

30 EXCAVATIONS OF BUILDING A AND LINE OF PALMETTO PALM POSTS AT EK WAY NAL, BELIZE

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This paper summarizes excavations of a suspected fish processing location at the submerged site of Ek Way Nal located in Paynes Creek National Park. Based on use-wear analysis of chert tools found near Building A and a line of palmetto palm posts indicated that fish processing was taking place at Ek Way Nal. In addition to fish processing, Ek Way Nal represents one of 110 Late Classic salt making settlements of the southern coast of Belize. Analysis of survey data, excavation data, and artifact analysis provides information about settlement organization, trade relationships, and activities taking place at the Paynes Creek Salt Works. Excavation data also suggests the presence of a deflated leaching mound created through long-term production of salt at this site. High volumes of charcoal indicate large amounts of wood harvested and burnt for brine boiling. Low-quality and high-quality stone tools and debitage indicate local and long-distance acquisition of stone materials. Artifacts associated with preserved wooden structures indicates building function across the site.

Introduction

Remnants of pole and thatch buildings are embedded and preserved in the sea floor at over 70 sites located in Punta Ycacos Lagoon in Paynes Creek National Park (McKillop 2019; McKillop and Sills 2021). Ek Way Nal is one of the largest sites in the Paynes Creek Salt Works (Figure 1). The sites produced large quantities of salt for export using a brine-boiling method (Feathers and McKillop 2018; Feathers et al. 2017; McKillop 1995, 2002, 2019; McKillop and Sills 2021; Somers 2007; Watson and McKillop 2019). Salt played a key role in the nutrition of the ancient Maya, was one of the only methods by which food could be preserved, could be used to fix dye coloring in textiles, tan hides, used for medical purposes, and improved flavoring of food (McKillop 2018; Williams 2010).

Although no formal excavations had taken place at Ek Way Nal prior to 2022, wood posts and other artifacts on the sea floor including ground stone, chert, diagnostic pottery, and obsidian were individually mapped with a total station and collected during systematic survey in 2006 and 2007 (McKillop 2019; McKillop and Aoyama 2018; McKillop et al. 2019; McKillop and Sills 2021). Ten buildings were mapped and used as a guide for excavations. The presence of large quantities of briquetage--pottery used during the production of salt cakes--indicates that multiple buildings at Ek Way Nal were used as salt kitchens, whereas others functioned as residences (McKillop and Sills 2021).

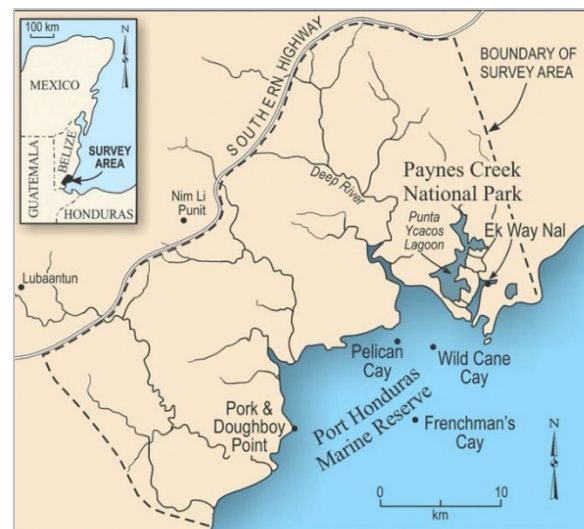


Figure 1. Location of Ek Way Nal in the Punta Ycacos Lagoon in Paynes Creek National Park, Belize (Map by Mary Lee Eggart, Louisiana State University).

Salt making at the highland villages of Sacapulas, Ixapa, and San Mateo Ixtatán provide modern-day comparisons of similar salt production methods (Andrews 1983; McKillop and Sills 2021).

Mapped artifacts associated with each building indicate their use. Domestic refuse such as food remains, tools used for food processing, ritual items such as ocarinas, and pottery for storage of food indicates a building was residential in nature (McKillop and Sills 2021; Williams 2008b). In contrast, a lack of artifact diversity paired with high volumes of briquetage indicate areas or buildings used in the salt production process (McKillop and Sills 2021).

