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PRICKLY-PEAR EXPERIMENTS

BY

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REPORT OF PRICKLY-PEAR EXPERIMENT CARRIED OUT AT THE GOVERNMENT CIVIL DAIRY, KIRKEE.

Object.

The object of the experiment was to find out the possibilities of prickly-pear, as a forage during times of famine, etc., and the best method of preparing and feeding it.

Animals used.

Six bullocks were purchased in the famine-stricken district of Ahmednagar for this purpose. They were in exceptionally poor condition on arrival, with the exception of one bullock, No. 3 Rumalya, whose condition was fair.

Kind of Prickly-Pear used.

The pear used was the common variety which is to be found anywhere along the roadsides and in jungles. Statement "B" shows the chemical analysis of the pear during both the wet and dry season.

Preparation.

The spines (without the removal of which, it would be impossible for cattle to eat it,) were removed by burning, several varieties of "Primus" stoves being used for the purpose. The attached statement marked "A" shows the cost of removing by the various stoves, including oil and labour, and also the price of the stoves. The price of oil has been calculated at Rs. 2 per tin, and labour at As. 5 per day. The results arrived at being the average of a large number of trials may be taken as being practically correct. In burning, it is necessary to be careful that all the spines are removed, otherwise the pear will be refused. Some fine hairlike spines will however be left no matter how much care is observed, these will not have any ill-effect. Reference to statement "A" shows that the most economical stove is the "Effective" which costs Rs. 22. This stove has a double burner and a flat flame, and will burn

100 lbs. of pear in one hour at a cost of As. 2 for oil and labour, or at the rate of 1,000 lbs. in one day of 10 hours for Rs. 1-4-0. The slabs after burning were cut into small pieces by passing them through a small chaff cutter, or by chopping them on a wooden block with a knife, the former is of course quicker and more convenient, but the latter method also gives good results when the amount to be prepared is not excessive, the knife used should be similar to that used for chopping kadbi.

Feeding the Pear.

As the pear fed alone would not be sufficiently nutritious to form a maintenance ration, an addition of 6 per cent. of cotton seed was included, that is, for every 100 lbs. of pear 6 lbs. of cotton seed were added, and this mixture was fed during the experiment. At the commencement, small quantities of the pear mixture were given with a quantity of chaffed kadbi, the mixture being increased and the kadbi decreased daily, until after about a week the kadbi was altogether discontinued. Of the six bullocks, four took to the pear readily, and after about 10 days ate it greedily. No. 4 gave some little trouble, but also ate it readily after becoming accustomed to it, which he did after about a month. No. 5, however, gave great trouble, and only commenced to eat the pear at all readily at the end of the experiment. In this case the cause was most likely the very emaciated condition in which he arrived and commenced the experiment, for it was difficult to get him to eat sufficient good fodder to regain condition.

Results.

The first result to be noticed was the colour and consistency of the fæces, and the excess of urine. The fæces were of a slatish colour and showed a tendency to becoming too liquid, but at no time were they so liquid as to suggest scouring, nor was there any offensive smell. The urine was somewhat in excess in quantity, but appeared quite normal in quality. A reference to the history sheets will show, that, at the beginning of the experiment, there was a loss of weight varying from 2 lbs. to 60 lbs; this, however, was made up very soon and a steady gain in weight was made until a maximum was reached, after which the weights were practically constant. The greatest gain was 70 lbs. The average quantity of pear consumed was 32 lbs. per head per day, varying accordingly as the pear contained more or less moisture. This average works out

to 72 lbs. per 1,000 lbs. live weight. Taking the average analyses of the pear and cotton seed, we find that we have a maintenance ration as follows :—

Assuming digestible co-efficient 66 per cent.

	Protein.	Carbo- hydrates.	Fat.
Pear	24	3.84	24
Cotton Seed	48	96	50
Total	72	4.80	74

Comparing this with Haeker's standard, we find a slight deficiency in carbo-hydrates, but this is practically made good by the excess in fats as below :—

	Protein.	Carbo- hydrates.	Fat.
Haeker's Standard	70	7.00	10
Pear mixture with surplus fat and protein converted to carbo-hydrates	70	6.42	10
Difference ... ..	.....	-.58	...

