

## THE KEILOR FOSSIL SKULL: ANATOMICAL DESCRIPTION

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Plates IV-IX

The Keilor skull, when found, was almost completely covered with a mineral incrustation, the greater part of which has since been removed from the outer surface. The mandible and a part of each zygomatic arch, of the right temporal bone, and of the occipital bone, are missing. The skull was unearthed by a workman whose pick penetrated the cranium and shattered a piece of the right parietal bone measuring about 35 x 27 mm. The bone of the skull is mineralized and is very firm.

Photographs were taken after the removal of the incrustation (Pl. IV-VI). Contour drawings have been made (Pl. VII-IX) and measurements are shown in Tables I and II in comparison with corresponding data for series of Australian, Tasmanian, Melanesian, and Polynesian male skulls. All figures in these tables, except those for the Keilor skull and Tasmanian skulls, are quoted from Wagner (10); figures for Tasmanians are from Wunderly (11) and Morant (6). In both tables two columns of figures are shown under each heading except that referring to the Keilor skull; the first are measurements and the second show the number of specimens measured.

Orbitale, both poria, basion, and opisthion are all present. The difficulty in locating the prosthion, to which Wagner and others have alluded, is somewhat reduced in the Keilor skull, because some of the alveolar bone in this region has been lost through post-mortem damage, leaving a fairly sharp point of bone, which is the only one that can be used for measurements. Visual examination suggests that about 2 mm. of the alveolar bone has been lost, but the measurements have been made from the existing point of bone. All measurements from the alveolar point and prosthion are therefore approximate. A suitable point for measuring the bizygomatic breadth is available on the right side; on the left side, however, a point was used on a line joining the lateral edges of the broken anterior and posterior ends of the arch; this measurement is estimated to be between 1 and 2 mm. less than the correct value.

The means in Table I were not all calculated from measurements

made according to the biometric technique of Buxton and Morant (3). Those used by Morant (6) were calculated from measurements made by other authors. The symbols in the table are those used by Morant and other authors of papers published in *Biometrika*, with two additional symbols,  $Z_1$ ,  $Z_2$ . Wunderly's (11) figures for the orbital breadth of the Tasmanians apply to the dacryal orbital breadth.

The inferior border of each nasal bone is missing. The maximum width of the nasal bones, measured at their existing lower borders, is 16.5 mm. Their width at the fronto-nasal suture is 19 mm. As the lateral margins of the pyriform aperture exhibit the positions to which the nasal bones originally extended, their maximum width has been measured on these margins; it is 20 mm.

All linear measurements are in millimetres.

#### ANATOMICAL CHARACTERISTICS

The skull is long, but it is not high or wide relative to its length. The surface of the bone is generally smooth. The areas of muscle attachment are not as rough as in many Australian skulls.

The median curvature of the frontal bone is as broad as that found in the majority of the skulls of Australian and Tasmanian males. The superciliary and supra-orbital ridges are moderately prominent, but the nasion is not deeply depressed.

The parietal eminences are not as prominent as they are in many Tasmanian skulls, but they are more noticeable than in the majority of Australian crania. The Keilor skull exhibits occipital protuberance to an extent that is unusual in the skulls of males of the Oceanic races, except the Tasmanian.

The cranial sutures are not complicated. The metopic suture is patent throughout almost its whole length. Parts of the coronal and the metopic sutures are fused outwardly. The posterior one-third of the sagittal suture lies in a slight depression.

The orbits are distinctly rectangular and their transverse axes are inclined upwards at their median ends more than in some Tasmanian, but less than in the majority of Australian skulls. In the upper margin of the right orbit there is a notch about 3 mm. wide, and in that of the left orbit a shallow groove about 5 mm. wide.

The margins of the narial aperture are not so broadly rounded as in many Tasmanian and Australian skulls. On the right the inferior margin is single and well defined, while on the left it is double and it has fairly sharp edges. The nasal bones are typically Australian, and they lack the extreme restriction and convexity seen in many Tasmanian specimens.

The canine fossae are deep. The facial part of the skull exhibits, in addition to the Tasmanoid characters that have been referred to, several others which are described elsewhere in this volume by Dr. Wm. Adam.

The Keilor skull has none of the extreme features that are seen in many Australian male crania, such as the acute keeling of the vault, the very rough areas of muscle attachment, and the general ruggedness of bone construction.

On account of the incrustation on the inner aspect of the cranium, it was not possible to measure the cranial capacity in the usual way. Lee's formula No. 10 was, therefore, used in calculating it. This formula is as follows:

$$.000365 (\text{Length} \times \text{Breadth} \times \text{Auricular Height}) + 359.34.$$

Anatomically, the skull exhibits a mixture of Australoid and Tasmanoid characteristics in about equal proportions. In general form it resembles the cranial type of the South Australian males, but the parietal eminences and the superciliary ridges are more prominent than is usual in them.

#### CRANIAL CONTOUR DRAWINGS

Contour drawings of the Keilor skull are shown in Pl. VII, VIII and IX.

Type contours were obtained from four male Tasmanian skulls in the Anatomy School, University of Melbourne; war-time conditions prevent access to a larger series. Since the number of specimens is small, mean measurements for Tasmanian type contours in Table II are not as accurate as mean values for various racial groups quoted from Wagner (10, Table 27).

The irregularity in the line and the asymmetry on the right side of the transverse, vertical and horizontal contours of the Keilor skull are due to damage caused at the time of discovery.

*Sagittal Contour* (Pl. VII).

The sagittal contour was drawn while the skull was orientated at right angles to the Frankfurt horizontal plane, and not as described by Bennington (1) and Wagner (10).

The points marked on the drawings are those used by Wagner and are as follows: nasion, N; gamma,  $\gamma$ , in the same horizontal plane as nasion, when the skull is orientated in the Frankfurt plane; glabella, G; bregma, B; vertex, V; lambda,  $\lambda$ ;inion, I; basion, BA; opisthion, OP; porion, AUR; orbitale, SUB. ORB; and alveolar point, AP.