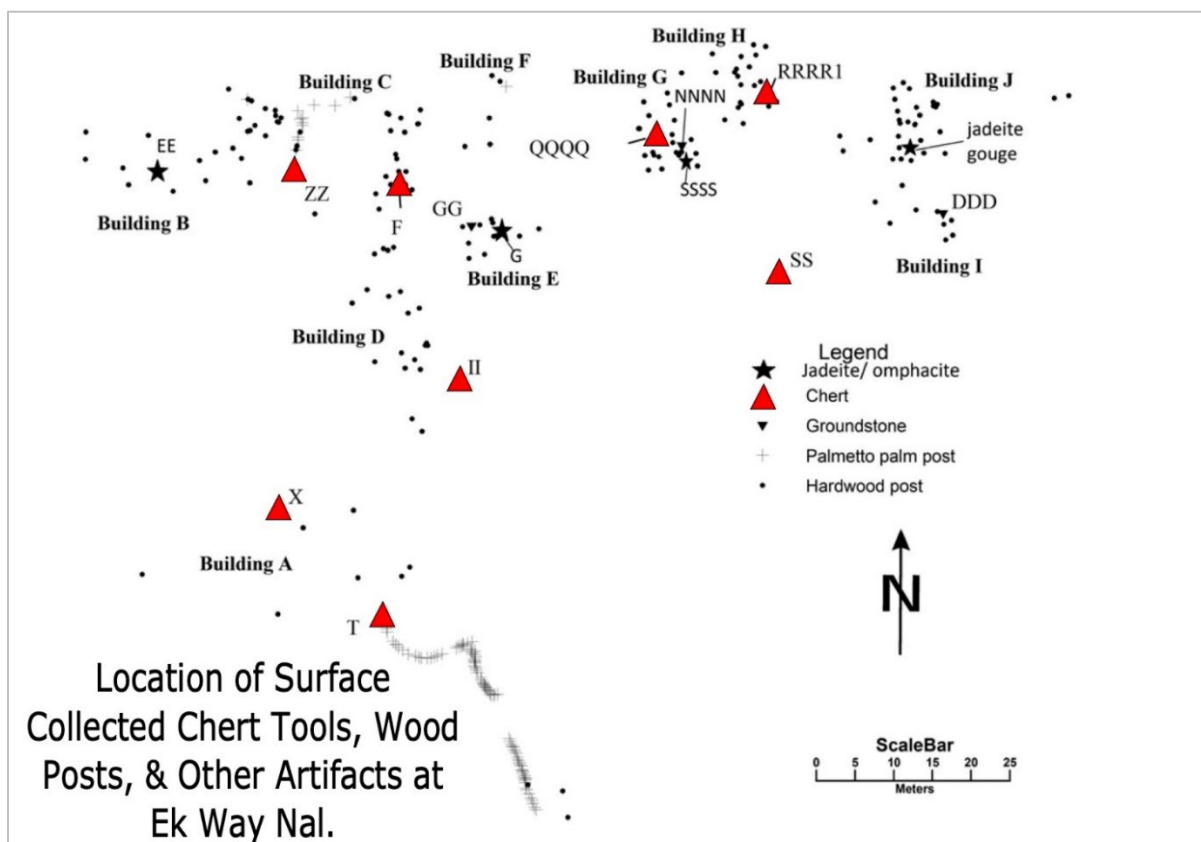


Figure 2. Map of surface collected chert tool locations. Artifacts are labeled with sea floor catalog letters that correspond to Table 1. (Map by Heather McKillop).



Figure 3. Image showing location of building A. Yellow flags on the left side of the photo show the location of transect 1. Orange flags on the right side of the image mark palmetto palm posts (Photo by Hollie Lincoln).

Indicators of fish processing and fish salting may include the presence of fish bones, stone tools used for cutting fish, and a drying rack or salting box (McKillop 2019). Use-wear analysis indicates that two chert stone implements, from buildings A and C at Ek Way Nal, were used for cutting fish or meat (McKillop and Aoyama 2018). A third chert tool near building A, near a line of palmetto palm posts was found to be used for scraping hide (McKillop and Sills 2021; McKillop and Aoyama 2018). The locations of these chert tools suggests that fish processing was taking place on the western periphery of the site (McKillop and Sills 2021). Historical documentation and archaeological evidence indicate that the coastal Maya traded salted fish and salt cakes with inland sites (McKillop 2019, 2022). Salt was one of the few means by which the Maya could preserve food. The practice of salting fish allowed for its consumption after transport or storage (Williams 2010). Modern fishing communities in near Lake Cuitzeo in Mexico still practice this preservation method and continue to trade fish for salt (Williams 2008, 2010). People living and working at Ek Way Nal would have utilized marine resources for sustenance and ritual purposes. Marine resources, such as salted fish, would have been desirable to inland communities and a valuable trade good.

