

# THE PREHISTORIC HUMAN REMAINS OF SOM RON SEN, CAMBODIA

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The human skeletal sample from the Som Ron Sen site (also called Samrong Sen), in the province of Kompong-Leng, Cambodia, was exhumed in 1901 by the Assistant Director of the Geological Service of Indo-China, Henri Mansuy (Mansuy 1902, 1923). There were at least 20 individuals as deduced from the number of mandibles and post-cranial bones (Colani 1930). However, of the three skulls, only that of one male is well preserved.

## THE SOM RON SEN SITE

The site of Som Ron Sen, which lies close to the village of Kompong-Cheng, was exploited during the 1930s through extraction of mollusc shells for the manufacture of hydrated lime (Patte 1932; Gubler 1935). Nowadays, the surviving portion is located on the right bank of the Strung-Kinit, a rivulet which belongs to a drainage network flowing from the Kompong-Leng mountains into the Tonle Sap (Saurin 1963).

The elliptical mound has a north-south length of 350 m and is 190 m wide. It is composed to a depth of 5 m of various sediments, many deposited by successive floods of the Strung-Kinit. The layers include burials and remains of habitation. The second level within the mound, beneath a surface layer 1 m thick, is predominantly composed of grey lenses made up of solid argyllo-limestone concretions a few centimetres thick, corresponding to the flood level at its highest during the rainy season (Mansuy 1923). This layer of sediment results from the chemical action of the river water, which contains a rather high proportion of carbonic acid. This carbonic acid reacts on contact with the lime-rich deposit and forms a precipitate of neutral, insoluble carbonate.

The third level from the surface, which is approximately 4 m thick, constitutes the whole of the archaeological deposit. It is composed of an argyllo-siliceous and calcareous sediment, rich in organic matter, strewn with shells and grey ash.

The site was discovered by Roques in 1876. Although H. Mansuy carried out some surveys there in 1901 and 1923, actual excavations were never undertaken by him. Nevertheless, the site was visited by many others, including Lt de Vaisseau Moura, a representative of the Protectorate in Cambodia; by Dr Corre (in 1879-80), a naval doctor; by M. Fuchs (in 1882), a mining engineer; and by M. Jammes (in 1887-88 and 1897), a member of the Company of Indochinese Studies. More recent visits were made by R. Mourer (Mourer and Guerin 1969), J.P. Carbonnel (Carbonnel and Delibrias 1968), and some students in archaeology from the Royal University of Fine Arts (Phnom-Penh).

In 1968, J.P. Carbonnel (Carbonnel and Delibrias 1968) obtained the radiocarbon date of 3230±120 BP (Centre des Faibles Radio-activités, CENS, 91-Saclay, Essonne, France) for the archaeological layer from shells found at 1.5 m depth. Near the skull described below, and buried at a depth below surface of 3.8 m, funerary furniture had been discovered consisting of four arm rings (two terracotta and two shell) and beads of flat circular shells (Mansuy 1902). During restoration of the skull in 1998, four more shell beads approximately 3.2 mm in diameter were discovered and extracted from the endocranial sediment.

The skull (Figure 1) was complete at the time of its discovery, but some parts of individual bones could not be recovered (Mansuy 1902). Indeed, the permeable ground which the skull comes from hardly favoured its conservation because it was inundated each year during the high water periods.

The skull is composed of the calvaria and almost all of the face (upper maxilla and mandible). Mansuy did not give a report on the post-cranial skeleton. However, the fact that the calvaria and the mandible were exhumed together suggests that the rest of the skeleton might also once have been present in the level, perhaps disturbed.

