STUDIES ON THE GRAZING HABITS OF CATTLE IN RELATION TO THE SEASONAL UTILIZATION OF DRY ZONE PASTURES*

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ALTHOUGH adequate information on the grazing behaviour of cattle is available in the temperate regions, few such studies have been made under tropical conditions.

Payne *et al.* (i) studying the grazing habits of Friesian cows under tropical conditions in Fiji found that the total grazing time was reduced in hot weather due to the diminution in the length of daytime grazing. In their studies, they observed that 67 per cent of the total grazing time took place at night. These workers therefore concluded that the grazing habits of cattle in the tropics were radically different from those in the temperate zones.

At the Coconut Research Institute, Gunasekera (2) made observations on the time spent in grazing by indigenous Sinhala cattle tethered to coconut palms. He observed that on the average these cows grazed 10.3 hr. and that the bulk of the grazing occurred during the hottest part of the day. Several investigations have been reported where the grazing behaviour studies have been successfully used in the solution of grazing management problems. (3.4). Hughes and Harker (4) showed how behaviour studies can be used in the improvement of animal weighing methods, when cattle are at grazing.

In the tropics, there is little information available on the precise way in which pastures should be managed in order to utilise the sward

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nutrients to the optimum in a system of intensive grassland management. The lack of precise information is no doubt due to the absence of reliable data on the grazing habits of cattle.

The main objective of this investigation which was initiated in January, 1959, was to study the grazing habits of the Sahiwal breed of dairy cattle with particular reference to the seasonal utilization of pastures in the dry zone of Ceylon and thence, to make tenative suggestions for the improvement of grazing management.

EXPERIMENTAL

Cattle. Four, two and half year old Sahiwal heifers of similar weight were selected for these observations. All sixteen observations were carried out using the same group of animals. The animals used were familar to being handled in experimental plots without causing any disturbance.

Pasture. Two one-acre plots of *Brachiaria brizantha,* one of which contained three large trees for shelter, were chosen for paddocks. Although there was always an abundance of forage, its quality varied from season to season.

Pasture Conditions. The pattern of herbage production in the dry zone assumes a bimodal form, coincident with the rainfall (5), In pastures, there is a flush period from October to November followed by a slower but steady vegetative growth in December and January. With the yala rains in April and May, there occurs a second growth period which is followed by a period of restricted growth in June and a final drying off of pastures with the advent of dry weather in July. A brief description of the pasture conditions during the experimental periods is shown in Table II.

Estimate of Pasture Yields. Estimates of pasture yields were made by cutting the herbage at ground level from 4 quadrats (3′ × 3′) at the time of cattle introduction. The samples were weighed green and a sub sample was hand separated into green and dry Brachiaria. A second sub sample was oven-dried for the determination of moisture and chemical analysis. The dry matter yields shown in Fig. I are not additive since they do not provide an estimate of production over the year.

Weather. Weather conditions varied widely during the trial. In order to avoid the effects of unusual climatic variations, much care

was taken to select a day during which the climatic conditions were typical for the month under observation. Table I gives briefly some of the details.

Observation Techniques. Observations were made for a 24-hr. period at monthly intervals. The animals had access to the pasture at least a day before the observations began. During moonless nights, a flash light was used to observe their activities in the dark. Recordings were made every minute throughout the 24 hr. period of the animals which were engaged in various activities. The activities were classified into—

(1) Grazing—time spent in grazing, gathering and selection of herbage.

(2) Idling—time spent in standing, walking, etc.

(3) Lying down—time spent in lying down.

In these observations, no attempt was made to record the time spent in ruminating.

DISCUSSION OF RESULTS

The time spent in various activities by cattle during single 24-hr. periods for sixteen observations are presented in Table II.