Obsidian blades are commonly found throughout the Paynes Creek Salt Works (McKillop 2005). Use-wear analysis at other Maya sites has indicated that obsidian blades were used in food production activities. At Kaminalijuyu, obsidian blades are used for scraping and cutting activities (Hirth 2003). Use-wear analysis at Aguateca shows obsidian blade fragments were used for wood working and for cutting meat and hide (Aoyama 2011). Knives or scrapers made of obsidian or other stone tools were utilized in ancient times but have been replaced by modern tools at traditional salt-making communities in Mexico (Williams 2008b).

Radiocarbon dates of wood post samples from each building at Ek Way Nal suggest that buildings A, C, D, E, F, and H were constructed at the end of the Late to Terminal Classic (A.D. 600-900), whereas buildings B, G, and J were constructed slightly earlier at the beginning of the

Late Classic (McKillop and Sills 2021) (Figure 2). The presence of Belize Red and Warrie Red pottery at Ek Way Nal supports these dates. Radiocarbon dating of red mangrove peat, organic material that has accumulated due to rising sea-levels, has also indicated that the Paynes Creek Salt Works were operating during the Classic Period (A.D. 300-900) (McKillop et al. 2010).

Excavations in Building A

One of several goals for the 2022 field season at Ek Way Nal was to assess whether additional evidence of fish or meat processing could be identified at the site. Excavation units were placed across most of the site to collect a sample of data from the interior and exterior of each identified building, including building A. With additional mapped buildings and artifacts to the east of a line of palmetto palm posts associated with building A, transects were placed on what was considered the interior of this boundary. The line of posts may have served as a fence delineating indoor and outdoor space or to protect the shoreline from rising tides (McKillop and Sills 2021).

Building A (Figure 2) and an associated line of palmetto palm (*Acoelorrhaphes wrightii*) posts are the southernmost mapped features at the site of Ek Way Nal. A site has been defined by McKillop and Sills (2021:3) as “a cluster of artifacts and posts at least 10 meters in distance from another.” Additional sites associated with salt making activities are located northeast, east, and southeast from Ek Way Nal and building A. A raised area of living mangroves sits roughly west to east in between building A and the other mapped buildings at Ek Way Nal. The accumulation of sediment and organic material has created a high point at this site and is often visible above water during low tide.

Although virtually no animal remains were recovered from the salt works, use-wear study of chert tools provided evidence of fish processing. Red mangrove peat creates a highly acidic and anerobic underwater environment which means that any archaeological materials made up of calcium carbonate are destroyed through time (McKillop et al. 2019). For this reason, a lack of fish or animal bones in the lagoon is not surprising.

