Comparison of Aquatic Life Depicted in Illustrations and Plaster Casts of the Punt Relief from the Temple of Hatshepsut at Deir El-Bahari

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ABSTRACT

The primary objective of this study is to document differences between image characteristics of two sources (illustrations in Naville, 1898; and images in the cast of the relief at Virginia Museum of Fine Arts (VMFA) of the Punt relief from the temple of Hatshepsut at Deir El-Bahri. Our second is to compare cast images to photographs of the original relief. Characteristics of 30 species in the illustrations were described and compared to descriptions of the corresponding 30 species photographed from the cast at VMFA. The number of differences and similarities were recorded for each pair of corresponding icons and used to calculate percent difference hypothesized to be zero. Compared to cast images, all illustrations contained errors. Total average difference in the 30 icon comparisons was 43.5% (s.d.=18.5; range=14.3-90.0%). Average number of errors between 300 external characteristics of cast images and illustrations was 4.5 (s.d.=2.16; range=1-9). Over 76% of the illustrations had three or more errors. Cast images were comparable to those in the original relief containing only 5 errors (1.6%). Results of a paired t-test indicated that the average character difference (41.8) between illustrations and cast and cast and relief was significant (t=13.96; p>t=0.0001). We reject the hypothesis that there are no differences between illustrations and photographs of casts of aquatic species on Punt Relief from the Temple of Hatshepsut at Deir El-Bahari, but accept the hypothesis that cast images are an accurate representation of the original relief depicted in photographs of Meyer (1913).

Key words: Hatshepsut, Punt expedition, aquatic life, archaeology

INTRODUCTION

Queen Hatshepsut (= Hatasu of Edwards, 1891), one of Egypt's only female rulers, devoted resources of Egypt towards building projects and trade (Edwards, 1891). One of her various accomplishments that has received much attention is her commercial expedition to the land of Punt in the ninth year of her rule (Millet, 1962). Most of the information pertaining to this journey is taken from a large narrative relief carved on the south wall of the middle colonnade of her mortuary temple at Deir El-Bahri (Porter and Moss, 1972; Danelius and Steinitz, 1967) (= Deir El-Bahari of Naville, 1898) (Mayo, 2003). The images are rendered in minute detail giving much information about the Egyptians, the Puntites and indigenous fauna (Mayo, 2003). Of particular interest is the aquatic life, which is carved at the bottom of several of...
the registers. Identification of these creatures would not only expand knowledge of the
types of aquatic animals that were observed and deemed important by Egyptians, but
also would aid in determining the location of the Land of Punt (Danielius and Steinitz,
1967). In some publications Punt has been identified as being near the Somali coast
(Mayo, 2003) but this has not been confirmed.

Attempts to identify the aquatic life pictured in these reliefs were directed to narrow
the search for the exact location of the Land of Punt. For example, Danielius and
Steinitz (1967) used pictures drawn from the original relief during Edouard Naville’s
expedition as the basis for identification of species. Albeit these authors were unable
to identify many of the fishes and other aquatic life, they admit that the main obstacle
to any identification lay in the fact that the representations could be studied neither on
the original reliefs nor on any reproductions (casts or photographs) other than the
illustrations published by Naville (1898). Our preliminary comparison resulted in
identifying inconsistencies between the illustrations in Naville (1898) and the images
on the cast of the original relief housed at the Virginia Museum of Fine Arts (VMFA).
These inconsistencies suggest that a detailed comparison of the illustrations from
Naville (1898) and the cast from VMFA is requisite prior to identifying the species.

The objective of this study is to document differences between image characteristics
of the three sources (illustrations in Naville, 1898; images in cast of relief at VMFA;
and photographs of original relief in Meyer, 1913) in preparation for identification of
species depicted in the Punt relief.

MATERIALS AND METHODS

Contents of the relief were first recorded by Edouard Naville, a Swiss Egyptologist
working on behalf of the Egypt Exploration Fund, in 1892 (Millet, 1962). Naville
charged two artists, Howard Carter and Percy Brown, to draw black and white
illustrations of each section of the relief, which were published as plates in his book,
The Temple of Deir El-Bahari in 1898.

Two plaster casts of the relief were made in 1906 by Charles Trick Currelly, first
curator of the Royal Ontario Museum, in order to duplicate the image and allow it to
be viewed in museums in America and Canada (Currelly, 1957; Tyndale, 1907). So as
not to damage the original relief, thin foil was rubbed into it with a rag until the relief
began to show through. Deeper areas were pressed in with a hoghair brush. Beeswax,
which had been softened in the sun, was then pressed onto the tinfoil and allowed to
cool. Later the foil and wax were removed from the stone, laid down flat and covered
with grease and used to make the plaster casts. Casts were colored by William Tyndale
to imitate the original hues (Tyndale, 1907).

Photographs of icons on the cast of the Punt Relief from the Temple of Hatshepsut
at Deir El-Bahari (Accession number = L5, 52.48) at VMFA, on long-term loan from
the Metropolitan Museum of Art in New York, were compared to illustrations drawn
from icons on the original relief in Egypt by Naville (1898). Large clear images of each
icon from each source were made for accurate and detailed comparison. These were
obtained through two separate means. Icons on the lower register of the cast at the
VMFA were photographed from a distance of 0.3 m using an Olympus Camedia D-
360L digital camera without use of flash or tripod. The images from the upper register
were made using a Sony Cybershot digital camera with a 10x precision digital zoom
lens without use of a flash or tripod. The ability of the lens of this camera to remain
straight while the view screen was tilted allowed for clear images. Images were
transferred to a computer and enlarged to maximize detail. Photographs in Meyer (1913)
and Naville (1898) and photographs of the cast at VMFA of the relief. Standard terminology and abbreviat-
(Figs 1, 2, and 3): D=dorsal fin (in the case of corresponding icons and used to calculate p
zero. Numbers of character differences between cast and relief were compared with a t-test (SAAS)

RESULTS

Character Descriptions:

Descriptions of external characteristics are species depicted in illustrations on plates LXXI
(1898) and are followed by those in photographs of the cast at VMFA, on long-term loan from
the Metropolitan Museum of Art in New York, were compared to illustrations drawn
from icons on the original relief in Egypt by Naville (1898). Lower registers of the southern wall of the middle
cast copy at VMFA. Plates from Naville (1898) were scanned on an Epson Perfection 1640SU scanner. The scan
from the entire page and enlarged. Each image relative to its position (i.e. upper or lower register
Naville, 1898, or cast copy at VMFA) and the position right. Corresponding images were inserted next to

CharacteraDescriptions:

Illustration: mouth superior; eye superior, brast;

Differences:
mouth terminal; eye superior.