The above shows that a mixture of prickly-pear and 6 per cent. of cotton seed gives a maintenance ration, being only deficient of .58 lbs. of carbo-hydrates, according to Haeker's standard, which is a very high one; a comparison with any of the lower feeding standards would have left us a small margin of excess over the requirements of an animal at rest.

As the weights of the animals increased their appearance improved. At the commencement of the experiment, they all looked dull, miserable and emaciated, with staring coats, but they rapidly improved, and after six to eight weeks they appeared like totally different animals; their coats became smooth and glossy, eyes bright, and they had a general appearance of health and well-being.*

The pear was also fed to 19 cows and 19 buffaloes which were in milk, mixed with their ordinary food which was proportionately decreased in quantity. It was given up to 14 lbs. per head per day, and after 3 or 4 days they ate it readily. This was not continued sufficiently long, owing to the labour engaged on burning it being

* See photographs taken at commencement and close of the experiment, which are appended.

urgently needed elsewhere, to enable me to say what effect the pear would have on the milk yield, but for the time it was fed it had no apparent effect beneficial or otherwise, this will be tried again later. The dry cattle and young stock of the dairy at Mánjri were also fed the pear mixed with cotton seed hulls, molasses and cotton seed. The feed consisted of 19 lbs. per pear, 8 lbs. of cotton hulls, 1 lb. of molasses and 1 lb. of cotton seed. These animals had fallen off condition, owing to the grazing having become exhausted, but when put on the feed above named, they rapidly improved and regained their former condition. They exhibited no signs of abnormal looseness of the bowels at any time neither did they need any urging to eat it mixed as above, even on the first day.

N. B.—The bullocks did not take any water worth mentioning except when salt was fed with the pear, but with the addition of 2 ozs. of salt they drank a normal quantity.

Summary.

To sum up it has been clearly demonstrated that the prickly-pear if properly prepared and mixed with 6 per cent. of its weight of cotton seed, is not only enough to support life, but will enable an animal to regain condition even after it has become very poor from semi-starvation. That the cultivators could save their bullocks, etc., in times of famine, by feeding the above, the cost of preparation being very low. With the "Effective" stove, enough pear could be prepared for a pair of bullocks weighing 1,450 to 1,500 lbs. at cost of As. 1-6 for oil and As. 3-3 for the necessary cotton seed, or a total of As. 4-9 per pair per day. One stove would be sufficient to burn pear for 10 pairs. The pear was used with profit at Mánjri for the Dairy stock when fodder was very dear, and effected a considerable saving. It is therefore profitable to feed it as a part of the ration at any time when fodder is scarce and prices are high. No ill-effect of any kind was noticed throughout the whole six months of the experiment, and it is still being carried on to find if there will be any ill-effect produced by feeding it for a much longer period. A point worthy of notice is, that, although the stoves used work very well if properly managed and the directions which accompany them are carried out, they will soon go out of order if carelessly handled or negligently treated.

Statement showing the working of the different kinds of stoves tried.

Name of stove.	Price.	Quantity of pear prepared per hour.	* Total cost of removing spines.
	Rs. a. p.		Rs. a. p.
Primus No. 1	5 12 0	31	0 1 2
„ No. 2	8 12 0	31	0 1 2
Vesuvius (flat flame)	15 8 0	60	0 1 5
„ (round flame)	15 8 0	55	0 1 5
Etna	10 8 0	50	0 1 7
Petrolia	13 0 0	55	0 1 3
Effective	22 0 0	100	0 2 0

* Cost of removing spines = cost of labour and oil.

“ B ”

Chemical Analysis of Prickly Pear.

	Dry Season.	Wet Season.
	Per cent.	Per cent.
Moisture	79'32	92'65
Ether extract	'78	'22
Albuminoids*	'68	'31
Soluble Carbo-hydrates	11'61	4'37
Woody Fibre	2'48	'85
Ash†	5'13	1'60

	Per cent.	Per cent.
* Containing Nitrogen	'11	'049
† Containing Sand	'04	'12

History Sheet of Bullock No. 1 (Lakhulya).

