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Authors
Ralston, Candice E.
Fitzgerald, Richard T.

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REPORTS

Two Atlatl Engaging Spurs from CA-CCO-18/548: A Critical Examination of Atlatl Spur Taxonomy

CANDICE E. RALSTON
California Department of Parks and Recreation
Archaeology, History, and Museums Division
4940 Lang Avenue, Sacramento, CA 95838

RICHARD T. FITZGERALD
California Department of Parks and Recreation
Archaeology, History, and Museums Division
4940 Lang Avenue, Sacramento, CA 95838

The atlatl is one of the oldest and perhaps most universally used weapons in the New World. Evidence for its use in California is found in nearly every region of the state in the form of engaging spurs. Attachable spurs tend to be the least perishable component of this ancient weapon system. Despite their ubiquity in the archaeological record, little has been published on these artifacts since Riddell and McGeein's 1969 article in American Antiquity. *In this paper, we report on a pair of recently excavated bone atlatl engaging spurs recovered from a site in central California. Using these stylistically very different, yet almost contemporaneously dated spurs, we critically examine the application of the existing taxonomic system and present a refinement of White's 1989 classification of California atlatl spurs.*

One of the most essential tools in prehistoric California was the atlatl. Evidence for the use of this sophisticated, complex weapon has been found throughout most of the state in the form of atlatl engaging spurs and—more rarely—the stone counter weights commonly referred to as boatstones (Curtis 1963; Fitzgerald 1993; Fredrickson and Grossman 1977; Gifford and Schenck 1926; Heizer and Elsasser 1953; Olsen and Riddell 1963; Olsen and Wilson 1964; Riddell 1960; Riddell and McGeein 1969; Wallace 1956). A recent article noted that 178 atlatl spurs, or hooks, have been reported from the Central Valley and 55 from the south coast (Stevens and Codding 2009). Despite these numbers, little serious discussion of their form and stylistic variation has been published since 1969, when Frances Riddell and Don McGeein published "Atlatl Spurs from California" in *American Antiquity*. In this paper, we report on a pair of recently excavated bone atlatl engaging spurs recovered from the Early Period component of one prehistoric site (CA-CCO-18/548). Using these stylistically disparate yet almost contemporaneously dated spurs as a point of departure, we critically examine the utility of the three types proposed by Riddell and McGeein (1969) and draw attention to White's (1989) master's thesis as a refined classification of atlatl spurs found in California.

SITE CA-CCO-18/548

The Marsh Creek Site (CA-CCO-18/548) is located in Marsh Creek State Historic Park, which lies just outside of the city of Brentwood, California (Fig. 1). This area, formerly a portion of the Mexican-era Los Meganos land grant, lies between Mt. Diablo and the San Joaquin/Sacramento River delta. John Marsh, the early settler who was given this land grant by the Mexican government, constructed a stone house at this location in 1856; that structure still stands. CCO-18/548 is a multi-component site that covers 37.6 acres and has numerous components representing nearly 7,000 years of human occupation, beginning in the early Middle Holocene and continuing through the Early, Middle, and Late periods of the Late Holocene (Rosenthal et al. 2010). The prehistoric components are expansive, with constituents found beneath the Marsh house, extending to both sides of Marsh Creek, onto surrounding pasture land, and beyond the boundary of State Park's property onto privately owned land (Rosenthal et al. 2010).

Archaeological research began at CCO-18 in the late 1940s; many of these investigations were focused around the historic John Marsh house. State Park archaeologists recorded CCO-548 in the 1980s. The two sites were recognized as one large site in the early 2000s, when the construction of a subdivision next to park property prompted further archaeological investigation (Rosenthal el al. 2006; Wiberg 2010; Wiberg and Clark 2004).

