A REVISION OF RISLEY'S ANTHROPOMETRIC DATA RELATING TO THE DARJEELING HILL TRIBES

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SUMMARY. The anthropometric data relating to Bengal Castes and Tribes and Chittagong Hill Tribes collected by Sir H. H. Risley in 1886-88 and published by him in 1891 were scrutinized by Mahalanobis (1933-34) and his opinion was that the only fundamental objection to Risley's data was that the individual figures and averages given by Risley are seriously inconsistent. He concluded that the mistakes had crept in during calculation of averages and indices and in printing and the rectified data are singularly free from mistakes and can be used with safety. Author has scrutinized Risley's data relating to the Darjeeling Hill Tribes and reached similar conclusion. Rectified data which can be used with safety for the Darjeeling Hill Tribes are given in this paper.

1. Introduction

Sir H. H. Risley collected a huge body of anthropometric data in 1886-88 and published them in 1891. Since then a great deal of controversy has taken place regarding the reliability of these data. Mahalanobis (1933) considered this problem and his opinion was that the only fundamental objection to Risley's data was that the individual figures or averages given by Risley were seriously inconsistent. Mahalanobis (1933, 1934) published the results of a careful scrutiny of Risley's data relating to the tribes and castes of Bengal and of Chittagong Hill tribes. He claimed that the real defect in Risley's data had crept in during the subsequent stages of calculating indices and averages, and of printing, and that practically all the discrepancies in individual measurements and indices could be corrected with certainty, leaving the data singularly free from inconsistencies.

In the present paper, it is proposed to pursue this idea of Professor Mahalanobis and to examine the reliability of Risley's data relating to Darjeeling Hill tribes, so far as this can be done by internal comparisons and checks within the body of the data. The method of scrutiny was broadly similar to that explained by Mahalanobis (1933) in his paper.

2. Material

Risley's data consist of 11 measurements along with age, district of birth and name of each subject and 10 indices calculated on the basis of measurements. In the present paper, age, 2 measurements viz. stature and weight, height-weight index and the facial angle are not scrutinized.

Table 1 gives the list of characters for which measurements were taken and definition of indices, which are scrutinized in the present paper, along with the symbols used in the text and in the tables.[1]

[1]Risley's spelling of all names of castes and tribes, his anthropological terminology, which differ in many respects from modern usage, are retained in this paper. All measurements are given in millimetres.

TABLE 1A. LIST AND SYMBOLS OF CHARACTERS

symbol	character	symbol	character
Nh	nasal height	Fb	minimum frontal breadth
Nw	nasal breadth	Bz	maximum bizygomatic breadth
Bb	bimalar breadth	Hvi	height, vertex to inter-supercilliary point
Nm	nasomalar breadth	Hvt	height, vertex to tragus
Gl	cephalic length	Hve	height, vertex to chin
Cb	cephalic breadth		

TABLE 1B. LIST AND SYMBOLS OF INDICES

symbol	indices	formula	symbol	indices	formula
NI	nasal index	$\frac{Nw}{Nh} \times 100$	VcI	vertico-cephalic index	$\frac{Cb}{Hve} \times 100$
NmI	nasomalar index	$\frac{Nm}{Bb} \times 100$	VbI	vertico-bimalar index	$\frac{Bb}{Hve} \times 100$
CI	cephalic index	$\frac{Gl}{Cb} \times 100$	VfI	vertico-frontal index	$\frac{Fb}{Hve} \times 100$
FzI	fronto-zygomatic index	$\frac{Fb}{Bz} \times 100$	VzI	vertico-bizygomatic index	$\frac{Bz}{Hve} \times 100$

The material scrutinized in the present paper covers 388 individuals belonging to 8 different tribes of Darjeeling Hills. Bimalar breadth and Nasomalar breadth were not measured for 33 individuals, spread over 5 different tribes, and the Vertico-bimalar and Nasomalar indices are, therefore, not available in such cases. In addition, Risley also gave the average values of the different characters and indices separately for each tribe.

3. THE RESULTS OF SCRUTINY—INDIVIDUAL FIGURES

Professor Mahalanobis in his paper described in detail the procedure followed in scrutinizing the data and classified all possible reasons of discrepancies. He also gave list of symbols used in describing the reason of mistakes and classification of corrections of individual figures. The same method and the same symbols are adopted in this paper. For easy reference, Mahalanobis's list of symbols used for specifying reasons of discrepancies is reproduced in Table 2.

All doubtful figures were carefully scrutinized and corrected. Corrections of individual measurements and indices are listed in Table 3 along with the corresponding probable sources of error. Columns (2) to (5) refer to the specification of individual and character in Risley's volumes. Column (11) shows the nature of discrepancies and cross checks available, if any, for ascertaining that the adopted values are correct. It is here that the symbols listed in Table 2 are used. Column (12) gives the classification of the corrections under the heads (A-1) or (A-2) as defined below.

