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Mahmoud Y. El-Najjar
Yarmouk University, Irbid, Jordan

Thomas M. J. Mulinski
Chicago, Illinois

Karl Reinhard
University of Nebraska-Lincoln, kreinhard1@mac.com

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Mummies and mummification practices in the southern and southwestern United States

MAHMOUD Y. EL-NAJJAR, THOMAS M.J. MULINSKI
AND KARL J. REINHARD

Mummification was not intentional for most North American prehistoric cultures. Natural mummification occurred in the dry areas of North America, where mummies have been recovered from rock shelters, caves, and overhangs. In these places, corpses desiccated and spontaneously mummified. In North America, mummies are recovered from four main regions: the southern and southwestern United States, the Aleutian Islands, and the Ozark Mountains of Arkansas. This chapter is limited to a discussion of burial practices and a tabulation of the location of mummies in the southwestern United States with some comments on mummies of the southern United States, including the Ozarks (Figure 7.1).

FIGURE 7.1. Sites where mummies have been found in the southern and southwestern United States. (Map by Timothy Motz, Detroit Institute of Arts, modified by K. Reinhard.)

SOUTHWESTERN UNITED STATES

Mummies are associated with several cultures in the southwestern United States. The oldest mummies are from the Archaic cultures in western Texas, primarily from the Rustler Hills and the lower Pecos region at the confluences of the Rio Grande and Pecos Rivers, and the Rio Grande and Devils River (Turpin *et al.* 1986). Mummies are also associated with later agricultural populations of Arizona, Colorado, New Mexico, and Utah. These mummies come from three main localities: northeastern (Anasazi), east-central (Sinagua) and southern (Hohokam) Arizona. Mummies vary in how they are positioned. In the Four Corners area, they are usually tightly flexed, with the arms and knees drawn to the chest and the head bent forward. In southern Arizona and west Texas, however, the position varied. Some were tightly flexed, but some were buried in extended position.

From northeastern Arizona, mummies have been recovered from Canyon de Chelly, Canyon del Muerto, Vandal Cave, and Painted Cave. Canyon de Chelly and its major tributary, Canyon del Muerto, have yielded some of the best preserved desiccated bodies in the New World. Only a few of these have been conserved to the present day. The majority of these ($n=10$) is housed at the American Museum of Natural History, New York City. Four of these mummies were studied at Case Western Reserve University, Cleveland, Ohio (El-Najjar *et al.* 1980). A partial mummy and an Anasazi child were studied at the Human Variation Laboratory, Arizona State University, Tempe.

The earliest of the Anasazi are known as the Basket Makers, a semi-nomadic group of hunters and gatherers who lived in the caves and rock shelters between AD 100 and 700. The diet of the Basket Makers was a mix of agricultural products and gathered foods (Reinhard 1992). Mummies of Basket Makers show that they were short and had coarse black hair with a tendency to be wavy, little body hair, and brown skin (Wormington 1973).

Basket Maker corpses mummified when placed in pits or stone-lined cysts that had originally been constructed for storage in caves. Occasionally, however, a body was left in a corner on the floor of a cave or was placed in a crevice. This was probably done immediately after death occurred, before the body had stiffened. It is possible that the small size of the cyst led to the custom of flexing, in which the knees are drawn up to the chest and the arms are extended at the side. The bodies were usually wrapped in fur blankets, but occasionally tanned deerskins were used. Bodies of infants and small children were wrapped in a pad-like mass of soft fiber made from the leaves of yucca plants and shrouded either in fur, skin, or feather cloth blankets.

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Mortuary offerings included baskets, sandals, beads and ornaments, weapons, digging sticks, cone shaped pipes, and a variety of personal possessions. Among the unique finds associated with Basket-Maker mummies is a pair of unworn sandals which are double soled, somewhat cupped at the heel, with a square toe, and usually ornamented with a fringe of buckskin or shredded juniper bark (Wormington 1973).

