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Dorsey. G. A.

ANTHROPOLOGY.¹

Observations on the Scapulæ of Northwest Coast Indians.
—Researches on the scapula since the time of Broca's² paper in 1878 have not been very numerous or conclusive in their results, and it seems fair to say that the valuable ethnic results which it was expected would be derived from extended observations on the scapula have not proved entirely satisfactory. Nor does it yet seem possible to say whether this is due to the insufficient numbers of scapulæ which have been examined or to individual variation. From an examination of the literature on the subject, especially from the papers of Sir William Turner³ and Professor Dwight,⁴ one would infer that the latter reason is the chief cause for the unsatisfactory results. Indeed, Professor Dwight declares,⁵ "I do not know what range of variation a great series of the scapulæ of the larger felidæ might present, but a small one shows nothing like that of the human race—I might even add, that of the Caucasian." It must be confessed, however, that the numbers of observations so far made have been exceedingly small. This is to be explained, of course,

¹ This department is edited by H. C. Mercer, University of Pennsylvania.

² "Sur les indices de largeur de l'omoplate chez l'homme," etc., Bull. de la Soc. d'anthropologie de Paris, Feby. 21, 1878.

³ Challenger report, Zoology, Vol. XVI, "Report on the Human Skeletons," p. 81.

⁴ "The Range of Variation of the Human Shoulder-blade," AMERICAN NATURALIST, July, 1887.

⁵ "The Range and Significance of Variation in the Human Skeleton," Boston, 1894, p. 23.

in large part, by the fact that even in fairly well preserved skeletons the scapula is extremely likely to be more or less damaged.

With the view of testing some of the conclusions of Professor Dwight, chiefly for my own satisfaction, I made a hasty examination of the scapulæ of the Northwest Coast Indians in the Field Columbian Museum. I was at once surprised at the apparently great individual variation in the general form of the bones, in the surfaces, borders, angles, etc. I then became curious to know if the indices would show a variation correspondingly great. In all I found twenty skeletons, the scapulæ of which were sufficiently well preserved to warrant an examination. Of these, thirteen were of the Kwakiutl race, seven being males and six females; and seven were Songish, four being males and three females.

I have studied topically the following subjects: I. Glenoid cavity; II. Borders and angles; III. Dimensions; IV. Indices; to which is added a general summary.

I. GLENOID CAVITY.

My interest in the glenoid cavity was confined to a sexual study of comparative size, and for this purpose two measurements were taken, the maximum length and the maximum width. I made no distinction of race in this study, and measured the cavity of the right bone only. In Table I are given the individual measurements of twenty specimens.

TABLE I.

Males.		Females.	
Length.	Breadth.	Length.	Breadth.
41 mm.	30 mm.	35 mm.	26 mm.
42	33	34	25
45	28	35	25
44	35	37	26
40	30	35	25
43	30	37	27
40	31	34	24
40	29	34	26
41	31	37	28
40	29		
40	28		

The sharp line of demarkation between the two sexes is perhaps better shown in the following table, where the comparative distribution of the measurements can be seen at a glance:

TABLE II.

Length.	Males.	Females	Breadth	Males	Females.
34 mm.		3	25 mm.		4
35		3	26		3
36			27		1
37		3	28	2	1
38			29	2	
39			30	3	
40	5		31	2	
41	2		32		
42	1		33	1	
43	1		34		
44	1		35	1	
45	1				
Total,	11	9	Total,	11	9
Mean,	41.4	35.3	Mean.	30.3	25.7

Or, to put the result in still another form, we may say the glenoid cavity in the male measures 41 x 30 mm., in the female 35 x 25 mm. According to Professor Dwight the average length in the European male is 39.2 mm., in the female 33.6 mm.

II. BORDERS AND ANGLES.

a. *Superior Border.*—The superior border necessarily includes a portion of the vertebral border, or at any rate so much of it as is included in the superior angle. As there is no peculiar variation, so far as I can see, which is characteristic of either sex, or is confined to either the Kwakiutl or Songish, I have put into a single group some of the extreme forms. Naturally the chief interest in the superior border centers in the definiteness of the supra-scapular notch. As may be seen in Figure 1 there is an insensible gradation in the series, passing a gradual parabolic curve with no indication of a notch to a well defined notch. Another point to be noted is the very open superior angle which prevails with very few exceptions, and forms a marked contrast to the characteristic pointed termination of the European shoulder-blade.

b. *Vertebral Border.*—Again, as for the superior border, I have treated the collection as a whole, and reproduce here in Fig. 2 some varieties, drawing upon the entire series:

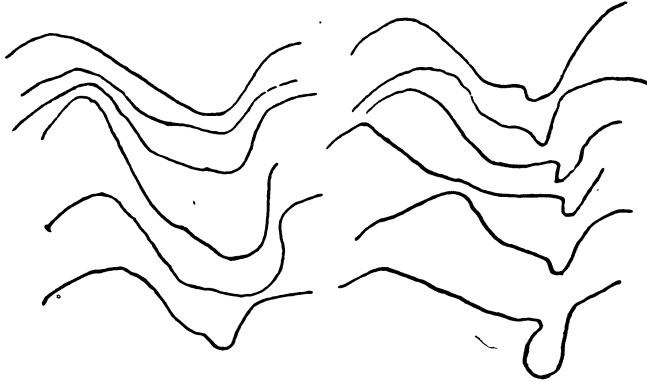


FIG. 1.—Variations in the Superior Border of the Scapula in Northwest Coast Indians. (One-half natural size.)

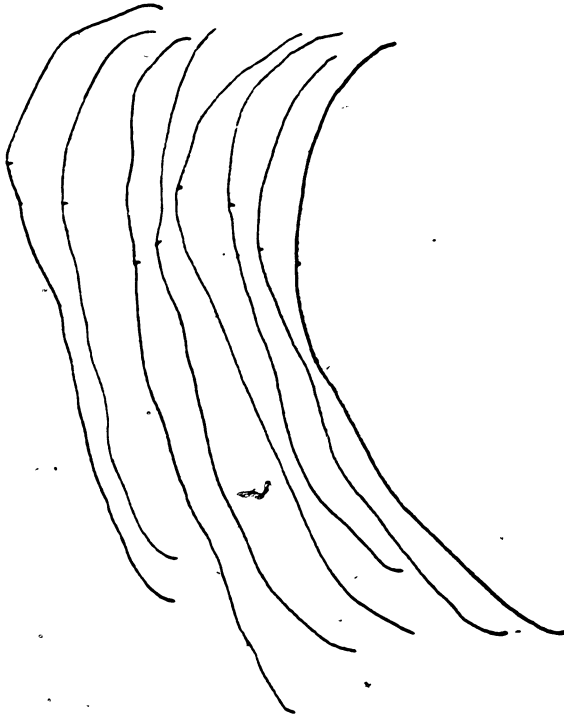


FIG. 2.—Vertebral Border of Scapulae of Northwest Coast Indians. (One-half natural size.)

c. *Axillary Border and Inferior Angle*.—The variation here equals or even exceeds that of the superior border. This, as is well known, is due very largely to the variations in the attachment surface for the *teres major* muscle. As Professor Dwight here pointed out, this surface is prolonged after the nature of a spinous process in many of the lower monkeys, and has been considered by him as “the appearance of a peculiarity of lower forms”—analogous to the third trochanter. This opinion is, I believe, not generally held by anatomists, the majority preferring to regard the process, when present, as due solely to the influence of an unusually well developed *teres major* muscle. There being thus an unusual amount of interest in this region I have reproduced the outlines (see Figs. 3 and 4) of all the Kwakiutl and Songish scapulæ, keeping the two sexes distinct.

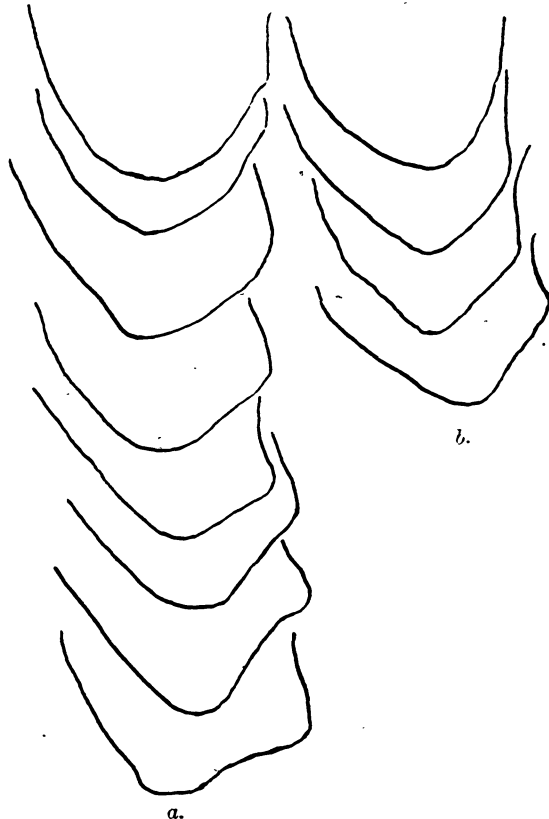


FIG. 3.—Inferior Angle of Scapulæ of Kwakiutl Indians. (One-half natural size.)—a. Males. b. Females.