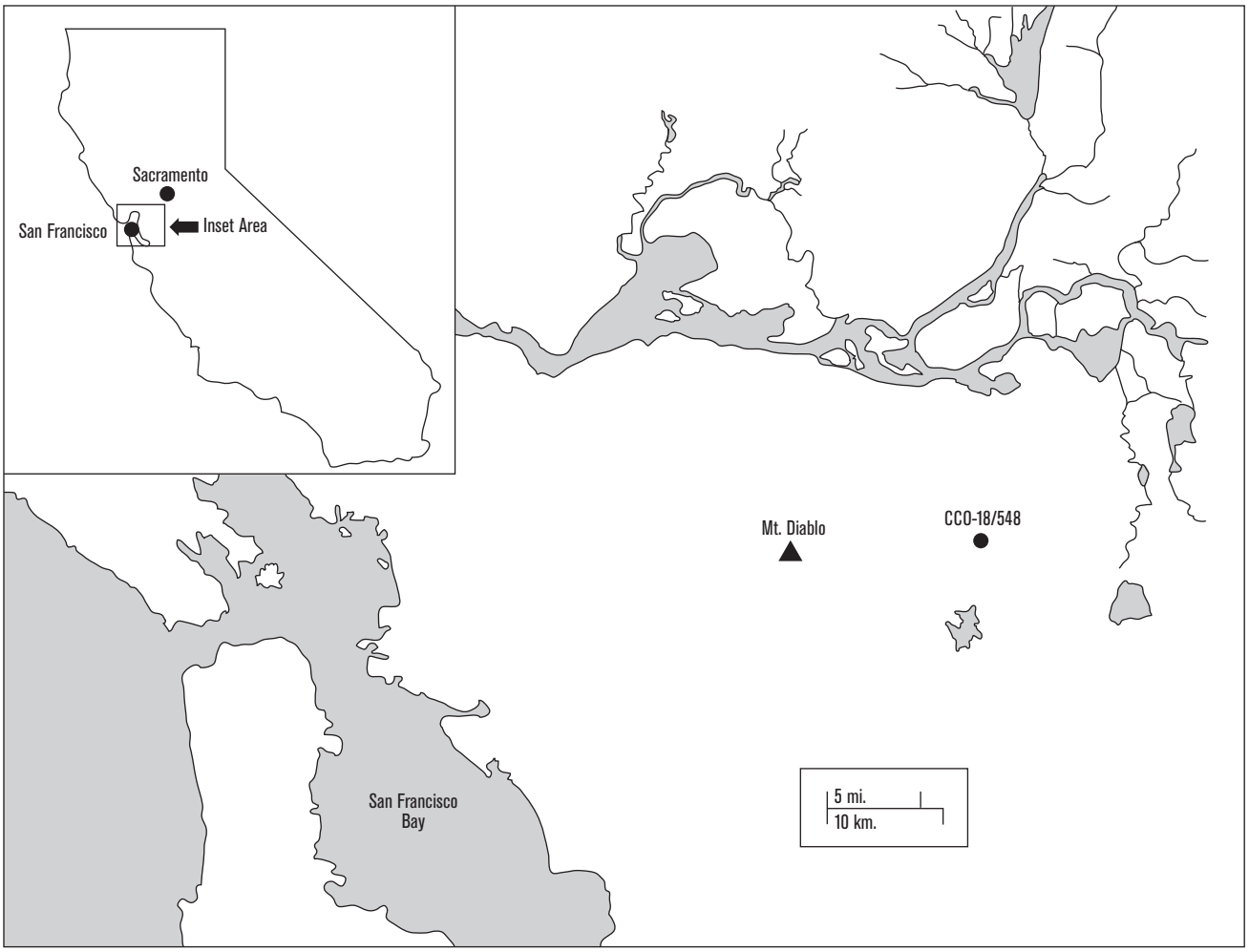

Figure 1. Map showing location of archaeological site CA-CCO-18/548.

Since 2005, State Park archaeologists have conducted a series of excavations in an effort to salvage and stabilize those portions of the deposit threatened by severe creek erosion. A summary of the work conducted from 1946 to 2008 can be found in Rosenthal et al. (2010).

As part of the salvage excavations along the north bank of Marsh Creek, two atlatl engaging spurs were recovered 60 meters apart. The first spur (Fig. 2) was found in 2006 and the second (Fig. 3) in 2011. Both were within the well-defined Early Period midden of CCO-18/548. This component also contains large amounts of highly fragmented small- and medium-sized mammal bone, moderate amounts of small fish bone, a high number of human burials, and many temporally diagnostic artifacts including charmstones, quartz crystals, slate pencils, and modified human bone. Temporally diagnostic shell beads are also common, consisting of *Olivella* thick rectangle beads (Types L2a, L2b, and L3), *Mytilus* rectangular or square beads, and *Haliotis* square or rectangular beads. The above artifacts are all contained within this Early Period component, which has been dated by multiple radiocarbon assays to between 4,000 and 3,000 B.P., with the period between 3,800 and 3,200 B.P. being the period of most sustained site occupation (Wiberg 2010:429). The discovery of two atlatl engaging spurs in this component inspired our exploration into atlatl technology, its archaeological significance, and the archaeological literature on the subject.