Illustration: no visible mouth; eye superior, brast;

Differences:
mouth, cheek margin.

Second Icon (plate LXXII in Naville, 1898;

Illustration: no visible mouth; eye superior, brast;

Differences:
mouth, cheek margin.

Third Icon (plate LXXII in Naville; cf. photo

Illustration: no visible mouth; eye superior, brast;

Differences:
mouth, cheek margin.
of the aquatic life on the original relief were also inspected and compared to the cast copy at VMFA.

Plates from Naville (1898) were scanned one page at a time into a computer using an Epson Perfection 1640SU scanner. The scanned image of each icon was cropped from the entire page and enlarged. Each image was given a specific designation relative to its position (i.e. upper or lower register), its source (i.e. illustration from Naville, 1898, or cast copy at VMFA) and the position of the icon in order from left to right. Corresponding images were inserted next to each other in a Word document and printed for comparison.

Characteristics of each aquatic organism were described from illustrations in Naville (1898) and photographs of the cast at VMFA, and Meyer's (1913) photographs of the relief. Standard terminology and abbreviations of external features are as follows (Figs 1, 2, and 3): D = dorsal fin (in the case of two dorsal fins the anterior one is designated D1 and posterior one as D2); symmetrical caudal fin = upper and lower limbs of equal length. The number of differences and similarities were recorded for each pair of corresponding icons and used to calculate percent difference hypothesized to be zero. Numbers of character differences between illustrations and those between cast and relief were compared with a t-test (SAS, 2002).

RESULTS

Character Descriptions:

Descriptions of external characteristics are presented for each of the 30 aquatic species depicted in illustrations on plates LXXII, LXXIII, LXXIV, LXXV in Naville (1898) and are followed by those in photographs of the plaster cast at VMFA lower and upper registers of the southern wall of the middle colonnade of the Punt relief from the mortuary temple of Hatshepsut at Deir El-Bahari.

Lower Register (Left to right):
First Icon (plate LXXII in Naville, 1898; cf. photograph 616 in Meyer, 1913).
Illustration: mouth superior; eye superior, breaking body margin; opercle one third distance between dorsum and isthmus; pectoral fin thin and tapering; dorsal profile slightly convex; belly strongly rounded from isthmus; small triangular dorsal fin and anal fin; ovoid hemicercal caudal fin (Fig. 4a).

Cast: mouth terminal; eye superior not breaking body margin; opercle two thirds distance between dorsum and isthmus; pectoral fin long and rounded; dorsal profile highly convex; belly flattened from isthmus and becoming rounded; small triangular dorsal fin and anal fin; rounded hemicercal caudal fin (Fig. 4b).

Differences: mouth, eye, opercle, pectoral fin, dorsal profile, belly, caudal fin

Second Icon (plate LXXII in Naville, 1898; cf. photograph 616 in Meyer, 1913).
Illustration: no visible mouth; eye superior; narrow margin between cheek and opercle; opercle one half distance between dorsum and isthmus; high pointed dorsal fin; pectoral and pelvic fins originating just posterior to opercle; elongate body; strongly forked symmetrical caudal fin (Fig. 5a).

Cast: mouth terminal; eye superior; wide margin between cheek and opercle; opercle one half distance between dorsum and isthmus; high pointed dorsal fin; pectoral and pelvic fins originating posterior to opercle and tapering to points; elongate body; strongly forked symmetrical caudal fin angled slightly dorsally (Fig. 5b).

Differences: mouth, cheek margin, pectoral and pelvic fin origin
Illustration: open mouth terminal; highly tapered head; distance from mouth to nape shorter than distance from nape to caudal fin; eye superior; no visible opercle; small triangular pectoral fin; two dorsal fins; D₁ vertically pointed and convex on the anterior margin, D₂ short and quadrilateral extending one half distance from posterior base of D₁ to caudal fin; small tapered pelvic fin; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Cast: open mouth terminal; highly tapered head, slightly concave on dorsal side; distance from mouth to nape approximately equal to distance from nape to caudal fin; eye superior; no visible opercle; small triangular pectoral fin; two dorsal fins; D₁ vertically pointed and concave on the anterior and posterior margins, D₂ short and tapered, extending two thirds distance from posterior base of D₁ to caudal fin; pelvic fin and most of anal fin obscured by damage; anal fin base extending posterior of caudal fin base; short truncated symmetrical caudal fin (Fig. 6b).

Differences: head, distance from mouth to nape, D₁, D₂, pelvic fin, anal fin

Fourth Icon (plate LXXII in Naville; cf. photograph 615 in Meyer, 1913).

Illustration: mouth terminal; maxilla extends beyond mandible; dorsal margin of head highly concave; superior eye; thin, vertical opercle; tapered pectoral fin; deep body shape; two dorsal fins; D₁ narrow square and extending one half distance from posterior head margin to caudal fin base; D₂ narrow and tapered posteriorly extending two thirds distance from D₁ to caudal fin base; pelvic fin originating posterior to isthmus and tapering, anterior margin convex, posterior margin concave; anal fin triangular and tapering posteriorly; symmetrical forked caudal fin (Fig. 7a).

Cast: mouth terminal; maxilla normal; dorsal margin of head convex; superior eye; rounded opercle; tapered pectoral fin; deep body shape; two dorsal fins; D₁ narrow square and extending greater than one half distance from posterior head margin to caudal fin base; D₂ narrow and tapered posteriorly extending entire distance from D₁ to caudal fin base; pelvic fin originating posterior to isthmus and tapering, anterior and posterior margins convex; anal fin quadrilateral; symmetrical forked caudal fin (Fig. 7b).

Differences: maxilla, dorsal margin of head, opercle, D₁, D₂, pelvic fin, anal fin

Fifth Icon (plate LXXII in Naville; cf. photograph 614 in Meyer, 1913).