Probable age	... 7 years.	Height	... 4	6
Weight	... 392 lbs.	Length	... 2	2
Colour	... Black.	Girth	... 4	7

Date.	Weight in pounds.	Pear consumed in preceding 7 days in pounds
15th January 1913	392	103
22nd " "	364	168
29th " "	368	194
5th February 1913	384	250
12th " "	392	251
19th " "	392	246
26th " "	396	237
5th March 1913	400	220
12th " "	400	254
19th " "	400	254
25th " "	402	259
1st April 1913	408	248
8th " "	408	237
15th " "	408	189
22nd " "	420	183
29th " "	420	216
6th May 1913	420	224
13th " "	408	216
20th " "	402	191
27th " "	402	161
3rd June 1913	404	221
10th " "	404	225
17th " "	404	280

History Sheet of Bullock No. 2 (Ganesha).

		Feet. inches.
Probable age ...	9 years.	Height ... 4 6
Weight ...	420 lbs.	Length ... 2 6
Colour ...	Fawn with white legs.	Girth ... 3 5½

Date.	Weight in pounds.	Pear consumed in preceding 7 days in pounds
15th January 1913	404	106
22nd " "	420	179
29th " "	420	223
5th February 1913	448	236
12th " "	448	253
19th " "	448	247
26th " "	460	261
5th March 1913	448	245
12th " "	476	274
19th " "	476	263
25th " "	476	258
1st April 1913	476	231
8th " "	476	248
15th " "	476	218
22nd " "	476	216
29th " "	488	241
6th May 1913	476	259
13th " "	484	252
20th " "	476	262
27th " "	488	214
3rd June 1913	488	252
10th " "	490	266
17th " "	486	280

History Sheet of Bullock No. 3 (Rumalya).

	Feet. inches.
Probable age ... 7 years.	Height ... 3 4
Weight ... 464 lbs.	Length ... 2 6
Colour ... Red.	Girth ... 4 6

Date.	Weight in pounds.	Pear consumed in preceding 7 days in pounds
15th January 1913	472	103
22nd " "	462	179
29th " "	504	223
5th February 1913	490	267
12th " "	498	245
19th " "	482	252
26th " "	504	274
5th March 1913	496	250
12th " "	504	274
19th " "	504	266
25th " "	504	266
1st April 1913	504	265
8th " "	512	266
15th " "	516	248
22nd " "	520	236
29th " "	524	249
6th May 1913	514	265
13th " "	524	274
20th " "	520	272
27th " "	532	234
3rd June 1913	532	257
10th " "	532	280
17th " "	504	280

History Sheet of Bullock No. 4 (Bawara).

Probable age	... 8 years.	Height	... 3 1
Weight	... 380 lbs.	Length	... 2 5
Colour	... White.	Girth	... 4 2

Date.	Weight in pounds.	Pear consumed in preceding 7 days in pounds
15th January 1913	336	46
22nd " "	344	31
29th " "	364	3
5th February 1913	384	.....
12th " "	382	12
19th " "	373	192
26th " "	400	219
5th March 1913	392	218
12th " "	392	241
19th " "	392	237
25th " "	392	241
1st April 1913	404	222
8th " "	420	215
15th " "	420	176
22nd " "	400	245
29th " "	412	200
6th May 1913	408	209
13th " "	400	198
20th " "	392	203
27th " "	416	199
3rd June 1913	404	215
10th " "	406	245
17th " "	392	273

History Sheet of Bullock No. 5 (Putala).

Probable age	... 9 years.	Height	... 3 7
Weight	... 376 lbs.	Length	... 2 5
Colour	... Black, mottled with white.	Girth	... 4 1

Date.	Weight in pounds.	Pear consumed in preceding 7 days in pounds
15th January 1913	316	35
22nd " "	336	36
29th " "	348	4
5th February 1913	380	.....
12th " "	380	.....
19th " "	336	67
26th " "	400	.....
5th March 1913	420	.....
12th " "	448	.....
19th " "	462	.....
25th " "	476	.....
1st April 1913	476	.....
8th " "	488	.....
15th " "	476	.....
22nd " "	448	.....
29th " "	450	.....
6th May 1913	448	.....
13th " "	420	.....
" "	420	.....
27th " "	420	.....
3rd June 1913	420	.....
10th " "	420	45
17th " "	420	178

