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A Note on the Cattle and Pastures of the Anamalais

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Object of the survey: The work was undertaken at the instance of the District Veterinary Officer, Coimbatore with a view to survey the Anamalai hill cattle, the pasture lands and fodder facilities available and to suggest ways and means of further improvement of the cattle. The survey was confined mainly to the estates which are members of the Anamalai Hill Cattle Society.

Geographical Position etc., of the Anamalais: The hills of the Anamalais figure as a great wall to the south of Pollachi with towering peaks ranging from 6,000 to 8,000 feet. The hills are in several ranges but are divided roughly into the upper and lower ranges. The latter consist of undulating country lying at an elevation of 3,000 to 4,500 feet above mean sea level, while the former (the upper ranges) are noted for their scenery and the numerous rugged peaks which rise to a height of about 8,000 feet. The rainfall is rather heavy varying from 100 to 160 inches annually as detailed below:—

Annual Average Rainfall in Some of the Estates in Anamalais.

S. No.	Name of Estate.	Rainfall inches.
1.	Monica	118·6
2.	Injiparai	123·4
3.	Nallacathu	123·6
4.	Sirukundra	122·4
5.	Mukkothumudi	150·2
6.	Thaymudi	134·0
7.	Anaimudi	146·5
8.	Thonimudi	139·6
9.	Gajamudi	141·3
10.	Valparai	128·8
11.	Mudis	140·1
12.	Iyerpadi	121·3
13.	Lower paralai	124·0
14.	Upper paralai	126·6
15.	Water fall	116·4

Soil Condition and Fodder Position: There are about 29 estates comprising The Anamalai Hill Cattle Society with an aggregate of about 3000 head of cattle and about 2500 acres of grazing area. This works out

on an average to 83 cents per head, but actually it is less than half an acre in many of the estates. About 40 Scindhi breeding bulls are stationed on the Anamalais for grading up purposes. The cattles are half-breeds of Scindhi varying from 7/8 to 15/16 pure and are kept for milk purposes only. The general condition of cattle is not satisfactory. The common ailments are due to ticks and worms. The pasture condition is bad as grazing facilities exist only in the ravine swamps infested with numerous leeches. The grasses in these swamps are mostly coarse and are locally known as buffalo grass and bison grass. The soils vary from sandy loam to clayey loam and of all shades from red to black. Since almost all available cultivable area is under tea, coffee and cardamom, only those in deep ravines are left for grazing. Such places are invariably swamps. Cattle entirely depend on the grasses that grow in these swamps. No stall feeding is resorted to, as most of the cattle are owned by coolies who cannot afford it. Concentrates of any form are seldom fed, save in the case of cattle owned by the officers in few places, and even then, not adequately. The cattle on the whole subsist only on the grasses from the swamps and water from the hill streams.

Analysis of Soils: Eighteen samples of soils collected from different localities were analysed and the results are presented in Appendix I. The ph value of the soils ranges from 5·35 to 6·21. The soils are acidic with a fair amount of organic matter. The water soluble salts are low. The soil nitrogen varies from 0·114 to 0·743% and is generally fair in the different samples. Calcium, one of the important minerals, varies from 0·080 to 0·331% and is generally poor in all the samples. The available phosphoric acid varies from 0·0022% to 0·0266% and is generally fair to good.

Analysis of Pasture Herbage: Twenty three samples of pasture grasses collected from different localities were analysed, for their protein and mineral contents and the results are given in Appendix II. The protein content of the herbage ranges from 6·86 to 13·94 per cent and may be considered to be from average to good quality. The lime content varies from 0·283% in Sirukundra estate to 0·661% in lower Paralai. The lime content of the pastures is generally poor with the exception of those at Monica, Gajamudi, Iyerpadi, Thonimudi (F. No. 7) Paralai (Lower). The phosphoric acid content of the herbage varies from 0·217 at Thonimudi to 0·552 at the Waterfalls estate. The phosphoric acid content of the pasture is generally fair except in places like Injiparai, Thonimudi (2nd and 3rd Division) and Nallamudi where it is poor. None of the herbage from these pastures is rich both in lime and phosphoric acid. Both the lime and phosphoric acid content of the pasture are about average only in Monica, Sirukundra (cut grass), Thonimudi, Gajamudi, Iyerpadi, and Paralai (lower).