Illustration: mouth terminal angled ventrally; superior eye; distance from mouth to nape equal to vertical distance through eye; vertical opercular margin; single rayed dorsal fin extending from posterior margin of head to caudal fin base; elongate pectoral fin; elongate tapered pelvis fin originating from isthmus; rayed anal fin extending from belly to caudal peduncle; caudal peduncle long and slender; symmetrical forked caudal fin (Fig. 8a).

Cast: mouth terminal curved dorsally; superior eye; distance from mouth to nape 79% of vertical distance through eye; opercular margin curved; single dorsal fin extending from posterior margin of head to caudal fin base; short tapered pectoral fin; short tapered pelvic fin; anal fin extending from belly to caudal peduncle; caudal peduncle short and thick; caudal fin symmetrical and forked (Fig. 8b).

Differences: mouth, distance from mouth to nape, opercular margin, dorsal fin, pectoral fin, pelvic fin, anal fin, caudal peduncle

Sixth Icon (plate LXXII in Naville; cf. photograph 614 in Meyer, 1913).

Illustration: mouth supraternal; superior eye; distance from mouth to eye approximately equal to distance from eye to anterior base of D₁; two dorsal fins; D₁ long and highly tapered, D₂ rectangular; long four or five rays; rounded belly originating from three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Cast: mouth supraternal; superior eye longer than distance from eye to base of D₁; one dorsal fin; three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin extends shorter than distance from eye to base of D₁; two dorsal fins; D₁ long and highly tapered, D₂ rectangular; long four or five rays; rounded belly originating from three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Differences: mouth from nape to caudal fin, anal fin

Seventh Icon (plate LXXII in Naville; cf. photograph 615 in Meyer, 1913).

Illustration: mouth supraternal; superior eye; distance from eye to base of D₁; one dorsal fin; three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin extends shorter than distance from eye to base of D₁; two dorsal fins; D₁ long and highly tapered, D₂ rectangular; long four or five rays; rounded belly originating from three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Differences: mouth from nape to caudal fin, anal fin

Eighth Icon (plate LXXII in Naville; cf. photograph 615 in Meyer, 1913).

Illustration: mouth supraternal; superior eye; distance from eye to base of D₁; one dorsal fin; three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin extends shorter than distance from eye to base of D₁; two dorsal fins; D₁ long and highly tapered, D₂ rectangular; long four or five rays; rounded belly originating from three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Differences: mouth from nape to caudal fin, anal fin

Ninth Icon (plate LXXIII in Naville; cf. photograph 614 in Meyer, 1913).

Illustration: mouth supraternal; superior eye; distance from eye to base of D₁; one dorsal fin; three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin extends shorter than distance from eye to base of D₁; two dorsal fins; D₁ long and highly tapered, D₂ rectangular; long four or five rays; rounded belly originating from three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Differences: mouth from nape to caudal fin, anal fin

Tenth Icon (plate LXXIII in Naville; cf. photograph 614 in Meyer, 1913).

Illustration: mouth supraternal; superior eye; distance from eye to base of D₁; one dorsal fin; three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin extends shorter than distance from eye to base of D₁; two dorsal fins; D₁ long and highly tapered, D₂ rectangular; long four or five rays; rounded belly originating from three dorsal spines; D₁ rectangular; quadrilateral; anal fin extending almost entire distance from posterior pelvic fin base to caudal peduncle; posterior base of anal fin does not reach caudal fin base; short truncate symmetrical caudal fin (Fig. 6a).

Differences: mouth from nape to caudal fin, anal fin
long and highly tapered, \( D_2 \) rectangular; long tapering quadrilateral pectoral fin with four or five rays; rounded belly originating from isthmus; short rhomboid pelvic fin; rhomboid anal fin; symmetrical deeply forked and tapered caudal fin (Fig. 9a).

Cast: mouth supratemporal; superior eye; distance from mouth to eye significantly longer than distance from eye to base of \( D_1 \); two dorsal fins; \( D_1 \) long and highly tapered with three dorsal spines; \( D_2 \) rectangular; quadrilateral pectoral fin tapered dorsally with six rays; belly rounded posterior to isthmus; short rectangular pelvic fin; short rectangular anal fin; symmetrical deeply forked caudal fin (Fig. 9b).

Differences: distance from mouth to eye, \( D_1 \) shape, \( D_1 \) spines, pectoral fin, belly, pelvic fin, anal fin

Seventh Icon (plate LXXII in Naville; cf. photograph 613 in Meyer, 1913).
Illustration: mouth supratemporal; superior eye; high ridged dorsal margin of eye; rounded body tapering posteriorly; single dorsal fin extending from head to caudal fin base, tapering widely posteriorly; no pectoral fin; rounded opercle; single quadrilateral ventral fin extending from posterior of isthmus to caudal peduncle; short truncate caudal fin (Fig. 10a).

Cast: mouth supratemporal; superior eye; low ridge at dorsal margin of eye; rounded body; single dorsal fin extending from head to caudal fin base, tapering narrowly posteriorly; no pectoral fin; rounded opercle; single quadrilateral ventral fin extending from posterior of isthmus to caudal peduncle; short truncate caudal fin (Fig. 10b).

Differences: dorsal margin ridge, body, dorsal fin

Eighth Icon (plate LXXII in Naville; cf. photograph 613 in Meyer, 1913).
Illustration: mouth terminal; superior eye breaking body margin; elongate body tapering anteriorly and posteriorly; single dorsal fin extending from posterior margin of head to caudal fin base and tapering posteriorly; opercle horizontal from mouth to eye and then curved dorsad; thin tapered pectoral fin; no pelvic fin; anal fin tapering to caudal peduncle; symmetrical weakly forked caudal fin (Fig. 11a).

Cast: mouth terminal; superior eye breaking body margin; elongate body tapering anteriorly and posteriorly; single dorsal fin extending from posterior margin of head to caudal fin base and tapering posteriorly; opercle horizontal from mouth to eye and then curved dorsad; thick tapered pectoral fin; tapered pelvic fin extending from isthmus; anal fin triangular and tapered to caudal fin; symmetrical weakly forked caudal fin (Fig. 11b).

Differences: pectoral fin, pelvic fin, anal fin

Ninth Icon (plate LXXIII in Naville; cf. photograph 612 in Meyer, 1913).
Illustration: mouth terminal; eye superior; rhomboid body shape; single large triangular dorsal fin not extending to posterior margin of caudal fin; curved opercular margin; thin tapered pectoral fin; two long mental barbels; single large triangular anal fin equal in size and shape to dorsal fin not extending to posterior margin of caudal fin; short truncate caudal fin (Fig. 12a).