Fifty-seven measurements of the sagittal contour of the Keilor skull are recorded in Table II together with Wagner's mean



measurements for skulls of males of a number of racial groups. The Keilor skull excels all groups in sixteen of these measurements; less than half the groups exceed the Keilor skull in twenty-one of the remaining measurements.

The sagittal contour of the Keilor skull closely resembles the corresponding contour of South Australian male crania figured by Wagner (10, fig. 25, Pl. III), and by Fenner (4, fig. 5, p. 258).

Approximately 50 per cent. of the measurements of the Keilor skull exceed those of all groups except three.

#### *Horizontal Contour* (Pl. VIII)

The horizontal contour was drawn through the glabella while the skull was orientated in the Frankfurt plane. The points marked on the drawing are as follows: glabella, F; occipital point, O, as far as possible in the median sagittal plane; and the points on each side where the contour cuts the temporal lines, TR and TL.

Twenty-nine measurements are shown in Table II together with the measurements of Wagner's contours for males of several racial groups. In seventeen measurements, those of the Keilor skull exceed those of all these racial groups.

#### *Transverse Contour* (Pl. IX)

The transverse contour was drawn through the poria while the skull was orientated at right angles to the Frankfurt plane. The points marked on the drawing are as follows: the points at which the contour cuts the sharp ridge on the crista zygomatica, ZR and ZL; the mid-point, M, of the base line; and the point A, where the vertical from M meets the contour. The ends of the contour line represent the poria on the skull.

Twenty-nine measurements of this contour are included in Table II together with those of the corresponding contour of racial groups. In sixteen measurements the Keilor transverse contour exceeds those of the corresponding contours of all the groups. Only the Sandwich Island group exceeds the Keilor skull in the length of the vertical axis.

### CRANIAL MEASUREMENTS

#### (a) *Absolute Measurements*

Table I gives measurements of the Keilor skull and mean measurements of crania of various Oceanic groups; figures for the Oceanic groups are quoted from Wagner (10, Table 23), except those for Tasmanians, which are from Wunderly (11) and Morant (6). This table shows that the Keilor skull is comparatively large. In seventeen of the twenty-eight measurements it exceeds the mean measurements of all groups shown in the table. Over 60 per

cent. of the measurements of the Keilor skull are greater than the mean measurements of all the racial groups recorded in Table I.

Hrdlička (5) measured nearly 1,000 Australian skulls. The following table shows that three of the more important measurements of the Keilor skull are comparable with the maxima recorded by Hrdlička, for the corresponding measurements of skulls of males of six Australian regional groups:

Group	Max. Glabella Length	Max. Parietal Breadth	Basion- Bregmatic Height
Northern Territory . . . . .	206	139	147
Queensland . . . . .	199	142	150
New South Wales . . . . .	204	141	147
West Australia . . . . .	194	140	138
South Australia . . . . .	216	146	143
Victoria . . . . .	208	143	147
Keilor Skull . . . . .	197	143	143

#### (b) *Cranial Indices.*

Six indices have been recorded for the Keilor skull.

The following table compares these indices with corresponding indices for eight racial groups, data for which are quoted from Wagner (10), Wunderly (11), and Morant (6):

	Breadth- Length	Height- Length	Height- Breadth	Foramen Magnum	Orbital	Nasal
Keilor . . . . .	72·6	72·1	100·0	82·1	75·9	54·0
Total Australia . .	70·1	71·8	102·4	84·6	76·2	54·0
Tasmania—A* . . .	74·2	70·6	93·9	81·6	78·2	59·9
B* . . . .	74·2	71·3	96·3	82·1	—	59·1
Melanesia . . . . .	71·7	74·1	104·2	84·2	79·4	53·4
New Guinea . . . .	72·0	73·3	102·1	81·5	82·0	51·6
Maori . . . . .	73·7	74·1	100·7	88·8	82·1	47·9
Marquesan . . . .	76·7	74·2	97·0	86·7	81·9	44·4
Sandwich Islands . .	78·5	77·5	98·8	87·7	81·0	49·0

\*A from Wunderly (11) and B from Morant (6).

In respect of four of the six indices, the values for the Keilor skull occupy the middle third of the total range of nine racial values, while, in the remaining two indices, they lie in the lowest third.

#### SUMMARY AND CONCLUSIONS

The foregoing notes reveal the following particulars about the Keilor skull:

1. It combines Australoid and Tasmanoid characteristics in about equal proportions.

2. Compared with the average male skulls of several Oceanic races, it is large.
3. The form of its contour resembles closely that of the South Australian male skull.
4. The anatomical characteristics, absolute measurements, and contour drawings indicate masculinity.
5. The cranial sutures and other features indicate an individual of middle age.
6. The Australoid and Tasmanoid anatomical characteristics are consistent with the theory that the Australians had a bi-racial origin, and also with the supplementary theory that Australia was originally peopled by Negritos. The presence of characteristics of the two racial types is more important than their proportional relationship.

The theory of remote bi-racial origin of the Australians is independent of recent admixture with races, which are known to have entered Australia in the north and the north-east in comparatively recent times; this admixture is still going on.

The characteristics of the Keilor skull are also consistent with the geological evidence, which is given elsewhere in this volume, that it is of some geological antiquity.

#### TECHNIQUE OF EXAMINATION

In the examination of the Keilor skull, the English biometric technique described in several papers published in *Biometrika* (1, 3, and 8) has been followed with a few modifications suggested by Wagner (10) and by Wunderly (11).

##### *Orientation.*

The skull was orientated in the Frankfurt horizontal plane. The apparatus used for supporting it is a modification of Martin's Kubuskranio-phor. Several years ago the adjustable clamp of the kubus was found to cause considerable damage to fragile skulls; the clamp was therefore removed and various parts were added, as shown in fig. 1.