The Som Ron Sen skull is that of a modern human (*Homo sapiens sapiens*). The probability that it is male is very high,

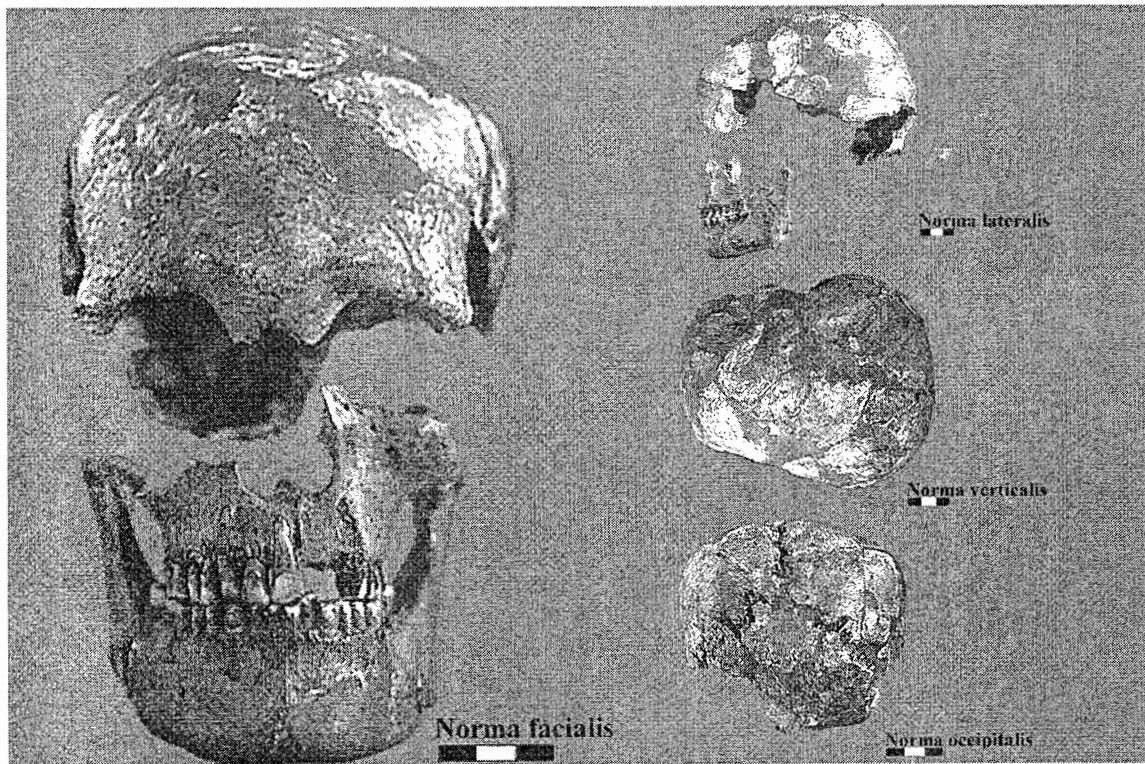


Figure 1: The Son Ron Sen skull.

as testified by the inclined frontal bone, the well-developed supraorbital arches, the barely oblique gonial angle ( $109.5^\circ$ ), the high mental symphysis (36.2 mm) and the marked height of the ramus (73.5 mm).

Scrutiny of the cranial sutures, although made difficult by the presence of wax, reveals the existence of at least two wormian bones (extra-sutural ossicles) and an early stage of synostosis of the lambdoid suture. This last character evokes a young adult. The presence of completely erupted third molars which however have not developed any occlusal wear facets confirm his youth. On the other hand, the helicoidal wear of the molars and the premolars, and the strong wear evident from the planed shape of the incisors, both features due to a labio-dental occlusal pattern which is characteristic of prehistoric populations, suggest that this young adult could not have been too young. This point of view is confirmed by radiography of the right  $I^1$  which shows a narrow root canal.

