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# NOTES ON SOME ANCIENT CHILIAN SKULLS, AND OTHER REMAINS.

By R. E. LATCHAM, Local Correspondent of the Anthropological Institute for Chile.

[WITH PLATES XV—XVI.]

IN his *Journal of the Voyage of the "Beagle,"* Darwin briefly describes the terrace formation of the district round Coquimbo Bay. Being located in the neighbourhood during the past few years, I thought it a favourable opportunity of making a more detailed study of the district than could be attempted in a few days' stay. The results of this study, geological and otherwise, I hope to publish shortly.

Meanwhile some of the results may be of interest to anthropological students and may help to throw a light upon the disputed question of the aboriginal inhabitants of this part of the continent.

One of the first things that attracted my attention was the frequent recurrence of irregular shaped mounds along the terrace edges, or ancient high-water marks. At first I supposed that these were piles of drifted sand, such as are in the course of formation along the actual coast line, but a closer examination showed that, while in many cases this was so, others were formed almost entirely of shells. It then occurred to me that these might owe their origin to human agency, and have been formed in the same manner as the shell mounds of the Baltic and other coasts. In such a case they would probably contain other remains, perhaps even human relics.

After a careful search, I found my surmise correct. Embedded among the shells and sand, were the bones of numerous animals and birds, some of which are not now found in this district. Occasionally I came upon instruments of stone, shell, or bone, also fragments of pottery, and, in several cases, portions of human skeletons, but in such a weather-worn, broken condition that I could not form an opinion respecting the race they represented. The skulls invariably crumbled away on touch, and even the teeth were so brittle that they would seldom stand the least pressure. This was doubtless owing to the porous nature of the soil, and the action of the moisture and acids. Only on one occasion did I obtain a skull in such condition as would render even a superficial study possible, and then only after carefully piecing and cementing the different fragments.

Not far from Coquimbo, on the upper level of the terrace series, are a number of quarries, from which a porous calcareous stone, much used for filters and building purposes, is obtained. By accident I heard that human remains were occasionally found there by the workmen. I repaired to the spot, and on

questioning the men, they admitted that they did, from time to time, come across such remains in the deposit immediately above the stone, and that they were generally in a good state of preservation. They invariably buried them again under the increasing piles of *débris*.

Having obtained this information, I set methodically to work on a portion of the ground entirely undisturbed. After three days' work I had the good fortune to find an almost entire male skeleton, in so good a state of preservation, and so little weathered, that it seemed to have been interred only a few years since.

On a subsequent occasion I was able to recover three other partial skeletons, all of them wanting their lower extremities. This was caused by a curious coincidence. The three interments had been made in a row, the axis of which ran from north to south. The space between each separate grave was about 3 feet, the heads all pointing in the direction of the rising sun. On uncovering the rock for a new quarry, the workmen had run their base-line exactly through the centre of the line of graves, cutting the skeletons in two, and carrying off in the rubbish the lower extremities, leaving intact the upper portions.

At first I thought that this was a burial place of recent date, and might be referred to one of the numerous skirmishes that took place in the neighbourhood during the revolutions of 1851 and 1859. But the testimony of the owners of the quarries, a closer study of the remains themselves, and an examination of the soil from which they were taken, convinced me that they were of considerable antiquity. This probability was strengthened by the number of stone objects found buried with the remains, some of them showing no small degree of skill in their manufacture.

A few days later I was lucky enough to come across another grave, containing in this case a group of three skeletons, an adult female, and two children, one quite an infant; also several interesting stone objects, among others two mullers of a peculiar pattern; a square stone, evidently used as a mortar, and some stone ornaments (Plate XVI).

A close examination of the ground satisfied me that it had not been disturbed for hundreds, perhaps for thousands, of years.

The remains I have mentioned were found at an average depth of 4 feet, 9 inches, and the result of my observations inclines me to the belief that, since the date of their burial, the whole level has been under the sea, and has afterwards been upheaved; the present height above the sea-level being over two hundred feet.

My reasons for this conclusion are as follows:—The skeletons are found in all instances in a layer of black deposit mixed with shells, which lies immediately upon the calcareous stone (composed, by the way, of minute particles of sand, broken shells, and fine fragments of stone, compressed into a solid mass). This black soil is still deposited in the southern part of Coquimbo Bay, where there is little current, and is quite distinct from the other deposits of the bay. The shells most abundant in it are: *concholepas*, *fisurellæ*, *chitonæ*, *patellæ*, and *lapas*.

Above this black deposit there is a layer of calcareous compound of a yellowish-white colour, from 14 to 16 inches in thickness. This produces a very good quick-lime, and has led to the establishment of limekilns in the neighbourhood. On the top of this again is a bed of sand, with a light topping of gravelly mould. This, too, is full of shells.

Here then we have three layers of different colours and conditions. On removing the skeletons, I was most particular to notice in each case if these three layers were intact, finding that in every instance they were so; a clear proof that the burials had taken place before the deposition of the upper two layers; as in a contrary case, all three would have become mixed, on refilling the excavations.

I have been able to form no estimate as to the probable date of these burials, as the whole country shows such multiple signs of a vast series of submersions and upheavals that speculation would be vain.

The remains mentioned were so encrusted with the black deposit spoken of, that it was only with great difficulty I could remove it. All these remains have suffered remarkably little from weathering, and in most cases have lost little of their organic substances, being in these respects quite the reverse to those found in the sand-hills and shell mounds. This is doubtless owing to the tight packing and extremely fine nature of the deposit in which they were embedded, which is almost impervious to filtering. As an example of this, I subsequently noticed that in uncovered parts, after three days' heavy rain, the moisture had only penetrated to the depth of two or three inches, and that in the parts where it had been most upturned and so become loosened.

#### PARTICULAR DESCRIPTION OF THE SKELETONS.

*Skull A* (Plate XV.)—This skull is of medium capacity (mesocephalic), 1450 c.c. It is also mesozygous, mesognathous and mesaticcephalic. Compared with the others of the series, it would seem to denote a cross with a race having different characteristics.

The sutures are open and simple; there is a small wormian bone in the lambdoidal suture near the right asterion.

The frontal is well developed, though the forehead is narrow in the superorbital region. The glabella and the superciliary ridges are not noticeable, forming one smooth contour; but the frontal eminences are prominent, giving a high appearance to the forehead. The general aspect of the face is one of flatness, and presents characteristics that have not before come under my notice. The nasal notch is completely wanting, a fact which probably accounts for the high naso-malar index. The nasal bones continue in a line with the forehead, while the biacrylic breadth is only 19 mm.; the dacryons being only slightly behind the external surface of the bi-nasal suture. This makes the outer edge of the orbits appear to recede, and gives an internal bi-orbital arc of 98 mm., while the chord is only 88 mm., infusing a prosopic element (111.3) to what is essentially a platyopic face.

