

***Cranial clues to the
mysterious decline of
the Maya civilization:***

The hippocampal hypothesis

By William Feindel, MD., CM, FRCS(C), FRS(C)

Archeological studies have substantiated the Maya culture as the most highly developed ancient civilization in the Americas. Flourishing between 300 and 800 A.D., it was characterized by achievements in astronomy, mathematics, writing, religion, art, and architecture that marked high intellectual and creative activity.

But within a century, beginning around 800 A.D., the oldest and most developed centers of this civilization underwent a dramatic col-

lapse: the richly decorated temples and palaces (some sited to coincide with viewlines of the solstices and equinoxes) and the calendric monuments systematically sculpted to identify successive rulers, were no longer erected. The priest-ruled cities became depopulated and eventually abandoned to the jungle.

Many probable causes for this strange decline have been the subject of intense scholarly consideration, but none of the possible explanations

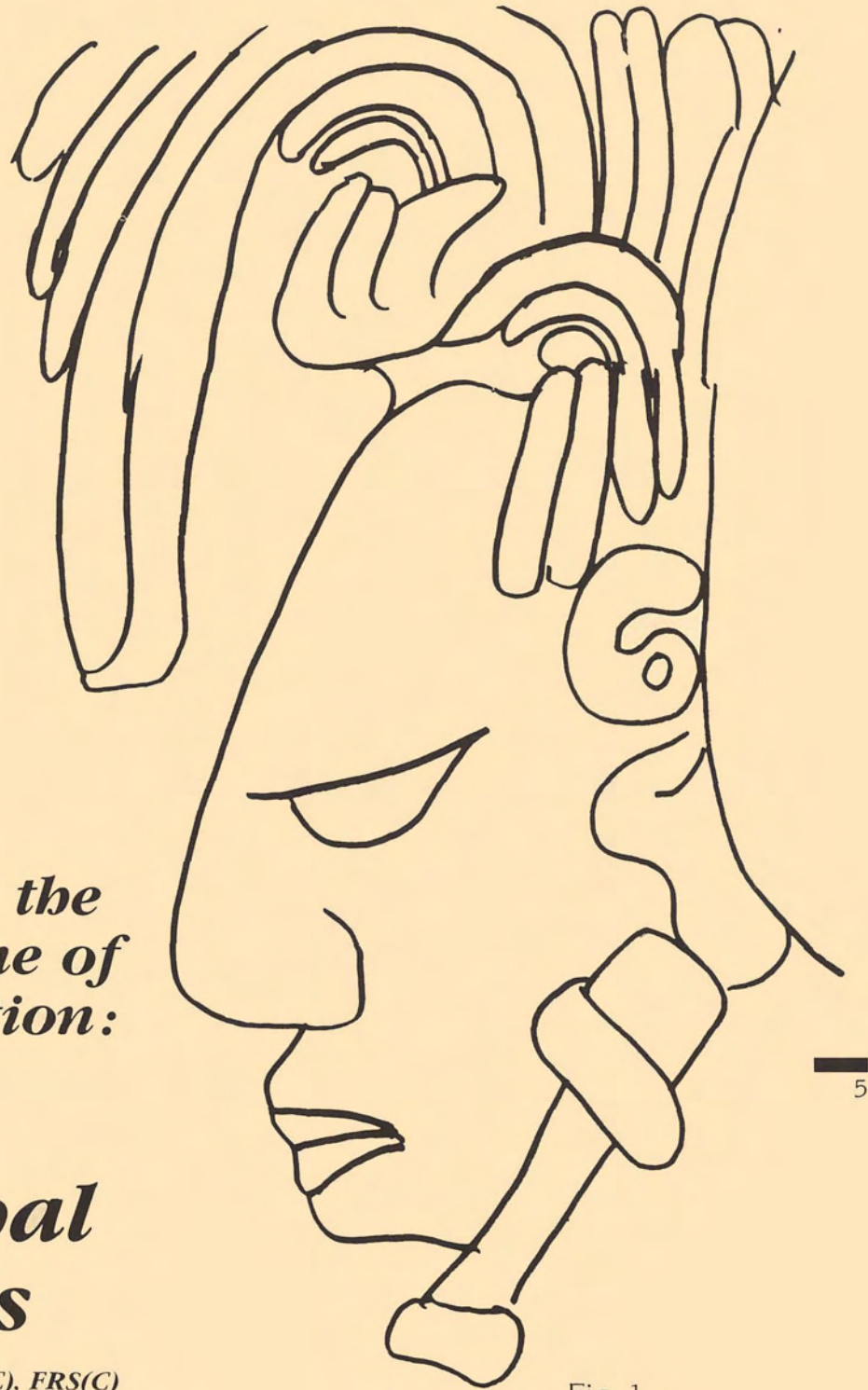


Fig. 1

associated with exuberant head dress as part of the elaborate religious costume. In typical examples, the forehead was slanted acutely backward and the head often pointed or oxycephalic, as evident in the bas-relief stone sculpting (outlined in Figure 1) from Bonampak (circa 790). In other examples, the base of the head dress fitted like an inverted cone over the misshapen cranium as shown in the drawing of the ceramic figurine from Campeche (Figure 2). This practice of moulding the cranium may possibly have been carried on for some centuries after the Maya decline. A skull dated about 1700 A.D. from the National Museum, shows the exaggerated elongation and a concavity in the superior frontal parietal region that may correspond to a constricting head-band (Figure 3). It would be of great value to study examples of earlier skulls to elucidate at what phase of the Maya culture this deformity appeared.

A jade carving from the American Museum of Natural History (undated) shows what appear to be two children with headbands made of individual plates. These may represent the means by which the head moulding in infancy or childhood determined the unusual adult shape (Figure 4). Many depictions of headshapes going back to the earlier centuries of the Maya culture show normal cranial outlines. Indeed, the first historical document of Maya hieroglyphic writing, known as the Leyden plate (circa 320),

shows a head with only a slight obliquity of the forehead common to the normal Maya profile but topped by one of the florid head costumes (Figure 5).

Some of these splendidly costumed priests with magnificent plumed head-dresses showed more advanced oxycephaly than the soldier guards or peasants. In wall drawings documenting the conquest of the Toltecs over the Maya in Chichen Itza, the Maya, but not the external victors, are pictured with moulded heads. These head shapes were thus most prominent among the elitist ruling class during the later classic period, after which the Maya culture relentlessly declined.

Such advanced forms of cranial distortion could produce secondary effects on brain growth and development. As we know, from studies carried out here earlier at the Institute, compression of the head during difficult birth and delivery can selectively damage the mesial portions of the temporal lobes, especially the amygdala and hippocampus on both sides. This can result in seizures and disturbance of memory function^(2,4,6,8). If this cranial compression by headbands were continued from childhood onward, one would even expect some of the secondary effects noted in severe cranial stenosis such as proptosis (see Figure 2) and the well recognized associated intellectual deterioration⁽⁹⁾. This cranial deformity seems to have



Fig. 4