Anthropological analysis of the Som Ron Sen skull (Figure 1, Table 1) highlights a mosaic of "archaic" and "modern" features. The calvaria, in particular the parietal, has an advanced morphology. On the other hand, the masticatory apparatus retains many "archaic" anatomical characters. The skull is brachycephalic, sphenoid and very

broad, both across the calvaria and the face, with projecting parietal bosses located high on the vault. Its endocranial surface is strongly marked with the negative impressions left by the cerebral vascularisation. The external and internal bi-condylar widths are relatively small (121 mm and 81.5 mm) compared to the other transverse breadths of the calvaria (maximal width of the cranium is 147 mm), which implies a narrow base to the skull (Peyre 1986). These features agree well with the "house" form in posterior view. The parietal bone is well developed in the sagittal plane, as much in its orientation as in its curve. The fact that the lateral outline of the parietal continues uninterrupted from that of the frontal bone corresponds well to the evolutionary tendency expected for this period. Lastly, the occipital bone carries fairly marked nuchal lines and an extremely developed external occipital protuberance. This last feature is interpreted as masculine.

Some "archaic" characters can be observed on the braincase, but especially on the masticatory apparatus. The pronounced thickness of the bone of the cranial vault corresponds to that of the Wajak skulls (10.1 mm) from Indonesia (Demeter 1996), and the Mai Da Nuoc and Mai Da Dieu skulls from Vietnam (Nguyen 1986). The length of the mandible corpus (84 mm) is large and close to the value for

Table 1. Main linear measurements (in mm) and angles (in degrees) of the Som Ron Sen male skull (Demeter 2000). Estimates are shown with a ± range indicating the likely error. Asterisked measurements are defined by Twisselman and Brabant (1960). See Demeter (2000) for further measurements.

| Measurement description | Martin's no. | Measurement | Measurement description         | Martin's no. | Measurement |
|-------------------------|--------------|-------------|---------------------------------|--------------|-------------|
| Maximum cranial length  | 1            | 181.8       | Spino-alveolar facial height    | 48 (1)       | 18.8        |
| Glabella-inion length   | 2            | 165.5       | Inter-orbital breadth           | 50           | 23.5        |
| Nasion-inion length     | 2a           | 162.0       | Palate height                   | 64           | 14.0        |
| Glabella-lambda length  | 3            | 180.0       | External bi-condylar width      | 65           | 121.0       |
| Maximum cranial breadth | 8            | 147.7       | Bigonial breadth                | 66           | 99.0        |
| Minimum frontal breadth | 9            | 100.0       | Anterior corpus breadth         | 67           | 52.0        |
| Maximum frontal breadth | 10           | 117.6       | Mandible breadth across molars* | -            | 46.5        |
| Bi-asterionic breadth   | 12           | 108.7       | Left corpus height at molars*   | -            | 32.8        |
| Frontal arc             | 26           | 131.0       | Right corpus height at molars*  | -            | 32.3        |
| Parietal arc            | 27           | 131.0       | Corpus length                   | 68           | 84.0        |
| Lambda-inion arc        | 28 (1)       | 82.5        | Mandible length                 | 68 (1)       | 105.5       |
| Frontal chord           | 29           | 115.0       | Condyle height                  | 70           | 69.0        |
| Parietal chord          | 30           | 116.0       | Ramus height                    | 70 a         | 73.5        |
| Lambda-inion chord      | 31 (1)       | 74.5        | Sigmoid notch depth             | 70 (3)       | 16.0        |
| Inion-opisthion chord   | 31 (2)       | 90.0        | Left ramus breadth              | 71           | 38.0        |
| Bimaxillary breadth     | 46           | 101.0       | Right ramus breadth             | 71           | 35.8        |
| Facial height           | 47           | 122+2       | Gonial angle                    | 79           | 109.5       |
| Upper facial height     | 48           | 73.5+2      | Symphysis angle                 | 79 (1a)      | 85.0        |

Minatogawa 1 (80 mm) from Okinawa (Demeter 1996). The dental arches are strongly developed in the molar region (46.5 mm). The molars (Table 2) are very large (average maxillary molar surface area: 117.1 mm<sup>2</sup> and average mandibular molar surface area: 121.4 mm<sup>2</sup>), similar to those of Liujiang from China (Demeter 2000). The tendency for molar breadths to be not much greater than molar lengths (average maxillary molar shape index: 127.1 and average mandibular molar shape index: 108.2) is very close to the pattern observed for the Wajak group. The lower third molars, completely erupted and as large as any of the other molars, can be held responsible for the anterior orientation of the roots on the lower second premolars, first and second molars, and incisors (Marseillier 1947; Twisselman and Brabant 1960).