The orbits themselves are rectangular and mesoseme, the superorbital notches pronounced; as is the case with all the foramina.

The maxillaries are short, broad, and remarkable for the very slight concavities below the malars. This helps to give the face its appearance of flatness. The *apertura pyriformis* is extremely narrow, and the nose highly leptorhine (39·2). The distance from the nasal spine to the alveolar process is very short; the palate is parabolic, with a staphylinic index of 95·8. This again is a point which has not before come under my notice, especially in Chilean skulls, whether Indian or otherwise. The internal palatine breadth, 46 mm., is much above the average, while the internal length, 48 mm., is less than customary.

The teeth, which are all present, are worn down in a remarkable way; far more so than I have ever seen before, even among the lowest savages (Fuegians and Ocas). In this skull especially, they barely protrude—incisors, canines and molars alike—four millimetres from the alveolar processes, and are quite separate *inter se*; the spaces between the molars being about 1 mm. and between the incisors about 2 mm. The superior molars especially are worn to a sharp exterior edge, being for the most part in a healthy condition, but in a few instances carious.

The mandible is strong and the chin square. There are indications that the muscular attachments have been extremely powerful. The inclination of the ascending ramus—narrow in all the skulls of the series—is about 105°.

Viewed in *norma lateralis*, one notices a flattening of the roof, beginning slightly before the bregma, and continuing for 60 mm. along the sagittal suture; on either side of which there is a slight concavity. The squamose suture is almost horizontal, and is very low, rising in no part more than 30 mm. above the *zygomata*. These latter, and also the malars, are massive, though not so solid as in skulls B and D. The temporal crest is not visible, but the post-zygomatic is very prominent. The parietal eminences are conspicuous, and curiously enough both are seriously damaged. On one side there is a star-shaped fracture which extends in every direction to the sutures, and was possibly the cause of death; although it may have been post-mortem. On the other side there is a deep indentation, 25 mm. in length and 5 mm. in depth, but the bone is not fractured or perforated, and it may have been caused in youth, while the bone was still in a plastic condition.

The skull rests on the occipital condyles, which are full and massive; the mastoids being only slightly developed, but the digastric grooves are wide and deep.

On the whole this skull is the best developed of the series, the face being weak, but denoting a degree of intelligence wanting in the others. The frontal region is extremely full in the spheno-frontal portion, bulging along the whole temporal crest. The roof of the skull is flattened, as is also the posterior surface, between the parietal eminences, rounding off in the occipital region.

*Skull B* (Plate XV.)—This skull is of a far ruder type than A, with a much smaller cranial capacity (1360 c.c.) It is also more dolichocephalic and more hypsicephalic. The bones are strong and massive, and the sutures very simple.

In *norma verticalis* it is ovoid in form, phænozygous in a high degree, and markedly prognathous, especially in the subnasal region. The parietal eminences are prominent, as are also the frontal; these latter being fused, which cause the forehead to bulge somewhat in the centre. The strongly marked superciliary ridges are distinctly discernible from above.

The greatest breadth is at the parietal protuberances, the skull sloping gradually from these points to the mastoids. The sides are very much flattened, presenting two surfaces; one anterior to, and the other posterior to and below, the parietal eminences.

In *norma lateralis* the great prognathism and the massive nature of the jaws and malars immediately attract attention. The forehead is receding, and the whole sagittal curve, from the metopic point to the inion, forms a single elliptic arc, without any flattening at the bregma, or at the post-bregmatic portion of the skull.

The *zygomata* are strong and the post-zygomatic ridges distinct, with indications of remarkably developed muscular attachments. The temporal crest is also prominent but very irregular in outline, rising obliquely to a point vertically above the *meatus auditorius*, whence it falls to the parietal eminence. The mastoids are insignificant, but the mastoid foramina are unusually well marked; as are all the foramina of this series.

The digastric grooves are deep and broad, and the occipito-mastoidal sutures form parallel grooves of considerable size. The occipital condyles are slight, but pointed and projecting.

The palate is elliptical in shape, with a staphylinic index of 80·1.

In *norma facialis*, what strikes one at once is the negro type of the face, with its massive jaws, prominent malars, and overhanging glabella and superciliary ridges.

The face is mesopic and leptoprosopic, but has a broad appearance owing to the fulness of the malars.

The bidacryc distance is rather more than is usual in American skulls. The nasal bones are entirely different in formation to those in A; the bridge being depressed, but the lower part of these bones much wider than at the nasion. The *apertura pyriformis*, instead of presenting sharp angles, is rounded at the corners and slightly truncated; the nasal spine is prominent.

The orbits are squarish, and the bony rim massive, and, what is peculiar, have two superorbital notches.

There is considerable facial and sub-nasal prognathism, the upper jaw projecting greatly. Most of the teeth are wanting; their loss being post-mortem. The alveolar processes show that they were protruding. The few molars left are much worn down, but not to the same degree as in A.

The lower jaw is strong and heavy; the chin square and full, fairly high symphysis, and moderately deep sigmoid notch. The thickness of this mandible is unusual, being 18 mm., both at the point of the chin and at the second molar. The angle of the narrow ascending ramus is slightly everted.



The occipital bone is small but prominent, and very massive at the union; the thickness at this point being 13 mm. The asterions are well inside the occipital plane, both the mastoids and the squamæ being visible in *norma occipitalis*.

The left facial portion of the skull has been burnt; the zygoma and coronoid being completely carbonized.

The frontal is deeply scarred on both sides, but whether this is the result of wounds, or a pathological condition, I have not been able to decide. The scars, of which there are several, are from two to six cm. long and about one mm. in depth; one of them is bifurcated. Possibly they may only indicate a constricted superorbital nervous system, such as occurs in some South African races; but similar cases have not before come under my notice in South American crania.

*Skull C.*—The most conspicuous feature of this skull is its diminutive size. Its capacity is only 1080 c.c. (measured approximately with No. 8 shot). I say approximately, as the whole left temporal bone is wanting, and to measure the cubic contents I had to substitute one of wax.

In general appearance this skull resembles A, the flatness of the face being due to the same reasons, that is, to the continuity of the naso-frontal line, the fulness of the maxillaries and the prominence of the canine alveolars, thus flattening the whole anterior part of the alveolar process. The face does not look as broad as it otherwise would, owing to the want of the left zygoma; the right being very salient. Its general conditions are: slightly microseme, leptorhine, very platyopic, and leptoprosopic.

The forehead is narrow and low, receding abruptly from the metopic point, but is full in the spheno-frontal region as in A. The infra-orbital suture is plainly marked in this and in other skulls of the series.

The orbits are rectangular, and here again, as in B, the double superorbital notch is seen. The bones of the nose are straight and narrow, and the sub-nasal portion of the face extremely short and prognathous.

Seen from above, the skull is elliptic, and phænozygous in a high degree, the sutures open and simple.