ATLATL ENGAGING SPURS IN CALIFORNIA

Attachable engaging spurs serve as limited evidence for the atlatl in California. This is largely due to the fact that atlatls were mostly made of perishable materials.

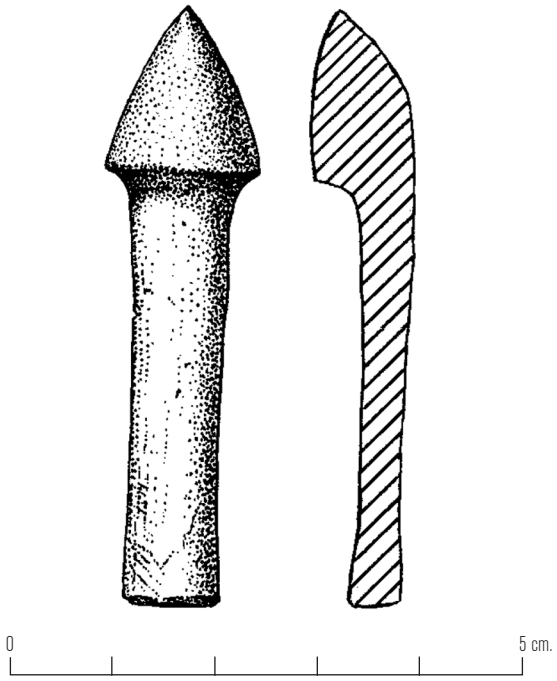

Figure 2. Illustration of atlatl engaging spur (catalog number P1780-889).

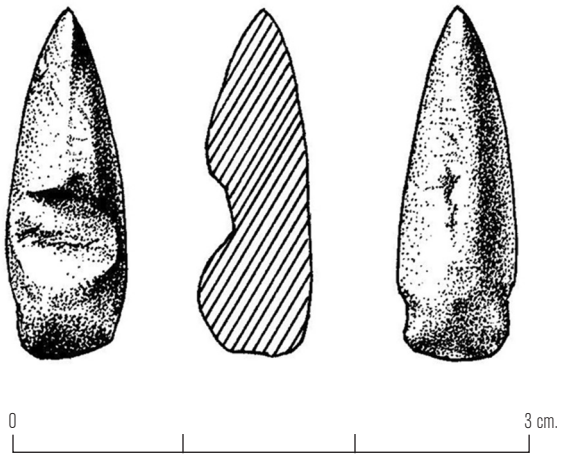

Figure 3. Illustration of atlatl engaging spur (catalog number P1766-31-1).

The major components (the throwing stick and dart shafts) tend to have been constructed from wood that is only preserved in exceptional circumstances, such as in dry rock shelters or caves. Integral spurs (engaging spurs carved from the atlatl body) are also uncommon due to poor preservation. Attached atlatl spurs are made separately from the atlatl body and tend to be constructed from bone, stone, and occasionally shell. The shaft of the dart rests on the spur and disengages from it when the dart is thrown. Engaging spurs would have been secured (either by binding or adhesion) to the end of the atlatl's body. Grooves, perforations, and evidence of tar or asphaltum are found on many specimens and provide evidence of methods of attachment. There are diverse sizes reported, with smaller variants found in the Sacramento area and larger forms from the southern San Joaquin Valley (Riddell and McGeein 1969). A few specimens are highly decorated with punctations, incising, and polishing (Gifford 1940).

Many spurs have possibly been unrecognized and misidentified in the archaeological literature. For example, Gifford and Schenck (1926:98) mentioned artifacts they labeled as 'snake heads,' suggesting that they may have been "fetishes or ceremonial objects… (or also possibly) grooved beads;" these are now identified as atlatl engaging spurs (Riddell and McGeein 1969). In *Californian Bone Artifacts*, Gifford described comparable specimens as "conical-headed, shouldered object[s]" (type QQ) (1940:184) and as "conical-headed objects, flat stemmed" (type Z) (1940:178). In this publication, he remarked that type QQ artifacts might be connected to atlatl use; he also mentioned that previous interpretations of the type Z variety suggested they were arrow points used to stun birds (Gifford 1940:178).