Two vertical bars, A and B, have been fixed to each side of the kubus frame, and each carries an attachment that is adjustable horizontally, one, C', for insertion into the auditory meatus and the other, D', into the orbit. Each adjustable attachment consists of a rod C', D' fitted into a thick-walled tube, C, D, provided with a thumb-screw to lock the rod in position. The free end of each rod is shaped almost to a knife edge for a length of about 18 mm. The knife edge on C' is on the upper surface, and that on D' is on the



lower surface. The knife edges, when adjusted to support a skull, are in the same horizontal plane. Attachment C' is not adjustable vertically, while D' is adjustable both vertically and horizontally and it can be clamped in either direction by thumb-screws.

An adjustable part, E, attached to the front of the frame provides support under the maxillae; this part resembles a tuning fork with the handle attached to the kubus, and the two arms bent so as to give support under the maxillae. The two arms are separated about 20 mm. so as not to interfere with measuring, or drawing in the median sagittal plane.

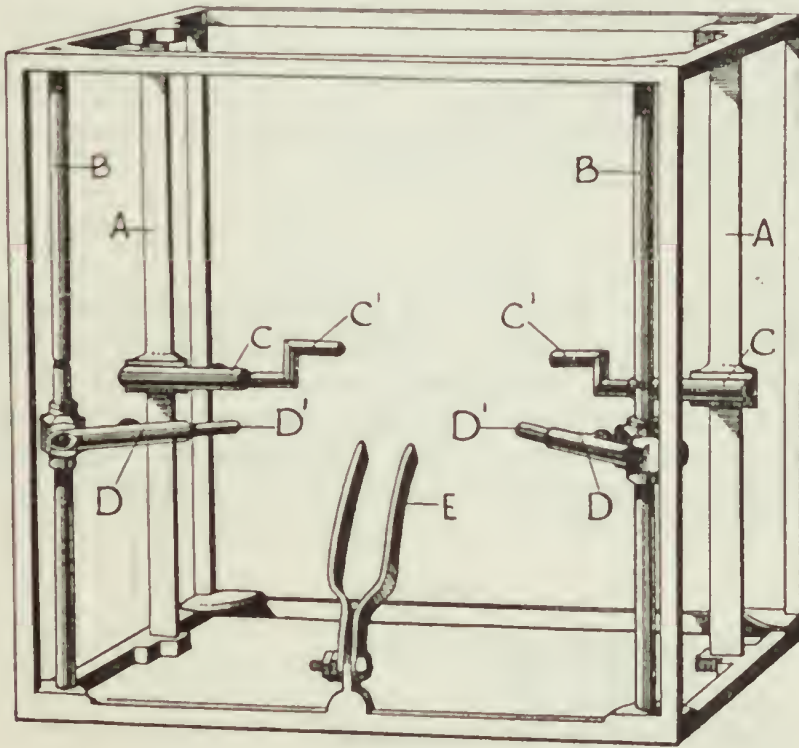


FIG. 1.

The two poria points can rest on the ends of the knife edges, or the ends can be inserted as far as necessary into the meati. In either case, the knife edge, resting against the inferior border of each orbit, must be adjusted vertically to correspond horizontally with the poria. If the inferior border of one orbit or one prorion is missing, a skull can still be orientated reasonably accurately. Fragile skulls can be given additional support in the kubus by means of thread, wire, or plasticine.

By turning the kubus so that different aspects rest on the bench, the skull can be orientated in the Frankfurt plane or in any plane at right angles to it.

### *Contour Drawings*

The cranial contour drawings shown in Pls. VII, VIII and IX are made in accordance with directions given by Bennington (1) and Wagner (10). The modified kubus enables the sagittal and the transverse contours to be drawn at right angles to the Frankfurt plane, and not with the orientation used by Wagner and others. A skull may be supported face downwards while the transverse vertical drawing is made, and thus both right and left sides are directly represented in the drawing.

### *Craniometric Measurements*

The anatomical points, between which measurements were made, are those defined by Buxton and Morant (3), with certain reservations suggested by Wagner (10). Points not anatomically obvious have been treated as closely as possible in accordance with the directions given by these writers.

### ACKNOWLEDGMENTS

My thanks are due to Dr. J. M. Baldwin, Government Astronomer of Victoria, for accurate adjustment of drawing apparatus; C. W. Brazenor for photographing the skull; D. J. Mahony, Director of the National Museum, Melbourne, for advice and revision of the manuscript; and Professor S. Sunderland, the University of Melbourne, for assistance in the location of various points on the Keilor skull.

### PLATES

- IV. Skull with incrustation partly removed.  
Fig. 1. Right profile.  
Fig. 2. Left profile.
- V. Skull with incrustation partly removed.  
Fig. 1. Front.  
Fig. 2. Back.
- VI. Skull with incrustation partly removed.  
Fig. 1. Top.  
Fig. 2. Base.
- VII. Sagittal contour.
- VIII. Horizontal contour.
- IX. Transverse contour.

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TABLE II

MEASUREMENTS OF TYPE CONTOURS: KEILOR SKULL AND MEAN VALUES OF  
RACIAL GROUPS (MALES)

