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臺灣及印度產水牛の體尺に就きて

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MEASUREMENT OF THE ZEBU  
OF FORMOSA AND INDIA.

By

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In India many breeds of Zebu are known to exist, while in Formosa only a single breed as yet has been found. As the thorough measurement of the Indian breeds and especially of the Formosan seems never to have been taken, I tried to fill up this gap in our knowledge of this domesticated animal, availing myself of the excellent opportunity which I have had.

The work was attended with considerable difficulty and often performed at a risk of danger, as the Formosan Zebu is still semi-wild and gives a very hard kick, which in many instances has proved to be fatal.

The measurement was taken during the month of August in 1911 on thirty head of the Formosan Zebu-cows, and also on one head of the bull of the same breed. The measurement on the Indian Zebu was performed at about the same time; the individuals examined were nine in all, of which six were cows and three bulls. The Indian breed introduced to our Stock-Farm is one and the same breed, which seems to correspond to *Bos Zebu indicus major* Fitzinger.

The measurement was taken after the method described by Werner <sup>1)</sup>.

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1). H. Werner, Die Rinderzucht. Zweite Aufl. S. 144.

## ZEBU-COWS

Name	Katsu- tsubaki	Katsu- fusa	III	Katsu- aya	Katsu- den	Katsu- koto	Katsu- izumi	Katsu- yanagi
Years old	7	11	7	8	12	9	10	10
Date of measurement	Aug.7, 1911	Aug.7, 1911	Aug.8, 1911	Aug.8, 1911	Aug.8, 1911	Aug.9, 1911	Aug.9, 1911	Aug.10, 1911
Height at withers	111	114.2	102	110.8	109	106.5	108	114
Height at chine	110.3	109.0	98.5	106.2	104	104	105.5	109
Height at croup	110.8	112.5	103.5	110	108	104.2	108.8	112.5
Height at setting of tail	114.7	113.7	105.2	115	110	106	106	112.5
Depth of chest	65	66	57	57	62	61	61	63
Height at knee	31.3	33	29	32.8	30	28.5	30.3	33.5
Height at hock	43.2	42	39.3	39.5	41	41	39.5	44.5
Height at elbow	60	63	57	61	58	59	57	61.5
Height at thigh-joint	97.7	98	90.5	99.5	94	90	92	97.2
Length from poll to tail	163.2	152.5	135.0	163.0	146	141	148	147
Length from point of shoulder to pinbone	124	124.5	114.5	123.0	122	116	120	120.5
Length of shoulder	47	43	39	43	44	44	43.5	43
Length of pelvis	42	41	35	38	41	36.5	35	39
Length of loin	29	30	28	27	25	29	31	29
Breadth of forechest	37.8	36.2	27	32.5	29	30	31	33
Breadth of hindchest	42	38.5	23	38	32	29	34	32
Girth of hindchest	161	155	131	145	149	141	150	150
Breadth of pelvis	38	36	34	39	36	31	37	36
Breadth between hips	42	38	36	42	38	34	34	39
Breadth between pinbones	20	22.5	15.5	17	16	15	15	18
Girth of shank	17	15	12.5	15	14	15	14	15
Length of head	43	40	39	44	42	43	41	44
Length of forehead	19	18.5	18	19	18	19.5	20	19
Breadth of upper forehead	18	16	15.5	16	14	16	14	15
Breadth of lower forehead	19	17	17.3	19	18	18	19	18.5
Narrowest breadth of forehead	16	15	16	14	14	15	15	14
Length of horn	12	18	9.5	18	18	19	16	13
Length of neck	53	60	48	63	51	55	60	59
Live weight in kilogramms	320.6	309.4	202	285.8	248	208.7	238.1	255.8