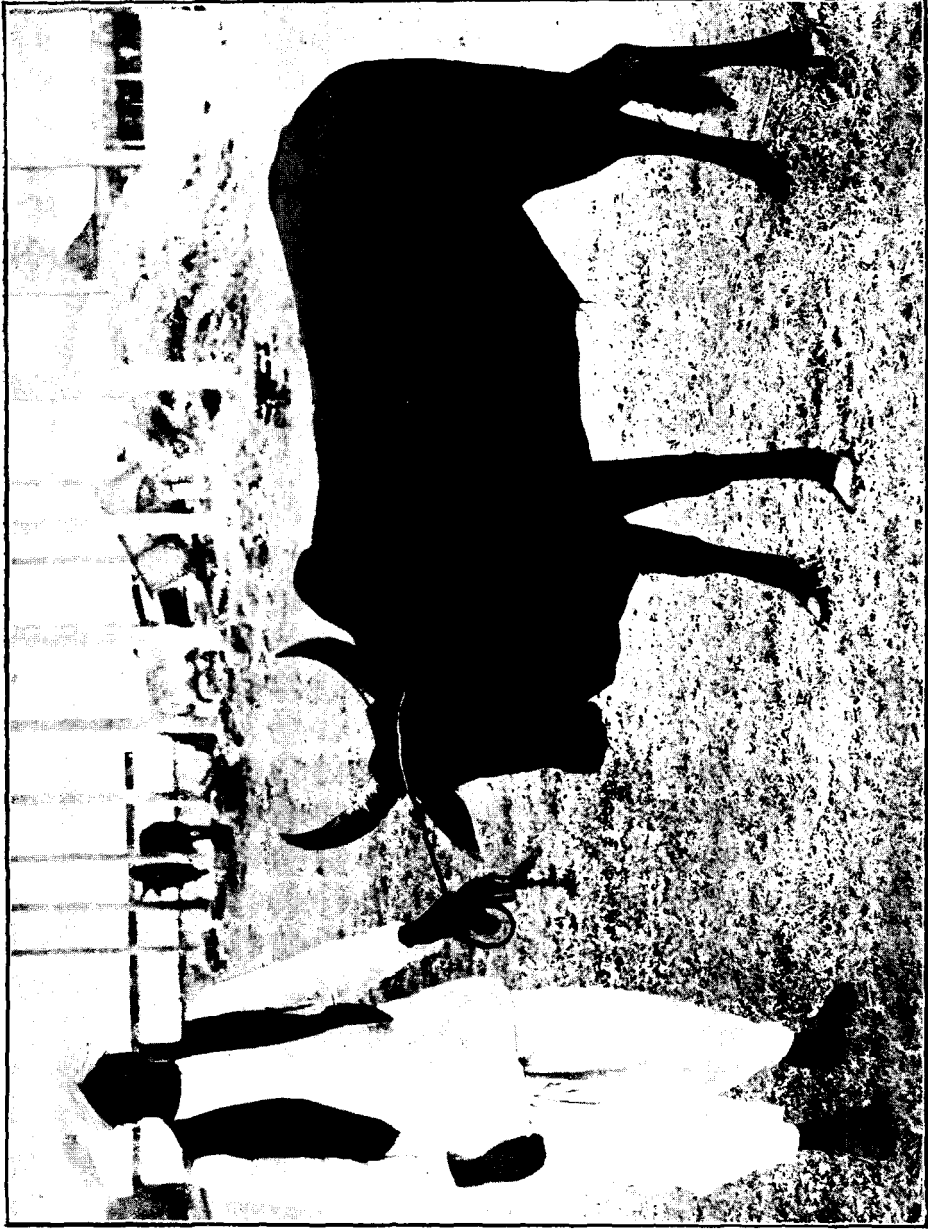
History Sheet of Bullock No. 6 (Harna).