TABLE 1
Weather Data

Date	*Max. Temp. of*	*Min. Temp. of*	*Relative humidity at 8.30a.m.*	*Rainfall inches*	*Remarks*
24. 1.59	87·3	68·0	88	—	Warm and humid
22. 2.59	89·9	71·8	91	—	Warm day with bright sun shine, cool night
25. 3.59	98·0	72·0	86	—	Hot and humid, no breeze
23. 4.59	90·8	76·7	81	—	Warm, clear day
21. 5.59	87·9	75·9	80	—	Light shower at 11 a.m.
26. 6.59	85·9	73·9	84	—	Cool morning, cloudy with cool breeze from S. W.
21. 7.59	91·6	75·1	78	—	Warm, strong blowing from S. W.
18. 8.59	92·0	74·0	74	—	Strong blowing from S. W.
15. 9.59	92·3	74·4	70	—	Warm, with strong blowing from S. W.
17.10.59	95·2	71·5	86	·10	Warm and humid
16.11.59	84·2	70·2	95	·38	Thick mist in early morning, shower in early afternoon
17.12.59	85·1	68·0	93	·77	Cloudy, rain throughout the afternoon
13. 1.60	80·1	69·5	93	·07	Cloudy day, intermittent showers
19. 2.60	84·0	70·2	100	·56	Misty morning, with plenty of dew
29. 3.60	94·1	66·3	78	—	Warm with no breeze
29. 4.60	87·9	75·2	87	—	Warm and humid

TABLE II

Average Time spent per Heifer in various activities (Minutes) and Pasture Conditions

Month	*Grazing*	*Idling*	*Lying down*	*Conditions of the pasture*
January, 1959 ..	384	328	728	Grasses slightly matured
February, 1959 ..	482	236	722	Coarse growth, fair amount of dry material
March, 1959* ..	640	211	589	Almost dried pasture
April, 1959 ..	385	435	620	Grass a foot high, soft young flush
May, 1959* ..	354	519	567	Dense growth of grass, 18–24″ high
June, 1959 ..	449	317	674	Fair amount of green matter mostly old growth
July, 1959 ..	602	299	539	Pasture partially withered
August, 1959 ..	637	219	584	Almost dried up pasture
September, 1959	625	235	580	Mostly old growth, very little green matter
October, 1959* ..	520	365	555	Young growing pasture, 6″ high
November, 1959	463	446	531	Leafy pasture
December, 1959*	460	612	368	Leafy, dense growth of grass, 18″ to 24″ high
January, 1960 ..	494	444	502	Advanced stage of growth
February, 1960 ..	567	446	427	Fair amount of green material still evident
March, 1960 ..	716	166	558	Partially withered pasture.
April, 1960* ..	37–	520	546	Young foliage, 9″ to 12″ high
Average ..	510 (8·50 hr.)	362 (6·03 hr.)	568 (9·47 hr.)	

* Shade available.

The average time occupied in grazing was found to be 8.50 hr. per day and ranged from 5.90 hr. to 11.90 hr.

Although Larkin (6) and Payne *et al.* (1) found that weather was the major cause of variation affecting the grazing habits of cattle in tropical Queensland and in Fiji, these results appear to indicate that the condition of the pasture had a much greater effect than adverse climatic conditions and in fact, in all these observations, a major portion of the grazing was done during the hottest part of the day. (see Fig. 3).

It can be seen from a perusal of Table II and Fig. 1 that cattle on good pasture spent less time in grazing, but as the quantity and the quality of the pasture decreased, the grazing time also increased. The significant decrease in grazing time during October to January and once again during April to June reflects the better growing conditions due to adequate rainfall. The increase in grazing time in March, July, August and September may be attributed to the decrease in the quantity of pasture arising from severe drought conditions which prevail at this time of the year. In March, 1960, for instance, the animals spent about 100 per cent more time in grazing than in May, 1959.

The shorter time expended in grazing and idling and the increase in the time of lying down on good pastures also indicate that cattle were able to obtain their feed requirements with a smaller expenditure of energy in comparision to those grazing on poor quality pastures. The only exception was in December, when heavy rains increased the total idling time with a corresponding reduction in the time spent lying down.

The yield of dry Brachiaria is particularly high during periods of low herbage production (see Fig. 1). The average protein content of dry and green Brachiaria was 2.99 per cent (range 2.17 per cent to 3.75 per cent) and 6.92 per cent (range 3.96 per cent to 12.54 per cent) respectively. The high yield of green Brachiaria in the sward indicates an increase in herbage quality. It can be seen that the time spent in grazing appears to be related to the amount of green material present in the pasture. It was also observed that during dry weather, the cattle were very selective and spent considerable time in walking, gathering and selecting green material. It cannot be concluded that grazing is linked with a high content of crude protein or a low percentage of fibre or dry matter, although this seemed to be the case when animals showed a preference to graze the young and tender shoots of grasses.

It must be admitted that any improvement that will cause cattle to obtain their sustenance with a minimum of grazing will conserve the energy for milk and beef production. Energy expended in work, as a result of excess grazing is used at the expense of production, particularly when herbage is sparse and supplementary feeding is not the general practice. This emphasises the need that cattle, particularly the dairy cattle, should have access to better quality pastures during the day.

