

Report

of the

(15)

Committee appointed
to consider and adopt
Measures for the
Protection of Crops
from Wild Animals
and Stray Cattle.

(12)

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**Report of Committee appointed to consider and adopt
Measures for the Protection of Crops from
Wild Animals and Stray Cattle.**

There has been in recent years a very widespread outcry regarding the damage done to crops in the Bombay Presidency by Wild Animals and by Stray Cattle, and the matter was brought prominently to the notice of the Provincial Board of Agriculture which met in Poona in August 1921, under the presidency of the Hon. Mr. C. V. Mehta, Minister of Agriculture. After discussion of the subject, the Board recommended to Government that a Committee should be appointed to consider and propose measures to deal with the troubles above referred to. Accordingly the Government of Bombay were pleased to appoint* a Committee of the following gentlemen to inquire fully into and to report on the subject:—

- (1) Dewan Bahadur K. R. Godbole, M.L.C., Chairman.
- (2) Mr. T. Gilbert, Deputy Director of Agriculture, Southern Division.
- (3) Rao Saheb M. L. Kulkarni.
- (4) Rao Saheb Bhimbhai M. Desai, Deputy Director of Agriculture, Gujarat.
- (5) Rao Bahadur V. S. Naik, Ranebennur.
- (6) The Conservator of Forests, Northern Circle.
- (7) Dr. H. H. Mann, Director of Agriculture, (Secretary).

2. The Committee first met in Poona on May 11, 1922, in order to plan their inquiries. In view of the opinion expressed by the Deputy Director of Agriculture, Sind, that the problem was not a serious one in Sind, it was decided to limit the investigations to the Bombay Presidency proper, and a list of questions was drawn up (copy† attached to this report), on which answers were desired from gentlemen in all parts of the Presidency. It was decided to visit (1) Dharwar and Kanara, oral evidence being taken at Karwar, Yellapur and Dharwar, (2) Gujarat and Nasik, oral evidence being taken at Surat, Nadiad and Nasik, and (3) the Konkan, oral evidence being taken at Kalyan. In addition special journeys have been taken by the Chairman and other members of the Committee to gain further information, and confirm doubtful points in the evidence.

I. WILD ANIMALS.

3. The first part of the present report will deal with the damage done by wild animals to the crops of the country, the question of that due to stray cattle being dealt with later. In dealing, however, with the question of wild animals it has been found necessary to limit the scope of the inquiry to the larger animals, and to exclude birds.

The animals to whose devastations attention has been specially drawn in the Committee's inquiry are as follows:—

- (1) Wild pigs, which are immeasurably the most injurious at present.
- (2) Deer and antelopes, including the *nilghai* or blue bull.
- (3) Jackals, which do great damage to many of the more valuable crops including sugarcane.
- (4) Wild elephants whose damage though local in Kanara, is very great where it occurs.

* By Government Resolutions (Revenue Department No. 4058 of February 3, 1922, March 23, 1922 and May 15, 1922).

† Please see accompaniment A.

The present report will deal chiefly with the first of these, but an attempt will be made, on the basis of evidence collected, to discuss the others so far as it is possible to draw valuable conclusions. Carnivorous animals, chiefly tiger and panthers, have been omitted from consideration, as they do no direct damage to crops. They are, moreover, useful in reducing the number of the other injurious animals, particularly wild pigs. But they are nevertheless serious agricultural pests, and are annually responsible for the destruction of very large number of cattle. Probably, on the whole, the damage they do is least counterbalanced by their usefulness in killing pigs.