One of the most unusual mummies recovered from the American Southwest is a young Pueblo child approximately three years of age. The Pueblos were the Anasazi descendants of the Basket Makers and lived in large communal houses in the same area between AD 700 and 1300. The child died during the eleventh century (El-Najjar et al. 1975). The desiccated body had been laid flat on an elaborate cradleboard with a cottonwood bark sunshade in place around the head. There was also a worn textile fragment round the neck and a bracelet round the right wrist. This burial contrasts markedly with other burials recovered from the same site. None of the others had a grave cover or had as many or as elaborate grave goods. The child's death has been attributed to severe anemia (El-Najjar and Robertson 1976). The diagnosis was based on macroscopic, radiographic, and histochemical analysis. No other evidence of pathology was found. In an earlier paper, El-Najjar et al. (1975) conclude that the child was probably unable to walk and was unable to participate in normal activities and/or was mentally retarded.

Autopsies have been performed on two Canyon del Muerto mummies, an adult male and an infant (El-Najjar et al. 1980). The researchers found dried red powder, thought to be blood, in the thoracic cavity of the adult mummy. After immunologic analysis there was the suggestion of degraded IgG in the powder. This material was very unstable and may be the result of proteolytic enzyme activity after rehydration. They also conducted hair and fecal analysis. No abnormalities could be found in the hair samples. The feces contained eggs of the pinworm *Enterobius vermicularis*, which has been shown to be the most common parasite of the Anasazi (Reinhard 1990).

Reporting on mummies from Ventana Cave, southern Arizona, Haury (1950) found two types of burial practice: flexed and extended bodies. Haury further states that the degree of flexure varies, from doubling up the legs without drawing them up to the chest to tight flexing, the latter being more common. In the former cases, there is a binding about the legs. Here, as elsewhere in the Southwest, the mummies were entirely the result of natural desiccation.

One of the largest mummy collections is stored at the Arizona State Museum (Table 7.1). This includes mummies from Vandal Cave and Painted

Table 7.1. Sites with mummies in the collections of the Arizona State Museum (ASM)

Site name	Site number ^a	Total number of burials	Number of mummies in ASM collections	Time period ^b	Cultural affiliation ^b	Archeological reference
Vandal Cave	Ariz. E:7:1	11	8	AD 500–700 AD 1150–1250	Anasazi	Haury (1936)
Painted Cave	Ariz. E:7:2	3	2	AD 1150–1250	Anasazi	Haury (1945)
Canyon Creek Ruin	Ariz. V:2:1	40	5	AD 1300–1350	Anasazi	Haury (1934)
McCuen Cave	Ariz. W:13:6	21(?)	10	Undoubtedly prehistoric	?	None
Ventana Cave	Ariz. Z:12:5	39	11	AD 1000–1400 ^c	Hohokam	Haury (1950)
Texas Cave	Texas 0:7:3 ^d	2(?)	2	?	?	None
Miscellaneous	Various places in Arizona and Colorado	?	5	Probably prehistoric	?	None

Notes:

^a Except when noted, sites are designated according to the system employed by the Architectural Survey of the ASM (Wasley 1964).

^b Information on the time period and cultural affiliation of Vandal Cave, Painted Cave, Canyon Creek Ruin, and Ventana Cave comes from Haury (personal communication).

^c Ventana Cave was occupied off and on for thousands of years, beginning more than 10 000 years ago. However, all the burials except three (nos. 20, 35, and 36), and all the mummies, date from the period AD 1000–1400.

^d This designation is according to the system employed by the no-longer-existing Gila Pueblo Archeological Foundation.

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Cave, northeastern Arizona, as well as those from east-central and southern Arizona. The mummies from Ventana Cave were reburied in 1992. Pertinent information on each mummy is provided in Tables 7.2 through 7.8. It is necessary to point out two things. First, when the burial number of a mummy is not known, the Arizona State Museum (ASM) catalog number of the specimen is used in its place in order to distinguish individuals. The catalog number always appears in parentheses. Second, the age and sex of each mummy were estimated by Mulinski and Birkby (unpublished data).

As noted above, dry conditions resulted in spontaneous mummification, i.e., the soft tissues dried before putrefaction destroyed them. In connection with this, it is interesting to note that the integument of the head is usually the first to disintegrate. For example, mummies had generally intact skin on the torso and extremities, but the covering of the head, especially of the face, has not been preserved or has a significantly lesser percentage of skin still intact. This phenomenon is undoubtedly related to differences in the thickness of the soft tissues surrounding the skull and post-cranium.