TABLE 2. LIST OF SYMBOLS USED FOR DESCRIBING NATURE OF MISTAKES

PM[tr.(0)/(1)]	Printing mistake : transposition of (0) and (1)
PM[(0)/(1)]	Printing mistake : (0) used in place of (1)
PM[i.(9)/(6)]	Printing mistake : (9) interchanged for (6)
PM[a.c.(5)/(2)]	Printing mistake : adjoining columns interchanged, (5) for (2)
PM[a.r.(5)/(2)]	Printing mistake : adjoining rows interchanged, (5) for (2)
WT[(126)/(127)]	Wrong Table entry under (120) instead of under (127)
WF[a.c.(201)/(183)]	Wrong figure (201) used from adjoining column instead of correct figure (183)
WF[a.r.(201)/(183)]	Wrong figure (201) used from adjoining row instead of correct figure (183)
AM[c.10]	Arithmetical mistake in carrying ten
AM[CT→ RT]	Arithmetical mistake : corrected total equal to Risley's total
AM[CT = RT]	Arithmetical mistake : corrected total agrees approximately with Risley's total
CC[(212) Hvt(VcI, VfI, VzI); (122) Bm(NmI)]	Cross checks : (212) Hvt agrees with VcI, VfI and VzI; also (122) Bm agrees with NmI
C[(155) Cb(VcI)]	Cross check : (155) for Cb agrees with VcI.
Cl(188)[CT = RT]	Adopting Cl(188) the corrected total is identically equal to Risley's total
Cl(202)[CT→ RT]	Adopting Cl(202) the corrected total shows better agreement with Risley's total
Cb(145)[Cl ≠ Cl(74.1)]	Retaining Cb (145) no suitable value of Cl will yield given Cl (74.1)

(A-1) There is no doubt regarding the validity of the corrections. In this category have been placed obvious printing mistakes, and mistakes caused by entering the index-table in the adjoining column or row, where the correction is supported by cross checks.

(A-2) There is practically no doubt regarding the validity of the correction. For example, when the mistake has occurred by a wrong entry in index-table by a not unlikely confusion between figures such as 3 and 8, 1 and 7, etc., and where the correction is supported by cross checks.

It will be seen that no correction is doubtful and all the discrepancies in individual measurements and indices are, however, reconciled with practical certainty.

All discrepancies of -0.1 in individual indices which were caused by arithmetical mistakes in rounding off were corrected but these corrections could not be shown in Table 3. Such discrepancies occurred in 1453, evenly distributed over different tribes and indices, out of 3088 individual indices. But any discrepancy of -0.1 which was caused by any other reason, e.g., printing mistake, wrong table entry etc., were considered, duly corrected and shown in Table 3.

From Table 3, it may be seen that there were only 7 mistakes out of 4202 individual measurements. This gives an incidence rate of 1.67 per thousand figures, which is in general agreement with rates per thousand observed by Professor Mahalanobis for Bengal castes and