Cast: mouth terminal; eye superior; rhomboid body shape; single large triangular dorsal fin extending to posterior margin of caudal fin; curved opercular margin; round tapered pectoral fin; two long mental barbels; single large triangular anal fin equal in size and shape to dorsal fin extending to posterior margin of caudal fin; short truncate caudal fin (Fig. 12b).

Differences: dorsal fin, pectoral fin, anal fin

Tenth Icon (plate LXXIII in Naville; cf. photograph 612 in Meyer, 1913).
Illustration: mouth terminal; eye superior; maxilla projects beyond lower jaw; large rounded dorsal fin extending from head and tapering to a point near caudal fin; five rows of horizontal banding in dorsal fin; opercle less than one half distance from isthmus to dorsum; rounded tapering pectoral fin; round tapered pelvic fin; large rounded anal fin tapering to a point at caudal peduncle, equal to one half distance from isthmus to caudal peduncle; body tapered at caudal peduncle; no horizontal banding in anal fin; symmetrical weakly forked caudal fin (Fig. 13a).

Cast: mouth terminal, eye superior; maxilla projects beyond lower jaw; large rounded dorsal fin extending from head and tapering to a point near caudal fin; five rows of horizontal banding in dorsal fin; opercle approximately equal to distance from isthmus to dorsum; rhomboid pectoral fin; pelvic fin present but shape obscured by damage; large rounded anal fin tapering to a point at caudal peduncle, equal to less than one half distance from isthmus to caudal peduncle; five rows of horizontal banding in anal fin; symmetrical weakly forked caudal fin (Fig. 13b).

Differences: opercle, pectoral fin, pelvic fin, anal fin, body

Eleventh Icon (plate LXXIII in Naville; cf. photograph 611 in Meyer, 1913).

Illustration: mouth terminal; superior eye; head dorsally concave from mouth to anterior margin of eye and convex from anterior margin of eye to dorsal fin; single rounded dorsal fin extending from head and tapering to a point at caudal fin; opercle curved dorsally; long tapered pectoral fin; single tapered pelvic fin; thick rounded anal fin tapered to caudal peduncle and equal to one half distance from isthmus to caudal peduncle; wide truncate caudal fin (Fig. 14a).

Cast: mouth terminal; superior eye; head dorsally concave from mouth to posterior margin of eye and then flattened from posterior margin of eye to dorsal fin; single rectangular dorsal fin extending from head to caudal fin; apparent opercular lines continuous with pectoral fin; long pointed pectoral fin; rounded pelvic fin; rectangular anal fin equal to one third distance from isthmus to caudal peduncle; wide truncate caudal fin (Fig. 14b).

Differences: head, dorsal fin, opercle, pectoral fin, pelvic fin, anal fin, anal fin length

Twelfth Icon (plate LXXIII in Naville; cf. photograph 611 in Meyer, 1913).

Illustration: terminal open mouth; superior eye; head dorsally concave from mouth to eye and from eye to dorsal fin; elongate body; single narrow rayed dorsal fin extending from head to caudal fin, round anteriorly, tapered posteriorly; pectoral fin tapered; pelvic fin not present; anal fin short and triangular; caudal fin symmetrical and weakly forked (Fig. 15a).

Cast: terminal open mouth; superior eye; head dorsally concave from mouth to eye and convex from eye to dorsal fin; elongate body with dorsal highly convex; single narrow dorsal fin extending from head to caudal fin, rounded anteriorly and sharply tapered posteriorly; pectoral fin tapered; pelvic fin not present; anal fin short and triangular; caudal fin symmetrical and forked (Fig. 15b).

Differences: head, body, dorsal fin rays, dorsal fin shape, caudal fin

Thirteenth Icon (plate LXXIII in Naville; cf. photograph 610 in Meyer, 1913).

Illustration: mouth terminal; superior eye; dorsal margin peaked; opercle oriented vertically; tapered pectoral fin; rounded ventral margin; pelvic fin tapered; anal fin narrow and extending from pelvic fin to point at caudal peduncle; caudal fin short and truncate (Fig. 16a).
Cast: mouth terminal; superior eye; opercle absent; pectoral fin small and round; deep square body shape, height greater at head than at anterior of caudal peduncle; pelvic fin small and tapered posteriorly; single dorsal fin located on posterior fourth of body, small and triangular; anal fin small and triangular; large truncate symmetrical caudal fin (Fig. 19b).

Differences: mouth position, mouth shape, pectoral fin, body height

Seventeenth Icon (plate LXXIII in Naville; cf. photograph 608 in Meyer, 1913).

Illustration: mouth slightly subterminal; superior eye; opercle absent; pectoral fin small and triangular; deep square body shape, height at head nearly equal to anterior of caudal peduncle; pelvic fin small and tapered posteriorly; single dorsal fin located on posterior fourth of body, small and triangular; anal fin small and triangular; large truncate symmetrical caudal fin (Fig. 19a).

Cast: subterminal mouth; parrot beak-shaped mouth; superior eye; opercle absent; pectoral fin small and round; deep square body shape, height at head nearly equal to anterior of caudal peduncle; pelvic fin small and tapered posteriorly; single dorsal fin located on posterior fourth of body, small and triangular; anal fin small and triangular; large truncate symmetrical caudal fin (Fig. 19b).

Differences: tentacles, eyes

Sixteenth Icon (plate LXXIII in Naville; cf. photograph 609 & 608 in Meyer, 1913).

Illustration: mouth slightly subterminal; superior eye; opercle absent; pectoral fin small and triangular; deep square body shape, height at head nearly equal to anterior of caudal peduncle; pelvic fin small and tapered posteriorly; single dorsal fin located on posterior fourth of body, small and triangular; anal fin small and triangular; large truncate symmetrical caudal fin (Fig. 19a).

Cast: subterminal mouth; parrot beak-shaped mouth; superior eye; opercle absent; pectoral fin small and round; deep square body shape, height greater at head than at anterior of caudal peduncle; pelvic fin small and tapered posteriorly; single dorsal fin located on posterior fourth of body, small and triangular; anal fin small and triangular; large truncate symmetrical caudal fin (Fig. 19b).