In general, artifacts that fit the aforementioned description have been identified as atlatl spurs, but there are few publications that inventory, describe, or comment on their various forms. The only published article that explicitly addresses California atlatl engaging spurs is the aforementioned paper by Riddell and McGeein (1969). That article presents a representative discussion of the various spurs discovered throughout California and suggests potential time periods to which atlatl spurs might be assigned. The authors reviewed the collections curated at the Phoebe Hearst Museum of Anthropology at the University of California, Berkeley (Riddell and McGeein 1969), and developed a basic typology for atlatl engaging spurs based on form, material, and geographic area. Their research led to the designation of three types: Type I ('snake heads'), Type II ('acorns'), and Type III.

The Type I or 'snake head' variety takes its name from a description used by Gifford and Schenck (1926). According to Riddell and McGeein (1969), these artifacts are primarily (and possibly exclusively) composed of

stone. Based on data associated with 'snake heads' found throughout California, these specimens are thought to have affinities with the Central California Early Period (5,000–3,000 B.P.) Martis complex, and the Early-Transitional Lovelock Period of the western Great Basin (Riddell and McGeein 1969). Riddell and McGeein postulated that this variety is possibly the oldest type of atlatl engaging spurs found in California. This seems unlikely, given the time depth of human occupation in California; however, three radiocarbon dates from a deposit associated with a deeply buried 'snake head' spur from site CA-KER-116 returned an age of 7,600 ± 200 radiocarbon years B.P. and two samples were dated to 8,200 ± 400 radiocarbon years B.P. (Fredrickson and Grossman 1977). Very little descriptive information is provided for this type and only one illustration is offered (Riddell and McGeein 1969:Fig. 1) as an example. Although not directly dated, another stone 'snake head' and a boatstone were recovered from CA-SCL-65 (the Saratoga site); this deposit yielded two dates: 5,995 ± 150 and 6,450 ± 160 radiocarbon years B.P. (Fitzgerald 1993).

Type II, the 'acorn,' has been found throughout California and is fashioned mostly of bone or antler. Temporally, it is affiliated with the Central California Middle Period (3,000–1,000 B.P.); however, there are known examples that are associated with deposits dating from between 7,000 to 5,000 years ago (Riddell and McGeein 1969). Numerous illustrations of the Type II or 'acorn' are provided in Riddell's and McGeein's (1969:Fig. 1) article; they depict a variety of styles ranging from artifacts with shoulders to those with grooves, and from crude specimens to well-formed shapes.

Type III is considered a possible variant of Type I and is distinguished by its larger size and the fact that it tends to be made of bone rather than stone. Riddell and McGeein left Type III's cultural and temporal context poorly defined, because only one specimen was analyzed with no associated radiocarbon date (Riddell and McGeein 1969).

Laura Smith White's M.A. thesis (1989) expanded on Riddell and McGeein's typology. Her extensive research discovered new shapes and focused on additional attributes which demanded new type or subtype designations while maintaining Riddell and McGeein's original classifications (Fig. 4). She stated in her revision that types I and II "represent two different technological solutions to the problem of elevating the center line of the engaging head above the surface of the atlatl" (White 1989:46), and referred to this attribute of the spur as the elevated engaging head (Table 1). Type I was further divided into subcategories, 'Ia' (keeled) versus 'Ib' (unkeeled). The keel of the atlatl engaging spur refers to the thick or deep base of the artifact, which was intended to be inserted into a groove on the atlatl body (White 1989).