The mandible has an "archaic" morphology, which seems to be atavistic in comparison with the late estimated age of this fossil. The ascending ramus is extremely high (73.5 mm). The robust mandible body is vertically oriented and remains relatively high in its molar portion (left body: 32.3 mm, right body: 32.8 mm). The breadth of the ascending ramus is average (36.8 mm) and much narrower than that of Wajak II (56 mm). The gonial angles are very squareish (109.5°), even for a male, and the mental symphysis has average projection. Lastly, the interorbital breadth, which is large (23.5 mm), strongly evokes the Wajak (29.5 mm), Liujiang (27.6 mm) and Mai Da Dieu (23 mm) crania.

## CONCLUSION

It may be concluded that the Som Ron Sen individual was an adult, rather young, and doubtless of the male sex. His diet, maybe mainly composed of siliceous plants, prematurely wore down his teeth. The helicoidal and labio-dental wear observed may have been caused by specific movements of the masticatory apparatus, such as use of the molars in manufacturing braid links (following Inuit ethnographic analogy).

The skull presents a mosaic of modern and archaic features. The broad calvaria, with a parietal bone well developed in size and curvature, the strongly projecting parietal bosses, and an unobtrusive glabella, are "modern" aspects. On the other hand, the large molars with the third molars as large as any more anterior molars, the vertically oriented and high mandibular body, and the very high ascending mandibular ramus reflect "archaic" aspects of the skull.

Although the Som Ron Sen cranium differs in shape from the small skulls found in Japan (Minatogawa) and from the very large skulls found in Indonesia (Wajak) and Vietnam (Mai Da Dieu, Mai Da Nuoc), this skull shares with them some morphological features, especially in the persistence of "archaic" as well as "modern" characters. This may suggest that the prehistoric human groups of early Holocene Southeast Asia were inter-related.

## DEMETER, PEYRE AND COPPENS: HUMAN REMAINS, SOM RON SEN, CAMBODIA

Table 2. Som Ron Sen tooth diameters, surface areas and shape indices, compared to other specimens (from Demeter 1966, 2000)