## OF FORMOSA

Katsu- an	Bo- kawa	Bo- tsuki	Bo- hikari	Katsu- haru	XVI	Akiu- ichi	Kei- shun	Ki-san	U-sei	Ten-wa	Un-puku
7	5	5	9	10	5	6	7	8	8	6	9
Aug.10, 1911	Aug.11, 1911	Aug.11, 1911	Aug.11, 1911	Aug.11, 1911	Aug.12, 1911	Aug.12, 1911	Aug.12, 1911	Aug.12, 1911	Aug.14, 1911	Aug.14, 1911	Aug.14, 1911
111.5	107.6	110.8	110	114	108.3	107.5	113.2	108	108.5	109	111
111	105.5	109.5	106.5	112.5	105.5	104	108.8	108.2	106.5	109.5	106.5
114	106.5	113	108.5	110.2	110	107.3	109	108.2	109.6	112.5	110
111.2	105	113.6	107.4	108.5	102.3	104.5	109	109.1	108.5	112.2	105.5
61	60	65	50	59	58	58	65	61	60	59	60
34.5	28	30	30	30	30	30	30	30.5	33	31	30.5
42	38.5	40.2	37.5	37	39.5	38.8	44	40	38.5	43	42
62	57	65	57	60	54.8	58	59	58	64	58	59
99	90	99	90	94	97	91	97	90.8	96.5	95.6	93
136	143.6	144.3	148.3	152.8	143.8	136	142.5	136	138	150.8	151.5
120	123.5	128	123.5	127.5	127	126	120	117.5	115	119.2	120
44	42.8	45	40	46	41	43.5	46	40	42	43	41
37.5	37	33.5	34	35.5	35.5	34	35	34.5	36.5	36.5	35
25.5	27.2	26	29.5	31.5	30	25	23	31.2	33	28	30
29	29.4	30.8	29	31	32.8	29.5	35	29	26.5	29	30
31	27.8	27.3	28.5	28	34	27.5	35	27.2	24	28	26.5
148	141	151	152	146	146	141	160	150	139	145	141
34.2	33.5	34.2	32	34.7	30	30	31.5	31.5	30.5	33.5	30
37	37	40	35.5	40	37	35	38.3	34	35	36.5	40
16	18	19.8	17	17	16.5	15	19	16	15	13.5	14.5
15	15	16	14	15	13.5	14	15	14	14	14	14
43	40	44	42.2	43	38.5	40	40	40	44	42.5	41.5
17	17.5	20	20	18.5	18	20	19.5	19	19	17.5	18
16	15	14.5	15	13.5	14.5	14	14.5	14.5	14.5	15	14
18	18.5	21	17.5	17.8	17	17	18.5	17	16.5	17.5	16
16	14	16	14.5	13.8	14	13	13.5	12	13	14.5	13
14	16	13	16	8	10	5	12	15	14	20	Broken
46	44	50	52	60	61	48	51	52.5	52	61	60
242.3	219.4	279.0	261.4	275.8	263.6	217.5	285.6	241.4	195.9	230.1	248.1

## ZEBU-COWS

Name	Kwaku- to	Chin- koku	A-hichi	Ki-ni	Ki-mu	Katsu- kemuri	Katsu- rai
Years old	8	7	9	4	7	7	8
Date of measurement	Aug.14, 1911	Aug.14, 1911	Aug.15, 1911	Aug.15, 1911	Aug.15, 1911	Aug.16, 1911	Aug.16, 1911
Height at withers	100.9	106.2	111	106	112.2	106.3	103.5
Height at chine	97.8	104	114.5	103.5	108.2	109.2	103.6
Height at croup	100.5	106.7	113	105.5	109	109.2	108
Height at setting of tail	95.5	103	108.5	104	103	106.4	107
Depth of chest	57	56	51	55.5	56	59.5	60
Height at knee	29.7	28	30	29.5	30	30	29
Height at hock	37.4	42	43	38	42	46	45
Height at elbow	57	58	61.5	61	60	62	60
Height at thigh-joint	90	90.5	97.5	93	99	90	91.5
Length from poll to tail	131	136.3	156.3	126	139	142	138
Length from point of shoulder to pinbone	113	118	127.5	111	111	117	121
Length of shoulder	41	43.5	43.5	39	41	41	40
Length of pelvis	31.5	36	34.5	32.5	32.5	33.5	34
Length of loin	27.5	32	28	25	30.5	26.4	26
Breadth of forechest	30	31	29	29	28.5	27.5	34
Breadth of hindchest	30	24	32.5	30.8	30	26	32
Girth of hindchest	137	133	156	141	140	141	150
Breadth of pelvis	32.5	30	31.5	28.5	32.5	30.5	32
Breadth between hips	37	33	34.5	30	32	35.5	39
Breadth between pinbones	15.5	16.5	17	13.5	14	13.3	14.5
Girth of shank	14	14	15	13	13	13	15
Length of head	42.5	40.5	42.8	40.5	41	41	38.5
Length of forehead	20	17	18	18	17	18	18
Breadth of upper forehead	16.5	13.5	14	12.5	11.5	14	15
Breadth of lower forehead	18.5	17	17.8	15	17	16	17.5
Narrowest breadth of forehead	14.5	13.5	14.5	13.5	13.5	14	14.5
Length of horn	14	15.5	6	7	5	10	17
Length of neck	58	46	54	45	54	43	50.5
Live weight in kilogramms	219.2	207.8	249.0	190.9	200.6	210.9	252.3
Length of ear							