This skull, like B, is scored in the frontal region, but it is difficult to say whether this is accidental or pathological.

In *norma lateralis* it presents some features worthy of note. The bulging of the lower portions of the parietals and of the squamose portions of the temporals is very pronounced; as is also the arching of the *zygomata*. The temporal crest is not noticeable except in the frontal. The upper portion of the coronal suture is depressed, which causes a corresponding bulging, anterior and posterior to the bregma. The frontal also bulges over the central line; but flattens away over each orbit. The parietal eminences cannot precisely be designated, owing to the rounding curves of this part. Different from the other skulls, the maximum breadth is not found in the bi-parietal diameter, but in the temporal region, 20 mm. below the squamose edge.

The skull is not symmetrical, one parietal being higher than the other, while

the right side of the occipital protrudes 10 mm. more than the left. Below theinion there are two deep impressions, where the recto-major muscles were inserted. The mastoids are small and pointed, the digastric grooves very wide, and the condyles insignificant. The palate is U-shaped, long and narrow; the teeth worn even more than in A, forming a sharp cutting edge on the outside, and worn down to the alveolars on the inside. The lower jaw is wanting, but must have been narrow and pointed.

This skull is the most chamæcephalic of the whole series, although it is well within the limits of orthocephaly, with an index of 71·2.

As I have already mentioned, the skeleton to which this skull belonged was found buried together with the skeletons of two children, one of an infant, and the other evidently not more than four years old. But these bones were in such a fragmentary condition that it was impossible to take any measurements, or even to make any detailed study.

*Skull D* (Plate XV).—On examining this skull, the theory of the American anthropologists, as to the probability of the primitive inhabitants of this continent having been of the Eskimo type, immediately occurred to me. Here we have many of its peculiarities reproduced, although in some cases slightly modified. The Fuegians, also, if one allows for distance and altered circumstances, are in many respects very similar.

In this skull we have the dolichocephaly (75·68), the marked scaphoid character without any sign of synostosis, the infra-orbital suture, the massive nature of the body of the mandible, the wide palate and worn teeth, the flat face with its prominent malars, the considerable sub-nasal prognathism, the prominence of the chin, the relatively narrow *apertura pyriformis* of the nose, and the small size of the mastoids and condyles; all in accordance with the cranial characteristics of the Eskimo.

The sutures are all well defined, but simple, the bones thick and very heavy.

All the protuberances and *foramina* are strongly marked.

In *norma verticalis* this skull has the shape of a truncated cone with a rounded base. It is slightly phænozygous and highly prognathous. The parietal eminences are very prominent and the frontal protuberances well indicated. As in C there is a slight depression at the bregma.

In *norma occipitalis* the skull is pentagonal in outline; the roof being sharply pointed and the sides vertical. The mastoids are larger and the digastric grooves shallower than in any of the other skulls. The occipital and the posterior portions of the parietal and temporal bones are asymmetrical, there being a considerable bulging on the left side of the lambda, especially in the vicinity of the mastoid. The skull is acrocephalic, the breadth-height index being 102·9.

In *norma lateralis* the forehead is seen to be full and rather high. The glabella and superciliary ridges are insignificant. The sagittal curve rises to a point at the bregma, rounding off to the lambda; there being a faint post-bregmatic concavity.



Owing to the protrusion of the temporal *squammæ*, and the flattening of the zygomata, the temporal *fossæ* are better filled than in any other of these skulls, although the sphenoids are deeply grooved.

Viewed in this norma, three planes present themselves. One falling from the sagittal suture to the temporal crest; the second from the temporal crest to the zygomata; and the third including the lower posterior part of the parietals; behind the line running from the *meatus auditorius* to the parietal eminences, which latter are strongly marked. There is also a considerable flattening from the obelion to the inion.

In *norma facialis* the fulness of the maxillaries, spoken of in the other skulls, is still a prominent feature. The face is leptoprosopic and verges on platyopy, with a naso-malar index of 108·6.

A point worthy of note is that in all the male skulls of the series the orbital measurements are identical.

The nasal fossæ are of the true pyriform shape, and the index places the skull in the mesorhine group. As I have remarked in the case of other skulls of the series, the infra-orbital suture is very apparent, and seems to persist till old age without obliteration. The bidacryc distance is small. The frontal is very narrow, allowing the whole side of the skull to the parietal eminences to be seen. The palate is parabolic and unusually high (17 mm. from the centre of the palatine torus to the alveolar plane). The teeth are small, rather worn down, but all sound. The chin is prominent, but the sigmoid notch is not very deep owing to the vertical setting of the inferior incisors; those of the upper jaw meeting them obliquely, thus causing great sub-nasal prognathism.

The mandible, though strong, is not so massive as in A and B; the ascending ramus being small and the condyles slight.

The molars present a considerable inward obliquity, owing to which the exterior edge is much more worn than the interior. The *apophysis genii* are very protuberant, with the digastric notch well formed.

The *foramen magnum* is pyriform and asymmetric; the condyles insignificant, and the jugular apophysis extremely small. The rugged surface of the lower portion of the occipital denotes that the neck muscles must have been very powerful.

*Skull E.*—This skull is very similar in general outline to D, having many points in common with the rest of the series, and also some special characteristics of its own.

In respect to the age of the individual, it belonged undoubtedly to the oldest member of the group. The sutures, especially the coronal, are partially synostosed. The forehead is low but not retreating, and the parietals rise to a peak about 4 centimetres behind the bregma. The skull is scaphoid, but not so much as D, dolichocephalic (71·6) and phænozygous, with a marked sub-nasal prognathism.

It is not in such perfect condition as the others of the series, the right parietal being badly damaged.

Viewed in *norma verticalis* it is ovoid in form, with a capsular occiput. All the eminences are prominent, the glabella especially being strongly marked.

In *norma lateralis* the development of the temporal crest at once fixes the attention. It is so strongly marked in the frontal region as to cause a depression immediately above it. In the parietals this ridge is duplicated, leaving a slight but well-marked furrow between the two branches. The flattened planes noticed in D are here reproduced, but the occiput is much more protruding.

In *norma facialis*, the flat features, the narrow forehead, the continuous fronto-nasal line, the prominent canines and the double superorbital notch are all in accordance with others of the same group, although the wider malar diameter and the broad short nose (nasal index 56·5) indicate individual variation.

Although the majority of the sutures are obliterated, the infra-orbital suture is still distinctly marked. Another significant fact is that the orbital measurements are exactly identical with those of the other male skulls of the series. Is this a racial distinction or a mere coincidence?

The malar orifice is double on both sides, there being a space of about 10 millimetres between the ducts.

The general characters of the face are chamæprosopic, platyopic, mesoseme, and platyrhine.