		Keilor	Tasmania	Total Australia	North Australia	South Australia	Maori	Marquesans	Sandwich Is.
Transverse Contours									
MA		120.0	111.8 4	112.6 83	113.6 10	110.3 19	117.4 38	118.1 17	121.7 56
1R		62.5	57.9 "	56.1 "	56.4 "	56.4 "	58.5 "	59.1 "	58.8 "
1L		62.5	57.9 "	56.1 "	56.4 "	56.4 "	58.5 "	59.1 "	58.8 "
M $\frac{1}{2}$ R		66.5	60.4 "	59.7 "	60.5 "	59.7 "	62.5 "	62.8 "	62.4 "
M $\frac{1}{2}$ L		66.5	61.4 "	59.3 "	59.6 "	59.6 "	62.2 "	62.3 "	62.0 "
2R		67.0	61.3 "	59.8 "	60.2 "	59.8 "	63.4 "	64.2 "	63.6 "
2L		66.5	62.0 "	59.1 "	58.9 "	59.8 "	63.0 "	63.0 "	62.4 "
3R		69.0	63.6 "	62.2 "	62.2 "	61.7 "	65.1 "	66.5 "	65.7 "
3L		68.5	65.4 "	61.5 "	60.5 "	62.0 "	64.8 "	65.3 "	65.1 "
4R		70.5	66.1 "	64.2 "	64.2 "	63.3 "	67.2 "	69.2 "	68.8 "
4L		72.5	68.4 "	63.3 "	62.3 "	63.6 "	66.6 "	67.5 "	68.0 "
5R		68.5	66.3 "	64.5 "	64.8 "	63.4 "	67.5 "	69.9 "	69.8 "
5L		72.5	68.5 "	63.4 "	62.8 "	63.3 "	66.7 "	68.2 "	69.1 "
6R		66.5	65.5 "	63.3 "	63.7 "	62.3 "	66.0 "	68.9 "	69.6 "
6L		71.0	67.8 "	62.2 "	62.0 "	62.1 "	65.6 "	67.5 "	69.0 "
7R		64.0	63.4 "	61.2 "	61.6 "	59.9 "	63.8 "	67.2 "	68.1 "
7L		69.0	65.5 "	59.4 "	59.6 "	59.6 "	63.5 "	65.9 "	67.7 "
8R		59.0	58.4 "	56.8 "	57.2 "	55.4 "	59.5 "	63.7 "	64.2 "
8L		64.0	60.6 "	55.2 "	55.0 "	54.7 "	59.0 "	61.7 "	63.5 "
9R		50.0	50.0 "	47.6 "	48.3 "	46.0 "	50.3 "	55.8 "	54.7 "
9L		53.5	50.9 "	45.6 82	45.6 "	45.2 "	49.4 "	52.7 "	53.7 "
10R		32.5	30.6 "	32.7 83	33.3 "	31.1 "	34.0 "	39.4 "	36.9 "
10L		34.5	33.1 "	31.0 82	30.9 "	30.6 "	32.8 "	36.2 "	36.1 "
A $\frac{1}{2}$ R		17.0	14.4 "	16.6 83	17.0 "	15.2 "	16.2 "	19.3 "	17.2 "
A $\frac{1}{2}$ L		14.0	16.6 "	15.4 82	15.4 "	15.1 "	15.0 "	17.6 "	17.5 "
ZR		66.0	61.0 "	60.1 83	60.9 "	60.2 "	63.9 "	63.6 "	63.3 "
ZL		67.0	61.9 "	59.7 "	60.1 "	60.2 "	63.4 "	63.0 "	62.7 "
XR		2.5	4.3 "	3.4 "	4.3 "	3.4 "	5.2 "	3.7 "	4.2 "
XL		4.0	4.1 "	3.6 "	4.9 "	3.7 "	5.0 "	4.1 "	4.7 "
Horizontal Contours									
FO		195.0	185.8 4	184.6 82	180.1 9	186.8 19	184.7 38	182.5 16	180.8 56
F $\frac{1}{2}$ R		34.0	29.8 "	26.4 "	24.3 "	25.8 "	22.3 "	24.4 "	23.9 "
F $\frac{1}{2}$ L		29.5	24.9 "	27.1 "	25.1 "	26.3 "	22.4 "	25.9 "	23.4 "
F $\frac{1}{2}$ R		41.0	37.0 "	37.5 "	37.9 "	36.5 "	36.7 "	36.0 "	36.3 "
F $\frac{1}{2}$ L		39.5	33.8 "	37.5 "	37.8 "	36.4 "	36.7 "	36.3 "	35.3 "
2R		52.5	48.0 "	49.1 "	49.9 "	48.5 "	48.3 "	46.6 "	47.6 "
2L		50.5	45.6 "	48.5 "	48.9 "	48.0 "	48.1 "	46.6 "	46.2 "
3R		51.5	48.4 "	48.5 "	48.3 "	48.4 "	48.8 "	49.9 "	48.3 "
3L		52.5	47.8 "	47.9 "	47.6 "	48.2 "	48.6 "	50.1 "	47.5 "
4R		56.0	51.4 "	52.9 "	53.8 "	53.1 "	55.6 "	55.4 "	54.8 "
4L		58.0	52.8 "	52.4 "	53.4 "	52.8 "	55.0 "	55.8 "	53.9 "
5R		64.0	60.6 "	59.7 "	59.7 "	59.5 "	63.1 "	64.0 "	63.0 "
5L		65.0	60.9 "	58.6 "	59.2 "	58.8 "	62.4 "	63.6 "	61.3 "
6R		69.5	67.3 "	64.3 "	63.3 "	63.9 "	67.5 "	69.3 "	68.9 "
6L		71.0	67.0 "	62.9 "	62.5 "	62.7 "	66.8 "	68.7 "	66.4 "
7R		71.0	69.9 "	65.9 "	65.0 "	65.5 "	68.6 "	71.0 "	71.3 "
7L		72.5	69.1 "	64.2 "	63.4 "	64.0 "	67.6 "	70.1 "	68.3 "
8R		67.5	68.0 "	63.4 "	62.3 "	63.3 "	65.4 "	68.3 "	68.6 "
8L		68.5	66.6 "	62.2 "	61.1 "	62.1 "	64.3 "	67.4 "	65.8 "
9R		59.0	58.3 "	56.9 "	56.0 "	56.8 "	58.3 "	61.7 "	61.6 "
9L		60.5	59.1 "	55.8 "	54.2 "	56.0 "	57.3 "	61.1 "	59.2 "
10R		43.0	42.8 "	44.3 "	43.2 "	44.0 "	45.8 "	49.1 "	48.5 "
10L		44.0	43.9 "	43.2 "	40.5 "	43.2 "	44.7 "	48.9 "	47.1 "
O $\frac{1}{2}$ R		23.0	23.3 "	25.1 "	25.2 "	24.1 "	27.0 "	29.5 "	29.6 "
O $\frac{1}{2}$ L		26.0	26.8 "	24.5 "	22.6 "	24.0 "	26.6 "	29.8 "	28.9 "
TR		54.0	51.4 "	52.1 "	53.1 "	51.7 "	49.9 "	48.8 "	49.6 "
TL		51.0	51.2 "	51.1 "	51.8 "	50.3 "	49.3 "	48.0 "	47.6 "
XR		21.5	25.1 "	23.5 "	24.1 "	23.4 "	20.5 "	19.9 "	20.4 "
XL		20.0	27.3 "	22.4 "	22.8 "	21.9 "	20.4 "	18.6 "	19.5 "