		Feet. inches
Probable age ...	8 years	Height ... 3 3
Weight ...	438 lbs.	Length ... 3 5
Colour ...	Fawn.	Girth ... 4 8

Date.	Weight in pounds.	Pear consumed in preceding 7 days in pounds
15th January 1913 ...	420	47
22nd " " ...	442	149
29th " " ...	420	169
5th February 1913 ...	420	200
12th " " ...	436	219
19th " " ...	436	229
26th " " ...	456	253
5th March 1913 ...	432	232
12th " " ...	448	265
19th " " ...	476	264
25th " " ...	476	264
1st April 1913 ...	476	266
8th " " ...	486	246
15th " " ...	492	211
22nd " " ...	488	219
29th " " ...	496	247
6th May 1913 ...	476	258
13th " " ...	484	258
20th " " ...	484	267
27th " " ...	496	211
3rd June 1913 ...	492	267
10th " " ...	476	274
17th " " ...	486	280



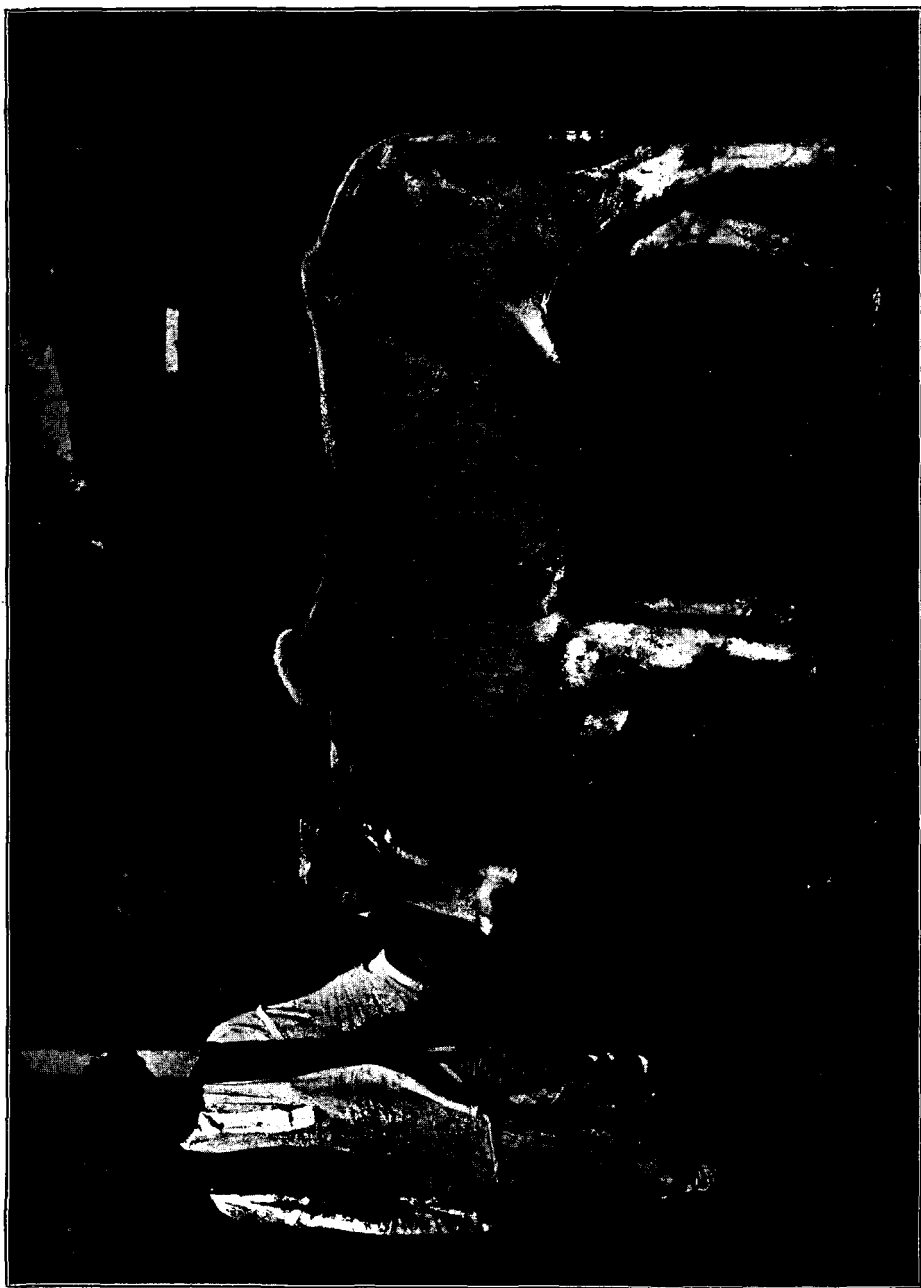
No. 1.—Lakhulya at the Commencement of the Experiment.