TABLE 3. LIST OF INDIVIDUAL CORRECTIONS

arl. no.	page	tribe	charac-ter	table and no.	Risley's value	calcu-lated value	adopted value	discre-pancy [(8)-(6)]	componenet parts	reasons of discrepancy and cross-checks used[1]	classi-fication of cor-rection[2]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	232	Gurung	VfI	I 6	51.6	52.11	52.1	+ 0.5	Fb111 Hvc213	WT[(110)/(111)]CC[(111)Fb(FzI); (213)Hvc (VcI, VbI, VzI)]	A-1
2*	234	,,	Cb	II 8	168	—	148	—20	—	PM[(6)/(4)]C[(148)Cb(CI, VcI)]	A-2
3	233	,,	VfI	I 17	50.9	51.38	51.4	+ 0.5	Fb111 Hvc216	WF[a.r.(216)/(216)]CC[(111)Fb(FzI); (216) Hvc(VcI, VbI, VzI)]	A-1
4	,,	,,	VzI	I 24	66.9	56.91	56.9	—10.0	Bz140 Hvc246	PM[a.r.(669)/(569)]CC[(140)Bz(FzI); (246)Hvc(VcI, VbI, VfI)]	A-1
5	,,	,,	VzI	I 26	54.9	64.97	65.0	+10.1	Bz141 Hvc217	PM[i(5)/(6)]; AM[c.10]CC[(141)Bz(FzI); (217)HVc(VcI, VbI, VfI)]	A-1
6	,,	,,	VcI	I 28	62.0	59.58	59.6	— 2.4	Cb143 Hvc240	WT[(149)/(143)]CC[(143)cb(cI); (240)Hvc(VbI, VfI, VzI)]	A-2
7	236	Khambu	FzI	I 4	74.8	74.28	74.3	— 0.5	Fb 104 Bz 140	WT[(139)/(140)]CC[(140)Fb(VfI); (140) Bz(VzI)]	A-1
8	,,	,,	NI	I 6	83.3	82.35	82.4	— 0.9	Nw42 Nh51	PM[(3)/(2)]; AM[c.10]	A-2
9	,,	,,	VfI	I 6	45.8	45.41	45.4	— 0.4	Fb104 Hvc229	WF[a.r.(105)/(104)]CC[(104)Fb(FzI); (229)Hvc(VcI, VbI, VzI)]	A-1
10	,,	,,	CI	I 7	81.0	81.96	82.0	+ 1.0	Cb150 Cl183	WT[(185)/(183)]C[(150)Cb(VcI)]	A-2
11	,,	,,	FzI	I 7	78.1	80.28	80.3	+ 2.2	Fb114 Bz142	WT[(111)/(114)]CC[(114)Fb(VfI);(142)Bz(VzI)]	A-2
12	,,	,,	NmI	I 10	103.7	103.77	103.8	—59.9	Nm110 Bb106	PM[i(6)/(0)]; AM[c.10]C[(106) Bb(VbI)] Bb(106)[Nm ≠ NmI(163.7)]	A-2
13	,,	,,	CI	I 11	79.3	79.07	79.7	+ 0.4	Cb149 Cb187	PM[a.r.(793)/(790)];AM[c.10]C[(149)Cb(VcI)] Cb(149)[CI ≠CI(79.3)]	A-2
14	237	,,	CI	I 16	82.6	82.41	82.4	— 0.2	Cb150 Cl182	PM[(6)/(4)]C[(150)Cb(VcI)]Cb(150)[CI≠CI(82.6)]	A-2
15	,,	,,	NmI	I 22	102.8	110.28	110.3	+ 7.5	Nm118 Bb107	WT[(110)/(118)]C[(107)Bb(VbI)]	A-2
16	,,	,,	VzI	I 22	70.7	71.71	71.7	+ 1.0	Bz142Hvc198	WT[(140)/(142)]CC[(142)Bz(Fzi); (198)Hvc (VcI, VbI, VfI)]	A-2
17	,,	,	CI	I 24	78.9	68.42	68.4	— 9.5	Cb130 Cl190	WT[(150)/(130)]	A-1
18	,,	,,	VcI	I 24	60.7	59.36	59.4	— 1.3	Cb130 Hvc219	WT[(214)/(219)]C[(219)Hvc(VbI, VfI, VzI)]	A-2
19	,,	,,	NI	I 26	72.0	76.00	76.0	+ 4.0	Nw 38 Nh 50	WT[(36)/(38)]	A-2
20	,,	,,	VbI	I 27	47.7	46.81	46.8	— 0.9	Bb103 Hvc220	WF[a.r.(217)/(220)]CC[(103)Bb(NI); (220)Hvc(VcI, VfI, VzI)]	A-1
21	,,	,,	NI	I 29	75.5	77.55	77.6	+ 2.1	Nw38 Nh49	WT[(37)/(38)]	A-2
22	,,	,,	NmI	I 30	109.0	109.61	109.6	+ 0.6	Nm114 Bb104	PM[a.r.(1000)/(1098)]CC[(104)Bb(VbI)] Bb(104)[Nm≠NmI(109.6)]	A-2
23	240	Lepcha	FzI	I 6	75.4	75.57	75.6	+ 0.2	Fb90 Bz131	PM[a.r.(754)/(755)]; AM[c.10]CC[(199)Fb(VfI)· (131)Bz(VzI)]	A-1
24	,,	,,	VbI	I 7	52.3	52.80	52.8	+ 0.5	Bb113 Hvc214	WT[(112)/(113)]CC[(113)Bb(NmI); (214)Hvc(VcI, VfI)]	A-1
25	,,		VzI	I 7	62.9	63.08	63.1	+ 0.2	Bz135 Hvc214	WT[(134)/(135); (213)/(214)]CC[(135)Bz(FzI); (214)Hvc(VcI, VfI)]	A-1
26	241	,,	NmI	I 13	107.1	116.07	116.1	+ 9.0	Nm130 Bb112	WT[(120)/(130)]C[(112)Bb(VbI)]AM[CT→RT]	A-2