The lower mandible is broken in two, and is much weathered. All the incisors are present, but are worn down to the alveolar borders, while the molars, with one exception, were lost previous to death. The ascending ramus forms a much more obtuse angle than in any of the other mandibles, undoubtedly owing to the age of the individual. The bicondylic breadth is unusually great (128 mm. exterior measurement).

The palate is U-shaped and elongated, and the upper teeth all wanting with the exception of three incisors, worn down to the alveolar. The *foramen magnum* is asymmetrical and rhomboidal in form, and the condyles larger than usual.

*Skull No. 1.*—From shell mounds. This skull is only fragmentary but in general outline quite different from those already described. From its size it would appear to be that of a child, and the thinness of the bones seems to point to the same deduction. It is mesaticephalic in form, with an index of 80·0, with narrow sloping forehead, and gently rounded roof. The parietal protuberances are barely noticeable, and the greatest diameter is found below and slightly to the front of them.

As only the frontal, parietals and a portion of the occipital are present it is not easy to make a comparison, but I should have no hesitation in saying that it belonged to a type distinct from the series lettered alphabetically.

Measurement.	A	B	C	D	E	No. 1	Observations.
Sex ....	male	male	fem.	male	male	male	?
Age ....	30-40	35	30	30	60		Approximate.
<i>Diameters.</i>	mm.	mm.	mm.	mm.	mm.	mm.	
Antero-posterior ....	176	177	167	181	180	164	Maximum.
Transverse ....	141	135	128	137	129	131	
Frontal, maximum	116	112	102	109	112	102	
„ minimum	89	95	86	94	91	86	
Height ....	137	143	119	141	134	—	Basi-bregmatic.
Basi-nasal ....	96	100	91	98	98	—	
Basi-alveolar	87	98	97	95	99	—	
Foramen magnum	38	34	33	32	37	—	Length.
„ „	34	30	26	28	28	—	Breadth.
Bi-orbital ....	100	107	96	101	104	—	External.
„ ....	88	96	88	93	96	—	Internal.
Orbital length ....	40	40	37	40	40	—	All the male skulls are equal in these diameters.
„ breadth ...	35	35	31	35	35	—	
Bi-dacryc ....	19	23	19	21	22	—	
Nasal length ....	51	50	47	49	46	—	
„ breadth ....	20	25	22	24	26	—	
Palatal length ....	48	53	48	53	59	—	} Internal.
„ breadth ....	46	43	40	42	43	—	
Bi-jugal ....	107	116	108	110	114	—	
Bi-zygomatic ....	126	130	129	127	132	—	
Ophryo-alveolar ....	76	81	77	80	73	—	
Nasi-alveolar ....	66	72	63	68	64	—	
<i>Curves.</i>							
Frontal ....	126	128	122	130	126	113	
Parietal ....	114	134	110	124	138	108	

Measurement.	A	B	C	D	E	No. 1	Observations.
Sex ....	male	male	fem.	male	male	male	?
Age ....	30-40	35	30	30	60		Approximate.
	mm.	mm.	mm.	mm.	mm.	mm.	
Occipital ...	134	112	110	120	111	—	To opisthion.
Total sagittal ...	470	474	433	472	473	—	Including basi-nasal line over bregma.
Supra-auricular ...	325	320	290	325	316	—	
Horizontal ....	510	505	480	499	505	—	
Naso-malar ...	98	105	93	101	102	—	
<i>Indices.</i>							
Cephalic ....	79·2	76·2	76·6	75·6	71·6	79·8	
Length, height ...	77·0	80·2	71·2	77·9	74·4	—	These three indices give the true proportions.
Breadth „ ...	102·9	105·9	92·9	102·9	103·8	—	
Mixed „ ...	89·9	93·0	82·0	90·4	89·1	—	
Orbital ...	87·5	87·5	83·8	87·5	87·5	—	
Nasal ...	39·2	50·0	46·8	48·9	56·5	—	
Palatinal ...	95·8	80·1	83·3	79·2	72·9	—	Staphylinic.
Nasi-alveolar ...	55·8	55·4	48·8	53·5	48·4	—	Kollmann's.
Ophryo-alveolar ...	60·3	62·3	59·7	63·0	55·3	—	Broca's facial index.
Stephanic ...	77·5	84·8	79·4	86·2	81·2	84·3	
Foramen magnum...	90·0	88·2	78·8	87·5	75·6	—	
Naso-malar ...	111·3	109·0	105·6	108·6	106·2	—	
<i>Mandibles.</i>							
Bi-condyloid diam. ....	111	120	—	106	128	—	External.
Ramus, height ...	44	50	—	45	40	—	
„ breadth ...	31	34	—	32	35	—	
Symphysial height ...	30	36	—	32	28	—	
Molar height ...	26	31	—	28	—	—	{ A. 1st molar. B. 2nd „ D. 2nd „
Coronoid height ...	56	56	—	57	59	—	

Measurement.	A	B	C	D	E	No. 1	Observations.
Sex ....	male	male	fem.	male	male	male	?
Age ....	30-40	35	30	30	60		Approximate.
	mm.	mm.	mm.	mm.	mm.	mm.	
Condyloid height ...	59	69	—	58	58	—	
Bi-gonial curve ....	181	200	—	191	206	—	
Bi-gonial breadth....	97	96	—	90	97	—	
Ophryo-mental height ...	—	133	—	128	114	—	
Naso-mental „ ....	—	116	—	116	—	—	
Bi-stephanic length ....	—	109	101	108	—	—	
Spino-alveolar height ....	—	22	18	20	—	—	
	c.c.	c.c.	c.c.	c.c.	c.c.		
Capacity ....	1450	1360	1080	1330	1295	—	The capacity of skull C is approximate.
<i>Other bones.</i>							
Radius ....	23·0	23·5	21·3	24·1	22·6	—	Where possible the bones of the right side are those of which the measurements are given.
Ulna ....	27·0	26·5	25·2	27·3	26·0	—	
Humerus ....	32·0	33·6	28·5	33·9	30·7	—	
Tibia ....	32·7	—	31·5	—	—	—	
Femur ....	44·7	—	41·3	—	—	—	
Clavicle ....	13·5	13·7	12·4	13·9	13·1	—	

*Other Objects Found.*

Two mullers of peculiar form, shaped for the hand to grasp, and indicating considerable use. (Plate XVI, Figs. 1 and 2.)

One flat stone with scalloped sides, much worn in the centre and evidently used as a mortar. (Plate XVI, Fig. 3.)

A flat thin stone, probably used as an amulet or ornament. (Plate XVI, Fig. 4.) This stone is highly polished and is of a kind of yellowish-white marble. It has been perforated at one end by three small holes, which, by the constant friction of the suspending cord, have become greatly elongated; so much so that one has been cut right out and a second bored beneath it. It indicates long use and may possibly have been a family relic. This stone was found with the mullers and mortar, buried with the female skeleton.