No. 1.—Lakhulya at the Close of the Experiment.



No. II.—Gawsha at the Commencement of the Experiment.



No. II.—Gawsha at the Close of the Experiment.



No. III.—Rumalya at the Commencement of the Experiment.



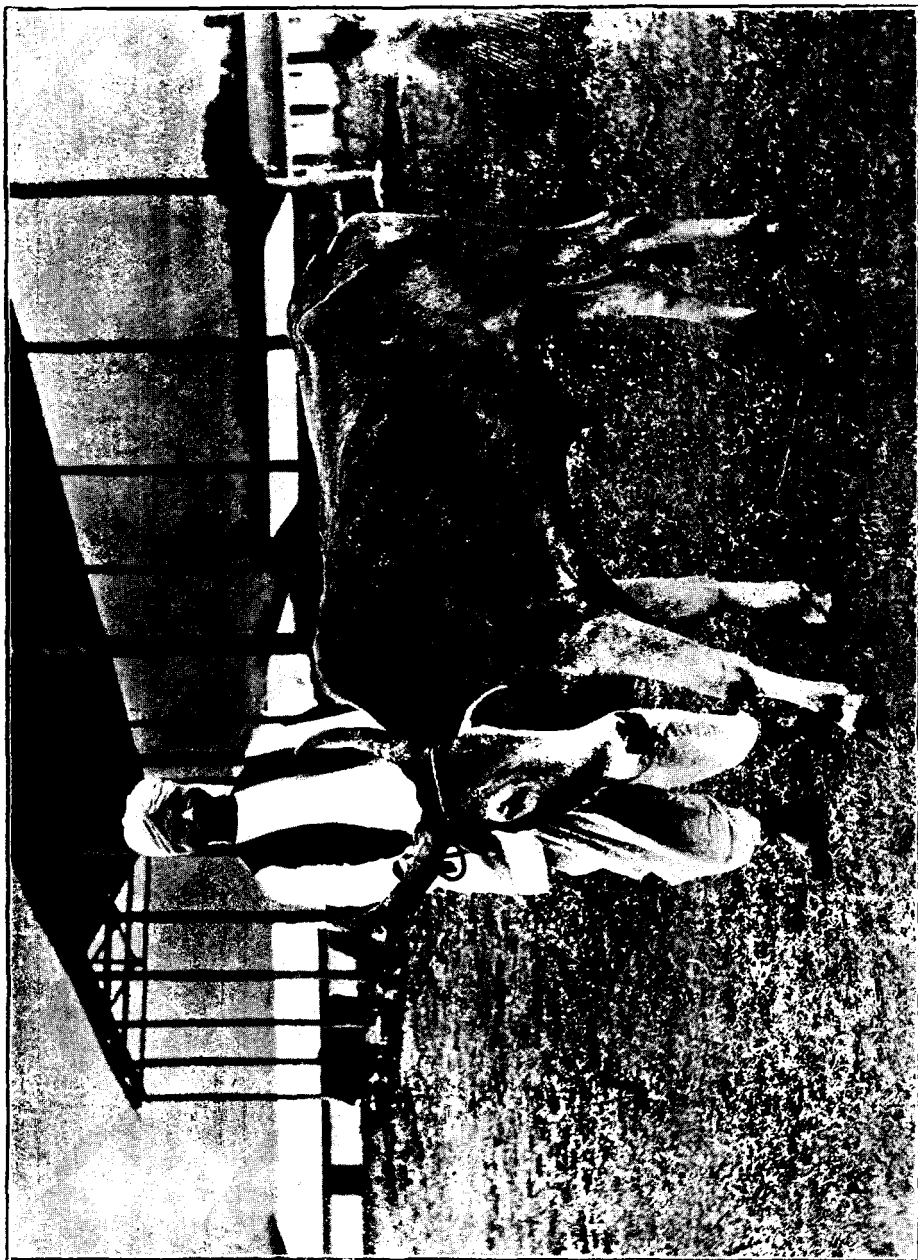
No. III.—Rumalya at the Close of the Experiment.



No. V.—Putala at the Commencement of the Experiment.



No. VI.—Harna at the Commencement of the Experiment.



No. VI.—Harna at the Close of the Experiment,