27	,,	,,	CI	I	14	87.9	88.00	88.0	+ 0.1	Cb154 Cl175	WT[(153)/(154); (174)/(175)]C[(154)Cb(VcI)]	A-2
28	,,	,,	CI	I	17	83.3	83.87	83.9	+ 0.6	Cb156 Cl186	WT[(155)/(156)]C(156)Cb(VcI)]	A-1
29	,,	,,	NI	I	19	67.2	67.92	67.9	+ 0.7	Nw36 Nh53	PM[(2)/(9)]	A-2
30	,,	,,	CI	I	25	85.6	85.79	85.8	+ 0.2	Cb151 Cl176	PM[a.r.(856)/(857)];AM[c.10]C[(151)Cb(VcI) Cb(151)][Cl≠CI(85.6)]	A-2
31	,,	,,	VbI	I	26	46.8	47.08	47.1	+ 0.3	Bb97 Hvc206	WT[(207)/(206)]CC[(97)Bb(NmI); (206)Hvc(VcI, VfI, VzI)]	A-1
32	,,	,,	FzI	I	29	74.3	74.62	74.6	+ 0.3	Fb100 Bz134	PM[i(3)/(6)]CC[(100)Fb(VfI): (134)Bz(VzI)]	A-1
33	243	,,	VbI	I	44	47.0	44.34	44.3	— 2.7	Bb98 Hvc221	WF[a.r.(104)/(98)]CC[(98)Bb(NmI); (22)Hvc(VcI, VfI, VzI)]	A-1
34	,,	,,	NI	I	47	72.7	72.22	72.2	— 0.5	Nw39 Nh54	PM[a.c.(727)/(722)]	A-2
35	,,	,,	FzI	I	51	74.8	74.30	74.3	— 0.5	Fb107 Bz144	WT[(143)/(144)]CC[(107)Fb(VfI);(144)Bz(VzI)]	A-1
36	,,	,,	CI	I	56	85.3	84.26	84.3	— 1.0	Cb150 Cl178	WT[(152)/(150)]C[(150)Cb(VcI)]	A-2
37	248	Limbu	NmI	I	5	110.8	110.28	110.3	— 0.5	Nm118 Bb107	PM[a.c.(1108)/(1102)];AM[c.10]C[(107)Bb(VbI)] Bb(107)[Nm≠NmI(110.8)]	A-2
38	,,	,,	VfI	I	5	49.8	49.28	49.3	— 0.5	Fb103 Hvc209	PM[(8)/(2)]: AM[c.10]CC[(103)Fb(FzI); (209)Hvc(VcI, VbI, VzI)]	A-1
39	,,	,,	NmI	I	6	104.8	104.42	104.4	— 0.4	Nm118 Bb113	PM[a.c.(1048)/(1044)]C[(113)Bb(VbI)] Bb(113)[Nm≠NmI(104.8)]	A-2
40	249		VfI	I	13	52.8	53.36	53.4	+ 0.6	Fb111 Hvc 208	WT[(110)/(111)]CC[111)Fb(FzI); (208)Hbc(VcI, VbI, VzI)]	A-1
41			NmI	I	24	111.1	107.14	107.1	— 4.0	Nm120 Bb112	WT[(108)/(112)]	A-2
42		,,	VbI	I	24	44.1	48.48	48.5	+ 4.4	Bb112 Hvc231	WT[(102)/(112)]C[(231)Hvc(VcI, VfI, VzI)]	A-2
43	,,	,,	NI	I	25	69.0	69.64	69.6	+ 0.6	Nw39 Nh56	PM[a.r.(690)/(696)]	A-2
44	,,	,,	CI	I	27	84.2	73.68	73.7	—10.5	Cb140 Cl190	WT[(160)/(140)]C[(140)Cb(VcI)]	A-2
45	,,	,,	VbI	I	27	46.4	46.83	46.8	+ 0.4	Bb111 Hvc237	WT[(110)/(111)]CC[(111)Bb(NmI); (237)Hvc(VcI, VfI, VzI)]	A-1
46	,,	,,	VbI	I	28	45.0	49.55	49.6	+ 4.6	Bb111 Hvc 224	WT[(101)/(111))]CC[(111)Bb(NmI); (224)Hvc(VcI, VfI, VzI)]	A-2
47	250	,,	NmI	I	31	111.9	102.75	102.8	— 8.9	Nm112 Bb109	WT[(122)/(112)]C[(109)Bb(VbI)]	A-2
48	,,	,,	FzI	I	33	75.5	74.28	74.3	— 1.2	Fb104 Bz140	CC[(104)Fb(VfI); (140)Bz(VzI)]	A-2
49	,,	,,	VfI	I	34	47.4	47.84	47.8	+ 0.4	Fb111 Hvc232	WT[(110)/(111)]CC[(111)Fb(FzI); (232)Hvc(VcI, VbI, VzI)]	A-1
50	,,	,,	CI	I	36	91.4	91.32	91.3	— 0.1	Cb158 Cl173	PM[(4)/(3)]C[(158)Cb(VcI)]Cb[(158)[Cl≠CI(91.4)]	A-2
51	,,	,,	CI	I	37	86.2	86.11	86.1	— 0.1	Cb155 Cl180	PM[a.r.(862)/(861)]C[(155)Cb(VcI)]Cb(155) [Cl≠CI(86.2)]	A-2
52	251	,,	CI	I	48	77.4	77.08	77.1	— 0.3	Cb148 Cl192	WT[(191)/(192)]C[(148)Cb(VcI)]	A-2
53	,,	,,	FzI	I	48	77.7	79.71	79.7	+ 2.0	Fb110 Bz138	PM[a.c.(777)/(797)]CC[(110)Fb(VfI); (138)Bz(VzI)]	A-1
54	256	Manger	CI	I	5	86.6	83.24	83.2	— 3.4	Cb149 Cl179	WT[(172)/(179)]C[(149)Cb(VcI)]	A-2
55*	260	,,	Bz	II	14	146	—	145	— 1	—	PM[i(6)/(5)]C[(145)Bz(FzI, VzI)]	A-1
56	257	,,	VbI	I	14	48.1	48.91	48.9	+ 0.8	Bb113 Hvc231	PM[i(1)/(9)]CC[(113)Bb(NmI);(231)Hvc(VcI,VfI,VzI)]	A-1
57	,,	,,	NmI	I	16	108.9	116.83	116.8	+ 7.9	Nm118 Bb101	WT[(110)/(118)]C[(101)Bb(VbI)]	A-2
58	,,	,,	FzI	I	18	77.0	75.55	75.6	— 1.4	Fb102 Bz135	WT[(104)/(102)]CC[(102)Fb(VfI);(135)Bz(VzI)]	A-2
59	,,	,,	CI	I	20	79.7	85.24	85.2	+ 5.5	Cb156 Cl183	WT[(146)/(156)]C[(156)Cb(VcI)]	A-2
60	,,	,,	VzI	I	25	57.2	57.91	57.9	+ 0.7	Bz139 Hvc240	WT[(243)/(240)]CC[(139)Bz(FzI); (240)Hvc(VcI, VbI, VfI)]	A-2
61	,,	,,	NmI	I	25	106.6	110.47	110.5	+ 3.9	Nm116 Bb105	WF[a.r.(112)/116)]C[(105))Bb(VbI)]	A-1
62	,,	,,	NmI	I	26	107.8	109.80	109.8	+ 2.0	Nm112 Bb102	WF[a.r.(110)/(112)]C[(102)Bb(VbI)]	A-1