Periodicity of Grazing Habits. Grazing was largely done during the daylight hours whilst the nights were mainly devoted to lying down (see Fig. 2). Of the total grazing time, 75 per cent occurred during the day. During the night however, 6.75 hr. were spent in lying down. This represented 70 per cent of the total time devoted to this activity. All studies have shown that these habits can change in these respects, only under very adverse weather conditions.

To study the pattern of grazing behaviour, periodicity charts were constructed from data collected. An example of such grazing periodicity, as occurred on two pasture types in April, 1959, and March, 1960, is shown in Fig. 3.

The distribution of grazing time between the two pasture types was not indentical. In March, when quality herbage was sparse, there was

a marked increase in the grazing time, compared with better quality pasture in April and grazing was more or less continuous throughout the day.

Grazing usually commenced about 7.30 a.m. depending largely on weather conditions. When the herbage is wet with rain or dew, grazing was generally delayed. In the mornings the heifers grazed steadily, but not so intensively as in the afternoons and the grazing period ceased abruptly at sunset time. The relationship between the last daylight grazing period and the time of sunset is illustrated in Fig. 4.

The small amount of night grazing which varied from season to season did not follow a regular pattern.

Effect of Shade. Shade was made available to these animals in March, May, October, December, 1959, and April, 1960, and the time spent in the shade between 10 a.m. and 3 p.m. was recorded. The data relating to the average total time spent in the shade irrespective of the activities are presented in Table III. The provision of shade caused cattle to seek shelter during the hottest part of the day, when heat became uncomfortable. Due to heavy rains, throughout the afternoons in December, less use was made of the shade.

TABLE III
Time spent in the Shade between 10 a.m. and 3 p.m. (Minutes).

Date	*Shade*
25.3.59	123
21.5.59	126
17.10.59	155
17.12.59	82
29.4.60	149

Although providing of shade was found to be beneficial, it did not materially influence the activities of the animals to any appreciable extent.

SUMMARY

SIXTEEN observations on the grazing habits of cattle in relation to the seasonal utilization of pastures are described.

The average times spent in grazing, idling and lying down were 8.50 hr., 6.02 hr. and 9.47 hr. respectively.

The results of this study indicate that the condition of the pasture is a major factor which influences the grazing habits of cattle in the dry zone of Ceylon. The time spent in grazing was found to be correlated with the amount of green material present in the sward.

Grazing was done largely during the daylight hours, whilst the nights were mainly devoted to rest. Of the total grazing time, 75 per cent occurred during the day.

In the mornings, the animals grazed steadily, but not so intensively as in the afternoons. The last daylight grazing period was related to the time of sunset.

The provision of shade caused cattle to seek shelter during the hottest part of the day, but this did not materially influence the activities of animals.

No signs of heat distress were noted in any of these observations and as a breed, the Sahiwal is well adapted to climatic conditions of the dry zone.

It is suggested that further studies on the grazing habits of various breeds of cattle would be of considerable value in the selection of animals suited to different climatic zones of the island.

Tentative recommendations have been made for the improvement of grazing management practices.