It may first be noted in regard to these two sets of outlines that the inferior angle itself is extremely variable. But I entirely agree with

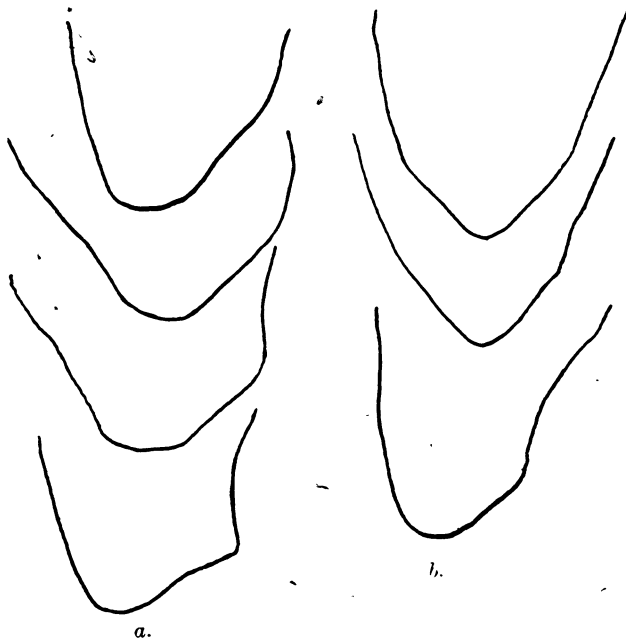


FIG. 4.—Inferior Angle of Scapulae of Songish Indians. *a.* Males. *b.* Females. (One-half natural size.)

Professor Dwight in thinking that the value of the results obtained from measuring it are not in proportion to the time necessary for the work, and this in addition to the difficulty of not being at all times sure of the results, especially when the axillary border is irregular in its course, as it very often is. This angle is said by Mivart to be about 35° – 40° in European scapulae; it certainly averages much higher in the series under consideration.

In regard to the *teres major* spine, it seems to be fairly constant in its development in the Kwakiutl males, about equally well developed in the Kwakiutl females and Songish males, and only faintly indicated in the Songish females.

III. DIMENSIONS.

I was interested in four points in the dimensions of the scapulae, viz.: (a) individual variation; (b) lateral variation; (c) sexual variation; and (d) ethnic variation. These may be seen in the following table.

TABLE III.

	Length.		Breadth.		Infraspinous Length.	
	Right.	Left.	Right.	Left.	Right.	Left.
Males.	165 mm.	165 mm.	104 mm.	104	128 mm.	124 mm.
	166	161	110	110	121	121
	160	—	100	94	126	—
	160	160	109	107	123	125
	177	177	—	—	—	—
	159	164	102	104	127	125
	169	169	107	104	133	133
Kwakiutl						
Females.	154	154	99	100	122	122
	140	130	93	94	111	110
	134	138	84	87	109	109
	140	—	95	—	107	—
	—	—	—	92	—	—
	—	—	—	87	—	113
	—	—	—	—	—	—
Males.	180	172	107	108	140	135
	153	149	98	97	114	115
	177	177	110	110	135	133
	164	160	107	105	122	122
	—	—	—	—	—	—
Songish						
Females.	198	133	95	95	107	101
	144	—	101	—	111	—
	133	151	95	95	111	115

a. *Individual Variation.*—Taking the entire series as a whole, the range of variation in length is from 130 mm. to 180 mm.; in breadth from 84 mm. to 110 mm.; the infraspinous length from 101 mm. to 140 mm. The greatest contrast is thus, naturally, found in the length, the longest bone exceeding by almost one-third in length the shortest.

b. *Lateral Variation.*—In five instances the right bone is longer than the left, the total aggregate additional length being 31 mm.; in four instances the left bone is the longer, the total aggregate additional length being 18 mm. Lateral variation in breadth occurs equally five times for each side, but the total aggregate additional breadth for the right bone is 14 mm., while for the left it is only 8 mm. For the infraspinous length the right bone is the longer six times, with a total of 20 mm., while the left is the longer in three instances with a total of 8 mm. Thus, it may be seen that the number of instances where some dimension of the right bone exceeds that of the left is sixteen, while in

twelve instances the right exceeds the right in some dimension,—a difference hardly so great as one might expect; and it is possible that a larger series of observations would quite overcome whatever difference seems to exist.

c. *Sexual Variation*.—Taking the scapulæ of the right side only and of the two races together we have the following results, which I have thrown into a Table:

TABLE IV.