4. The wild pig is, as has already been stated, by far the most important of these pests, and the injury from its work extends over the greater part of the Bombay Presidency. The habits of the wild pig seem, however, comparatively little known and almost all the information available is contained in the following extract from the Fauna of British India (Mammalia, by W. T. Blanford, 1891, page 561):—

“The Indian wild boar is found during the day in high grass bushes, sometimes in forest and often in high crops, the females and young as a rule associating in herds or “Sounders” usually of ten or a dozen and rarely exceeding about twenty individuals, whilst the adult males keep apart. They roam about and feed on various vegetable substances in the morning and evening. They are partial to marsh, and feed largely on the roots of plants growing in swampy places, especially, according to Jerdon, on those of a sedge that is found on the edges of tanks. They turn up the soft ground with their snouts when rooting about for food, and leave marks easily recognized. No animals are more destructive to crops. The food of wild pigs is, however, not absolutely restricted to vegetables; they have several times been observed to feed on dead animals, and Mr. P. states that in Assam they dig out and eat the fish that bury themselves in mud during the dry season. Wild pigs feed much at night, but they are less nocturnal in tracts where they can feed without disturbance at sunrise.”

“The speed of a wild pig is considerable, but not for a long distance on any practicable ground either boar or sow may be caught by a fair hunter within a moderate distance.....Several instances are on record of desperate fights between a large boar and a tiger, and in not a few cases the tiger has been killed. Sterndale mentions two cases within his own knowledge. McMaster relates an instance of a boar charging, knocking over, and ripping a camel, and occasionally even elephants are attacked. Yet a boar seldom makes an attack without provocation. There is no difference in both the endurance and courage of hogs in different parts of India, the large heavy pig of Bengal having less taste for running; more for fighting than the more lightly built animals of the Deccan and the Punjab.”

“Wild pigs have a habit of cutting grass and making a kind of shelter, in which they are said to leave the young. Old boars may sometimes be found in these lairs, as Simson states in his ‘Letters on Sport in Eastern Bengal.’”

“Pigs are much more prolific than most of the Ungulata. The period of gestation is about 4 months, and they, sometimes at all events, breed twice in the year; the number of young is usually 4 to 6 in *Sus scrofa* and probably the same in *Sus cristatus*.”

The above account leaves it somewhat doubtful how often the wild pig usually breeds. A note, kindly submitted to the Committee, by the Superintendent, Victoria Gardens, Bombay, states that frequently two litters are produced in the year.

5. Several of the witnesses examined before the Committee have added considerably to the available information as to the habits of the pigs and methods of their attack. Notable among these is Mr. P. N. Bhide, who

Close observations in the Poona District have been very interesting. Summarizing, it may be stated, however, that they refer to pigs which live and roam in waste, scrub, or forest land, and visit crops simply for the purpose of feeding. In certain cases the pigs actually live on the crops themselves, as in the sugarcane and other crops in the Nira Valley and they form a different problem which will be mentioned later. But by far the greater part of the damage is done by wild pigs living in jungle and merely visiting crops for feeding.

According to Mr. Bhide, he has met pigs damaging crops in several conditions. There are first large herds of from seven to sixty-five which wander in a group, and forage together, going from field to field and taking a quantity of material from each field, whether it be *jowar*, sugarcane or any other crop. In this case, the usual method of attack is for one of the old experienced females in the herd to go very quietly nearly up (say within ten paces) to the watchman's stand to see whether he is alert. If he appears asleep, she will then deliberately break off a *jowar* or other stalk, and on its breaking she looks up to see if the watchman is now awake. If not, the other pigs in the herd commence feeding, and the field of *jowar* will be ruined by the next morning. It is not, however, difficult to deal with these large herds of pigs by watching and scaring them. When a mother pig and her young are wandering alone, the position is difficult. These have a special fondness for the groundnut crop, or for grain which has just begun to ripen. These make much less noise and may easily do a very great deal of damage without being detected. Beyond these, pigs wander in pairs, and as solitary boars, which not only do much damage, but are exceedingly dangerous.

One of the points made clear is that the wild pigs, when in herds at a rate, choose regular paths and keep to them unless scared away, and that if they are killed on such paths, the herds will for a good long time cease visiting the fields to which these paths lead. When this result has been achieved by watching, scaring and shooting, the chief danger remains from the solitary boar and from the mother pig and her family.

