

A note on the specimens of *Kittonia hanna* ‘hannai’ (Bacillariophyta) figured in Long *et al.* (1946)

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In 1939, Lefébure & Chenevière described the Cretaceous fossil species *Kittonia hanna* Lefébure & Chenevière (1939: 23 pl. 1, fig. 3, see Sims & Williams 2022: fig. 8). The specimen figured was from the Moreno Shale deposit, California, USA, supplied by Dallas Hanna (1887–1970): “Moreno shale, Moreno Gulch in the Panoche Hills, Fresno County, California” [...] “Sec. 6, T. 15 S., R. 12 E., M.D.B. & M., Fresno County, California” (Hanna 1934: 352, see also Hanna in Long *et al.* 1946: 91, Hanna 1927, Rampi 1940, Goudkoff 1945). Other specimens of *Kittonia hanna* were from another Moreno Shale exposure, “Sec. 24, T. 14, S., R. 11 E., Fresno County, California” (Hanna in Long *et al.* 1946: 93, Brigger & Hanna 1965: 4). A detailed discussion of the Moreno deposit can be found in Hanna (1927: 10), Long *et al.* (1946), Nikolaev *et al.* (2001) and Davies *et al.* (2012), and a review of the genus *Kittonia* was undertaken by Brigger & Hanna (1965).

In a more recent account of a few species in *Kittonia* E.Grove & G.Sturt (1887: 74), the published illustrations of *Kittonia hanna* were summarised thus: Long *et al.* 1946: pl. 19, figs 6, 7; Brigger & Hanna 1965: figs 2, 3, Wornardt 1972: pl. 4, fig. 1; and Chambers 1997: pl. 14, figs 10, 11 (Sims & Williams 2022). The specimens used for the published figures were not recorded. In BM (the Natural History Museum, London) there are a total of five slides; in CAS (California Academy of Sciences) there are six slides (summarised in Table 1), of which three have been used for published illustrations of specimens.

TABLE 1. Slides with specimens of *Kittonia hanna* in BM and CAS. Slide = accession number in BM or CAS; Locality = as on label; Mounter = individual who mounted the specimen; Figure = place the image was published; - = no published image.

Slide	Locality	Mounter	Figure
BM 63885	“Maastrichtian [...] Moreno Shale”	Chambers	Chambers 1997: pl. 14, figs 10, 11
BM 66069	“Moreno Cal.”	Ferguson	-
BM 66082	“Moreno Cal.”	Ferguson	-
BM 89618	“Moreno”	Brigger	-
BM 90920	“Moreno California U.S.A. Cretaceous”	S.Russell	This paper: Figures 5–7
CAS 205065	“Panoche Hills, Sec. 24, T.14S., R.11E”.		Brigger & Hanna 1965: fig. 2 (hypotype ¹) = Wornardt 1972: pl.4, fig. 1
CAS 206066	“Panoche Hills, Sec. 24, T.14S., R.11E”.		Brigger & Hanna 1965: fig. 3 (hypotype)
CAS 97021	“Diatomite collected from Panoche Hills”	A.L.Brigger	-
CAS 97022	“Diatomite collected from Panoche Hills”	A.L.Brigger	-
CAS 97023	“Diatomite collected from Panoche Hills”	A.L.Brigger	-
CAS 97024	“Diatomite collected from Panoche Hills”	A.L.Brigger	-

¹ “Supplementary Types.-These consist of the described or figured specimens used in publication in extending or correcting knowledge of a previously defined species. For such type material the term hypotype (hypo = under or sub, and typos = type) may be used” (Schuchert 1897: 637).