| Specimen           | Jaw          | Tooth     | No.      | MD length   | BL<br>breadth | MDxBL<br>area | 100 BL/MD<br>index |
|--------------------|--------------|-----------|----------|-------------|---------------|---------------|--------------------|
| <b>Som Ron Sen</b> | <b>Upper</b> | <b>I1</b> | <b>1</b> | <b>9.0</b>  | <b>7.6</b>    | <b>68.4</b>   | <b>84.4</b>        |
| Mai Da Dieu        | "            | I1        | 2        | 7.9         | 6.9           | 54.2          | 87.9               |
| Liujiang           | "            | I1        | 2        | 7.2         | 8.0           | 57.9          | 111.2              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>I2</b> | <b>1</b> | <b>7.5</b>  | <b>6.5</b>    | <b>48.8</b>   | <b>86.7</b>        |
| Minatagowa I       | "            | I2        | 2        | 6.6         | 7.0           | 46.4          | 106.1              |
| Mai Da Dieu        | "            | I2        | 2        | 6.4         | 6.5           | 41.6          | 101.6              |
| Liujiang           | "            | I2        | 2        | 7.0         | 7.3           | 51.1          | 104.3              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>C</b>  | <b>2</b> | <b>7.1</b>  | <b>9.0</b>    | <b>63.1</b>   | <b>127.1</b>       |
| Wajak II           | "            | C         | 2        | 9.4         | 10.0          | 93.5          | 105.9              |
| Minatagowa I       | "            | C         | 1        | 7.1         | 8.5           | 60.4          | 119.7              |
| Mai Da Dieu        | "            | C         | 2        | 7.8         | 7.8           | 60.5          | 100.6              |
| Liujiang           | "            | C         | 2        | 7.5         | 9.1           | 67.8          | 122.1              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>P1</b> | <b>2</b> | <b>6.0</b>  | <b>9.6</b>    | <b>57.6</b>   | <b>160.0</b>       |
| Wajak II           | "            | P1        | 2        | 9.0         | 10.1          | 90.7          | 112.9              |
| Mai Da Dieu        | "            | P1        | 2        | 7.1         | 9.3           | 66.1          | 131.1              |
| Liujiang           | "            | P1        | 2        | 7.3         | 10.3          | 74.3          | 141.4              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>P2</b> | <b>2</b> | <b>6.2</b>  | <b>9.8</b>    | <b>60.5</b>   | <b>157.4</b>       |
| Wajak II           | "            | P2        | 2        | 7.8         | 10.9          | 85.0          | 139.7              |
| Minatagowa I       | "            | P2        | 1        | 6.5         | 9.8           | 63.7          | 150.8              |
| Mai Da Dieu        | "            | P2        | 2        | 6.8         | 8.8           | 59.4          | 130.7              |
| Liujiang           | "            | P2        | 2        | 7.2         | 10.2          | 73.4          | 141.7              |
| Dong Can           | "            | P2        | 2        | 6.4         | 10.1          | 64.8          | 158.1              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>M1</b> | <b>2</b> | <b>10.5</b> | <b>11.6</b>   | <b>120.7</b>  | <b>110.5</b>       |
| Wajak II           | "            | M1        | 2        | 10.4        | 11.8          | 122.8         | 113.8              |
| Minatagowa I       | "            | M1        | 1        | 8.8         | 12.8          | 112.6         | 145.5              |
| Mai Da Dieu        | "            | M1        | 2        | 11.3        | 12.1          | 136.8         | 107.1              |
| Liujiang           | "            | M1        | 2        | 10.0        | 12.7          | 125.7         | 127.6              |
| Dong Can           | "            | M1        | 2        | 9.5         | 13.4          | 127.2         | 144.6              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>M2</b> | <b>2</b> | <b>9.7</b>  | <b>11.7</b>   | <b>112.9</b>  | <b>121.4</b>       |
| Wajak II           | "            | M2        | 2        | 10.4        | 12.4          | 128.8         | 119.6              |
| Minatagowa I       | "            | M2        | 1        | 10.0        | 13.4          | 134.0         | 134.0              |
| Mai Da Dieu        | "            | M2        | 2        | 10.1        | 11.6          | 116.6         | 114.4              |
| Liujiang           | "            | M2        | 2        | 9.8         | 12.6          | 123.4         | 129.2              |
| Dong Cau           | "            | M2        | 1        | 10.8        | 13.7          | 148.0         | 126.9              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>M3</b> | <b>1</b> | <b>9.6</b>  | <b>12.2</b>   | <b>117.1</b>  | <b>127.1</b>       |
| Wajak II           | "            | M3        | 2        | 10.7        | 13.4          | 142.2         | 125.4              |
| Minatagowa I       | "            | M3        | 1        | 9.4         | 11.3          | 106.2         | 120.2              |
| Mai Da Dieu        | "            | M3        | 1        | 6.8         | 6.7           | 45.6          | 98.5               |
| Dong Can           | "            | M3        | 2        | 11.5        | 13.5          | 154.5         | 120.0              |
| <b>Som Ron Sen</b> | <b>Lower</b> | <b>I1</b> | <b>2</b> | <b>4.6</b>  | <b>6.0</b>    | <b>27.6</b>   | <b>130.4</b>       |
| Wajak II           | "            | I1        | 2        | 6.2         | 7.2           | 44.3          | 115.5              |
| Mai Da Dieu        | "            | I1        | 2        | 5.6         | 5.9           | 32.4          | 105.6              |
| <b>Som Ron Sen</b> | <b>"</b>     | <b>I2</b> | <b>2</b> | <b>5.8</b>  | <b>6.6</b>    | <b>38.4</b>   | <b>114.1</b>       |
| Wajak II           | "            | I2        | 2        | 7.1         | 7.0           | 49.0          | 98.7               |
| Mai Da Dieu        | "            | I2        | 2        | 6.0         | 7.2           | 42.9          | 119.2              |

Table 2 continued ...