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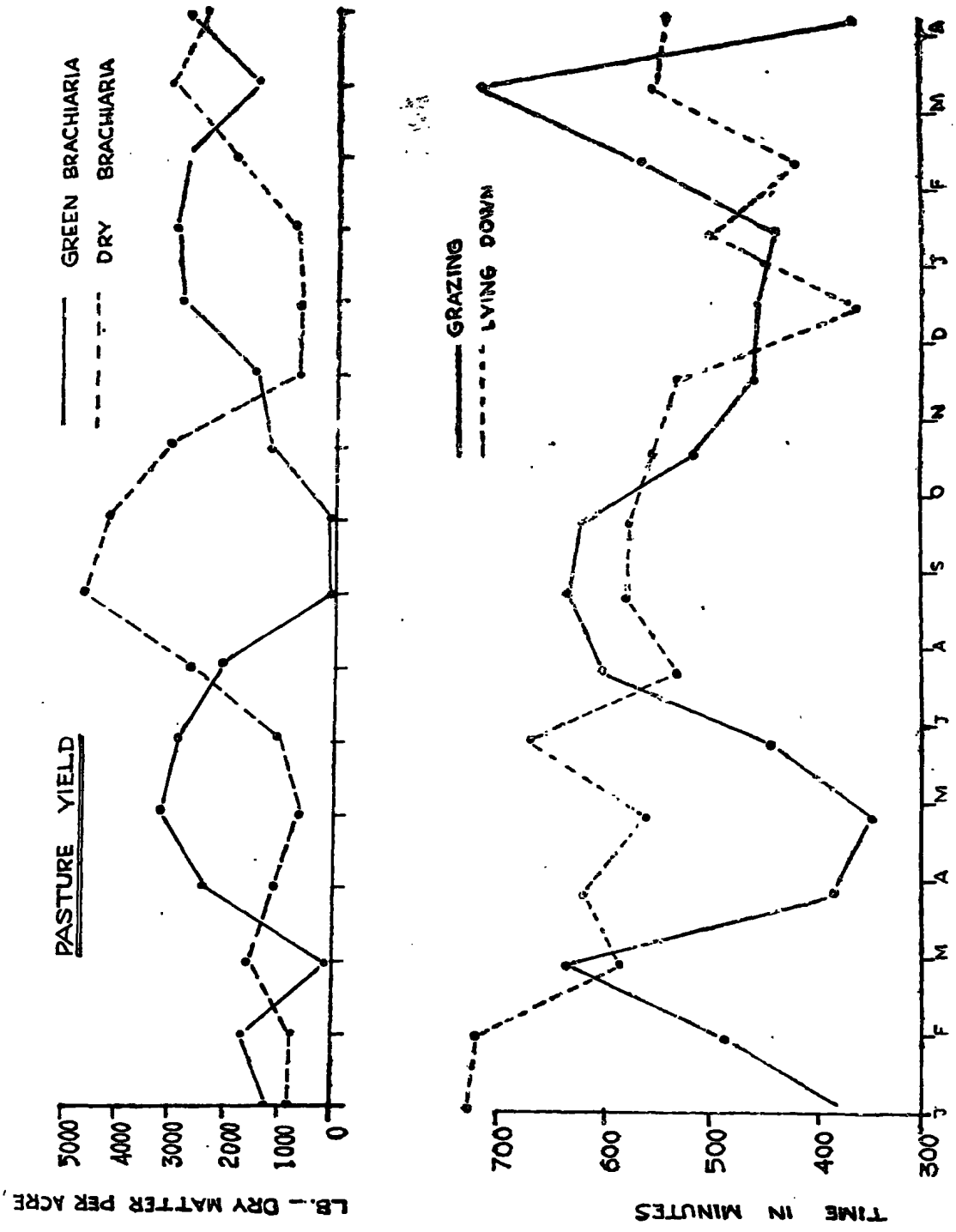


Fig. 1.—Showing the time spent in grazing and lying down in relation to pasture production.