Very few biological studies on the mummies in the ASM collections have been carried out. Gabel (1950) examined the human remains from Ventana Cave but made no specific studies of the mummies. On the other hand, two unpublished studies on the Ventana Cave mummies are mentioned by Haury (1950). One of these concerned the paleopathology of valley fever (coccidioidomycosis). Radiographic attempts to define pathology related to valley fever were inconclusive. A second study involved a search for ABO antigens. Nine mummies were positive for type O and one for AB.

Other research projects focussing on diet and parasitism have been done. Reinhard and Hevly (1991) analyzed feces from Mummy 5 from Ventana Cave, a child who died between 4 and 5 years of age. No parasites were found, but two meals were identified. One was composed primarily of mesquite and the other of Saguaro cactus seeds and pollen. A coprolite from an adult female mummy from Ventana Cave, Mummy 11, was studied. No intestinal parasites were found, but the sample contained evidence that buds of saguaro or organ pipe cactus were eaten. The use of buds from these cacti has never before been noted. Birkby has undertaken an examination of the head hair from several mummies for ectoparasites. His results are presented in Table 7.9. Of 18 individuals with a sufficient amount of hair to be analyzed, 8 (44.4 percent) had head lice (*Pediculus humanus capitis*). In all instances, only the nits were found.

Analysis of coprolites from partially mummified bodies from Utah and Arizona provides insights into the prehistoric use of medicinal plants, especially willow, Mormon tea, and creosote (Reinhard et al. 1991).

Table 7.2. Mummies from Vandal Cave

Burial number	Burial position	Condition of mummy	Sex	Age (yr)	Comments
2	Flexed	Complete, but no nails or hair present	Female (?)	Old adult, (>40)	Part of shroud still covering legs
7	Flexed	Complete, but no nails present; small amount of hair present	?	Infant (1-2)	Bracelet still in place on right wrist
9	Flexed	Complete, but no nails present; very small amount of hair present	Male (?)	Adult	Part of burial blanket still covering lower torso
10	Semiflexed	Apparently complete; nails and fair amount of hair present	?	Adult	Body still almost entirely covered with burial blanket and encrusted with soil
?(0-485)	Flexed/semiflexed	Complete; nails, but only very small amount of hair present	?	Infant (0.5-1.0)	Buried on flexible cradleboard
?(0-487A)	Flexed	Complete, although head detached from rest of body; some nails and very small amount of hair present	?	Infant (1.5-2.5)	Cranium with occipital deformation
?(0-487B)	?	Partial; only right forearm and hand and right leg and foot present	?	Infant (0.5-1.5)	
?(0-487C)	?	Partial; only lower part of left leg and foot present	?	Infant (birth-0.5)	

Mummies in the southern and southwestern United StatesTable 7.3. *Mummies from Painted Cave*

Burial number	Burial position	Condition of Mummy	Sex	Age (yr)
?(0-514)	Semiflexed (?)	Partial: left leg and foot missing, part of right foot missing; anterior walls of thoracic and abdominal cavities almost completely disappeared; nails absent; some hair present	?	Infant (0.5-1.5)
?(0-515)	Flexed	Complete, but skin rather worm-eaten in appearance; nails and some hair present	Male	Child (3.5-4.5)

ARCHAIC MUMMIES FROM TEXAS

In the last decade, mummies from the lower Pecos region of Texas have been most intensively studied. Mummies from this area come from caves and natural shafts where corpses were placed in prehistory. A great number of mummies is known from the regions, and the burial practices have been summarized by Turpin and associates (1986). These mummies are from hunter-gatherer cultures and provide an idea of the hazards of hunter-gatherer life in the area. One such hazard was seasonal starvation, as documented by Banks and Rutenburg (1982). Their radiographic analysis of a child mummy reveals a series of growth arrest lines that are probably the result of seasonal fluctuation in food abundance. The other main health hazard for the region was dental pathology. Dental attrition and dental caries with resulting tooth avulsion was the most consistent health problem faced by ancient Texas hunter-gatherers (Hartnady 1986; Marks *et al.* 1988; Turpin *et al.* 1986). The cause of this severe dental pathology was a reliance on desert succulent plants (Huebner 1991). These plants have been found to have a remarkably high concentration of abrasive crystals called phytoliths which are harder than enamel and which wore the teeth to point of exposing the pulp chamber (Danielson 1993).