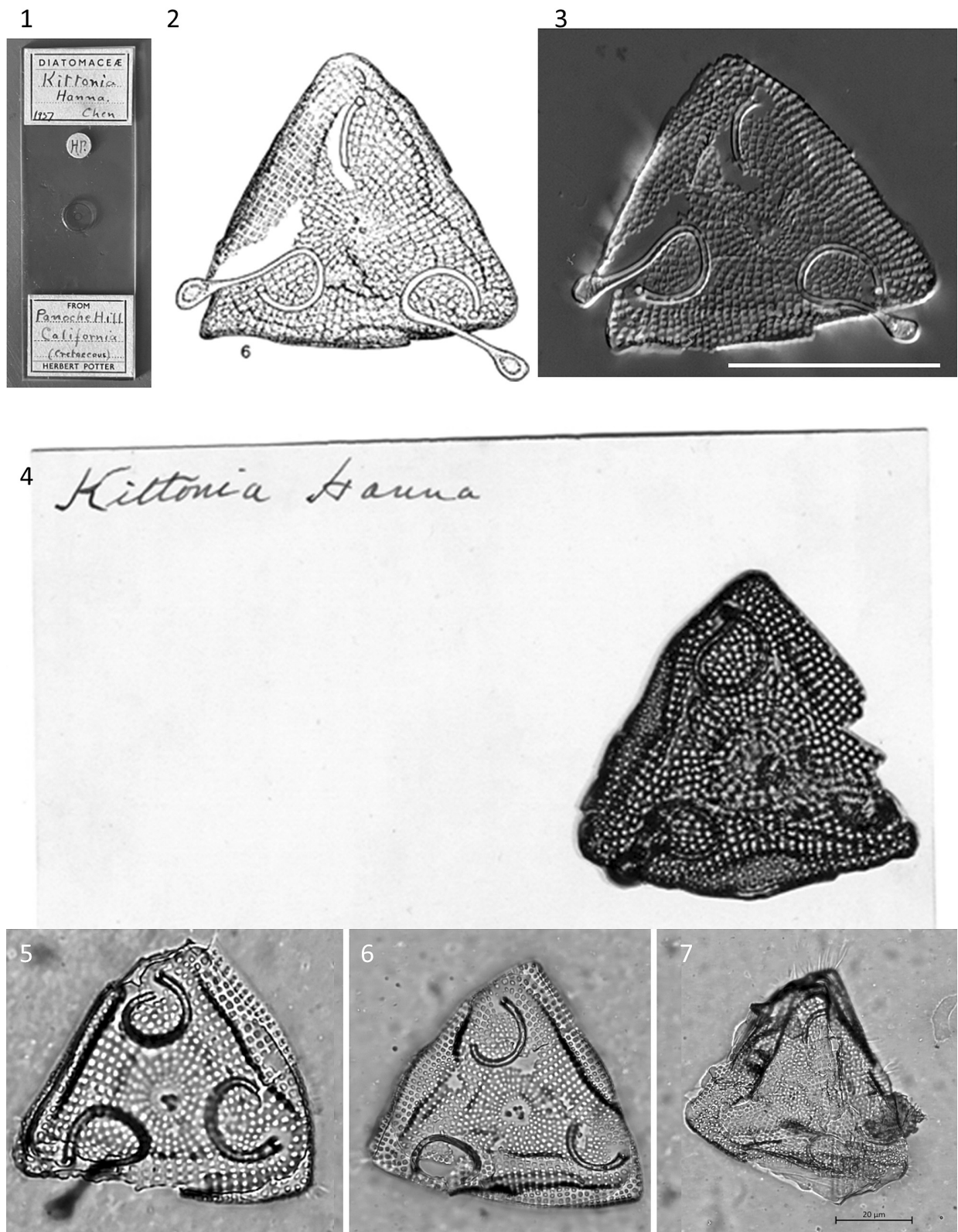


FIGURE 1, photograph of the Herbert Potter slide with the specimen of *Kittonia hanna* used for the illustration in Long *et al.* 1946: pl. 19, fig. 6; **FIGURE 2**, reproduction of Long *et al.* 1946: pl. 19, fig. 6; **FIGURE 3**, the specimen of *Kittonia hanna* used for the illustration in Long *et al.* 1946: pl. 19, fig. 6 from the Herbert Potter slide (image made with Olympus ax70 and 60x/1.42 in green light with Baader Solarspectrum filter and DIC, Differential Interference Contrast stacked with Helicon Focus, 142 levels/photos (scale bar = 100µm); **FIGURE 4**, photograph of the Hendey index card for *Kittonia hanna*, source of specimen unknown; specimen's name on the reverse of the card); **Figures 5–7**, three specimens on BM 90920, “Moreno | California | U.S.A. | Cretaceous”, mounter Steve Russell, (scale bar = 20µm).