Differences: tentacles, eyes

Fifteenth Icon (plate LXXIII in Naville; cf. photograph 609 in Meyer, 1913).

Illustration: dorsal view; two long tentacles; at least six short tentacles; two circular circumscribed eyes in center of head weakly breaking body margin; anterior margin of mantle scalloped; mantle tapering to its midpoint and then expanding into a spade-like shape (Fig. 18a).

Cast: dorsal view; two long tentacles; eight short tentacles; two circular circumscribed eyes in center of head breaking body margin; anterior margin of mantle scalloped; mantle tapering to its midpoint and then expanding into a spade-like shape (Fig. 18b).

Differences: tentacles, eyes

Fourteenth Icon (plate LXXIII in Naville; cf. photograph 610 in Meyer, 1913).

Illustration: mouth terminal; eye superior breaking body margin; single narrow rectangular dorsal fin extending from head to caudal fin; bilobed opercle; long rhomboid pectoral fin; long thin pelvic fin; short triangular anal fin; short truncated symmetrical caudal fin (Fig. 17a).

Cast: mouth terminal; eye superior breaking body margin; single narrow rectangular dorsal fin extending from head to caudal fin; bilobed opercle; long rhomboid pectoral fin; long thin pelvic fin; short triangular anal fin; short truncated symmetrical caudal fin (Fig. 17b).

Differences: opercle, anal fin

PUNT RELIEF DRAWING AND CAST COMPARISON

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Second Icon (plate LXXIV in Naville; cf. photograph 607 in Meyer, 1913).

Illustration: terminal open mouth; eye superior; single narrow dorsal fin (anterior margin rounded) extending from posterior margin of head to base of caudal fin; opercle equal to less than one half distance from isthmus to dorsum; pectoral fin absent; two thick pelvic fins originating at isthmus; single anal fin extending from pelvic fins to caudal peduncle; five longitudinal rows of punctuations on ventrum from behind opercle to caudal peduncle; round hemiscalar caudal fin (Fig. 22a).

Cast: mouth terminal; eye superior; single narrow dorsal fin (anterior margin angular) extending from posterior margin of head to base of caudal fin; opercle equal to one half distance from isthmus to dorsum; pectoral fin absent; two thick pelvic fins originating from isthmus; single anal fin extending from pelvic fins to caudal peduncle; six rows of diamond shaped scales on ventrum from behind opercle to caudal peduncle; ovoid hemiscalar caudal fin (Fig. 22b).

Differences: mouth, dorsal fin, opercle, pelvic fins, anal fins, caudal fin, body scalation.

Third Icon (plate LXXIV in Naville; cf. photograph 606 in Meyer, 1913).

Illustration: mouth terminal; projection above mouth; eye superior; first two D fin spines modified as two long curved filaments originating above eye; dorsal projection on posterior third of head; tall square dorsal fin extending from head to caudal fin; length of opercle equal to one half distance from isthmus to dorsum; width of opercle equal to width of eye; pectoral fin long and tapered extending almost entire length of body; no zigzag pattern in anterior body; pelvic fin long and tapered originating from isthmus and equal to one half distance from isthmus to caudal fin base; single triangular anal fin; long symmetrical truncate caudal fin (Fig. 23a).

Cast: mouth terminal; projection above mouth; eye superior; first two D fin spines modified as two long straight filaments originating above eye; dorsal projection on posterior third of head; square dorsal fin extending from head to caudal fin; length of opercle equal to two thirds distance from isthmus to dorsum; width of opercle twice width of eye; pectoral fin long and tapered extending almost entire length of body; anterior body with zigzag pattern continuous with background; pelvic fin long and tapered originating from isthmus and greater than one half distance from isthmus to caudal fin base; single triangular anal fin; longer anal fin (Fig. 23b).

Differences: filament, dorsal fin, opercle pattern.

Fourth Icon (plate LXXIV in Naville; cf. photograph 608 in Meyer, 1913).

Illustration: subterminal mouth; elongated mouth, eye small and located between eyes; smaller and immediately posterior to eyes, thoracic region, abdominal appendages, cephalothorax.

Cast: subterminal mouth; elongated mouth and eye, single large dorsal fin on posterior third of head; small rounded head; elongate body; long dorsal fin extending from anterior margin of head to base of caudal fin; elongated second dorsal fin and triangular posterior fin originating behind opercle; two broad rounded fins directly above and below caudal peduncle (Fig. 24a).

Differences: distance from gular to dorsum greater than distance from head to base of dorsal fin; anal fin present; damage in location of postoral apparatus; round abdominal appendages; elongate mouth; eye superior; opercle one half width of eye; pectoral fin originating behind opercle; two thick triangular pelvic fins directly above and below caudal peduncle; truncate symmetrical caudal fin with dorsal and anal fin (Fig. 24b).

Fifth Icon (plate LXXIV in Naville; cf. photograph 609 in Meyer, 1913).

Illustration: subterminal mouth; elongated mouth and eye, single large dorsal fin on posterior third of head; small rounded head; elongate body; long dorsal fin extending from anterior margin of head to base of caudal fin; elongated second dorsal fin and triangular posterior fin originating behind opercle; two broad rounded fins directly above and below caudal peduncle; truncate symmetrical caudal fin (Fig. 25b).

Differences: snout, opercle, dorsal fin, posterior fin.

Sixth Icon (plates LXXIV and LXXV in Meyer, 1913).

Illustration: (composite of two plates in Meyer, 1913).

Cast: mouth terminal; long tapered snout, mouth, eye; eye superior; opercle greater than one third width of eye; single dorsal fin extending from posterior third of head; round tapered pectoral fin originating behind opercle; two thick triangular pelvic fins located ventral and posterior to opercle; two thick and triangular anal fin located anterior to caudal fin (Fig. 26a).

Differences: subterminal mouth; elongated mouth and eye; eye superior; large and posterior; single small and posterior; single small triangular pelvic fin located ventral and posterior to opercle; two thick triangular anal fin located anterior to caudal fin.
caudal fin base; single triangular anal fin; long symmetrical truncate caudal fin; (Fig. 23b).