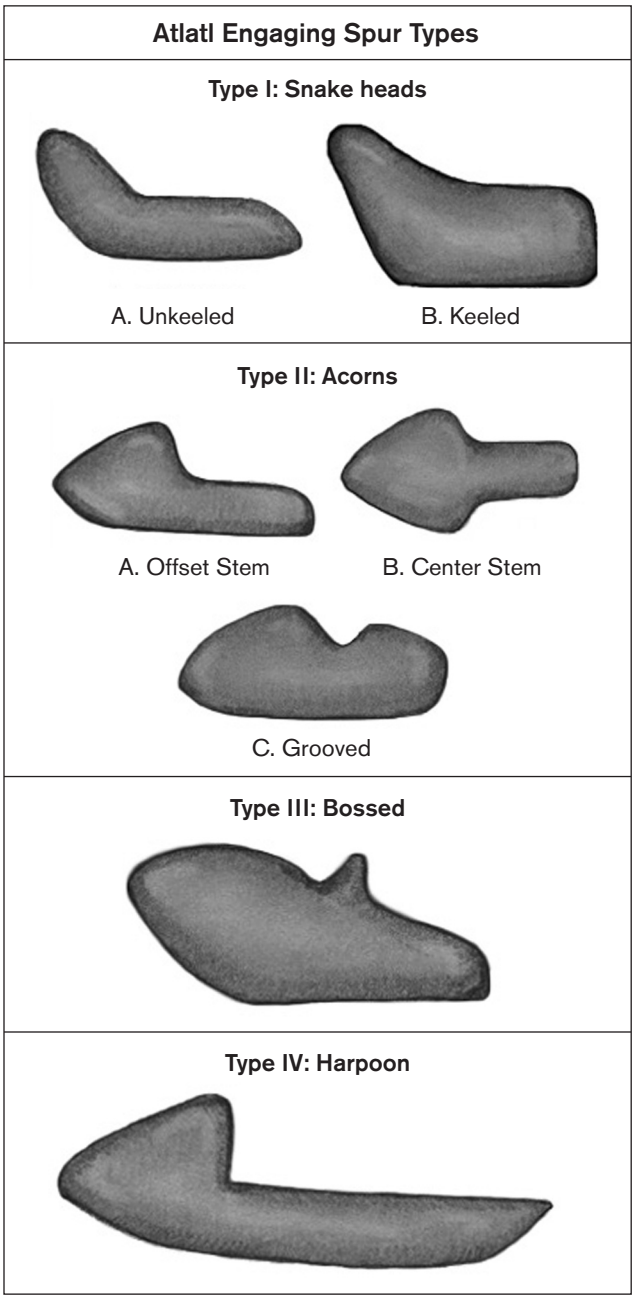

Figure 4. Atlatl engaging spur types (redrawn from White 1989).

Table 1

TERMINOLOGY USED BY LAURA SMITH WHITE FOR ATLATL ENGAGING SPURS

Atlatl Engaging Spur Terminology	
Proximal End:	The portion of the atlatl spur that comprises the engaging head.
Engaging Head:	The part of the spur which receives the butt end of the dart shaft.
Elevation of the Engaging Head:	The height of the centerline of the engaging head above the surface of the atlatl.
Stem:	A projection behind the engaging head used for hafting the spur.
Base:	The portion of the spur which rested on or was recessed in a groove on the atlatl.
Keel:	A thick or deep base intended to fit into a groove on the atlatl.
Distal End:	The non-engaging end of the spur.

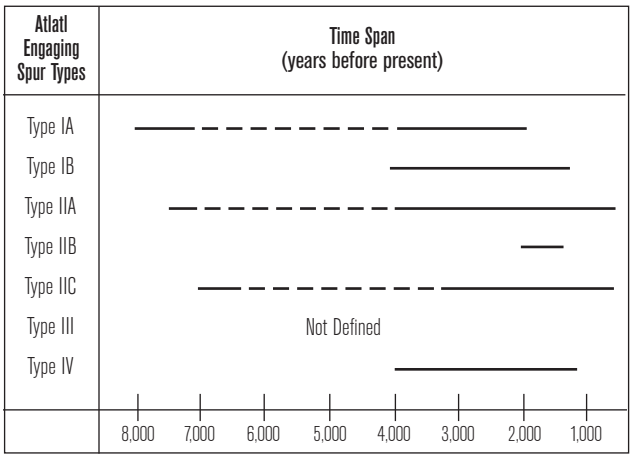

Figure 5. Chronological time table for California atlatl engaging spurs. Solid line indicates dated specimens. Dashed line represents hiatus (redrawn from White 1989).

Type II was further refined by including subcategories 'IIa' (offset stem), 'IIb' (center stem), and 'IIc' (grooved). White analyzed two additional spurs that would be classified as Type III in Riddell and McGeein's typology. This resembles the 'snake head' type because of its elevated engaging head, but also has a raised or bossed section towards the distal end of the spur. White retained Riddell and McGeein's description of Type III, but placed further emphasis on its bossed appearance. Additionally, she included a Type IV, the harpoon. Specimens belonging to this type come from the Santa Barbara coastal region, tend to be made of sea mammal teeth, and are highly decorated with punctations and evidence of red ochre residue.