	Length.		Breadth.		Infraspinous Length.	
	Male.	Female.	Male.	Female.	Male.	Female.
	mm.	mm.	mm.	mm.	mm.	mm.
Average,	165	141	105	94	125	111

It will thus be seen that the difference in the two sexes is a decided one, and a careful examination of the preceding table shows very few exceptions where the largest female scapula equals in size the smallest of the males.

d. *Ethnic Variation*.—Although the two series are hardly large enough to make it worth while to attempt to draw any conclusions, it would appear that the scapula in the Songish is very slightly larger than it is in the Kwakiutl. This difference is more pronounced in the males than it is in the females.

IV. INDICES.

In Table V the range of variation may be seen for each index, in each sex, and for both races.

The highest scapular index is 70, found in a Songish female; the lowest is 59, in a Songish male. The highest infraspinous index is 90, occurring both in a Songish female and a Kwakiutl male; the lowest is 76, in a Kwakiutl female. Apart from the extremes this table shows two very interesting points; the first is that there is very little sexual variation; the second is that while the scapular index is fairly uniform, the infraspinous index is subject to great variation. The averages of each index for both races are shown in Table VI,

The scapular index of 65.1 for the mean of both races may be regarded, it seems to me, as a trustworthy index for the Northwest Coast Indians. This index, it may be noted, corresponds very closely to that

TABLE V.

Scapular Index.					Infraspinous Index.						
In		Kwakiutl		Songish		In		Kwakiutl		Songish	
Index	♂	♀	♂	♀	Index	♂	♀	♂	♀		
59			1		76		1	1			
60					77		1				
61					78						
62	1	1			79	1					
63	2				80	2					
64	1	1	1		81	1	1	1			
65					82						
66		1	1	1	83		1				
67		1	1		84						
68	2			1	85			1	1		
69					86						
70				1	87			1			
					88		1		1		
					89	1					
					90	1			1		
Total,	6	4	4	3	Total,	6	5	4	3		
Index,	64.6	64.7	64.0	68.0	Index,	83.6	81.6	82.2	87.6		

TABLE VI.

	Scapular Index.	Infraspinous Index.
Kwakiutl,	64.7	82.3
Songish,	65.7	84.5
Both Races,	65.1	83.2

given by previous investigators for European scapulæ; the averages for the latter being 65.9 (Broca), 65.2 (Flower and Garson⁶), 65.2

⁶"On the Scapular Index as a Race Character in Man," *Journal of Anatomy and Physiology*, Vol. XIV, p. 13.

(Livon⁷), and 63.5 (Dwight). The result is also similar to that obtained by Professor Turner, 65.0, on the scapulæ of nine Fuegians.

The mean infrascapular index of 83.2 does not seem worthy of much consideration, from causes which have already been mentioned. It may be noted, however, that according to the table given by Professor Turner,⁸ this index is lower than any yet recorded for any race except the Eskimos, Hottentots and Tasmanians.

CONCLUSIONS.

From the present inquiry the following conclusions can be made:

1. There is a marked difference in the size of the scapula in the two sexes; this is seen in the dimensions of the glenoid cavity, and in the length, breadth and infraspinous length.

2. Lateral variations in the scapulæ in linear dimensions are so slight and so contradictory as to be explained perhaps as due to an insufficient number of observations. The right bone is, however, a trifle larger than the left in a small percentage of cases,—this percentage being larger than that of the left bone exceeding the right in size.

3. There is no important difference in the dimensions or indices of the scapula between the Kwakiutl and Songish.

4. There is very little difference in the two indices in the two sexes; the female, perhaps, having indices a trifle higher than the male. This is in accordance with the results of Livon. Broca, on the other hand, considered the male to possess the higher index.

5. The range of variation for the scapular index is not excessive, and there is a certain amount of uniformity in its distribution which makes the mean index of value.

6. The range of variation for the infraspinous index, while not extensive, is so evenly distributed as to destroy in part the value of its mean; and so it cannot be considered to have a value equal to that of the scapular index as representing the average for Northwest Coast Indians.—GEORGE A. DORSEY, PH. G., *Assistant Curator of Anthropology, Field Columbian Museum, Chicago.*

⁷ "De l'omoplate et de les indices de largeur dans les races humaines." Thèse Paris, 1879.

⁸ Challenger Report, Vol. XVI, "Report on the Human Skeletons," p. 81.

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