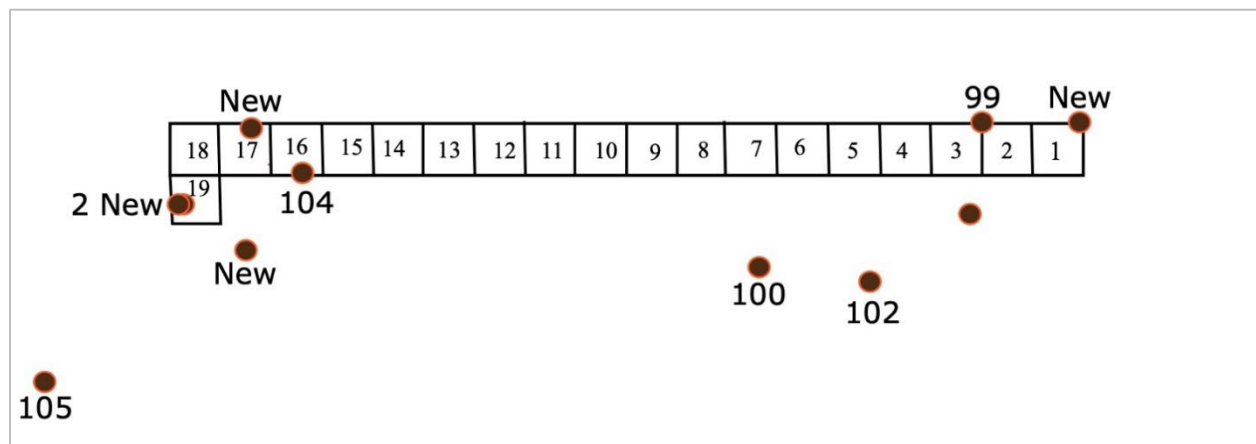


Figure 4. Map showing Building A, transect 1, units 1-19, and previously mapped and numbered wood post locations next to newly-found wood posts. (Map by Hollie Lincoln).

Microscopic analysis of use-wear on 21 chert tools from sites in the Paynes Creek Salt Works indicates the primary activities requiring chert tools involved wood working activities, as well as cutting fish or meat, and scraping hide or scaling fish (Table 1; McKillop and Aoyama 2018). Although most tools were multi-purpose, fish, meat, and hide were the most worked materials (McKillop and Aoyama 2018). Four of the 21 tools analyzed were from Ek Way Nal. Of the four tools analyzed, two tools were used for fish and/or meat processing, one was used for scraping of animal hide, and one was used for woodworking (Table 1). Four additional chert tools were also located during systematic sea floor survey but were not analyzed for use-wear (Table 1).

Fish weights or other gear have not been found at Ek Way Nal (McKillop and Sills 2021). However, a side-notched stone resembling a fishing weight was found at Ta'ab Nuk Na. Spindle whorls, potentially used to produce fishing line were found at site 6 (McKillop 2019; McKillop and Sills 2021). At nearby Wild Cane Cay, fishing weights, fish bones, and manatee bones were found in midden deposits dating to the Late Classic period (McKillop 2005).

Methods

Positioning of transects involved selecting two previously mapped wood posts that extended beyond the northern and southern extent of building A (Figures 3-4). Transect lines were measured with a tape measure on the sea floor

surface and marked with yellow ropes that extended from each post. Using the tape measure as a guide, consecutive one-by-one meter units were marked with PVC piping. Each square unit was divided into four subunits using during excavation, using a metal or plastic gridded unit that could be placed on the sea floor. Each subunit was excavated in 10 cm levels using a trowel. Matrix from each subunit was placed into a mesh bag and transported away from the excavation site using a research flotation device. All material removed from each subunit was screened using ¼ inch mesh and water from the lagoon.

The goal of transect 1 was to recover archaeological materials from the interior and exterior space of a group of wooden posts making up Building A. A total of 19 one meter by one-meter units were positioned along a transect line running roughly north to south. Of those 19 units, only 15 were excavated to avoid disturbing the living mangroves. Nine of 13 units were excavated to 10 cm below sea floor surface, three units to 20 cm, and three units to 30 cm (Figure 4). Transects 2 and 3 were positioned on the eastern side of the line of palmetto palm posts. Seven units on transect 2 and five units on transect three were excavated to a depth of 10cm below the seafloor surface. Variation in unit depth occurred for a variety of reasons. In some instances, deeper units were dug to assess the density of cultural material at deeper levels. Excavation to 10cm in depth allowed for more data to be collected over a larger spatial area.

Table 1. Surface collect chert tools from Ek Way Nal. Descriptions and use-wear analysis from McKillop and Aoyama (2018). See Figure 2 for locations of chert artifacts.

Seafloor Catalog ID	Description	Identified Use
F	Lenticular Biface	Wood cutting, whittling
T	Recycled Biface	Scraping hide
ZZ	Stemmed Biface	Cutting fish/meat
X	Stemmed Biface	Cutting fish/meat
QQQQ	Large Flake	N/A
RRRR1	Unifacial Stemmed Point	N/A
SS	Unifacial Stemmed Point	N/A
II	Shouldered Biface	N/A

Table 2. Artifact count by transect.