TABLE 3. LIST OF INDIVIDUAL CORRECTIONS—*contd.*

srl. no.	page	tribe	character	table and no.	Risley's value	calculated value	adopted value	discrepancy [(8)-(6)]	component parts	reasons of discrepancy and cross-checks used[1]	classification of correction[2]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
63	257	Manger	NmI	I 27	109.0	111.11	111 1	+ 2.1	Nm110 Bb99	WF[a.r.(108)/(110)]C[(99)Bb(VbI)]	A-1
64	,,	,,	NmI	I 28	107.5	102.857	102.9	− 4.6	Nm108 Bb105	WF[a.r (114)/(108)]C[(105)Bb(VbI)]	A-1
65	,,	,,	CI	I 28	80.3	80.43	80.4	+ 0.1	Cb148 Cl184	PM[(3)/(4)] or WT[(147)/(148); (183)/(184)]C[(148)Cb(VcI)]	A-1
66	,,	,,	NmI	I 29	109.1	115.15	115.2	+ 6.1	Nm114 Bb99	WF[a.r.(108)/(114)]C[(99)Bb(VbI)]	A-1
67	,,	,,	NmI	I 30	106.7	104.854	104.9	− 1.8	Nm108 Bb103	Wf[a.r.(110)/(108)]C[(103)Bb(VbI)]	A-1
68*	261	,,	Bb	II 31	187	—	107	−80	—	PM[i(8)/(0)]C[(107)Bb(NmI, VbI)]Bb(107)[CT→RT]	A-1
69	258	,,	NmI	I 31	110.2	58.82	102.8	− 7.4	Nm110Bb107	WF[a.r.(118)/(110)]C[(107)Bb(VbI)][(see srl. no 68)]	A-1
70	,,	,,	NmI	I 32	107.8	115.68	115.7	+ 7.9	Nm118 Bb102	WF[a.r.(110)/(118)]C[(102)Bb(VbI)]	A-1
71	,,	,,	NmI	I 33	109.6	105.76	105.8	− 3.8	Nm110 Bb104	WF[a.r.(114)/(110)]C[(104)Bb(VbI)]	A-1
72*	261	,,	Hvc	II 34	283	—	203	−80	—	PM[i(8)/(0)]C[(263)Hvc(VcI, VbI, VfI, VzI)]	A-1
73	258	,,	NmI	I 34	105.6	107.54	107.5	+ 1.9	Nm114 Bb106	WT[(112)/(114)]C[(106)Bb(VbI)]	A-2
74	,,	,,	CI	I 34	89.6	80.68	80.7	− 8.9	Cb142 Cl176	PM[i(9)/(0)]; AM[a.10]C[(142)Cb(VcI)]Cb(142) [Cl≠CI(89.6)]	A-2
75	262	Murmi	VbI	I 5	52.5	52.99	53.0	+ 0.5	Bb115 Hvc217	WF[a.r.(114)/(115)]CC[(115)Bb(NmI); (217)Hvc(VcI, VfI, VzI)]	A-1
76	,,	,,	NI	I 6	78.0	76.00	76.0	− 2.0	Nw38 Nh50	WF[a.r.(39)/(38)]	A-2
77	,,	,,	VbI	I 6	54.7	54.28	54.3	− 0.4	Bb114 Hvc210	WF[a.r.(115)/(114)]CC[(114)Bb(NmI); (210)Hvc(VcI, VfI, VzI)]	A-1
78	,,	,,	FzI	I 7	79.2	81.42	81.4	+ 2.2	Fb114 Bz140	WT[(111)/(114)]e[(140)Bz(VzI)]	A-2
79	,,	,,	VfI	I 7	42.5	52.53	52.5	+10.0	Fb114 Hvc217	PM[(4)/(5)]C[(217)Hvc(VcI, VbI, VzI)] Hvc(217)[Fb≠VfI(42.5)]	A-2
80	,,	,,	NI	I 9	72.5	66.07	66.1	− 6.4	Nw37 Nh56	WT[(51)/(56)]	A-2
81	,,	,,	CI	I 13	81.3	77.08	77.1	− 4.2	Cb148 Cl192	WT[(182)/(192)]C[(148)Cb(VcI)]	A-2
82	,,	,,	VbI	I 13	78.6	51.96	52.0	−26.6	Bb119 Hvc229	CC[(119)Bb(NmI); (229)Hvc(VcI, VzI)]	
83	,,	,,	VfI	I 13	48.0	48.47	48.5	+ 0.5	Fb111 Hvc229	WT[(110)/(111)]CC[(111)Fb(FzI); (229)Hvc(VcI, VfI)]	A-1
84	263	,,	VfI	I 14	49.7	50.22	50.2	+ 0.5	Fb111 Hvc221	WT[(110)/(111)]CC[(111)Fb(FzI); (221)Hvc(VcI, VbI, VzI)]	A-1
85	,,	,,	CI	I 20	85.2	86.66	86.7	+ 1.5	Cb156 Cl180	WT[(183)/(180)]C[(156)Cb(VcI)]	A-2
86	,,	,,	VbI	I 21	54.4	54.62	54.6	+ 0.2	Bb124 Hvc227	PM[a.c.(544)/(546)]CC[(124)Bb(NmI); (227)Hvc(VcI, VfI, VzI)]	A-1
87	,,	,,	VbI	I 23	53.7	57.00	57.0	+ 3.3	Bb122 Hvc214	WF[a.r.(115)/(122)]CC[(122)Bb(NmI); (214)Hvc(VcI, VfI, VzI)]	A-1
88*	267	,,	Hvt	II 24	185	—	145	−40	—	PM[(8)/(4)]AM[CT→RT]	A-2
89*	,,	,,	Hvc	II 24	253	—	203	−50	—	PM[i(5)/(0)]C[(203)Hvc(VcI, VbI, VfI, VzI)] Hvc(203)[(CT→RT)]	A-1
90*	,,	,,	Fb	II 29	183	—	103	−80	—	PM[i(8)/(0)]C[(103)Fb(FzI, VfI)]	A-1
91	264	,,	NmI	I 37	107.0	107.84	107.8	+ 0.8	Nm110 Bb102	PM[a.r.(1070)/(1078)]C[(102)Bb(VbI)]Bb(102) [Nm≠NmI(107.0)]	A-2