**Differences:** filaments, dorsal fin, opercle length, opercle width, pelvic fin, zigzag pattern

**Fourth Icon** (plate LXXIV in Naville; cf. photograph 606 in Meyer, 1913).

**Illustration:** subterminal mouth; elongate pointed snout; superior eye; distance from gular to dorsum less than distance from breast to nape; elongate body; two dorsal fins, both triangular curving backward, D₁ twice as big as D₂; two pectoral fins located below and behind opercle; pelvic fins absent; single triangular anal fin; pair of rounded fins directly above and below caudal peduncle; large weakly forked symmetrical caudal fin (Fig. 24a).

**Cast:** subterminal mouth; elongate pointed snout; superior eye; distance from gular to dorsum greater than distance from breast to nape; elongate body; one large triangular dorsal fin present; damage in location of possible second dorsal fin; two pectoral fins located below and behind opercle; pelvic fins absent; single triangular anal fin; pair of rounded fins directly above and below caudal peduncle; weakly forked symmetrical caudal fin (Fig. 24b).

**Differences:** distance from gular to dorsum, D₁, D₂, caudal fin

**Fifth Icon** (plate LXXIV in Naville; cf. photograph 605 in Meyer, 1913).

**Illustration:** mouth terminal; short snout; rostral projection originating between mouth and eye; eye superior; opercle one half distance from isthmus to dorsum; single dorsal fin extending from anterior margin of eye to caudal fin base; small pointed pectoral fin originating behind opercle; two elongate pelvic fins originating behind isthmus; round belly; single anal fin extending from pelvic fins to caudal peduncle; truncate symmetrical caudal fin with dorsal and ventral filaments (Fig. 25a).

**Cast:** mouth terminal; long tapered snout; rostral projection originating between mouth and eye; eye superior; opercle greater than one half distance from isthmus to dorsum; single dorsal fin extending from posterior margin of eye to caudal fin base; round tapered pectoral fin originating behind opercle; two pointed pelvic fins originating behind isthmus; square belly; single anal fin extending from pelvic fins to caudal peduncle; truncate symmetrical caudal fin with dorsal and ventral filaments (Fig. 25b).

**Differences:** snout, opercle, dorsal fin, pectoral fin, pelvic fins, belly

**Sixth Icon** (plates LXXIV and LXXV in Naville; cf. photograph 605 in Meyer, 1913).

**Illustration** (composite of two plates in Naville, 1898): mouth terminal; superior eye; small rounded head; elongate body; large opercle; two pointed pectoral fins located ventral and posterior to opercle; two dorsal fins located two thirds distance from mouth to caudal fin base; D₁ large and pointed with D₂ smaller and immediately posterior; single small triangular pelvic fin located anterior to margin of dorsal fin; small triangular anal fin located anterior to caudal peduncle; large symmetrical forked caudal fin (Fig. 26a).

**Cast:** mouth terminal; large superior eye; large pointed head; elongate body; large opercle; two pointed pectoral fins located ventral and posterior to opercle; two dorsal fins located less than two thirds distance from mouth to caudal fin base; D₁ large and pointed with D₂ smaller and immediately posterior; single small triangular pelvic fin located posterior to origin of dorsal fin; small triangular anal fin located anterior to caudal peduncle; large symmetrical forked caudal fin (Fig. 26b).
Dorsal fin located anterior to caudal fin with at least five rays; wide truncate pelvic fin, anal fin, caudal fin; pointed triangular anal fin; large forked symmetrical caudal fin (Fig. 28a).

Cast: mouth terminal; slightly extended snout; short pointed face; rectangular body shape; eye superior; ovoid pectoral fin; pelvic and anal fins absent; single small square dorsal fin located anterior to caudal fin with at least five rays; wide truncate symmetrical caudal fin (Fig. 27a).

Differences: snout, body shape

Eighth Icon (plate LXXV in Naville; cf. photograph 604 in Meyer, 1913).

Illustration: mouth terminal; superior eye: thin opercle extending posterior to eye; thin tapering pectoral fin; single dorsal fin extending from end of pectoral fin towards caudal fin with anterior and posterior crests; pelvic fin smaller than pectoral fin; small pointed triangular anal fin; large forked symmetrical caudal fin (Fig. 28a).

Cast: open mouth terminal; large superior eye; wide opercle extending to eye; wide pointed pectoral fin; single dorsal fin extending from midpoint of pectoral fin towards caudal fin with anterior and posterior crests; pelvic fin equal to pectoral fin; small square anal fin; thin forked symmetrical caudal fin (Fig. 28b).

Differences: mouth, eye, opercle shape, opercle length, pectoral fin, dorsal fin, pelvic fin, anal fin, caudal fin

Ninth Icon (plate LXXV in Naville; cf. photograph 603 in Meyer, 1913).

Illustration: damage obscuring head; arched dorsum; thick body; two dorsal fins; D₁ posterior to head, large and triangular; D₂ anterior to caudal fin, small and triangular; tapered pectoral fin; single tapered pelvic fin; single tapered anal fin; forked symmetrical caudal fin, lower limb partially obscured by damage (Fig. 29a).

Cast: damage obscuring head; arched dorsum; thin elongate body; two dorsal fins; D₁ posterior to head, large and highly tapered; D₂ anterior to the caudal fin, long and triangular; thick pointed pectoral fin; single large pelvic fin; two tapered anal fins; forked symmetrical caudal fin, lower limb partially obscured by damage (Fig. 29b).

Differences: body, D₁, D₂, pectoral fin, pelvic fin, anal fin

Tenth Icon (plate LXXV in Naville; cf. photograph 603 in Meyer, 1913).

Illustration: mouth absent; ventrally tapered snout; eye superior; two dorsal fins, D₁ tall and tapered located posterior to head, D₂ short and rounded located anterior to caudal fin; small curved opercle; two square pectoral fins on ventrum; rounded belly; two square pelvic fins smaller than pectoral fins; forked symmetrical caudal fin (Fig. 30a).

Cast: mouth absent; ventrally tapered extended snout; eye superior; two dorsal fins, D₁ tall and triangular located posterior to head, D₂ short and rounded located anterior to caudal fin; small curved opercle; two square pectoral fins on ventrum; flat belly; two square pelvic fins equal to pectoral fins; forked symmetrical caudal fin (Fig. 30b).

Differences: snout, D₁, belly, pelvic fins

Eleventh Icon (plate LXXV in Naville; cf. photograph 602 in Meyer, 1913).