A smooth thin axe-head, highly polished, and broken at its upper extremity. (Plate XVI, Fig. 5.)

A flint spear-head (Plate XVI, Fig. 8), roughly chipped, both extremities broken.

A polished axe-head. (Plate XVI, Fig. 7.) This has a slight groove round the narrow end, evidently where a cord has been used to fasten it to a haft.

A broken flint instrument, rudely chipped, which may have been a leaf-shaped spear-head. (Plate XVI, Fig. 6.)

A broken stone ring, much worn, probably used as a weight for nets. (Plate XVI, Fig. 9.)

A stone ball, probably used for the same purpose. (Plate XVI, Fig. 10.)

Several fragments of coarse pottery were also found. These were made of black clay mixed with fine white sand. They bear no mark of scoring or decoration, and are of the rudest description.

#### GENERAL OBSERVATIONS.

It will be as well here to recapitulate the distinctive characteristics of this series of skulls. These consist of the remarkable thickness and weight of the skulls, especially in the malar and occipital regions; the general flatness of the face; the continuous fronto-nasal line; the coincidence of the orbital measurements; the great width of the palate and worn condition of the teeth; the flattened surfaces of the walls and roof of the skulls; the tendency to scaphocephaly; the persistent infra-orbital suture; the double superorbital notch, and the prominence of the canines.

Their general dimensions place them among the sub-dolichocephalic group of races, their cephalic index being just a trifle over 76, although one (A) reaches 79·2.

The general type is quite distinct (even to a casual observer) from that of any other Chilean race which I have examined, including that of the natives of the time of the Spanish conquest.

In Chilean and Araucanian skulls the greatest transverse diameter is, in the great majority of cases, found immediately above the squamose edges of the temporals, while the parietal protuberances are rounded and not very prominent. With the skulls in question, on the other hand, the greatest width occurs exactly between the parietal prominences, while they narrow away considerably towards the temporals.

The roof of the skull is also far less symmetrical than in the Chilean and Araucanian, owing to the flattening of the parietals, both above and below the temporal crest, which give them a scaphocephalic tendency.

The prognathism of these skulls is very marked, especially sub-nasally. The angle ranges from 71° to 72°, about that of the Eskimo.

The frontal is high but narrow, quite distinct from the Araucanian skulls, in which it is broad but depressed. The frontal diameter (minimum) is less in this race than in any other, the mean diameter of the five skulls being 91 mm.



The general appearance of the face is one of extreme flatness. This is caused principally by the continuity of the fronto-nasal line (there being no notch below the glabella, the nose continuing in a line with the forehead) and the fulness of the malars.

The orbital index is high, and in four of the five skulls under study was exactly the same. The nasal index is low, while the zygomatic diameter is less than that of any other Indian race found in Chile.

Another peculiarity found in all the skulls is the great palato-maxillary diameter, the average (external) being 66 mm. The teeth in all of them are worn down in a most extraordinary way, not only the molars but even the incisors. In two of the skulls these latter only protrude from the alveolar processes about 4 or 5 mm., and are quite separated one from the other, the space between each being from 2 to 3 mm. Teeth and molars alike are worn to a sharp exterior edge and present a concave surface.

A point of especial importance is the persistent infra-orbital suture, which continues even in old age, as evidenced by skull E. This together with the double superorbital notch is a distinctive feature in all the skulls of the series, and is common among the Fuegians and Eskimo.

The capacity of the skulls is very low, giving an average of only 1,305 c.c. One of them, a female, only reached 1,080 c.c., although it does not show any signs of being abnormal.

The bones of the body seem to indicate that this race was of low stature, and slightly built. The average length of radius of the four male skeletons is only 23·3 cm., and, calculating this bone by Humphrey's table at 14·15 per cent. of the total length of the skeleton, would give an average height of 165·7 cm. or 5 feet 4½ inches more or less. The female skeleton, on the other hand, only measured a little over 150 cm. or 4 feet 11½ inches.

The state of civilization to which this race had attained seems to have been very low. They were evidently in the transition stone age, as the instruments found are some rudely chipped and some fairly polished. No sign of metal was found, but fragments of rude pottery, without any attempt at decoration, were numerous.

It is probable that their principal food was shellfish; but they also ground roots or berries, as is shown from the worn state of the rude stone mortar. They also had some means of catching or killing wild-fowl, as the bones of such are abundant.

Their mode of burial would seem to indicate that the sun had an important place in their religious ideas, and a belief in a future state is suggested by their burying arms and household utensils with their dead. It is also probable that they indulged in personal decoration, as the pierced stone (Plate XVI, Fig. 4), and a number of perforated shells of small size, have evidently been used as ornaments.

Who were these people? Whence did they come? Whither have they gone? These are questions that with the scanty data set forth I cannot venture to answer; but I would call the attention of anthropologists to several points which, while

common among the Fuegians and Eskimo, are persistent in the remains here presented.

Before making a more detailed comparison of these races it would be as well to mention that most text-books rather exaggerate the peculiarities of the Eskimo. Thus it is generally stated that they are extremely dolichocephalic (index from 71 to 72). We shall see by tables here given that the race is more probably sub-dolichocephalic with an index of more than 75, although there are many individuals who fall much below this.

The same remarks apply to the nasal index. While still very leptorhine, they are not so to such a degree as is commonly supposed, the average index being probably above 44.

Again, we are frequently informed that they have the yellow complexion of the Asiatic. This may be so where some intermixture has taken place with Mongolic tribes, but as a racial characteristic it is doubtful, as many well-known writers, who have made personal observations, decide otherwise. Hayes describes them as greyish brown; Holm and Pinart say they are of a light bronze colour; and John Murdoch speaks of their complexion as a dark brunette, often with a good deal of colour in the cheeks.

*Cephalic Index.*—I give here various lists of Eskimo skulls, indicating at the same time their provenance.

21 skulls from Greenland	...	..	71·7	(Broca)
14 " " "	...	..	71·3	(Davis).
614 " " "	...	...	76·8	(Deniker).
22 " " "	...	...	71·4	(Turner).
6 " " Hudson's Bay	...	...	75·1	(Davis).
35 " " " "	...	...	77·2	(Tocher).
5 " " Labrador	...	...	74·1	(Virchow).
27 " " "	...	...	77·0	(Deniker).
10 " " "	...	...	71·8	(Duckworth).
19 " " "	...	...	71·5	"
6 " " Alaska	...	...	75·3	(Davis).
? " " " "	...	...	74·8	(Deniker).
101 " " —	...	...	71·37	(Bessels).
Average of 880 skulls	...	...	76·1	

It is probable that many of the skulls contained in this list have been quoted more than once by writers who have included the results of other studies in their own tables.

Comparing the average index of the 880 skulls with that of the five Chilian, we find a near resemblance (76·1—76·5).