Suggestions and recommendations: From the figures of analysis of the pasture grasses and the soils of the pasture lands, it is evident that the pasture in many places is deficient in lime or phosphoric acid or both, though the protein content is farily good. The lack of a sufficient supply of mineral matter in the food given to an animal has been found to induce certain abnormalities or diseases in animals. To effect an improvement of the mineral content of the pasture, the pasture lands must be properly attended to, by way of cultivation and manuring. Therefore, the following suggestions if given effect to, may be useful in producing good and rich pasture herbage.

1. *Rotational grazing* :— Overgrazing should be avoidod as it will weaken the best pasture grasses, because there will be no opportunity for the plants to store reserve nutrients in their roots. It is beyond doubt that the natural herbage of grasses, if properly cared for and eaten off the land by cattle provides the ideal roughage. But where the grass-lands are being grazed off, cattle should be left in at the rate of about one head per acre, and a system of rotational grazing should be followed. This will mean that more land must be set apart for grazing.

2. *Weeding out the undesirable cattle* :— The total head of cattle can be reduced by weeding out the undesirable and aged animals. Dry cows may be taken if possible to places at the foot of the hills where fodder may be secured more easily.

3. *Soil improvement*:— Drainage is an important factor; the failure of grasses even under good climatic conditions is due to lack of drainage. It is useless to expect grasses to grow well in cold damp soils. By improving the drainage wherever it is necessary and possible, fine grasses can be grown where sour unpalatable and coarse grasses grew before. Further at least once a year some sort of a cultivation, such as harrowing must be given. In heavily stocked pastures, the droppings should be spread at least once a year, as otherwise, cattle will not graze the rank rings of grass around the piles of droppings, which means considerable wastage of feed. To enrich the mineral content of the pasture herbage, especially of calcium and phosphorus, adequate manuring of the lands with fertilisers rich in the above two elements is necessary. Manuring with (burnt) lime at the rate of 3 cwt. per acre and bone-meal may be tried. Lime besides supplying the deficiency of CaO, rectifies the soil acidity. Cattle manure is very good, but may not be available in the hills. High soluble basic slag upto 10 cwt. per acre with lime, is a very reliable manure to be tried. Any mineral phosphate is good as it acts best on perennial grass in acid soils found in the hills under high rainfall. Alternatively, superphosphate (2 to 3 cwt. per acre) and other phosphatic fertilisers furnish calcium and phosphorus commonly required by the soils under pasture in the hills.

These are best applied in summer or just before the grass has seeded. As the land is sloping in most places it should be protected from excessive erosion by bunding at convenient intervals along the contours. Old clumps of grasses must be removed.

4. *Introduction of new species of grass and legume*:— New species of grass which may thrive well under the swamp condition may be introduced. A species of grass known as buffalo grass *Brachiaria mutica* which comes up well under water-logged condition may be tried. Enriching the herbage by the introduction of leguminous plants is worth while attempting.

5. *Growing fodder crops*:— Wherever posible some kind of fodder may be grown and fed green or converted to hay or silage when available in plenty. Some of the cultivable perennial grasses such as the guniea grass (*Panicum maximum, Jacq.*) and Napier grass (*Pennisetum purpureum Schum*) may be tried. The last mentioned grass has been noticed to come up well at Thonimudi during the survey.

6. *Stall feeding of Cattle*:— The most important function of fodder is to provide a bulk feed to the ration of the animal. A large quantity of fodder is necessary to cattle if they are to be in good health and able to do work or provide a supply of milk. The milking cow, it must be remembered, has not only to provide for maintenance of its own body but also for producing milk as well as feeding the developing foetus. Pasture grasses are generally considered to have high nutritive value. In addition they supply vitamins and minerals in sufficient quantities provided the animals have adequate grazing. The pasture area reserved in the different estates is small compared to the number of cattle grazed on it. Secondly the grass is coarse and wet. Conseqnently the cattle may not graze up to their normal daily requirements. So, to better the condition of cattle, it is imperative to supplement the grazing by stall feeding with straw or hay. These dry fodders may be stocked in each estate for distribution among the labourers for the requirement of their cattle.