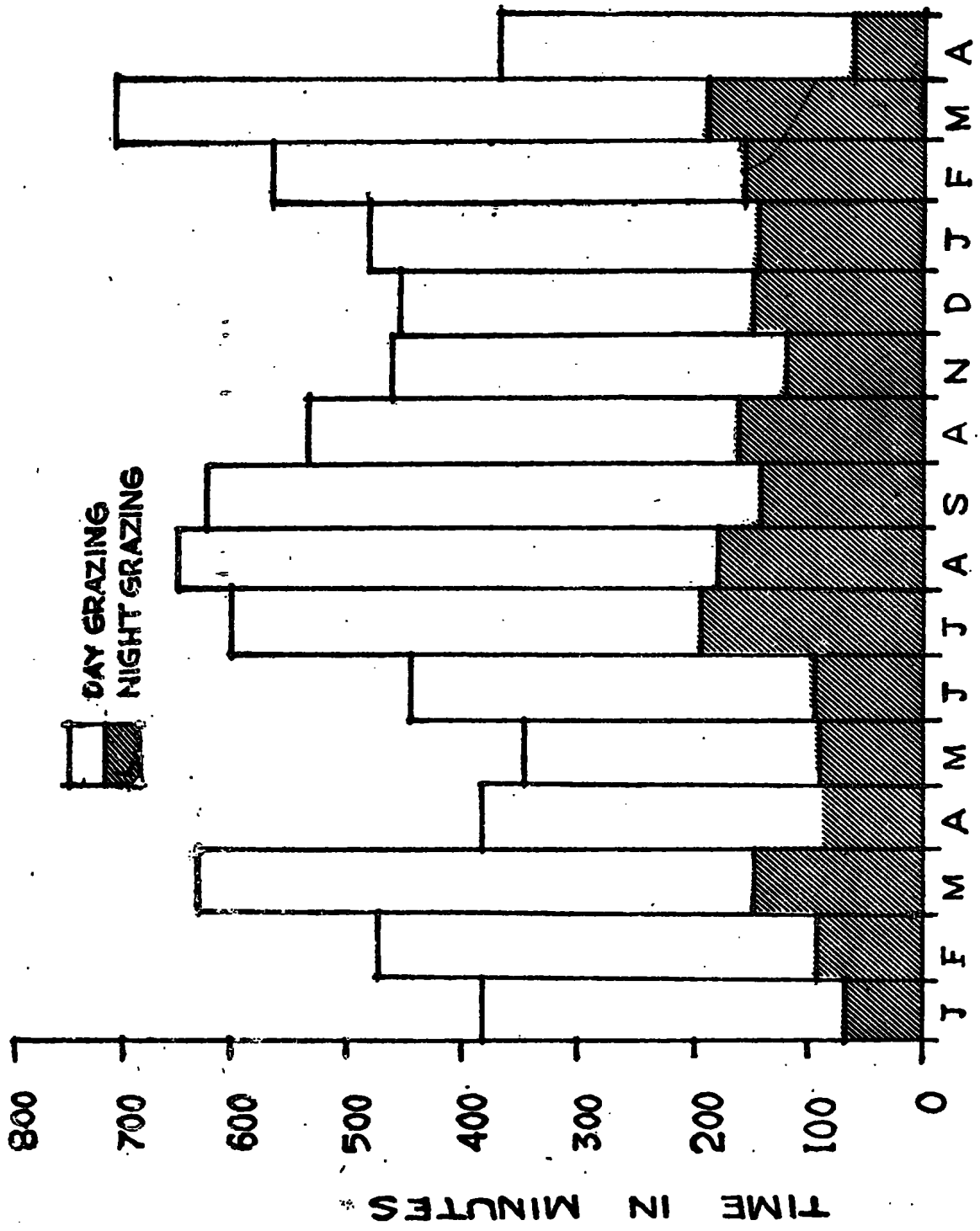


Fig. 2.—Showing total, day and night grazing. 1959

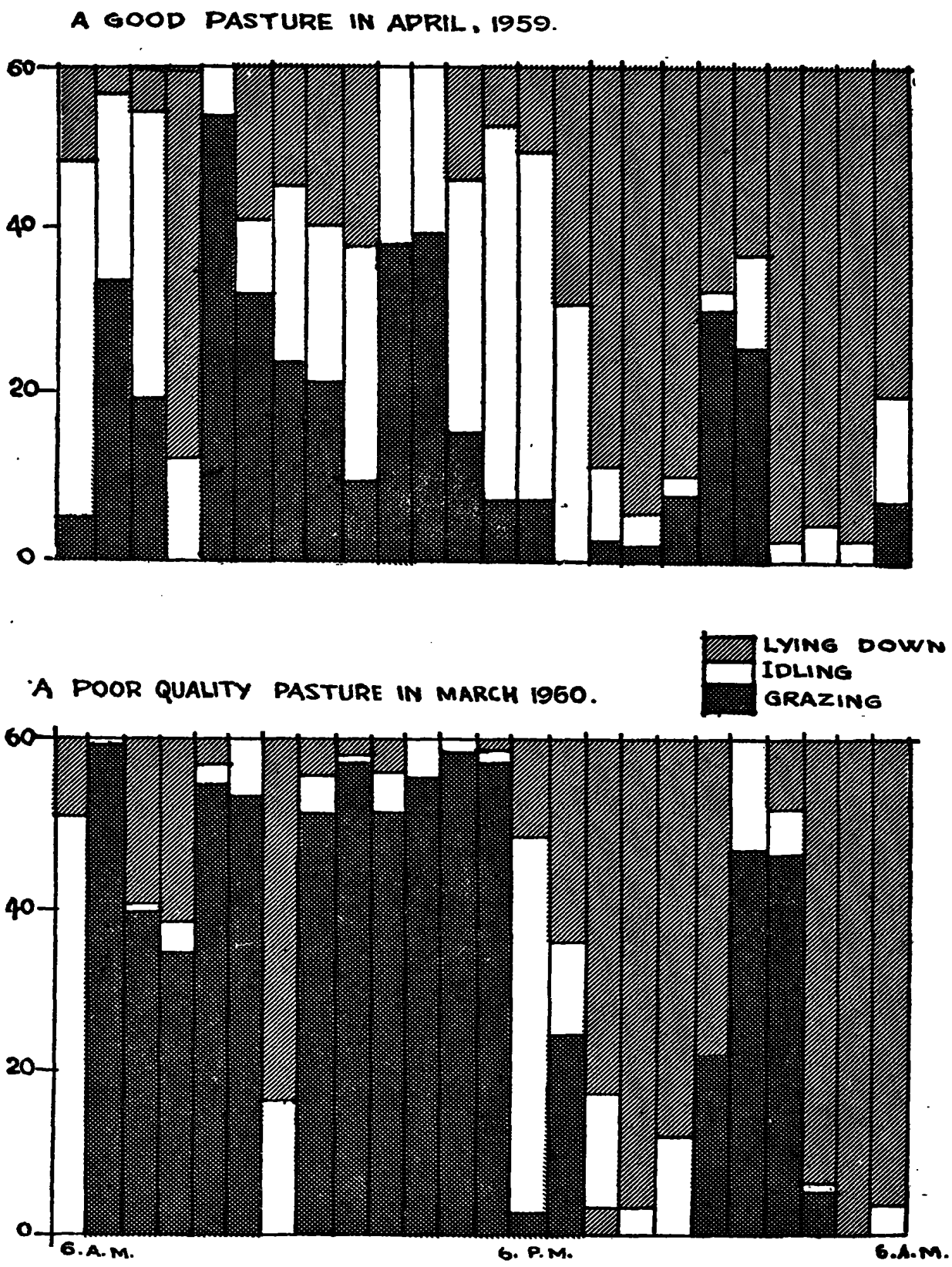
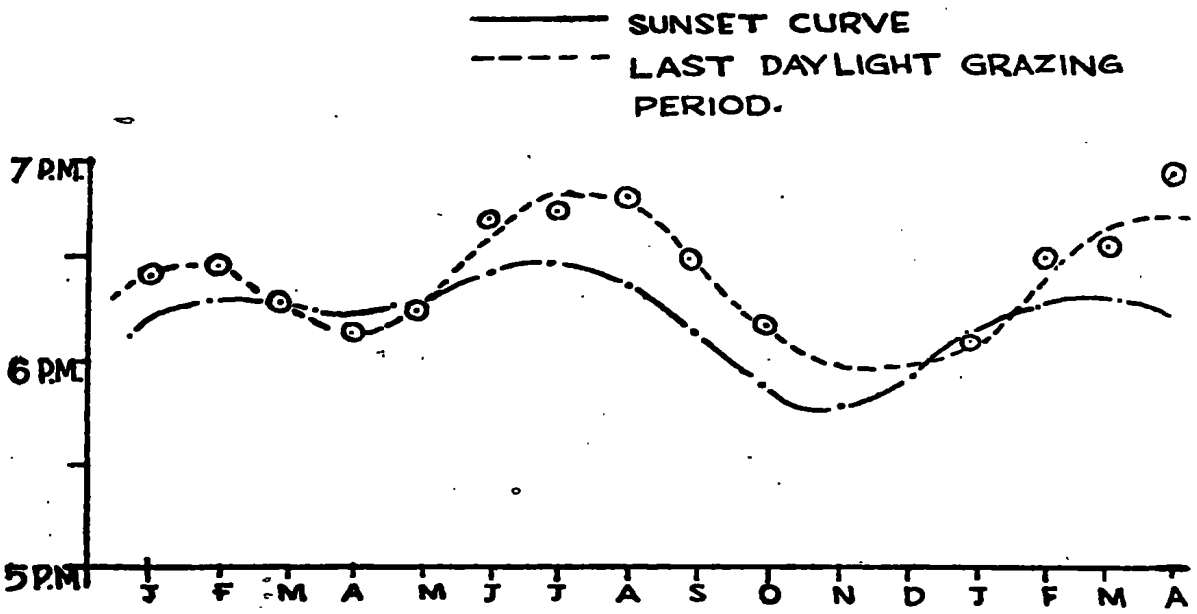


Fig. 3.—Periodicity of grazing habits on two pasture types.



1959—1960

Fig. 4—Showing the relationship between time of sunset and last daylight grazing period.