*Altitudinal Index.*—Another peculiarity of the Eskimo is the great height of the skull. French anthropologists chiefly employ the length-height index to express this quality; the Germans prefer the breadth-height. There is much to be

said against both methods, and we agree with Broca that the mixed-height index is that which gives the best idea of this characteristic.

				Length-height.	Breadth-height.	Mixed-height.	
13 Eskimo	....	....	....	73·1	—	—	Broca.
5 Eskimo	....	....	....	74·0	103·0	88·5	Virchow.
5 Chilians	....	....	....	76·1	101·7	88·9	

These indices show the similarity of the two races in this respect, and also place them as a unique group at the head of the hypsiccephalic and acrocephalic peoples.

*Frontal Measurements.*—The proportions and shape of the frontal region in the two races are also very similar, as shown below.

*Frontal Index:*—

15 Eskimo (Broca)	...	...	...	...	94·1
5 Chilians	...	...	...	...	91·0

*Stephanic Index:*—

10 Eskimo (Cambridge Museum)	...	...	...	81·2
7 „ (Duckworth)	...	...	...	80·9
5 Chilians	...	...	...	81·8

*Orbital Index.*—The same resemblance occurs in this index:—

8 Eskimo (Duckworth)	...	...	...	87·5
10 „ (Cambridge Museum)	...	...	...	88·6
5 Chilians	...	...	...	87·5

*Nasal Index.*—Here we note a more considerable difference, the Eskimo being highly leptorhine and the Chilians mesorhine, although the index in one case was little more than 39.

14 Eskimo (Broca)	...	...	...	...	42·3
15 „ (Duckworth)	...	...	...	...	45·3
9 „ „	...	...	...	...	44·0
10 „ (Cambridge Museum)	...	...	...	...	45·5
Average	...	...	...	...	44·2
5 Chilians	...	...	...	...	48·3

*Facial Index.*—To give a more exact idea of the facial proportions, we will append both Broca's and Kollmann's indices. Here we note a singular discrepancy. In the latter index we find that there is more or less coincidence between the two races, while in the former the difference is very marked.

*Kollmann's Index :—*

18 Eskimo (Duckworth)	...	...	...	51·8
10 „ (Cambridge Museum)	...	...	...	54·3
? „ (R. C. S.)	...	...	...	51·2
5 Chilians	...	...	...	52·4

*Broca's Index :—*

13 Eskimo (Broca)	...	...	...	73·4 ?
5 Chilians	...	...	...	60·1

It is difficult to say whence this difference arises, as neither the ophryo-alveolar length nor the bi-zygomatic breadth are given in Broca's list.

*Naso-malar Index.*—Very little difference is noted in this index; the slightly higher figure in the Chilians being due to the flattened nasal skeleton.

18 Eskimo (Duckworth)	...	...	...	107·0 (men).
8 „ „	...	...	...	106·1 (women).
10 „ (Cambridge Museum)	...	...	...	107·9
5 Chilians	...	...	...	108·1

The result of these comparisons shows that, although separated by the whole length of the continent, these two races have a very marked resemblance to each other. This is the more extraordinary when we refer to an article published by W. L. H. Duckworth and B. H. Pain in the *Journal of the Anthropological Institute*, vol. xxx, 1900, in which the special characteristics of the Eskimo skulls are given as follows :—

1. A tendency to scaphocephaly.
2. The persistency of the infra-orbital suture in *pars facialis*.
3. The asymmetry of the foramen magnum.
4. The peculiar wearing of the teeth.
5. The thickening of the body of the mandible.
6. The megasemic orbital aperture.
7. The flattened nasal skeleton.
8. The prominence of the chin.
9. The low nasal index.
10. The prominence of the malars.
11. The small mastoid processes.

Comparing these peculiarities with those of the Chilean skulls given at the beginning of the chapter, we find that they coincide in almost every detail.

Many writers have called attention to the affinities of the Eskimo with those tribes which people the coasts of the Magellan Straits; the Tehuelches, Onas, Analues, Yaghans, Pesheras, and others.

That these tribes have inhabited the southern portion of the continent since very remote times is proved by the remains found in various prehistoric sites.

Among others I may mention a series of prehistoric skulls sent by Dr. Moreno to the Anthropological School of Paris.

These skulls reproduce all the most notable characteristics of the Eskimo ; the high narrow forehead, the flattened planes of the skull, the dolichocephalic and acrocephalic elements, the length of the face, the prominence of the malars, the degree of prognathism, the small bi-orbital distance, the large palate, and the peculiar wearing of the teeth.

All these peculiarities are also reproduced, as we have seen, in the Serena skulls.

Medina, in his *Aborigines of Chile*, also mentions several skulls to which he ascribes considerable antiquity, giving the following details.

	1.	2.	3.	4.
Provenance ....	—	—	Osorno.	Chonos Archip.
Cephalic index ....	75·9	76·4	74·7	69·4
Bi-malar diameter ....	—	111 mm.	114 mm.	125 mm.
Frontal minimum ....	89 mm.	97 mm.	99 „	98 „
Length-height index ...	72·4	72·4	76·9	75

These measurements, so far as they go, would seem to indicate that they might belong to the same race.

The same author also gives some measurements of a Fuegian skull. Cephalic index, 73 ; length, 178 mm. ; breadth (parietal), 130 mm. ; breadth (bi-temporal), 123 mm. ; bi-malar diameter, 130 mm. (zygomatic ?) ; frontal (minimum), 82 mm.

An ancient Tehuelche skull from the south of the province of Neuquen (Patagonia), now in my possession, gives similar measurements, but also differs in some particulars. Cephalic index, 74·7 ; length-height index, 73·7 ; breadth-height, 98·6 ; mixed-height, 86·1 ; orbital, 90·2 ; nasal, 55·5 ; ophryo-alveolar, 59·2 ; naso-alveolar, 52·6 ; stephanic, 85 ; capacity, 1,540 c.c.

This skull is very slightly prognathic, the glabella and superorbital ridges extraordinarily salient and massive, the nasal notch deep, and the bones of this organ both broad and prominent. The skull is slightly scaphocephalic, and presents the flattened planes mentioned as common in the Serena skulls ; the mastoids are small, and the foramen magnum pyriform. The occipital torus, strongly marked, reaches from one asterion to the other. The double superorbital notch is apparent, but the infra-orbital suture is not noticeable ; in fact all the sutures are more or less synostosed. Its general characters are—dolicho-hypsiacrocephalic, mesognathic, megaseme, platyrhine, prosopic and slightly scaphocephalic.

From these details and comparisons it is seen that there exists a great general resemblance among the prehistoric races of the southern extremity of the continent, and that this resemblance extends to the races inhabiting the Magellan

Straits district, as well as to the Eskimo who inhabit the extreme north. At the same time we know of no other race who have any near affinities with this type.

Some writers, among them Quatrefages, contend that America was originally, and always has been, peopled by migrations from the Old World, presumably Asia, although some incline to Europe.