Attention must be directed to the feeding of some concentrates. Inspite of the fact that forage is similar in composition and nutritive value to the protein-rich concentrates, even tender forage is somewhat higher in fibre content on dry basis, as compared to concentrates. Therefore, it is correspondingly lower in total digestible nutrients and in net energy than the concentrates. Consequently, although such forage is often good enough it cannot fully replace the use of concentrates. As the Anamalai grasses are generally less rich, the need for concentrates is all the greater. Cows of high productive capacity need some concentrates in addition to even excellent pasture as otherwise their milk production will be reduced.

It is therefore suggested that some stall feeding with concentrates such as oilseed cakes, cotton seed, rice bran, dhall husk etc., may be given from 1 to 3 lbs. according to milk yield. About 2 oz. Mineral supplement (a mixture of powdered shell lime and sterillized bonemeal in equal proportion) with an ounce of salt (common bazaar salt) must be given daily along with the concentrates.

The dry fodder and concentrates with mineral supplement may be made available at cheap rates or free to the labourers, by a subsidized scheme of the Anamalai Hill Cattle Society. If all or at least some of the suggestions are given effect to along with the veterinary attention the animals are receiving, it will be possible to further improve the Anamalai cattle quickly and also maintain such improvements at a high level.

Summary & Conclusion: Eighteen samples of soil and 23 samples of pasture grasses from different localities in the Anamalais were analysed. The soils are generally acidic and deficient in lime. The pastures are generally poor in lime or phosphoric acid or both in several places. Basic slag or bonemeal and lime may be applied to the pasture lands to improve them generally and in lime and phosphoric acid particularly. In addition to manuring of pastures cattle should receive some kind of stall feeding with concentrates and small quantity of mineral supplement. Straw or hay to supplement the grazing is also necessary. As a result of this investigation it is realised that in addition to the attention devoted to the grading of the hill cattle and ridding them of the worms and other diseases peculiar to the Anamalais, attention should also be bestowed on improving the standard of feeding both in quality and quantity.

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APPENDIX I.

Results of Analysis of soil samples (Lab. Nos. 529—546.)

Lab. Nos.	Items of analysis.	Moisture.	Loss ignition	Total water soluble salt.	Nitrogen.	Calcium (CaO)	Available.		
							P_2O_5	K_2O	pH
529	Monica near group office.	7·72	12·56	0·053	0·290	0·080	0·0042	0·0126	6·21
530	Monica swamp.	1·90	1·06	0·086	0·114	0·105	0·0022	0·0066	5·96
531	Monica New field.	3·86	5·59	0·037	0·176	0·089	0·0093	0·0100	5·55
532	Injipparai Swamp.	7·74	9·93	0·079	0·307	0·223	0.0238	0·0245	5·88
533	Nallacathu No. 1 area.	2·32	6·68	0·031	0·187	0·113	0·0147	0·0134	5·95
434	Nallacathu No. 3 area.	7·56	16.93	0·045	0·367	0·189	0·0074	0.0165	5·81
535	Waterfall	3·64	8·42	0·040	0·148	0·106	0·0115	0·0079	5·98
536	Thonimudi F. No. 7.	5·54	15·63	0·083	0·357	0·139	0·0101	0·0074	5·55
537	Thonimudi 2nd division.	3·82	11·09	0·049	0·212	0·114	0·0081	0·0096	5·77
538	Gajamudi Fuel reserve.	5·13	16·56	0·080	0·386	0·331	0·0173	0·0131	5·81
539	Mukkutumudi 1st division.	3·78	12·60	0·058	0·230	0·086	0·0061	0·0124	5·75
540	Anamudi swamp.	7·49	28·28	0·155	0·743	0·203	0·0143	0·0115	5·35
541	Thaimudi 3rd division.	4·96	11·04	0·031	0·204	0·162	0·0186	0·0209	5·75
542	Mudis town swamp,	8·14	17·12	0·075	0·408	0·258	0·0150	0·0373	5·72
543	Thaimudi upper division.	5·37	10·23	0·031	0·102	0·086	0·0055	0·0136	5·65
544	Iyerpadi division No. 2.	2·40	6·10	0·043	0·168	0·087	0·0093	0·0226	5·75
545	Iyerpadi division No. 1.	5·89	5·93	0·032	0·280	0·219	0·0183	0·0219	5·85
546	Paralai Lower division.	5·99	9·01	0·108	0·330	2·297	0·0266	0·0320	5·98

N. B.— All results, except "Total Water soluble salts" have been calculated on moisture-free basis.

APPENDIX II.