SOUTHERN UNITED STATES

Another collection of naturally mummified prehistoric American natives comes from Kentucky. The best known of these is Little Alice (Watson 1969). Little Alice's desiccated body was recovered by two local men in 1875 near what is now known as Mummy Valley. Little Alice was displayed in commercial

Table 7.4. Mummies from Canyon Creek Ruin

Burial number	Burial position	Condition of mummy	Sex	Age (yr)	Comments
13	Extended (?)	Indeterminate, but no skin left on exposed part of head	?	Infant (1–2)	Body still wrapped in shroud(s); buried on cradleboard
20	?	Partial: only bones of right leg and both feet present, with some tissue also present	?	Adult	Osteitis observable on tibia and fibula; both feet in sandals
22	Extended (?)	Indeterminate, but does not appear to be much tissue left	?	Probably infant	Body still wrapped in shrouds(s)
32	?	Partial: skeleton disarticulated; very little tissue remaining	?	Infant (birth–0.5)	Body still wrapped in shroud(s); buried on cradleboard
33	?	Partial: skeleton disarticulated and incomplete; with no skull and very little postcranium remaining; very little tissue left	?	Fetal–newborn	

Table 7.5. Mummies from McCuen Cave

Burial number	Burial position	Condition of mummy	Sex	Age (yr)	Comments
Mc:1—4	?	Partial: body jumbled mass, but some tissue present	?	Fetal—newborn	
?(0-483)	Extended	Complete, although head detached from rest of body; a few strands of hair present	?	Infant (1-2)	Body still somewhat covered by shroud(s)
?(0-493)	?	Partial: only some lumbar vertebrae, pelvis, and lower extremities present; only small amount of tissue present	Male	Adult	
?(0-494)	?	Partial: head, upper extremities (except for left humerus), and feet missing; fair amount of tissue still remaining	Female	Adult	
?(0-500)	Extended	Complete; abundant amount of hair present	?	Infant (birth-0.5)	Body still wrapped in shroud(s); buried on cradleboard
?(0-502)	Flexed	Complete, although head detached from rest of body and skin not well preserved; no hair present	?	Infant (1-2)	
?(0-503)	Extended	Complete; some hair present	?	Fetal—newborn	Body still wrapped in shroud(s); buried on cradleboard
?(0-512)	?	Partial: only head, some vertebrae, and rib fragments present; some tissue preserved, but no hair present	Female	Adult	Cranium exhibits lambdoid deformation
?(0-750A)	?	Partial: only both legs and feet present; some tissue preserved	?	Adult	Feet in sandals
?(0-750B)	?	Partial: only left leg and foot present; some tissue preserved	?	Adult	Foot in sandal

Table 7.6. *Mummies from Ventana Cave*

Burial number	Burial position	Condition of mummy	Sex	Age (yr)	Comments
3	Flexed	Complete, although right upper extremity disarticulated at elbow; some hair present	Female	Old adult (>50)	Most of head hair present is gray; calculus present on anterior mandibular teeth; periodontal disease evident
5	?	Partial; skeleton fairly complete, but disarticulated; some tissue remaining, including very small amount of hair	?	Young child (5–6)	
6	Extended	Complete, although left upper extremity disarticulated at elbow; some hair present	Female	Young child (4–5)	Wooden block wrapped with textiles placed under head of this individual when buried
9	Extended	Complete; small amount of hair present, but no nails	Male	Adult	Nose plug and earrings still present; most of torso and upper extremities covered with shroud; grave goods included skin quiver containing cord with attached shell, nose plug, projectile points, four bone awls, human-hair wig, cactus-spine needle, and several fragments of preserved sandals, and miscellaneous cotton cloth fragments
11	Extended	Complete; nails and hair absent	Female	Adult	Body covered with cotton robe when buried
15A	?	Partial: skeleton fairly complete, but disarticulated; very little tissue	?	Infant (1.5–2.5)	