The two special races to which they are supposed to owe their origin are the Mongols, and the dolichocephalic type that inhabited Northern Europe during the Stone Age.

Let us briefly examine these two types to discover their points of contact.

The Mongols are brachycephalic, metriocephalic, mesorhine, megaseme, and mesognathic.

The Eskimo are dolichocephalic, hypsi- and acrocephalic in a high degree, very leptorhine, mesoseme, and prognathic. In all these points the two races differ radically. As regards the general shape of the face, stature, obliquity of the orbital axes they resemble each other, but there the likeness ceases.

The dolichocephalic races of Europe may be classed under two heads, the tall fair type of the north, and the short brunette of the south. With the latter we have nothing to do.

The former is known by many names—the Scandinavian, the Canstadt, the Frisian, the Row-grave, etc. It is still found in some parts of Sweden, in the Danish isles, and in certain Frisian districts.

This race was tall, dolichocephalic, extremely platycephalic, with a low retreating brow and narrow forehead, narrow prominent nose, enormous orbital cavities, heavily marked superorbital ridges, prognathism greater in the lower jaw than in the upper, and the occipital region highly developed. They had blue or grey eyes, abundant fair hair, and ample beards.

It is difficult to reconcile this description with that of the Eskimo, who are in almost every detail the direct contrary; being short, dark complexioned, and with very little hair on the face or body.

We must then either abandon the theory that these latter are not autochthonous, or seek new affinities for them among other races, prehistoric or otherwise, where the contrast will not be so marked; especially as the resemblance they bear to the Serena skulls would seem to indicate that, although the two branches must have been separated long ages ago, the racial type has remained, even under changed circumstances, remarkably persistent.

#### NOTE ON THREE SKULLS FROM MOCHA ISLAND.

Since writing the foregoing article I have received a communication from Dr. Vergara Flores, of Tocopilla, briefly describing three skulls—supposed to be very ancient—found in the island of Mocha. This island is situated close to the coast of Chile, in 38° 4' S. latitude. It was formerly considered by the Araucanos to be the resting-place of the souls of the dead in their voyage west.



The most notable characteristic of these skulls is the remarkable bi-zygomatic diameter (145·1 mm.) and the proportionately short ophryo-alveolar distance. This causes a very low facial index (53·2, Broca). This is a trait common to the Araucano Indians. In a list of measurements of 31 Araucano skulls, I found 11 with a facial index varying from 50 to 54.

The great palato-maxillary dimensions, and high staphylinic index, are also common features of the Araucanos and, in general, of the races inhabiting the southern extremity of the continent.

The frontal dimensions, and consequently the stephanic index, are also very similar in the two races; so, too, is the nasal index. The general form of the face, the very prominent glabella and superorbital ridges, again would seem to indicate that the two races had much in common; but here the likeness ceases.

The Araucano has a rounded skull, the Mochinos present plane surfaces with a decided tendency to scaphocephaly. The Araucano is only slightly phænozygous, the Mochinos extremely so; far more so than in any other race of which I have knowledge. The greatest transverse diameter is found in the temporal regions in the Araucano skulls, and in the parietal protuberances among the Mochinos.

So developed is the malar region in these latter that the bi-zygomatic diameter is greater by more than 5 mm. than the transverse diameter of the skull.

The sub-nasal prognathism in these skulls is also very great (67·3°), and the facial angle (Cloquet) 68·2°. The nasal spine is very developed, the bridge very sunken. The occipital region is also well developed, especially at the inion, there being a prominent occipital torus. The general characters of the skulls are: sub-dolichocephalic, hypsi-acrocephalic, extremely chamæprosopic, platyopic, phænozygous, megaseme, mesorhine, and highly prognathic.

In many points these skulls are similar to those described in the foregoing article; and it occurred to me that they might belong to a type formed by an intermixture of that ancient race with later comers, probably Araucanos.

The following is a list of the principal measurements, compared with those of these two races:—

Measurement.	Serena Skulls.	Mochinos.	Araucanos
Length (maximum) ....	176 mm.	180 mm.	177 mm.
Breadth „ ....	134 „	140 „	141 „
Frontal „ ....	110 „	118 „	118 „
„ (minimum) ....	91 „	97·3 „	97 „
Height (basi bregm.) ....	135 „	138 „	135·6 „
Diameter, bi-zygomatic ....	129 „	145·1 „	134·4 „
„ ophryo-alveolar ....	77·4 „	77·6 „	75·6 „

Measurement.	Serena Skulls.	Mochinos.	Araucanos.
Cephalic index ....	76·1	77·7	80·1
Length-height index ....	76·1	76·8	77·1
„ breadth „ ....	101·7	98·3	96
Mixed „ „ ....	88·4	87·5	86·5
Stephanic index ....	81·8	82·4	81·1
Frontal „ ....	—	—	68·8
Facial „ (Broca) ....	60·1	53·2	56·9
Nasal „ ...	48·3	49·7	48·6
Orbital „ ....	87·5	90	85·3
Palatino „ ...	82·3	83·6	82·9
Prognathism, angle ....	—	67° 3'	73°
Facial angle (Cloquet) ....	—	68° 2'	—
Capacity ....	1,305 c.c.	1,387 c.c.	1,401 c.c.

It will be seen from this list that the principal indices are such as would result from such an intermixture, while the fact that these skulls possess many of the characteristics of each would seem to strengthen the same deduction.

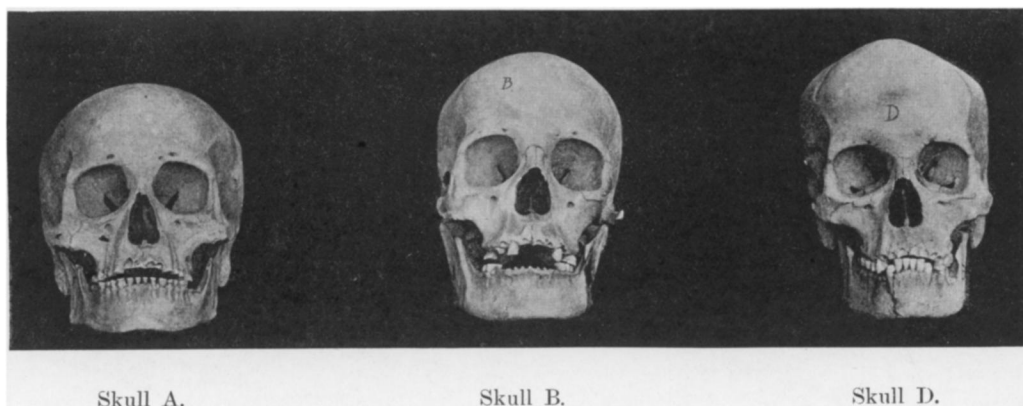


FIG. 1.—NORMA FACIALIS.