White's assessment of atlatl engaging spur chronology, based on dates she acquired from an updated literature review, supported Riddell and McGeein's findings, but the date ranges she posited were much broader and were interspersed with hiatuses (Fig.5). She proposed that Type I spurs ranged in age from about 8,000 to 1,500 B.P., with Type Ia as the older sub-variety at approximately 8,000 to 2,000 B.P. There is a hiatus for Type Ia artifacts from 7,000 to 4,000 B.P. Type Ib was identified as the younger specimen type and dated to approximately 4,000 to 1,500 B.P. Type II spurs were also quite old, but appeared later than the snake heads and had an extensive range from about 7,500 to 1,000 B.P. Type IIa was the oldest of the three Type II subcategories (approximately 7,500 to 1,000 B.P. ,with a hiatus between 7,000 to 4,000 B.P.), with Type IIc as the second oldest (approximately 7,000 to 1,000 B.P., with a hiatus from about 6,500 to 4,000 B.P.). According to the data, Type IIb had a very limited temporal span that started between about 2,000 to 1,500 B.P. Type III's chronological placement remained unclear due to the limited data available for this specific artifact type. Only three Type III artifacts were analyzed, and all of the specimens were from surface collections made by private collectors with no associated radiocarbon dates (White 1989:74). The new classification of Type IV had a temporal range from approximately 4,000 to 800 B.P. The information presented by White indicated that the presence of attachable atlatl engaging spurs in the archaeological record began to diminish after about 1,000 B.P. She concluded that this possibly represented the period when there was a shift from dependence on atlatl technology to the bow and arrow. That shift appears to be substantiated by the abundance of stone arrowheads found in deposits that date from 1,000 B.P. onwards. In most of California, archaeological evidence suggests that bow and arrow technology replaced the atlatl after circa 1,400 B.P., while in the northernmost part of California the shift appears to have occurred around 1,800 B.P. (Hildebrandt and King 2012:789).

DESCRIPTION OF ARTIFACTS

Both of the recovered spurs from the Marsh Creek Site, based on distinctions used by Riddell and McGeein, belong to the Type II or 'acorn' category, and are further

Table 2

COMPARISON OF ASSOCIATED RADIOCARBON DATES OF ATLATL ENGAGING SPURS FROM CA-CCO-18/548

Lab Designation	Sample	Database Used	Conventional Radiocarbon Age	2 Sigma Calibrated Result	Intercept of Radiocarbon Age Calibration Curve	Material Tested
Beta-215143	CCO548NBBURIAL#5	INTCAL 98	3,300 ± 60 B.P.	Cal B.C. 1,720 to 1,440	Cal B.C. 1,540	Bone Collagen
Beta-316296	CCO18/548U15/15E Feature 2 80–100 cm.	INTCAL09	3,170 ± 30 B.P.	Cal B.C. 1,500 to 1,410	Cal B.C. 1,430	Charcoal

distinguished by White's attributes of offset stem and grooved.

The first spur, P1780-8891 (Fig. 2), is a well-formed, polished specimen with distinct shoulders and a long stem; it is 59.93 mm. in length and weighs 5.5 grams. According to White's classification, this specimen is defined as a Type IIa (acorn, offset stem). The proximal end of the artifact is conical in appearance, with a flattened base that attaches to the stem. The stem of the artifact has nearly straight, parallel edges with a flattened base (with evidence of trabecular bone still present); all other sides are rounded and its distal end is nearly square. No groove, for tethering, is present on this specimen; it is presumed that the spur would have been attached to the body of the atlatl with some form of adhesive (such as asphaltum). There was no evidence of asphaltum or other adhesive on this artifact. It is possible that the stem of the spur was tied onto the body of the atlatl, even with the absence of a groove to secure it. The medullary cavity of the bone could have served as a ready-made groove to help secure the artifact onto the body of the atlatl. A conventional radiocarbon date of 3,300 ± 60 B.P. (Beta-215143) was retrieved from an associated burial, NB5 (Table 2).