		remaining;extremely small amount of hair present			
15B	?	Partial: only left forearm and hand present; some tissue remaining	?	Young child (5-6)	
16	?	Partial: only skull, some cervical vertebrae, and right talus present; some tissue remaining, including very small amount of hair	Male (?)	Old adult (>40)	
24	?	Partial: skeleton fairly complete, but somewhat disarticulated; some tissue remaining	?	Infant (0.5-1.5)	Body placed in twined bag and buried in grass nest
25	Semiflexed	Complete; fair amount of hair present	? ?	Probably infant/ young child	Body still almost entirely covered with shroud
29	Semiflexed	Complete, although head detached from rest of body; fair amount of tissue remaining; very small amount of hair remaining		Infant (1.0-1.5)	Body buried in fur robe shroud

Mummies of the Americas

Table 7.7. Mummies from Texas Cave

Burial number	Burial position	Condition of mummy	Sex	Age (yr)	Comments
?(0-740)	?	Partial: skeleton fairly complete, although somewhat disarticulated; some tissue remaining	?	Infant (birth-0.5)	
?(0-759)	Extended	Complete; large amount of hair present	?	Infant (birth-0.5)	Body still covered with burial blanket; buried on mat

caves for many years after the original discovery. In 1958 she was brought to the University of Kentucky, where detailed studies were made. The presence of external genitalia showed the desiccated body to be that of a young male about 9 to 10 years of age and Little Alice is now known as Little Al. According to Robbins (1971), the body is in an excellent state of preservation, except for slight fungus growth as a result of its exposure to the outside atmosphere. Radiocarbon dating using abdominal and lower thoracic tissue produced an age of 1960 ± 160 years BP. On the basis of cultural and physical anthropological data, Robbins concluded that Little Al may have belonged to a group of Woodland Indians who were the recent human occupants of the cave.

Several other desiccated bodies have been found in the Mammoth Cave area. Most of these were discovered by saltpeter miners early in the nineteenth century in Short Cave. Between 1811 and 1815, at least four mummies were found (Meloy and Watson 1969). The Mammoth Cave mummy known as Fawn Hoof was found in Short Cave in 1813. She was sitting in a stone box grave, of the kind commonly found in Tennessee and neighboring counties in Kentucky to the south of Short Cave. Physically, the body was well preserved; the flesh was dry, hard and dark. Fawn Hoof was dressed in several finely fashioned animal skin burial garments (Robbins 1974) and was accompanied by a variety of grave goods. Fawn Hoof is the only one of the mummies that definitely seems to have been accompanied by grave goods (Watson 1969). According to Watson, Fawn Hoof and several items found with her were given to the American Antiquarian Society in Worcester, Massachusetts, about 1817. She was then exhibited at the US National Museum in 1876. Her body has been dissected, and the clean bones are stored at the Division of Physical Anthropology, Smithsonian Institution.

Table 7.8. Mummies from several localities in the Southwest

Location	Burial position	Condition of mummy	Sex	Age (yr)	Comments
Slab House Ruin, Duggagei Canyon, Arizona (0-200)	?	Partial: legs and feet missing; no skin left anteriorly and only small amount remaining posteriorly	?	Infant (1-2)	Cranium exhibits rather extreme lambdoid deformation
Yellow Jacket Canyon Colorado (0-245)	?	Partial: skeleton fairly complete, but almost completely disarticulated; some tissue remaining	?	Infant (1.5-2.5)	
Cliff House, Tonto Basin, Arizona (0-498)	?	Partial: skeleton fairly complete, but for most part disarticulated; some tissue remaining	?	Infant (birth-0.5)	
Cottonwood area, Arizona (0-501)	?	Partial: most of face and lower extremities missing	?	Infant (birth-1)	
Duggagei Canyon, Arizona (0-511)	?	Partial: only skull, some cervical vertebrae, and innominates present; small amount of tissue present	Female	Adult (15-20)	

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Table 7.9. Findings of examination of head hair from certain North American Indian mummies in ASM collections for head louse, *Pediculus humanus capitis*

Site	Number of mummies with lice	Number of mummies without lice
Vandal Cave	0	3 (burials 7, 9, 10)
Painted Cave	2 (0-514, 0-515)	0
McCuen Cave	0	3 (Mc:2, 0-500, 0-503)
Ventana Cave	6 (burials 3, 5, 9, 15A, 16, 25)	2 (burials 6, 29)
Texas Cave	0	2 (0-740, 0-759)
Total	8	10

Source: W. H. Birkby (unpublished data).