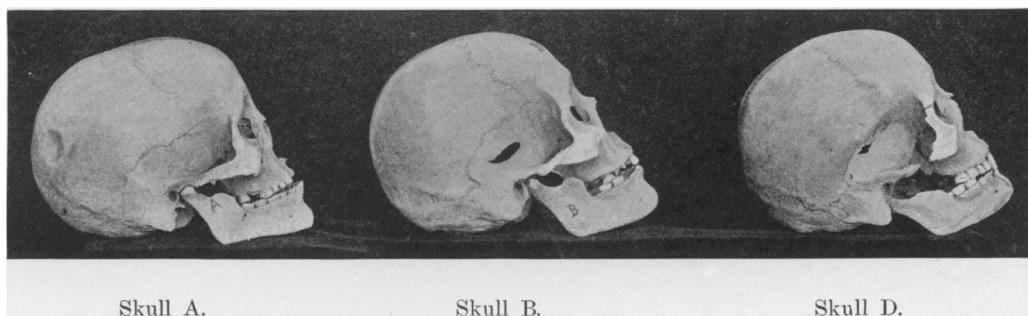


FIG. 2.—NORMA LATERALIS.

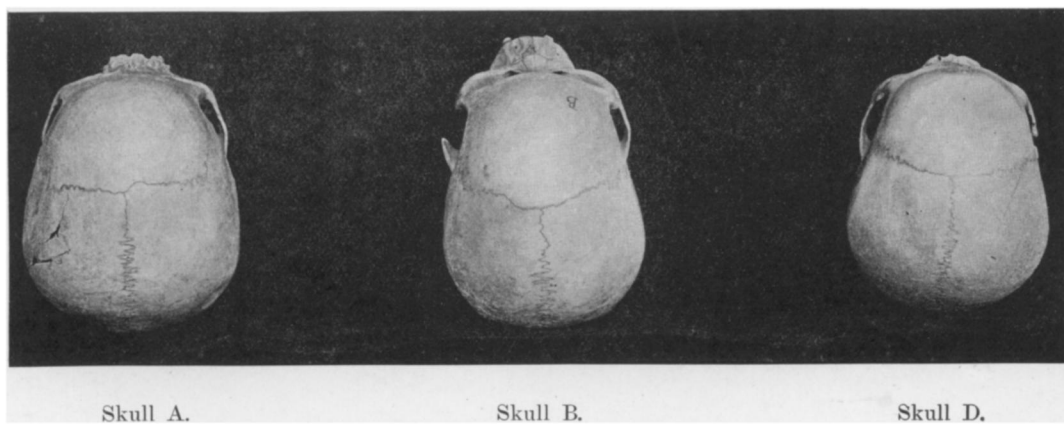
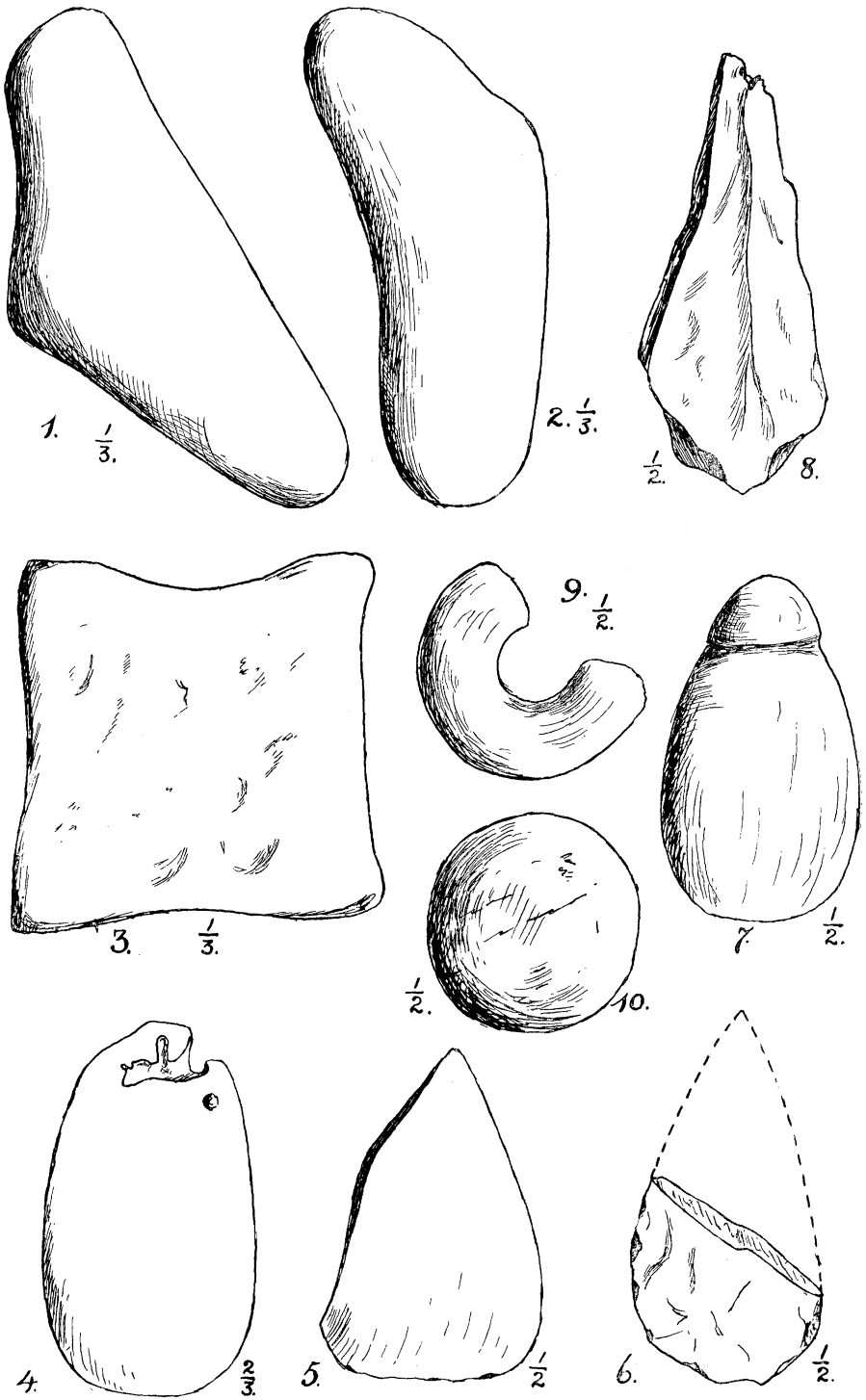


FIG. 3.—NORMA VERTICALIS.

NOTES ON SOME ANCIENT CHILIAN SKULLS AND OTHER REMAINS.



SOME ANCIENT CHILIAN SKULLS AND OTHER REMAINS.