Results of analysis of twenty-three samples of grasses collected at Anamalai Hills.

Heads of analysis,	Moisture.	Ash.	Crude proteins.	Crude fibre.	Ether-extractives.	Carbohydrates.	Total.	Insolubles.	Lime (CaO)	Phosphoric acid (P_2O_5)
Lab No./46—47.										
506 Grass. Monica near office ...	8·14	10·58	9·54	21·19	2·43	48·12	100·00	4·72	0·628	0·449
507 Grass. Injipparai swamp ...	7·81	14·14	8·18	24·64	1·63	43·60	100·00	7·69	0·327	0·444
508 Grass. Do. Teppakalam Swamp.	7·36	7·86	7·97	28·44	1·64	46·73	100·00	3·09	0·322	0·277
509 Grass. Nallacathu No. 1 area ...	7·57	10·24	9·80	25·23	2·18	44·98	100·00	4·90	0·380	0·438
510 Grass. Do. No. 3 area ...	6·63	10·37	11·98	23·24	2·39	45·39	100·00	5·62	0·367	0·496
511 Grass. Sirukundru cut grass ...	7·61	8·81	8·99	26·11	1·18	47·30	100·00	2·21	0·533	0·368
512 Grass. Do. from field ...	5·08	18·00	10·55	27·24	2·19	36·94	100·00	13·08	0·283	0·379
513 Grass. Waterfalls estate grazing...	7·02	13·68	10·38	23·95	2·72	42·25	100·00	6·61	0·447	0·552
514 Grass. Thonimudi F. No. 7 ...	6·02	8·07	11·81	27·11	2·82	44·17	100·00	2·66	0·530	0·402
515 Grass. Do. Napier grass ...	6·56	8·76	13·03	27·94	2·68	41·03	100·00	2·98	0·551	0·441
516 Grass, Do. 2nd division ...	6·68	8·15	9·13	26·42	2.01	47·61	100·00	2·96	0·356	0·226
517 Grass, Do. 3rd division ...	4·88	7·53	9·15	26·61	2·59	49·24	100·00	2·44	0·314	0·217
518 Grass. Gajamudi—mound ...	8·42	9·01	7·26	29·68	2·46	43·17	100·00	2·07	0·633	0·447
519 Grass. Mukkutumudi 1st division.	4·17	9·27	12·06	23·70	3·10	47·70	100·00	4·30	0·428	0·423
520 Grass. Do. 2nd division.	5·12	7·71	8·20	26·45	2·25	50·27	100·00	2·42	0·316	0·416
521 Grass. Nallamudi Swamp ...	7·59	7·37	10·33	23·57	2·67	48·47	100·00	2·21	0·492	0·287
522 Grass. Anaimalai ...	9·42	8·60	9·85	22·05	3·27	49·80	100·00	2·83	0·440	0·358
523 Grass. Thaimudi 3rd division ...	6·78	10·67	8·39	24·99	2·03	47·14	100·00	4·27	0·330	0·349
524 Grass. Mudis Town area. ...	6·13	20·82	9·09	18·66	1·91	43·39	100·00	11·27	0·446	0·403
525 Grass. Thaimudi Upper division.	4·83	7·83	13·94	21·40	2·97	49·03	100·00	2.38	0·290	0·431
526 Grass. Iyerpadi No. 2nd division.	7·19	15·08	7·75	19·85	1·51	48·62	100·00	8·57	0·562	0·319
527 Grass. Do. No. 1st division.	5·55	22·92	8·43	15·70	1·46	45·94	100·00	14·14	0·531	0·414
528 Grass. Paralai—Lower ...	4·66	34·94	7·93	16·29	1·34	34·84	100·00	25·29	0·661	0·454