92	265	,,	CI	I	47	77.9	81.76	81.8	+ 3.9 Cb148 Cl181	WT[(141)/(148)]C[(148)Ch(VcI)]	A-2
93	,,	,,	FzI	I	48	74.3	77.69	77.7	+ 3.4 Fb101 Bz130	WT[(130)/(130)]CC[(101)Fb(VfI);(130)Bz(VzI)]	A-2
94	,,	,,	NmI	I	53	108.9	108.73	108.7	− 0.2 Nm112 Bb103	PM[(9)/(7)]C[(103)Bb(VbI)]Bz(103)[Nm≠NmI (108.9)]	A-2
95	,,	,,	CI	I	54	80.8	80.11	80.1	− 0.7 Cb145 Cl181	PM[(8)/(1)]C[(145)Ch(VcI)]Cb(145)[Cl≠CI(80.8)]	A-2
96	,,	,,	FzI	I	60	56.2	76.29	76.3	+20.1 Fb103 Bz135	PM[(5)/(7)];AM[c.10]CC[(103)Fb(VfI); (135)Bz(VzI)]	A-1
97	,,	,,	VcI	I	61	63.6	63.87	63.9	+ 0.3 Cb145 Hvc227	WT[(228)/(227)]CC[(145)]Cb(CI); (227)Hvc(VbI, VfI, VzI)]	A-1
98	,,	,,	NI	I	62	70.2	72.34	72.4	+ 2.2 Nw34 Nh47	WT[(33)/(34)]	A-2
99	,,	,,	NI	I	64	76.1	76.74	76.7	+ 0.6 Nw33 Nh43	PM[(1)/(7)]	A-2
100	271	Nowar	VcI	I	3	69.0	66.09	66.1	− 2.9 Cb154 Hvc233	WT[(223)/(233)]CC[(154)Cb(CI); (233)Hvc(VbI, VfI)]	A-2
101	,,	,,	VzI	I	3	65.0	62.23	62.2	− 2.8 Bz145 Hvc233	WT[(223)/(233)]CC[(145)Bz(FzI); (233)Hvc(VbI, VfI)]	A-2
102	,,	,,	CI	I	9	84.3	85.88	85.9	+ 1.6 Cb146 Cl170	WT[(173)/(170)]C[146)Cb(VcI)]	A-2
103	273	Tibetan of E. Himalayas	VzI	I	4	32.3	62.38	62.4	+30.1 Bz141 Hvc226	PM[a.r.(323)/(623)]; AM[c.10)]CC[(141)Bz(FzI); (226)Hvc(VcI, VbI, VfI)]VzI(62.4)[CT→RT]	A-1
104	,,	,,	NI	I	5	71.5	74.50	74.5	+ 3.0 Nw38 Nh51	PM[(1)/(4)]	A-2
105	275	,,	VcI	I	26	61.7	66.08	66.1	+ 4.4 Cb152 Hvc230	WT[(142)/(152)]CC[(152)Cb(CI); (230)Hvc(VbI, VfI, VzI)]	A-2
106	,,	,,	CI	I	36	81.0	80.54	80.5	− 0.5 Cb149 Cl185	WT[(150)/(149)]C[(149)Cb(VcI)]	A-2
107	,,	,,	VbI	I	40	51.6	52.50	52.5	+ 0.9 Bb126 Hvc240	WT[(124)/(126)]CC[(126)Bb(NmI); (240)Hvc(VcI, VfI, VzI)]	A-2
108	276	,,	NI	I	45	69.8	69.64	69.6	− 0.2 Nw39 Nh56	PM[a.r.(3)/(6)]	A-2
109	,,	,,	CI	I	50	93.2	94.31	94.3	+ 1.1 Cb166 Cl176	WT[(178)/(176)]C[(166)Cb(VcI)]	A-2
110	277	,,	VcI	I	61	69.5	69.09	69.1	− 0.4 Cb152 Hvc220	WT[(153)/(152)]CC[(152)Cb(CI);(220)Hvc(VbI, VzI)]	A-1
111	,,	,,	VfI	I	61	51.8	51.36	51.4	− 0.4 Fb113 Hvc220	WT[(114)/(113)]CC[(113)Fb(FzI): (220)Hvc(VbI, VzI)]	A-1
112	278	,,	NI	I	75	81.1	78.18	78.2	− 2.9 Nw43 Nh55	WT[(53)/(55)]	A-2
113	279	,,	VcI	I	85	59.1	59.20	59.2	+ 0.1 Cb148 Hvc250	PM[(1)/(2)]CC(148)Cb(CI); (250)Hvc(VbI, VfI, VzI)]	A-1
114	,,	,,	VcI	I	95	58.5	61.82	61.9	+ 3.3 Cb149 Hvc241	WF[a.r.(141)/(149)]CC[(149)Cb(CI); (241)Hvc(VbI, VfI, VzI)]	A-1
115	,,	,,	NI	I	96	67.4	67.27	67.3	− 0.1 Nw37 Nh55	PM[(4)/(2)]AM[c.10]	A-2
116	,,	,,	NI	I	101	68.9	67.79	67.8	− 1.1 Nw40 Nh50	WT(58)/(59)]	A-2
117	,,	,,	VfI	I	102	52.6	53.11	53.1	+ 0.7 Fb111 Hvc209	WT[(110)/(111)]CC[(111)Fb(FzI); (209)Hvc(VcI, VbI, VzI)]	A-1
118	,,	,,	NI	I	103	84.7	95.12	95.1	+10.4 Nw39 Nh41	WT[(46)/(41)]	A-2
119	,,	,,	FzI	I	103	78.3	78.41	78.4	+ 0.1 Fb109 Bz139	PM[(3)/(4)]CC(109)Fb(VfI): (139)Bz(VzI)]	A-1
120	,,	,,	VbI	I	104	55.0	50.00	50.0	− 5.0 Bb113 Hvc226	PM[a.r.(550)/(500)]CC[(113)Bb(NmI): (220)Hvc(VcI, VfI, VzI)]	A-1
121	,,	,,	VcI	I	105	66.0	60.68	60.7	− 5.3 Cb142 Hvc234	PM[tr.(6)/(0)]: AM[c.10]CC][(142)Cb(CI); (234)Hvc(VbI, VfI, VzI)]	A-1