The second atlatl engaging spur, P1766-31-1[2] (Fig. 3), is conical in form, has a groove, lacks a stem, and is classified as a Type IIc (acorn, grooved). It measures 20.5 mm. in length, has a diameter of 6.4 mm. (taken from largest point), and weighs 0.8 grams. The distal end and most sides are rounded, while the base is slightly flattened. There seems to be some flattening of the distal end with mild battering. The groove's measurements are approximately 6.3 mm. by 1.79 mm. Comparatively speaking, P1766-31-1 is less polished and meticulously manufactured than P1780-889. A conventional radiocarbon date of 3,170 ± 30 B.P. (Beta-316296) was taken from a nearby burned rock feature, Feature II (Table 2).

The diversity of styles in atlatl engaging spurs is demonstrated by the discovery of the two spurs at archaeological site CCO-18/548. Specifically, there is a great difference in size between the two specimens; P1780-889 is approximately three times the size of P1766-31-1. There is also variability between the forms of the artifacts. P1780-889 has a stem, while P1766-31-1 lacks a stem and has a groove. Both spurs were made within a relatively small span of time. The calibrated radiocarbon dates separate them by approximately 110 years, with P1780-889 being the older specimen (Table 2).

DISCUSSION

The discovery of the two atlatl engaging spurs at CCO-18/548 prompted the research discussed here. During the research it became apparent that few updated resources are available. White's unpublished M.A. thesis (1989) represents an expansion and improvement of the more generic typology presented by Riddell and McGeein (1969).

According to Riddell and McGeein's specifications, both spurs from CCO-18/548 are representative of one style, the Type II or 'acorn;' however, it can be argued that the two artifacts are separate forms. Arguably, the classification used by Riddell and McGeein was too broad and included atlatl engaging spurs that are distinct from one another and yet are classified together.

White gathered extensive data on atlatl engaging spurs from both academic and private collections. Her research resulted in the study of 269 atlatl engaging spurs from all over California. Equipped with new information derived from a larger sample of spurs, White was able to more clearly define the typology originally presented by Riddell and McGeein. In her expanded typology, she analyzed artifact size and included subcategories that allowed for greater clarity

in type definition. For example, the two atlatl engaging spurs from the Marsh Creek site, while clearly disparate in form, used to be placed in the same category, Type II (acorn). White's typology differentiates between the two, identifying artifact P1780-889 as Type IIa (acorn, offset stem) and artifact P1766-31-1 as Type IIb (acorn, grooved). White's expanded typology goes beyond simply typing artifacts according to shape and considers attributes that represent different technological solutions to the problem of hafting the spurs to the atlatl body and fitting the atlatl dart onto the spur. It is our opinion that this distinction is more appropriate for the specimens recovered at CCO-18/548 because it addresses different technological approaches and will allow archaeologists to consider the possible choices of atlatl engaging spur manufacturers. The next step for archaeologists would be to explore the potential advantages of each hafting style. Additionally, the width of each spur should be correlated with the diameter of the dart shaft. Spurs with larger widths would accommodate larger darts while smaller widths would be associated with smaller darts. The differential size of darts might be related to the type of game hunted with the atlatl. Smaller darts, for example, could have been used to hunt small game such as birds, while larger darts may have been more useful for larger game. Therefore, metric information associated with atlatl engaging spurs could be used by archaeologists to make inferences about the type of game exploited by atlatl technology, even in the absence of the dart. Experimental archaeology exploring the advantages of particular atlatl dart sizes and spur hafting techniques will provide additional important insights.

More data is required before it is possible to resolve some key issues concerning cultural and temporal associations. White attempted to define regional differences among the various types of spurs, but many that she analyzed lacked proper provenience because they were obtained by private collectors. Therefore, it is imperative to incorporate newly discovered atlatl engaging spurs with known provenience in the existing data to better define regions. White's contribution to the reworking of Riddell and McGeein's important atlatl engaging spur classification is a significant step, and it should encourage the reassessment of other archaeological typologies.

NOTES

[1]Artifact P1780-889 was recovered by State Park's archaeologists in 2006. The archaeological collection associated with this project (accession P1780) is stored at the State Archaeology Collections and Research Facility in Sacramento, California.

[2]Artifact P1766-31-1 was recovered during excavations by the California Department of Parks and Recreation, Archaeology, History, and Museums division in 2011. The archaeological collection (accession P1766) is stored at the State Archaeology Collections and Research Facility in Sacramento, California.

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