## OF FORMOSA

Bo- izumi	Katsu- tomi	Katsu- midori	Total	Average	Percent- age	Max.	Min.	Toyo- fusa	Percent age
5	6	9						2.5	
Aug.16, 1911	Aug.16, 1911	Aug.16, 1911						Aug.17, 1911	
105.5	113	108.5	3268.0	108.9	100.00	114.2	100.9	119	100.00
107	112	105	3205.3	106.8	98.07	114.5	97.8	115	96.64
108.5	111	108	3268.5	109	100.09	114.0	100.5	117.3	98.57
105.6	108.8	101.3	3226	107.5	98.71	115	95.5	109	91.60
60	62	58	1783	59.4	54.55	66	50	61	51.26
28	30	28.3	908.4	30.3	27.82	34.5	28	32.5	27.31
42	43	41	1230.4	41.0	37.65	45.0	37.0	45	37.82
56	61	59.5	1784.3	59.5	54.64	64	54.8	64	53.78
90	98	88.9	2820.2	94	86.32	99.5	88.9	101.5	85.29
151	148	139	4325.9	144.2	132.42	163.2	126	145	121.85
122	124	120	3616.2	120.5	110.65	128	128	124.5	104.62
43	44.5	40.2	1277.5	42.6	39.12	47	39	43	36.13
35.5	38.5	34.5	1080	36	33.05	42	31.5	38.5	32.35
26.5	23	33.5	846.3	28.2	25.90	33.5	23	25.2	21.18
27	34.5	32	920	30.7	28.19	37.8	26.5	32.3	27.14
27	33	30	908.6	30.3	27.82	42	23	29	24.37
146	158	145	4389.0	146.3	134.34	161	131	149	125.21
31	30	27	928.1	30.9	28.37	39	27	34.6	29.08
33.5	37	35.5	1095.3	36.5	33.52	42	30	37	31.01
14.3	18.2	13.5	486.6	16.2	14.88	22.5	13.3	15.5	13.03
14.5	17	13	432.5	14.4	13.22	17	12.5	18	15.13
38.4	41	41	1241.9	41.4	38.02	44	38.4	43.5	36.55
16.7	18	16.5	552.2	18.4	16.89	20	16.5	19.5	16.39
14	16	13	439.5	14.7	13.50	18	11.5	17	14.29
17.5	17.5	17	528.9	17.6	16.16	21	15	19	15.97
13.4	15	13	425.7	14.2	13.04	16	12	16.5	13.87
10	16	5	372	12.8	11.75	20	5	15	12.61
49	56	62	1604	53.5	49.13	62	43	45.5	38.24
225.0	292.5	246.8	7323.5	244.1	—	320.6	190.9	277.5	—
								18	15.13

ZEBU-COWS OF INDIA (Perhaps *Bos Zebu indicus major* Fitzinger)