[1] Symbols are listed in Table 2.
[2] Classifications are explained in Section 3.
* Figures in columns (5), (8) and (9) are given in millimeters.

TABLE 4. CORRECTIONS IN AVERAGE VALUES

character	no. of individuals	Risley's mean (as printed)	corrected mean (adopted)	character	no. of individuals	Risley's mean (as printed)	corrected mean (adopted)
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Gurung Tribe				Limbu Tribe		
NI	28	78.5	79.3	NI	50	74.1	74.9
NmI	23	109.9	109.9	NmI	45	106.9	106.9
CI	28	81.6	78.0	CI	50	84.3	84.6
FzI	28	77.3	77.4	FzI	50	75.1	75.3
VcI	28	67.7	67.7	VcI	50	69.7	69.8
VbI	23	53.4	54.2	VbI	45	49.6	49.8
VfI	28	49.2	49.4	VfI	50	48.3	48.5
VzI	28	63.6	63.8	VzI	50	64.3	64.4
Nh	28	48.9	48.9	Nh	50	50.2	50.2
Nw	28	38.4	38.5	Nw	50	37.2	37.3
Bb	23	117.0	117.1	Bb	45	109.1	108.2
Nm	23	128.6	128.7	Nm	45	116.7	116.7
Cl	28	181.3	184.9	Cl	50	181.4	181.4
Cb	28	148.1	147.6	Cb	50	153.1	153.2
Fb	28	107.7	107.7	Fb	50	106.2	106.4
Bz	28	139.2	139.2	Bz	50	141.3	141.2
Hvi	28	83.7	83.8	Hvi	50	81.3	81.2
Hvt	28	133.3	133.0	Hvt	50	133.2	133.3
Hvo	28	218.7	218.6	Hvo	50	219.6	219.7
	Khambu Tribe				Mangar Tribe		
NI	32	76.6	77.0	NI	35	76.6	77.2
NmI	32	107.1	107.1	NmI	35	108.7	109.0
CI	32	81.0	81.1	CI	35	79.0	79.2
FzI	32	76.3	74.8	FzI	35	75.4	75.0
VcI	32	68.0	68.1	VcI	35	67.3	67.5
VbI	32	49.3	49.5	VbI	35	49.3	49.5
VfI	32	47.9	48.0	VfI	35	47.6	47.8
VzI	32	62.7	64.3	VzI	35	63.1	63.8
Nh	32	50.0	50.1	Nh	35	49.6	49.6
Nw	32	38.3	38.4	Nw	35	38.0	38.1
Bb	32	107.2	107.4	Bb	35	106.4	106.5
Nm	32	115.0	115.1	Nm	35	115.7	115.7
Cl	32	182.4	182.5	Cl	35	183.6	183.6
Cb	32	147.8	147.8	Cb	35	145.2	145.2
Fb	32	104.1	104.2	Fb	35	102.8	102.9
Bz	32	136.3	139.5	Bz	35	136.2	137.3
Hvi	31	80.1	80.2	Hvi	35	79.9	79.9
Hvt	32	132.7	132.8	Hvt	35	133.2	133.2
Hvo	32	217.3	217.3	Hvo	35	215.6	213.3
	Lepcha Tribe				Murmi Tribe		
NI	57	67.2	70.5	NI	65	75.2	74.8
NmI	54	108.1	108.2	NmI	58	108.9	109.0
CI	57	79.9	81.0	CI	65	79.5	80.0
FzI	57	75.2	75.4	FzI	65	75.9	76.6
VcI	57	67.6	68.6	VcI	65	68.4	67.5
VbI	54	49.0	49.1	VbI	58	51.0	50.9
VfI	57	47.6	47.8	VfI	65	51.9	48.5
VzI	57	63.3	63.5	VzI	65	66.7	63.4
Nh	57	51.6	52.0	Nh	65	49.7	50.6
Nw	57	34.7	36.5	Nw	65	37.4	37.7
Bb	54	106.4	106.5	Bb	58	111.5	111.5
Nm	54	115.1	115.2	Nm	58	121.5	121.6
Cl	57	183.5	183.6	Cl	65	188.0	184.3
Cb	57	148.7	148.5	Cb	65	149.6	147.3
Fb	57	103.5	103.6	Fb	65	113.5	104.8
Bz	57	137.5	137.5	Bz	65	145.9	138.4
Hvi	57	78.5	78.5	Hvi	65	81.0	82.0
Hvt	57	133.5	133.6	Hvt	65	141.8	136.5
Hvo	57	217.0	217.0	Hvo	65	218.6	218.6