Illustration: mouth absent; pointed head; both eyes visible, one superior, one inferior; opercle absent; pectoral fin absent; single rounded dorsal and anal fins, symmetrical in size and shape, both extending from head to caudal fin base; long tapered pelvic fins lateral to base of caudal tail with at least six rays; large symmetrical caudal fin (Fig. 31a).

Cast: mouth terminal; eye superior; dorsal fin, branchiostegal membranes; pectoral fin absent; point of head; round body tapering to a long tail; two rounded pectoral fins extending from head to caudal fin base; long tapered pelvic fins lateral to base of caudal tail with at least six rays; large symmetrical caudal fin (Fig. 31b).

Differences: eyes, pelvic fin rays

Character Analysis:

Compared to cast images, all illustrations (Table 1). Total average difference in the 301 external characters in icon photographs of the original relief made by Naville (1898) had three or four differences.

When 301 external characters in icon photographs of the original relief made by Naville (1898) had three or four differences.

Results of a paired t-test indicated that there were no significant differences between illustrations and cast, and Differences: eyes, pelvic fin rays

PUNT RELIEF DRAWING AND CHARACTER ANALYSIS

symmetrical in size and shape, both extending from head to caudal fin base; long tapered pelvic fins lateral to base of caudal tail with at least six rays; large symmetrical caudal fin (Fig. 31a).

Cast: mouth terminal; eye superior; dorsal fin, branchiostegal membranes; pectoral fin absent; point of head; round body tapering to a long tail; two rounded pectoral fins extending from head to caudal fin base; long tapered pelvic fins lateral to base of caudal tail with at least six rays; large symmetrical caudal fin (Fig. 31b).

Differences: eyes, pelvic fin rays

Character Analysis:

Compared to cast images, all illustrations (Table 1). Total average difference in the 301 external characters in icon photographs of the original relief made by Naville (1898) had three or four differences.

When 301 external characters in icon photographs of the original relief made by Naville (1898) had three or four differences.

Results of a paired t-test indicated that there were no significant differences between illustrations and cast, and Differences: eyes, pelvic fin rays

p > t = 0.0001).
PUNT RELIEF DRAWING AND CAST COMPARISON

symmetrical in size and shape, both extending from head to caudal fin; truncate symmetrical caudal fin (Fig. 31a).

**Cast:** mouth absent; pointed head; both large eyes visible, one superior, one inferior; opercle absent; pectoral fin absent; single rounded dorsal and anal fins, symmetrical in size and shape, both extending from head to caudal fin; large truncate symmetrical caudal fin (Fig. 31b).

**Differences:**

Twelfth Icon (plate LXXV in Naville; cf. photograph 602 in Meyer, 1913).

**Illustration:** mouth terminal; eye superior; double margined opercle; no branchiostegals membranes; pectoral fin absent; single narrow dorsal fin extending from head to caudal fin base; long tapered pelvic fin; narrow anal fin equal to one third distance from mouth to caudal fin base; wide truncate symmetrical caudal fin (Fig. 32a).

**Cast:** mouth terminal; eye superior; double margined opercle; four branchiostegal membranes; pectoral fin obscured by damage; single narrow dorsal fin extending from head to caudal fin base; long tapered pelvic fin; narrow anal fin equal to less than one third distance from mouth to caudal fin base; wide truncate symmetrical caudal fin (Fig. 32b).

**Differences:**

pectoral fin, anal fin, branchiostegal membrane

Thirteenth Icon (plate LXXV in Naville; cf. photograph 601 in Meyer, 1913).

**Illustration:** dorsal view; mouth absent; pointed head; two round eyes at widest point of head; round body tapering to a long highly tapered tail; two large highly rounded pectoral fins extending from head to pelvic fins; two small rectangular pelvic fins lateral to base of caudal tail with at least five rays (Fig. 33a).

**Cast:** dorsal view; mouth absent; pointed head; two large round eyes at widest point of head; round body tapering to a long highly tapered tail; two large highly rounded pectoral fins extending from head to pelvic fins; two small rectangular pelvic fins lateral to base of caudal tail with at least six rays (Fig. 33b).

**Differences:**

eyes, pelvic fin rays

**Character Analysis:**

Compared to cast images, all illustrations in Naville (1898) contained errors (Table 1). Total average difference in the 30 icon comparisons was 43.5% (s.d.=18.5; range=14.3-90.0%). Average number of errors between 300 external characteristics of cast images and illustrations was 4.5 (s.d.=2.16; range=1-9). Over 76% of the illustrations in Naville (1898) had three or more errors (Fig. 34).

When 301 external characters in icons on the cast were compared to those in photographs of the original relief made by Meyer (1913), five differences (1.6% of total) were found in three icons: Lower Register, First Icon, Cast – eye superior not breaking body margin, mouth terminal, pectoral fin long and rounded; Relief – eye superior breaking body margin, mouth superior, pectoral fin long and tapered; Lower Register, Fifth Icon, Cast - dorsal fin rays absent; Relief – dorsal fin rays present; Upper Register, Second Icon, Cast – pectoral fin rays absent; Relief – pectoral fin rays present. Results of a paired t-test indicated that the average character difference (41.8) between illustrations and cast, and **Differences** and relief was significant ($t$ = 13.96; $p > t$ = 0.0001).
TABLE 1. Number of similarities and differences, and percent (%) difference of external characteristics of aquatic species depicted in illustrations of Naville (1898) and cast copy of lower (L) and upper (U) registers of the Punt Relief on the southern wall of the middle colonnade in the mortuary temple of Hatshepsut at Deir El-Bahari.

<table>
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<tr>
<th>Icon</th>
<th># Similar Characteristics</th>
<th># Different Characteristics</th>
<th>% Difference</th>
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</thead>
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<tr>
<td>L1</td>
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<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>L2</td>
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Mean ± s.d. 5.5 ± 1.81  4.5 ± 2.16  43.5

DISCUSSION

We reject the hypothesis that there are no differences between the illustrations of Naville (1898) and the icons in the plaster cast copy at VMFA of aquatic life in the lower and upper registers of the southern wall of the middle colonnade of the Punt relief from the mortuary temple of Hatshepsut at Deir El-Bahari. In some comparisons, there were more differences than similarities between illustrative and photographic representations of aquatic species due to the differences between illustration and cast (e.g., 8th icon in the upper register with nine differences). In other comparisons, there were fewer differences due to the differences between illustration and cast (e.g., 11th icon in the lower register). We assume that the differences between illustrations and photographs may be due to artistic error or the absence of certain details in the illustrations.