TABLE II—(Continued)

MEASUREMENTS OF TYPE CONTOURS: KEILOR SKULL AND MEAN VALUES OF RACIAL GROUPS (MALES)

		Keilor	Tasmania	Total Australia	North Australia	South Australia	Maori	Marquesans	Sandwich Is.
Sagittal Contours									
Vertex	Ny	194.0	177.3 4	181.4 83	177.9 10	185.2 19	181.4 38	179.8 17	175.6 56
	x from N	99.0	90.3 "	92.1 "	93.8 "	91.4 "	100.3 "	104.2 "	103.4 "
Bregma	y	90.0	89.4 "	84.7 "	83.2 "	82.2 "	90.3 "	90.0 "	95.5 "
	x from N	71.5	69.6 "	75.2 "	76.3 "	76.4 "	74.7 "	76.1 "	72.3 "
Glabella	y	87.5	87.5 "	83.2 "	81.6 "	80.8 "	86.8 "	87.2 "	91.2 "
	Gx	3.0	6.0 "	4.7 "	4.2 "	4.4 "	3.7 "	3.1 "	4.3 "
	Cy	12.0	14.3 "	9.9 "	9.5 "	10.2 "	11.8 "	11.4 "	10.9 "
	O	22.0	27.6 "	25.3 "	21.7 "	23.2 "	25.8 "	24.6 "	27.9 "
	N $\frac{1}{2}$	35.5	39.1 "	38.2 "	33.0 "	35.9 "	40.9 "	39.9 "	41.7 "
	1	60.5	59.7 "	57.3 "	53.2 "	55.4 "	59.6 "	59.6 "	61.6 "
	2	74.5	73.4 "	70.5 "	66.7 "	68.6 "	73.0 "	73.3 "	76.3 "
	3	83.5	82.1 "	78.6 "	75.2 "	76.6 "	81.3 "	82.0 "	85.7 "
Ordinates above Ny	4	88.5	87.4 "	83.0 "	80.9 "	80.9 "	86.6 "	86.7 "	91.0 "
	5	90.5	89.5 "	84.3 "	82.7 "	81.7 "	89.5 "	88.9 "	94.1 "
	6	89.0	89.4 "	83.3 "	82.4 "	80.3 "	89.7 "	89.8 "	95.2 "
	7	83.5	85.5 "	79.0 "	78.1 "	76.1 "	85.5 "	86.5 "	91.8 "
	8	71.0	74.7 "	69.3 "	69.4 "	65.7 "	74.7 "	76.6 "	82.8 "
	9	53.0	55.2 "	49.7 "	49.8 "	44.9 "	56.8 "	59.8 "	67.3 "
	y $\frac{1}{2}$	22.0	32.9 "	23.7 "	23.3 "	19.4 "	30.8 "	34.0 "	42.8 "
	y $\frac{1}{4}$	13.5	24.5 "	17.7 "	17.4 "	13.6 "	24.0 "	25.6 "	35.6 "
	8	44.5	39.0 "	49.9 "	51.7 "	49.3 "	46.2 "	45.8 "	43.2 55
	9	32.0	26.9 "	40.4 "	42.7 "	40.3 "	36.0 "	34.1 "	30.5 56
Ordinates below Ny	y $\frac{1}{2}$	29.5	19.9 "	32.5 "	34.3 "	32.2 "	29.9 "	27.7 "	25.0 "
	y $\frac{1}{4}$	18.0	14.4 "	23.6 "	24.5 "	24.0 "	21.8 "	19.0 "	18.4 "
$\lambda$	x from $\gamma$	11.0	5.3 "	4.8 "	4.1 "	5.4 "	6.7 "	4.6 "	4.2 "
	y	40.5	34.6 "	23.5 "	21.4 "	21.1 "	34.7 "	34.4 "	41.4 "
Suborbital	x from N	9.0	11.0 "	10.9 "	9.2 "	10.3 "	8.9 "	8.4 "	9.3 "
Auricular	x from $\gamma$	94.5	87.0 4	91.5 83	89.3 10	95.7 19	90.8 38	91.1 17	84.5 56
	y	30.0	23.9 "	28.3 "	29.0 "	29.2 "	27.5 "	28.8 "	27.0 "
Opisthion	x from $\gamma$	59.5	52.5 "	55.9 "	54.2 "	58.3 "	54.7 "	53.8 "	47.3 55
	y	53.0	45.6 "	55.3 "	57.3 "	55.0 "	52.9 "	52.6 "	48.5 "
Inion	y1	30.0	—	44.2 "	44.7 "	47.3 "	37.9 "	35.9 "	29.7 56
	NI	188.5	—	168.8 "	167.2 "	170.2 "	169.4 "	168.3 "	165.7 "
Basion	y bas	112.5	—	105.6 "	105.6 "	108.6 "	102.8 "	101.0 "	95.4 "
	N bas	110.0	—	102.3 "	102.3 "	102.0 "	103.8 "	103.7 "	104.7 "
Alveolare	N to AP	74.0	—	68.4 82	71.8 9	69.2 "	69.2 37	72.8 16	69.0 47
	Bas to AP	108.0	—	102.2 "	102.1 "	102.6 "	98.6 "	100.8 "	99.6 "
Nose	$\angle$ of nasal prominence	103	—	112.7° 81	116.0° "	108.3° "	117.4° "	116.1° "	114.3° 54
	NL	17.0	—	17.4 "	19.7 "	16.4 "	20.3 "	20.0 "	19.3 "
Frontal	Max. nasal	8.0	—	7.8 "	9.0 "	7.6 "	8.6 "	8.5 "	8.4 "
	Subst.	2.0	—	3.0 "	3.1 "	2.6 "	3.1 "	3.1 "	3.4 "
	x from N	52.0	—	51.0 83	49.4 10	51.1 "	51.5 38	52.0 17	52.3 56
	y	23.5	—	25.0 "	23.4 "	24.7 "	25.4 "	25.4 "	24.7 "
Occipital	Max. Subst. to NB	58.5	—	48.1 "	49.6 "	44.4 "	52.9 "	55.5 "	56.2 "
	y	34.0	—	27.5 "	26.4 "	27.8 "	29.8 "	28.1 "	26.7 "
N $\frac{1}{2}$ base line	x from N	89.0	—	86.0 "	88.3 "	86.4 "	92.7 "	86.8 "	90.3 "
	y	70.0	—	73.0 "	72.3 "	71.7 "	71.2 "	71.5 "	72.2 "
GI base line	x from G	107.0	—	102.2 "	98.6 "	106.3 "	100.1 "	101.1 "	99.1 "
	y	100.5	—	104.2 "	104.1 "	102.8 "	106.3 "	106.2 "	107.9 "
P <sub>1</sub>	x from AP	62.0	—	58.6 82	58.5 9	59.5 "	51.1 35	51.1 16	51.1 46
	y	18.0	—	16.8 "	17.7 "	17.0 "	16.5 "	17.7 "	17.6 "
P <sub>2</sub>	x from AP	42.0	—	41.5 81	42.4 "	42.5 18	35.9 34	35.8 "	35.0 47
	y	14.5	—	15.3 "	16.6 "	15.0 "	15.0 "	17.6 "	16.3 "
P <sub>3</sub>		64.5	57.2 4	59.9 "	61.9 "	60.9 19	65.3 37	67.6 17	64.8 50
P <sub>4</sub>		63.5	54.9 "	57.4 82	58.9 "	58.6 "	62.8 36	64.2 "	61.7 52
P <sub>5</sub>		59.5	50.9 "	52.4 "	53.7 "	53.9 "	56.2 "	56.0 "	54.0 53
P <sub>6</sub>		60.5	49.6 "	52.6 "	54.2 "	53.5 "	53.6 35	55.8 "	52.7 "