TABLE 4. CORRECTIONS IN AVERAGE VALUES—*contd.*

character	no. of individuals	Risley's mean (as printed)	corrected mean (adopted)	character	no. of individuals	Risley's mean (as printed)	corrected mean (adopted)
(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Newar Tribe				Tibetans Tribe of E. Himalayas		
NI	13	73.3	73.5	NI	108	73.9	74.9
NmI	13	110.2	109.8	NmI	95	109.1	109.0
CI	13	81.5	81.7	CI	108	81.0	81.1
FxI	13	75.6	75.7	FxI	108	77.9	78.0
VcI	13	67.1	67.2	VcI	108	67.1	67.1
VbI	13	49.1	49.2	VbI	95	53.1	53.4
VfI	13	47.1	47.2	VfI	108	48.8	48.8
VzI	13	62.3	62.4	VzI	108	62.6	62.6
Nh	13	50.7	50.8	Nh	108	51.8	51.8
Nw	13	37.2	37.2	Nw	108	38.3	38.5
Bb	13	108.6	108.6	Bb	95	119.8	120.0
Nm	13	119.7	119.2	Nm	95	130.8	130.9
Cl	13	181.9	181.9	Cl	108	186.9	187.1
Cb	13	148.3	148.4	Ob	108	151.4	151.6
Fb	13	104.3	104.3	Fb	108	110.2	110.3
Bz	13	137.9	137.9	Bz	108	141.3	141.5
Hvi	13	85.7	85.8	Hvi	108	83.8	84.0
Hvt	13	135.0	135.0	Hvt	108	137.4	137.5
Hvo	13	221.0	221.1	Hvo	108	225.4	226.6

N.B.—Figures for measurements are given in millimetres.

tribes (1.31) and for Chittagong Hill tribes (2.27). But for individual indices the position is somewhat different. There were 114 mistakes out of 3038 individual indices for Darjeeling Hill tribes i.e. 37.52 per thousand. For Bengal and Chittagong Hills these figures were, according to Professor Mahalanobis, 13.47 and 15.10 per thousand respectively. This increase in number of mistakes in case of Darjeeling Hills may be partly explained by the occurrence of 10 mistakes in one index, viz. NmI of Manger Tribe, caused by shifting of 10 consecutive rows of one of the component parts, viz. Nm in reading index-table and also that Professor Mahalanobis had ignored all discrepancies of 0.1 but, here, discrepancies of 0.1 caused by reasons other than rounding off, were considered. Nevertheless then, mistakes were more frequent in the data for Darjeeling Hills than in those of Bengal and Chittagong Hills. It may be seen from Table 3 that the mistakes were more or less evenly distributed over different tribes and indices.

4. Results of scrutiny—average values

Totals and average values were recalculated on the basis of Risley's values as printed, but incorporating any corrections given in column (8) of Table 3 also, in case of indices, the corrections by 0.1. The results are shown in Table 4.

5. Conclusion

Frequent occurrences of discrepancies of magnitude 0.1 or 0.2 (especially of −0.1) shows that arithmetic calculations had been stopped at the last figure retained, and was not carried through for one place more in order to obtain the correct value of the last figure retained.

Discrepancies in individual figures, not due to rounding errors, were very few and these could be corrected with more or less certainty. But discrepancies in indices (3.752%) were much more frequent compared to discrepancies in measurements (0.167%) which shows that mistakes had occurred in calculating the indices rather than in recording original data.

One may conclude, therefore, that just as in the case of data for Bengal and Chittagong Hills, examined by Professor Mahalanobis, Risley's primary data for the tribes of Darjeeling Hills are singularly free from mistakes and may be used with safety after using the corrections given in the present paper. Since rounding errors of 0.1 in individual indices are not listed, one will have to recalculate the indices to use them.

6. ACKNOWLEDGEMENT

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CORRIGENDUM

An Application of the Confrontation Theorem on Northeast Frontier Railway : *By* Jagjit Singh, *Sankhyā*, Series B, **30**, 291-302.

1. First para of page 293 and last three sentences commencing with the words "the last or x-th up train .... will therefore be" should read as "the total of $(2x-1)$ up trains on the board of which x were started in time T and $(x-1)$ were already on the board before the commencement of the first train of the cycle will have the following total number of crossings."

2. *Figure* 3 :

As per article printed	As it should be
No. of confrontations	
$n = \frac{x}{2}(2x-1) = 15$	$N = x(2x-1)$