We identified five anomalies that can be attributed to the plaster cast. These include differences in the iconography (e.g., a fin present in the illustration but absent in the cast), differences in the shapes of the fish, differences in the transparency of the fish, and differences in the background pattern (e.g., a zigzag pattern within the bodies of the fish).

ACKNOWLEDGMENTS

We sincerely thank the Egypt Exploration Society, the British Museum of Fine Arts, and the Curator of Art, for their advice and providing access to the casts of the Punt relief, and for access to library facilities. We also thank the library staff of the Virginia Museum of Fine Arts, Dr. Marsha Hill and Catharine Roehrig, Curator of Art, for their advice and providing access to the casts of the Punt relief, and for access to library facilities. We also thank the library staff of the Virginia Museum of Fine Arts, Dr. Marsha Hill and Catharine Roehrig, Curator of Art, for their advice and providing access to the casts of the Punt relief, and for access to library facilities. We also thank the library staff of the Virginia Museum of Fine Arts, Dr. Marsha Hill and Catharine Roehrig, Curator of Art, for their advice and providing access to the casts of the Punt relief, and for access to library facilities.
PUNT RELIEF DRAWING AND CAST COMPARISON

(e.g. 8th icon in the upper register with nine differences and only one similarity; Fig. 28a and b). In other comparisons, there were fewer differences between illustrations and photographs; however, these differences were considerable. For example, the eighth icon in the lower register (Fig. 11a and b) had six similarities and three differences (i.e., pelvic fin absent in illustration but present in cast image, and pectoral and anal fin shapes differed between illustration and cast). These three characteristics, however, may be of taxonomic significance as Danelius and Steinitz (1967) could not identify this species from the illustration of Naville (1898).

The cast is an accurate representation of the original relief without having lost any detail which might have been present in the drawings of Naville (1898). We did not find details in the illustrations that were not present in the cast or of photographs of the original relief by Meyer (1913). We assert the plaster cast is the more precise representation of relief icons due to the direct transference of images from the original relief to the cast (see Currelly, 1957 and Tyndale, 1907). Our analyses (cf. 1.6% of 301 characters between cast and relief icons versus 43.5% of 300 characters between illustration and cast) were significant ($t=13.96; p<0.0001$) and validate that the cast method is less prone to artistic error than hand drawn illustrations. We conclude that attempts by Danelius and Steinitz (1967) to identify the species were impaired by the inaccuracies in the illustrations from Naville (1898), and may have led to misidentifications in Danelius and Steinitz (1967). Danelius and Steinitz (1967) admitted the primary difficulty they experienced in making identifications was the lack of access to the original relief or cast copies.

We identified five anomalies that can be attributed to the initial creation of the relief, duplicated in the cast but absent in illustrations. The zigzag wave pattern in the background of all icons of aquatic life occurs prominently within the margins of two icons (see Figs. 22b and 23b), and less so in three others (Figs. 6b, 7b, and 21b). For example, the zigzag pattern within the margins of the third icon of the upper register, present only in the anterior half of the icon, is continuous with the background zigzag pattern (Fig. 23b). It is also present in the tail of the fish in the second icon, upper register (Fig. 22b). Roehrig (pers. comm.) has suggested that the presence of the zigzag background pattern within the bodies of fishes could indicate a depiction of the transparency of these particular fishes. Our next step is to evaluate identifications of Danelius and Steinitz (1967) using photographs of the cast, and those made by Meyer (1913) of the original relief by consulting expert ichthyologists, and examining specimens in museum collections.

ACKNOWLEDGEMENTS

We sincerely thank the Egypt Exploration Society for permission to reprint illustrations in Naville (1898); Dr. Margaret Mayo, Curator of Ancient Art, Virginia Museum of Fine Arts for her guidance, consultation and access to materials; Drs. Marsha Hill and Catharine Roehrig, Curators of Egyptology, Metropolitan Museum of Art, for their advice and providing access to photographs of the original relief; and Don Dale, Caryl Burtner and the library staff of VMFA, for permission to photograph the cast of the relief, and for access to library files and resources. E. Lord and E. Maurakis equally contributed in the research investigation and manuscript preparation.

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FIGURE 4. Species icon 1 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 5. Species icon 2 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 4. Species icon 1 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 5. Species icon 2 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 6. Species icon 3 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 7. Species icon 4 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 6. Species icon 3 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 7. Species icon 4 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 8. Species icon 5 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

Figure 9. Species icon 6 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 8. Species icon 5 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 9. Species icon 6 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 10. Species icon 7 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 11. Species icon 8 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 10. Species icon 7 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 11. Species icon 8 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 12. Species icon 9 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 13. Species icon 10 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 12. Species icon 9 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 13. Species icon 10 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
Figure 14. Species icon 11 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

Figure 15. Species icon 12 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
Figure 14. Species icon 11 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

Figure 15. Species icon 12 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 16. Species icon 13 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 17. Species icon 14 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 16. Species icon 13 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 17. Species icon 14 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 18. Species icon 15 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 19. Species icon 16 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 18. Species icon 15 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 19. Species icon 16 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 20. Species icon 17 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 21. Species icon 1 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 20. Species icon 17 from lower register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 21. Species icon 1 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 22. Species icon 2 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 23. Species icon 3 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 22. Species icon 2 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 23. Species icon 3 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 24. Species icon 4 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 25. Species icon 5 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 24. Species icon 4 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 25. Species icon 5 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 26. Species icon 6 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 27. Species icon 7 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 26. Species icon 6 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 27. Species icon 7 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 28. Species icon 8 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 29. Species icon 9 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 28. Species icon 8 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 29. Species icon 9 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
Figure 30. Species icon 10 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

Figure 31. Species icon 11 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 30. Species icon 10 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 31. Species icon 11 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 32. Species icon 12 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 33. Species icon 13 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 32. Species icon 12 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.

FIGURE 33. Species icon 13 from upper register of Punt relief on south wall of middle colonnade from mortuary temple of Hatshepsut at Deir El-Bahari: a. illustration in Naville (1898); b. photograph of plaster cast at VMFA.
FIGURE 34. Chart illustrating percent error between corresponding illustrations in Naville (1898) and photographs of the plaster cast at VMFA (bubble size relative to error value).