Name or No.							Total
	178	182	181	177	179	180	
Years old	6	6	6	5	6	5	
Date of measurement	Aug.22, 1911	Aug.22, 1911	Aug.22, 1911	Aug.22, 1911	Aug.23, 1911	Aug.23, 1911	
Height at withers	126	130.6	129	127	136.9	130.1	779.6
Height at chine	125	129.6	127	127	133.3	128.6	770.5
Height at croup	129.3	135.9	133.4	129.8	141.2	133.5	803.1
Height at setting of tail	126.0	131.5	129.0	129.0	135.9	128.0	779.4
Depth of chest	64	63.5	59	67	62.2	62	377.7
Height at knee	35	38	35	36	40	39	223
Height at hock	48	49	50	50	49	43	289
Height at elbow	71	74	75	70	76	74.5	440.5
Height at thigh-joint	112.5	115	111	114	119.3	110.0	681.8
Length from poll to tail	147.2	155.5	149	158.5	156.5	155.8	922.5
Length from point of shoulder to pinbone	122.4	132.2	130.2	120	133.6	123	761.4
Length of shoulder	46	45	49	48	49.5	47	284.5
Length of pelvis	37.5	44	40	42	41.5	38.5	243.5
Length of loin	31.5	31	32	29	34	29.5	187
Breadth of forechest	35	41	37	35.4	35	34.5	217.9
Breadth of hindchest	37	32	35	39	38	34	215
Girth of hindchest	162	166	163	175	170	168	1004
Breadth of pelvis	35	38	38.3	38	38	39	226.3
Breadth between hips	45	43.5	43	45.5	46.3	46	269.3
Breadth between pinbones	18	20	21	18.5	19.5	21	118
Girth of shank	18	16	16	17.5	17	17	101.5
Length of head	46.5	48.5	45	51.5	44	45	280.5
Length of forehead	20	20	20	23	21	20.5	124.5
Breadth of upper forehead	17.5	17.5	19.5	19.5	19.5	18.5	112
Breadth of lower forehead	18.2	20.2	20	20	18	19	115.4
Narrowest breadth of forehead	15	15.5	17.5	17.5	15.5	16.5	97.5
Length of horn	43	40	48	38	30	36	235
Length of neck	51	62	56	62	66	68	36.5
Live weight in kilogramms	337.5	351.2	348	363.3	361.7	347.3	2109
Length of ear	38	32	37	33	32	28	200

ZEBU-BULL OF INDIA (Perhaps *Bos Zebu indicus major* Fitzinger)

Average	Max.	Min.	Percent- age				Total	Average	Percent- age
				174	175	173			
				6	6	6			
				Aug.17, 1911	Aug.17, 1911	Aug.17, 1911			
129.9	136.9	126.0	100.00	133.4	135.8	140.6	409.8	136.6	100.00
123.4	133.3	125.0	98.84	130.0	133.4	140.8	404.2	134.7	98.61
133.9	141.2	129.3	103.08	136.3	137.8	146.6	420.7	140.2	103.07
129.9	135.9	126.0	100.00	134.2	137.5	145.2	416.9	139.0	101.75
63	67	59	48.5	74	65	75.5	214.5	71.5	52.34
37.2	40	35	28.64	38	41	39	118	39.3	28.77
48.2	50	43	37.11	49.5	51	53	153.5	51.17	37.46
73.4	76	71	56.51	77	76	79	232	77.3	56.59
113.6	119.3	110	87.45	120	121	125.7	366.7	122.2	89.46
153.8	158.5	147.2	118.45	163.3	160.8	182.5	506.6	168.87	123.62
126.9	133.6	120	97.69	155	141.8	154.5	451.3	150.4	110.1
47.4	49.5	45	36.47	54.5	55	56.5	166	55.3	40.48
40.6	44	37.5	31.28	46	44.3	49.5	139.8	46.6	34.11
31.2	34	29	24.02	31	32.5	33	96.5	32.2	23.57
36.3	41	34.5	27.94	42.5	39	52	133.5	44.5	32.58
35.8	39	32	27.56	44.5	42	41	127.5	42.5	31.11
167.3	175	162	128.79	185	180	194	559	186.3	136.38
37.7	39	35	29.02	43	42	49	134	44.7	32.72
44.9	46.3	43	34.56	45.5	45.5	47.5	138.5	46.2	33.82
19.7	21	18	15.17	24	21	22	67	22.3	16.32
16.9	18	16	13.01	20.5	19	20	59.5	19.8	14.49
46.8	51.5	44	36.03	46	48	54	148	49.3	36.09
20.8	23	20	16.01	23	22	25.5	70.5	23.5	17.20
18.7	19.5	17.5	14.40	22	23	23	68	22.7	16.62
19.2	20.2	18	14.79	24	21.5	25	70.5	23.5	17.20
16.3	17.5	15	12.55	20	20.5	19.8	60.3	20.1	14.71
39.2	48	30	30.18	49	48.5	54	151.5	50.5	36.97
60.8	68	51	46.81	57	60	65	182	60.7	44.44
351.5	363.3	337.5	—	487.5	487.5	544.5	1519.5	506.5	—
33.3	38	28	25.64	32	31	33.5	96.5	32.2	23.57