Transect 1 Artifacts	Count
charcoal	18217
Cohune endocarps	12
Coyol endocarps	8
Crabbo seeds	6
hog plum seeds	1
Belize Red body sherds	24
unknown pottery	23
Punta Ycacos body sherds	345
Punta Ycacos cylinder supports	143
Punta Ycacos socket	22
Punta Ycacos rims	49
Amorphous clay lumps	20216
clay ball	1
unknown pottery	30
Warrie Red body sherds	165
Warrie Red rims	4
chert flakes	4
obsidian blades	4
quartz flake	1

Transect 2 Artifacts	Count
charcoal	39275
Amorphous clay lumps	6
Warrie Red rims	2

Transect 3 Artifacts	Count
charcoal	296
Crabbo seeds	1
unknown rim	1
Punta Ycacos body sherds	8
Punta Ycacos socket fragments	2
Punta Ycacos cylinder supports	7
Amorphous clay lumps	0
Warrie Red body sherds	10

Artifact densities were the highest in transect 1, with very little cultural material being recovered from transect 2 or 3.

After a unit was excavated to its final depth, a sediment sample was removed from the center or eastern wall of the unit. These samples

were labeled with transect and unit information and transported to the Village Farm laboratory for fine-mesh screening. Fine window screen mesh was placed inside of a large ¼" mesh screen. Sediment samples were screened by hand with water to aid in separating the light organic materials, including fine mangrove roots, from any artifacts.

Results

Artifacts recovered from excavations of Building A, transect one include fragments of seeds, large amounts of charcoal, a variety of pottery including Warrie Red, Belize Red, Punta Ycacos Unslipped briquetage, four obsidian blade fragments, chert debitage, quartz pounding tools, and one large quartz flake (Table 2). All three transects contained abundant charcoal. Transect two contained almost no other artifacts, whereas transect three had small amounts of pottery, including sherds of Warrie Red and Punta Ycacos Unslipped, two Punta Ycacos socket fragments, and seven Punta Ycacos cylinder fragments. A combination of Punta Ycacos body sherds, rim sherds, sockets, and cylinders, Warrie Red body and rim sherds, and Belize Red body and rim sherds were dispersed across transect 1.

Five unmapped wood posts were located during excavation of transect 1. To document the new wood posts in relation to the previously mapped wood posts, a map was produced using the transect one line as a baseline. With the addition of the new posts in this area, a small rectangular building was located at the northern end of transect 1 (Figure 4). Units 16, 17, 18, and 19 are located on the interior and exterior of this building. Units 17 and 19 are also where three obsidian blade fragments, one large quartz flake, and three chert flakes were found. Additional posts exist on the southern end of transect 1. However, their configuration is unclear (Figure 5). Excavations of transects two and three produced few artifacts (Table 2). Artifact density was greater across transect 1, with density and variability in artifacts increasing in the northern most units.

No evidence of micro-debitage or fish bones was found in the sediment samples collected from any of the building A transects.

However, one fish bone was found wedged next to hardwood post 1.

Summary

Lines of palmetto palm posts are found at other sites at the Paynes Creek Salt Works and appear to have been used as fences or to delineate yard or plaza space (McKillop 2022). These types of features are also used at modern coastal locations in Belize for protection of shorelines (McKillop and Sills 2021). At the Yotot site, another one of the Paynes Creek Salt Works, minimal artifacts were found within a fenced space, whereas abundant briquetage was inside and next to the buildings (McKillop and Sills 2016). A lack of artifacts associated with the line of palmetto palm posts near building A at Ek Way Nal exhibits similar qualities to the fenced space at the Yotot site.

In the absence of preservation of bone in the acidic mangrove peat matrix of the excavations at Ek Way Nal, the only indication that fish processing we currently have at the site is through the use-wear analysis completed on chert stone tools (McKillop and Aoyama 2018). However, additional objects related to fishing, including fishing weights, spindle whorls, fish bones, and manatee bones are present at other associated sites in and near the lagoon. More evidence of fish processing may be obtained through additional micro-wear analysis of stone tools.

The presence of botanical materials including endocarps of the native palms, cohune and coyol, as well as craboo and hogplum seeds may indicate that the ancient maya were consuming these fruits. At the Stingray Lagoon site, also part of the Paynes Creek Salt Works, radiocarbon from coyol, cohune, and mamey remains dated to the Late Classic (McKillop 2019). Abundant charcoal, in addition to briquetage is expected in areas where salt production was taking place. The brine boiling method utilized by the ancient Maya in Punta Ycacos Lagoon involved building fires to boil pots of enriched brine to produce salt cakes (McKillop and Sills 2021). Harvesting of large amounts of wood over time was necessary to continuously boil salty brine (Robinson and McKillop 2013). Large amounts of charcoal likely mark locations where salt kitchens were

Table 3. Total pieces of charcoal from each excavation transect associated with building A.