FIG. 1.



FIG. 2.

**The Keilor Skull**



FIG. 1.



FIG. 2.

The Keilor Skull



FIG. 1.

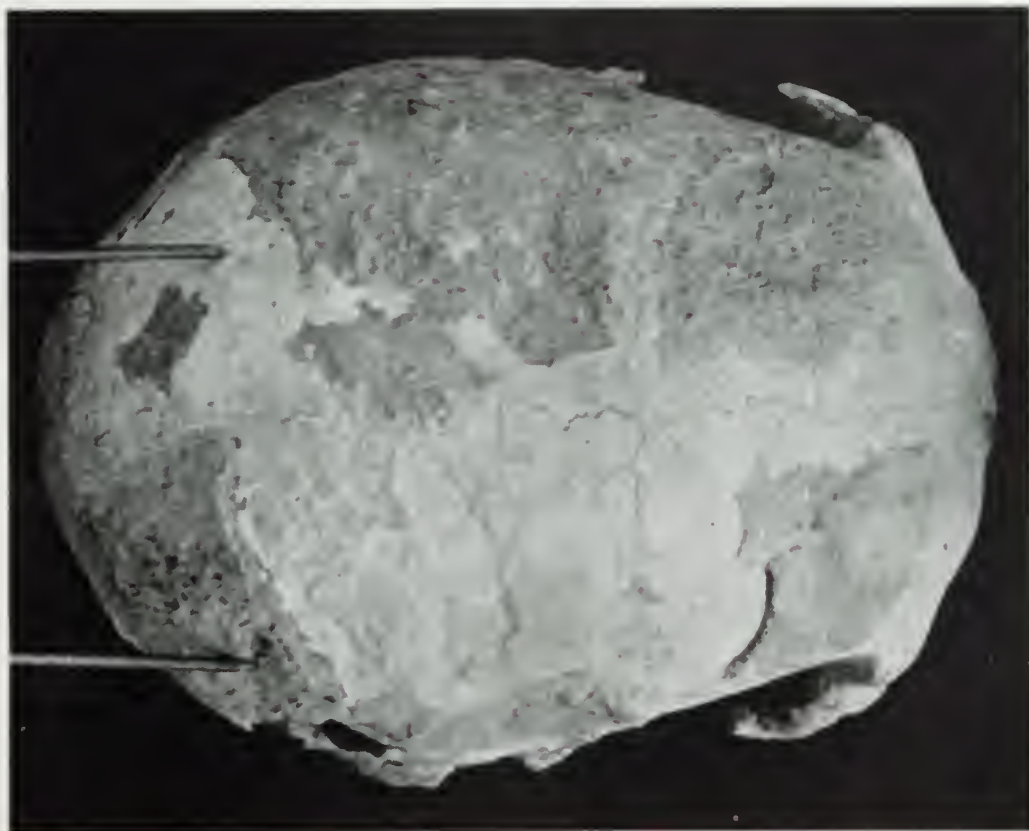