... Table 2 continued

|                    |   |           |          |             |             |              |              |
|--------------------|---|-----------|----------|-------------|-------------|--------------|--------------|
| <b>Som Ron Sen</b> | “ | <b>C</b>  | <b>2</b> | <b>7.2</b>  | <b>7.9</b>  | <b>56.1</b>  | <b>109.9</b> |
| Wajak II           | “ | C         | 1        | 8.0         | 9.1         | 72.0         | 112.5        |
| Minatagowa I       | “ | C         | 1        | 7.0         | 7.5         | 52.5         | 107.1        |
| Mai Da Dieu        | “ | C         | 2        | 6.7         | 8.0         | 53.2         | 119.0        |
| <b>Som Ron Sen</b> | “ | <b>P1</b> | <b>2</b> | <b>7.0</b>  | <b>8.6</b>  | <b>60.2</b>  | <b>123.2</b> |
| Wajak II           | “ | P1        | 1        | 8.5         | 9.6         | 81.6         | 112.9        |
| Minatagowa I       | “ | P1        | 2        | 5.4         | 8.6         | 46.2         | 159.0        |
| Mai Da Dieu        | “ | P1        | 2        | 6.8         | 8.3         | 56.0         | 123.0        |
| <b>Som Ron Sen</b> | “ | <b>P2</b> | <b>2</b> | <b>6.9</b>  | <b>8.7</b>  | <b>59.6</b>  | <b>127.1</b> |
| Wajak II           | “ | P2        | 1        | 7.2         | 7.8         | 56.2         | 108.3        |
| Minatagowa I       | “ | P2        | 2        | 7.0         | 9.0         | 63.0         | 128.6        |
| Mai Da Dieu        | “ | P2        | 2        | 6.8         | 8.6         | 57.7         | 126.7        |
| <b>Som Ron Sen</b> | “ | <b>M1</b> | <b>2</b> | <b>10.9</b> | <b>11.2</b> | <b>121.5</b> | <b>103.3</b> |
| Wajak II           | “ | M1        | 2        | 12.4        | 12.3        | 151.4        | 99.2         |
| Minatagowa I       | “ | M1        | 2        | 11.0        | 12.4        | 135.9        | 112.3        |
| Mai Da Dieu        | “ | M1        | 2        | 11.2        | 11.0        | 123.2        | 98.2         |
| <b>Som Ron Sen</b> | “ | <b>M2</b> | <b>2</b> | <b>11.0</b> | <b>10.9</b> | <b>119.4</b> | <b>99.5</b>  |
| Wajak II           | “ | M2        | 2        | 11.0        | 10.9        | 119.9        | 99.1         |
| Minatagowa I       | “ | M2        | 2        | 11.0        | 11.8        | 129.3        | 107.9        |
| Mai Da Dieu        | “ | M2        | 2        | 11.2        | 10.5        | 117.1        | 94.2         |
| <b>Som Ron Sen</b> | “ | <b>M3</b> | <b>2</b> | <b>10.6</b> | <b>11.5</b> | <b>121.4</b> | <b>108.2</b> |
| Wajak II           | “ | M3        | 2        | 11.4        | 10.5        | 119.7        | 92.1         |
| Minatagowa I       | “ | M3        | 2        | 11.1        | 10.9        | 120.4        | 97.8         |
| Mai Da Dieu        | “ | M3        | 2        | 10.9        | 10.3        | 111.1        | 94.6         |

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