Another mummy, known as the Scudder mummy, was also recovered from Short Cave. Deerskin wrappings on the body and deerskin items found with it indicated that it was from the same population as Fawn Hoof (Robbins 1974). The Scudder mummy, thought to be an adolescent boy, showed evidence of a fracture of the occipital bone that may have contributed to his death.

The remains of a mummy known as Lost John were recovered from Mammoth Cave in 1935. The desiccated body was found lying partially crushed under a boulder. Apparently, Lost John was the victim of a prehistoric mining accident. Neumann (1938) believes that the miner was kneeling when the boulder fell, its impact forcing him to fall on his right side. The cultural items found near the body indicate that this individual was involved in mining activities at the time of death (Robbins 1974). The body is well preserved, with flesh and internal organs present except for areas where rodent activities are evident. Lost John was a male in his forties. Textile material, evidently some sort of a blanket or robe of open twined weave, was tied with a braided cord around the body, and a mussel shell pendant was suspended from the neck by a piece of two strand twisted cord. A crude limestone hammer, bundles of reeds tied with grass, sticks, parts of gourds, a fragment of bagging, a stout pole that was probably used as a ladder, some hickory nuts, and human coprolites are the only other materials in the cave (Neumann 1938). On the basis of cultural and geological evidence, Neumann suggests a date for John's death of about 500 years ago.

Mummies have also been found in caves in Tennessee. Holmes (1891-2) reported on two mummies found in 'a copperas cave' in Warren County, West Tennessee. The bodies, a male and a female, were discovered in 1810. Both had been placed in large cane baskets and buried in the cave floor. The

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female, like the bodies in Short Cave, was wrapped in a succession of materials, including hides, a feather cloak, and a piece of plain textile. According to Holmes (1891–2), a scoop net, a moccasin, a mat (all made of bark thread), and a turkey feather fan were also found.

Robbins (1974) suggests that the interment of the Short Cave mummies exhibits a pattern similar in some ways to mummies found in Tennessee, though it is different in others. In both areas mummies were wrapped in deer-skin and accompanied with grave goods. Robbins further suggests that the Tennessee mummies differ in that some were disarticulated at the hips before being wrapped or dressed.

The most significant mummy discovery was made in Florida, where a peat bog had preserved brain tissue from a hunter–gatherer occupant dated to between 7000 and 8000 years ago. The site is known as Windover Pond and its discovery and excavation was a major sensation in the mid-1980s. No soft tissue other than the brain was preserved, but it provided the oldest sample of human DNA recovered at that point (Doran *et al.* 1986).

The mummies in the Ozark Mountains along the Arkansas–Missouri border belong to the bluff-dwellers who inhabited the shelters for centuries. Of the large number of burials found, a few mummified bodies have been identified and these have been studied sparingly (Riddick 1992). The mummies were not intentional, but were simply preserved by the dry climate in the limestone caves. Radiocarbon dating of agricultural material from these caves gave values ranging from 2960 ± 40 BP to the most recent at 280 ± 100 BP, although dating of charcoal from one site gave a value of approximately 10 000 BP. Analysis of coprolites from one mummy revealed traces of sumac, ground acorns, charcoal, and other vegetable material. Radiographic studies including three dimensional and standard CT scans were performed on several wrapped mummies, identifying those bodies that might be suitable for further study.

SUMMARY

Although mummies have been recovered from the southwest and southeast United States for many years, very few scientific studies on prehistoric health have been completed. During the past decade, Texas has been the scene of the most active mummy research, with a variety of analyses shedding light on the paleopathology in that region. In the 1990s, the potential for analysis decreased due to repatriation efforts on the part of Native American tribes. One of the most significant collections of mummies, that from Ventana Cave,

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has been reburied and is lost for future study. This is a strong indication that the door has been shut on mummy studies in the Southwest and can be opened only by concerted efforts to educate and cooperate with Native American tribes in the region.

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