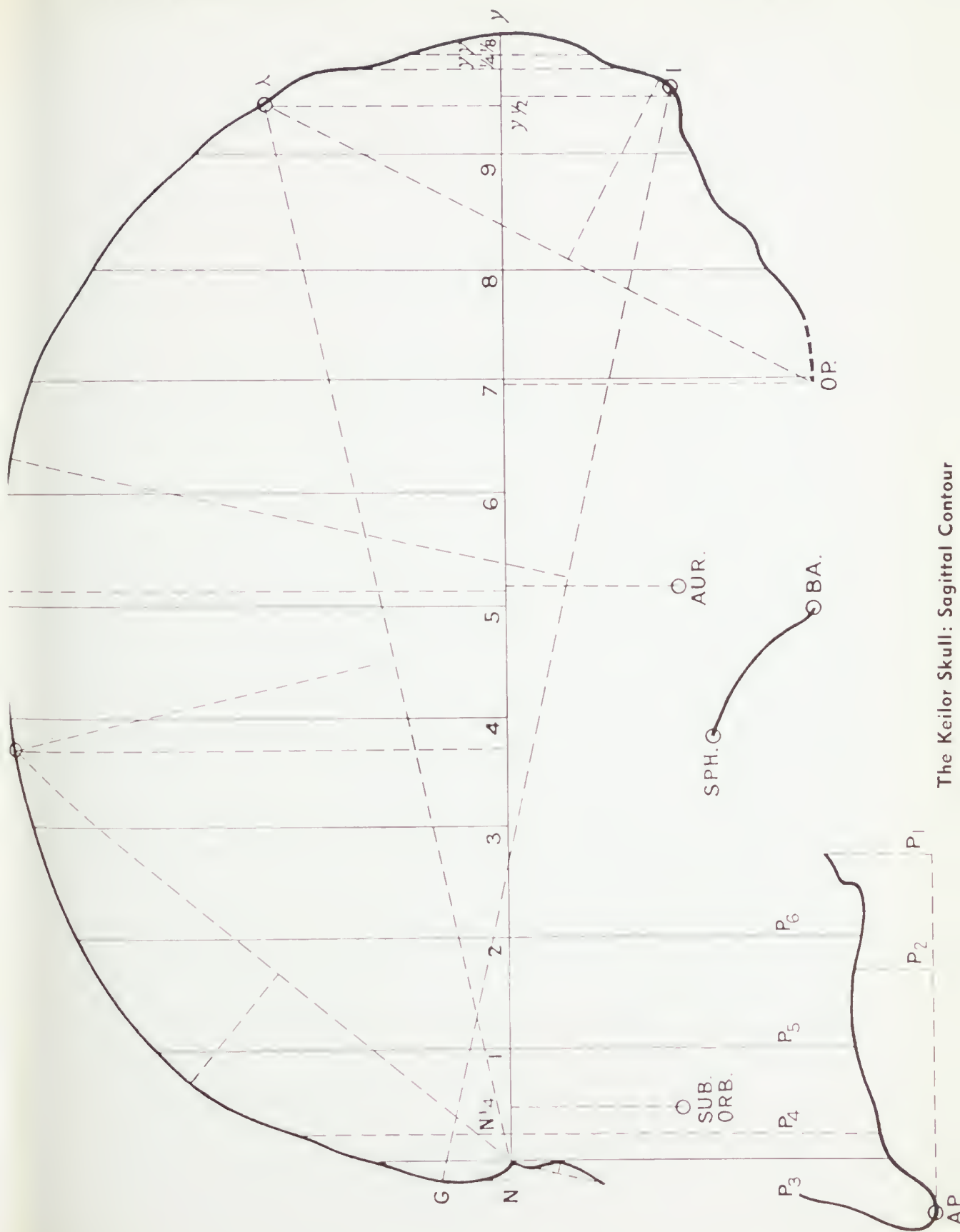


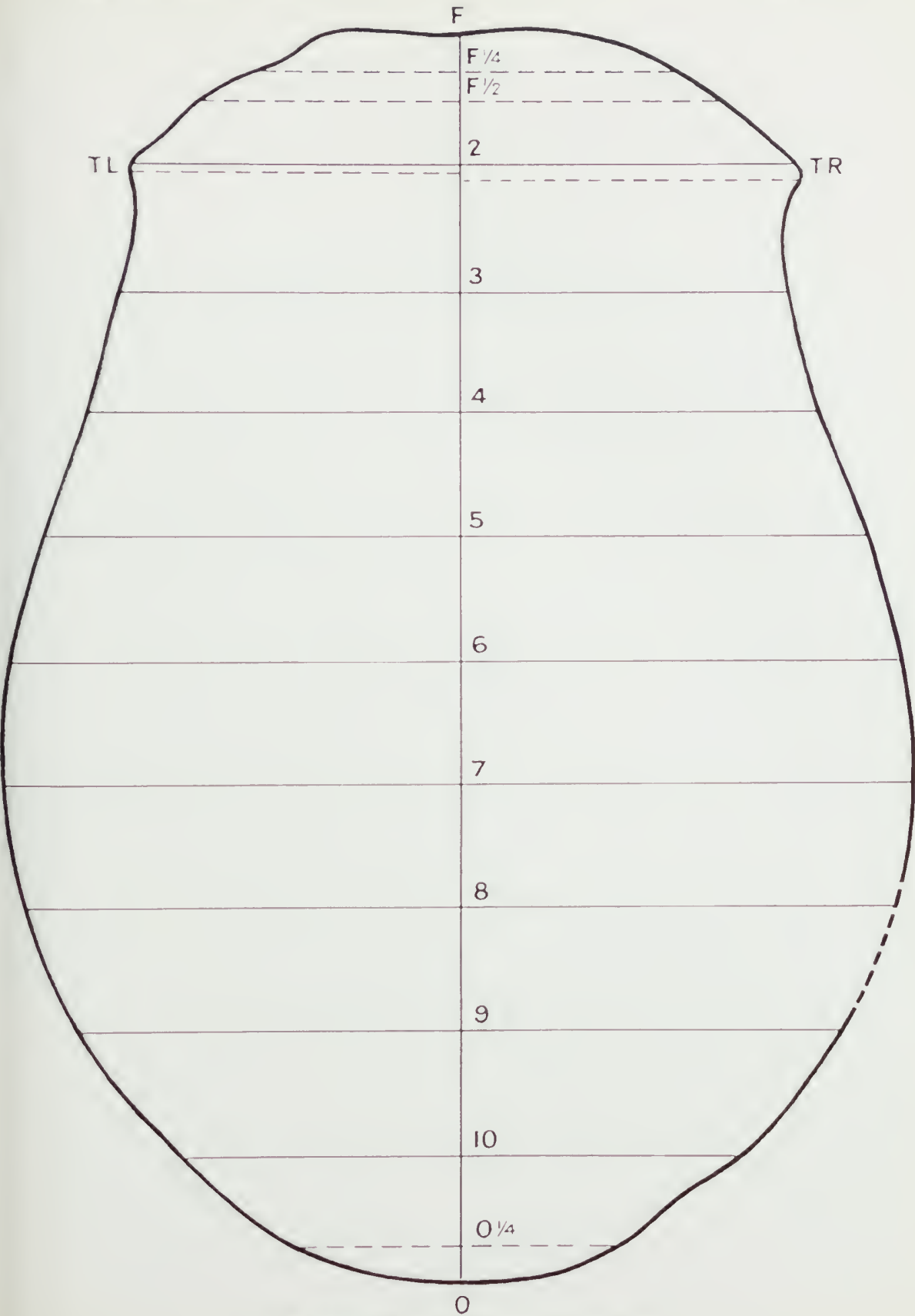
FIG. 2.