The specimens of *Kittonia hanna*e figured by Long *et al.* were drawn “by Mr. N. Ingram Hendey, F.R.M.S., from a specimen in the possession of Mr. H. Potter of Birmingham” (Long *et al.* 1946: 108). Up until recently, the Potter specimens were considered either unavailable or lost. They were not amongst the slides in Hendey’s own collection, now in BM. But a significant slide has now become available. Its upper label reads “*Kittonia hanna*i Chen. | 1937”, and its lower label “Panoche Hill | California | (Cretaceous)”, with “From | Herbert Potter¹” on a printed portion (Figure 1). The specimen is identical to that figured in Long *et al.* (1946: pl. 19, fig. 6) and is almost certainly that used by Hendey for the published drawing (see our Figs 2 and 3; Fig. 2 is a reproduction of the original figure in Long *et al.* 1946: pl. 19, fig. 6, Figure 3 is the specimen from the slide in Figure 1). Interestingly, the Potter slide is dated 1937, some two years before *Kittonia hanna*e was formally published by Lefébure & Chenevière (1939). Inspection of Hendey’s collection yielded only one image (a micrograph) of *Kittonia hanna*e, which is clearly not the specimen used by Long *et al.* (see our Figure 4, which is a scan of the card for *Kittonia hanna*e in Hendey’s image collection in BM; the slide with this specimen has not yet been located, neither has any relevant manuscript drawings). Hendey acquired a number of slides from “Moreno Shale—Panoche Hills—California”, some from James Smith, others from John A. Long (1863–1945) and Dingley P. Fuge (1874–1944), the three authors of Long *et al.* (1946).

Although some of Chenevière’s slides are scattered through various herbaria (including BM), his types have yet to be definitively located. In the absence of any identifiable holotype, either a lectotype or neotype could be assigned. Article 9.3 of the *International Code of Nomenclature for algae, fungi, and plants* states that “A lectotype is one specimen or illustration designated from the original material [...] as the nomenclatural type [...], if the name was published without a holotype, or if the holotype is lost or destroyed”, with original material comprising “the following elements: (a) those specimens and illustrations (both unpublished and published prior to publication of the protologue) that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis” (Article 9.4) (Turland *et al.* 2018). As the illustration in Lefébure & Chenevière (1939: 23 pl. 1, fig. 3 = Sims & Williams 2022: fig. 8) is part of the protologue it can be considered as the lectotype. While this illustration is reasonably informative and can fix the name of *Kittonia hanna*e, it is obviously not as ideal as an actual specimen. Of the published illustrations, all are known from actual specimens (Table 1), and now include one of those illustrated by Long *et al.* (1946: pl. 19, fig 6, see Figs 1–3).

The two Brigger & Hanna specimens of *Kittonia hanna*e are “from the same locality as that which was used by Long, Fuge and Smith, (1946, pp. 89–118) for their extensive work on the California Cretaceous. This was Sec. 24, T. 14, S., R. 11 E., Fresno County, California” (Brigger & Hanna 1965: 4, see our Table 1). As the Lefébure & Chenevière specimens were from “Sec. 6, T. 15 S., R. 12 E., M.D.B. & M., Fresno County, California”, the Brigger & Hanna specimens (and their illustrations) cannot be considered types. Of the specimens figured in their plate 19, Long *et al.* wrote “All specimens except figs. 6 and 7 [= *Kittonia hanna*e] from Sec. 24, T. 14 S., R. 11 E., M.D.M. Fresno County, California” (Long *et al.* 1946: 114, plate legend). The implication is that they might be specimens provided by Chenevière and thus might be considered isolectotypes. This cannot be established with absolute certainty.

Finally, following Art. 60.8(a), which notes that “if the personal name ends with a vowel [...] except when the name ends with -a, in which case adding -e [...]” (Turland *et al.* 2018). Thus, the correct spelling of this species should be *Kittonia hanna*e.

***Kittonia hanna*e ‘hanna**i’ Lefébure & Chenevière 1939: 23, pl. 1, fig. 3 (Figs 2–7)

Type:—“Moreno shale, Moreno Gulch in the Panoche Hills, Fresno County, California” [...] “Sec. 6, T. 15 S., R. 12 E., M.D.B. & M., Fresno County, California”, holotype unknown; **lectotype in Lefébure & Chenevière 1939: pl. 1, fig. 3 = Sims & Williams 2022: fig. 8), designated here; Potter slide = ? isolectotype.**

Illustrations and specimens: Long *et al.* 1946: pl. 19, figs 6, 7 (their figure 6 = our Figures 2, 3); Brigger & Hanna 1965: figs 2, 3 (= specimens from CAS 205065, 6; their figure 2 = Wornardt 1972: pl. 4, fig. 1); Chambers 1997: pl. 14, figs 10, 11 (= specimens from BM 63885).

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1. A short but useful account of Herbert Potter can be found in Stevenson (2022).

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