Total Pieces of Charcoal from Each Transect and Building Excavation		
Bldg. A, Tr. 1	Bldg. A, Tr. 2	Bldg. A, Tr. 3
18,217	39,275	296

Table 4. Artifacts collected from seafloor surface at building A.

Building A, Surface Collected Artifacts	
UUUU UUU	PY Bowl
VVVV VVV	Cylinder End
WWWW WWW	Sherd with Hole
XXXX XXX	Incised, Unknown sherd
YYYY YYY1	Belize Red Rim
YYYY YYY2	Pedestal Base Bowl
ZZZZ ZZZ1	Ocarina Head
ZZZZ ZZZ2	Quartz Pounding Tool
AAAA AAAA	Quartz Pounding Tool
BBBB BBBB	Burner (3 pieces)
CCCC CCCC	5 Sherds
DDDD DDDD	Large Base (3 pieces)
EEEE EEEE	Unit Stamped Rim (3 Pieces)
FFFF FFFF	Base
GGGG GGGG	Base/Socket
AAA AA AA	Fish Bone

located or areas where charcoal was disposed of over time. Other salt making sites, including the Placencia Salt Works to the north retain piles of leached soil from the brine enrichment process. Due to sea level rise and wave action, leaching mounds in the Payne Creek Salt Works are rare. Remnants of leached soil appear at two sites, Killer Bee and Witz Naab. Excavations of these mounds revealed bits of briquetage and charcoal discarded from salt kitchens nearby (Watson and McKillop 2019; Watson et al, 2013; McKillop 2022). The quantity of charcoal associated with building A far exceeds amounts found at all other excavated areas at Ek Way Nal. Large amounts of fragmented briquetage are also present in this area (Table 3).

Stone tools and debitage recovered from the building A transects included four chert flakes, four obsidian blade fragments, one quartz flake, and two surface collected quartz pounding tools (Tables 2, 4). Prior analysis of chert tools from the site of Ta'ab Nuk Na indicated that

formal tools were imported from northern Belize in finished forms (Lincoln 2022). Neither the quartz pounding tools nor the chert debitage appear to be from the high-quality sources imported from northern Belize. Low quality chert flakes and quartz tools are likely of local origin. However, the formal tools previously mapped and collected from the seafloor surface at Ek Way Nal appear to be comprised of tool forms commonly produced at Colha during the Late Classic. Overall, minimal stone tools were located during excavations in 2022.

Conclusions

At the Placencia Salt Works, 22 earthen mounds at 13 salt-making sites are described as “low-lying, amorphous shapes, ranging from 1.0-1.5 m in height (MacKinnon and Kepecs 1989; Watson and McKillop 2019).” These mounds of leached soil, produced during the brine-enrichment process in the production of salt cakes include broken pottery, a variety of broken

briquetage, soil. Stratigraphy of excavations at Witz Nab and Killer Bee included similar artifacts and included several layers of charcoal (Watson and McKillop 2019). Large amounts of charcoal and fragmented briquetage and pottery in transect 1 is adjacent to a raised linear patch of modern mangroves and may suggest a deflated salt leaching mound (McKillop 2022).

A rectangular building marked by four wood posts at the northern end of transect 1 contained obsidian blade fragments and other stone debitage. Several meters north of this building, a variety of fine pottery and an ocarina were found on the sea floor next to a dense mound of sediment containing large amounts of artifacts including pottery and briquetage related to salt making in addition to other pottery types.

The configuration of wood posts on the southern and central area of transect one is unclear. Transects 2 and 3 were located next to the line of palmetto posts. Few artifacts were recovered from those areas. This linear feature mimics features seen at other sites including the Yotot site and may have functioned as a retaining wall. Minimal artifacts on the eastern side of this feature contrasts to a complete lack of artifacts on the western side of this feature and suggests that the palmettos functioned to combat tidal or weather changes approaching from the west. The proposed leaching mound sits just to the east of this palmetto palm post wall, with multiple buildings just beyond.

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