The Keilor Skull

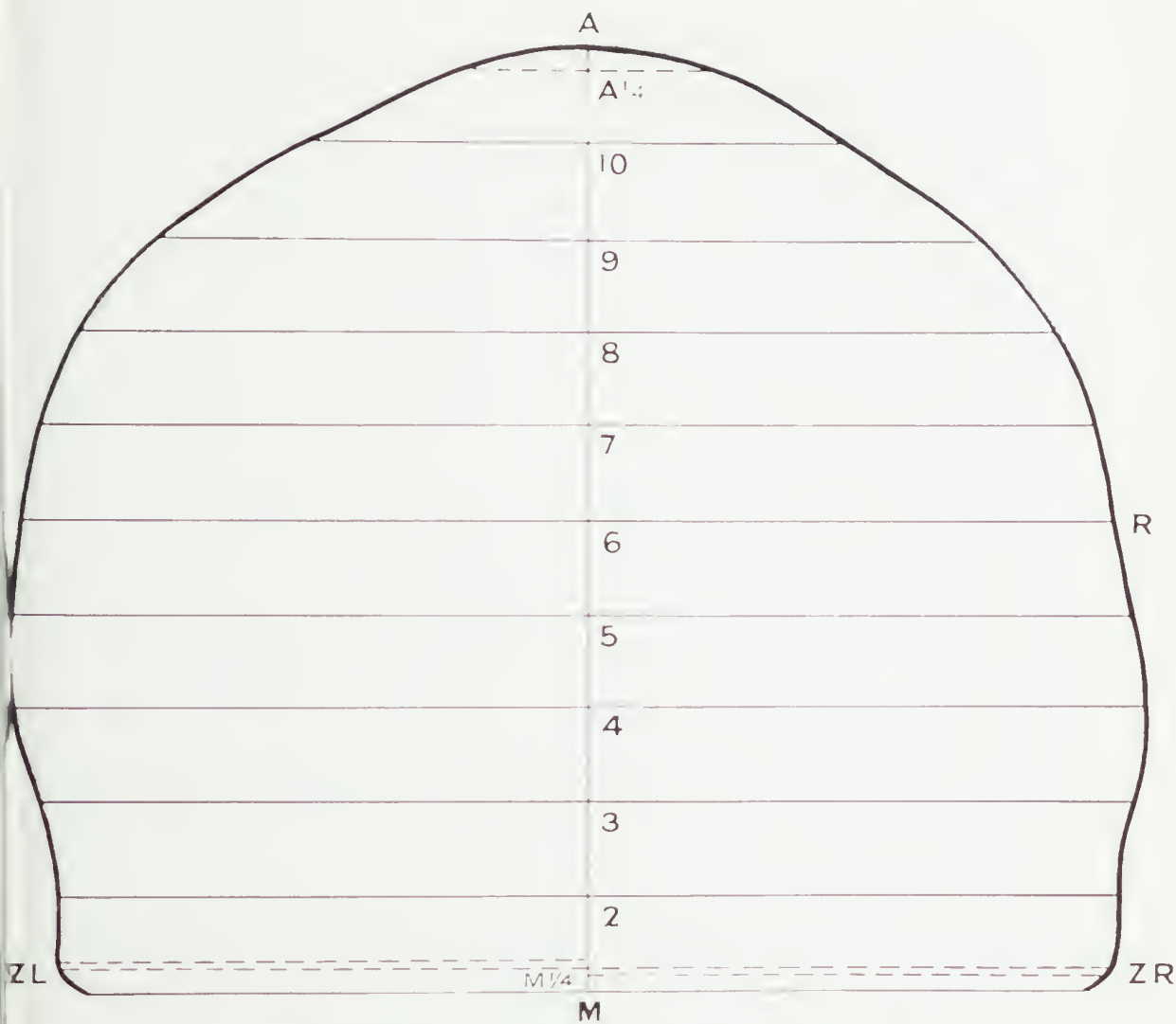




The Keilor Skull: Sagittal Contour



The Keilor Skull: Horizontal Contour



The Keilor Skull: Vertical or Transverse Contour