The information regarding the habits of the pigs even now will be seen to be extremely indefinite, and very incomplete. It seems clear that they wander about in different fashions, and that the manner of their attack, the crops they injure chiefly and the extent of their damage varies with these fashions. It seems clear too, that they have normally regular paths by which they forage, and that, if scared off a particular path, a whole area may be saved from injury for quite a long time. We do not know, however, the distance they will go, though they are commonly reputed to go long distances in a single night. They are said to do most damage just after dusk, and after midnight but this will certainly vary according to the phase of the moon.

The case of a self-contained district growing valuable crops like sugarcane with very limited amount of jungle, is special, for in these areas the crops themselves, and not the jungles, seem to be the reservoirs of pig. Such is the case of several of the Deccan Canal areas, and if the pig can be cleared from the sugarcane and similar crops the damage will here cease for a long time. This special problem will be dealt with later, (para. 47), but in these cases sugarcane has been described as furnishing first class waiting rooms for the pig, for though they damage the cane itself, yet they make the cultivation of sugarcane and other crops practically impossible. Excluding such special areas the Committee are convinced, that the existence of jungle covered areas whether forest or scrub, which are undisturbed or disturbed only to a limited extent, furnishes almost an inexhaustible reservoir of wild pigs, and unless such areas can be restricted or the forest eliminated altogether, the eradication of the pest is impracticable. To clear such forest or jungle areas of wild pig is out of the question, and it is, therefore, a question whether any of the methods of so doing which have been suggested could do more than touch the extreme fringe of the problem.

Near jungle and forest areas, nearly all crops are damaged, and those crops which are grown in or near the heavier jungle or the most undisturbed forest are those most attacked. Thus more damage is done to rice than to any other crop, but nearly all garden crops are damaged more or less at all stages.

6. The areas where the damage is greatest are those, where the jungle is present in largest amount and the attached sketch* map indicates where, according to the best information the Committee could gather, the damage is most severe. The worst part of all is probably the area lying in the borders of the Dharwar and North Kanara Districts.

7. The actual damage done is of two kinds. In the first place there is the direct damage to crops actually planted, in spite of precautions such as watching and fencing in many cases. Then there is the very much more serious indirect damage, which consists, first, in the very great reduction in area which a family can cultivate as a result of the necessity for watching, secondly, in the unhealthiness which results from the continual necessity of night watching almost throughout the growth of the crop, thirdly, in the loss through not being able to grow the crops either new or old, for which areas are best fitted, and lastly, in the abandonment of the cultivation of crops which are damaged year after year.

8. The Committee have endeavoured to obtain some idea of the actual amount of the *direct* damage done by wild pigs each year. A number of the witnesses, who know certain districts well, have given estimates, which, though interesting, are acknowledged to be little more than guesses. Moreover, though wild pigs are the greatest offenders, the figures represent damage by other wild animals as well. Some of these estimates are as follows:—

(a) Mr. V. G. Gokhale, Deputy Director of Agriculture, Konkan, estimates annual direct damage in the Konkan at 8 to 10 lakhs of rupees at prices prevailing early in 1923.

(b) The Divisional Forest Officer, Kolaba, considers that nearly ten per cent. of the total crop of many villages is destroyed by wild animals just after sowing.

(c) Mr. R. P. Pandit, District Deputy Collector, Dharwar, states that the Mamlatdar of Hangal (Dharwar District), in which taluka the Government land revenue is Rs. 2,07,191, estimates the damage to crops by wild pigs in that taluka as Rs. 1 lakh or slightly less than half the land revenue.

(d) Mr. V. R. Dharwarkar, Cotton Superintendent, Dharwar, (formerly District Agricultural Overseer, Dharwar), estimates the average damage to sugarcane at 25 per cent., to groundnut at nearly 20 per cent. and to rice at 10 per cent. in that District.

(e) Mr. D. M. Chandavarkar, Dharwar, puts the damage in the Dharwar District in the infested areas at 10 per cent. generally and at 50 per cent. to sugarcane.

(f) Mr. S. S. Salimath, Inspector of Agriculture, Dharwar, states that in the infested areas the damage varies from one-sixteenth to one half of the produce.

(g) Mr. M. G. Athalye, Divisional Superintendent of Agriculture, Deccan Canals, estimates the direct damage annually in the Deccan Canal areas as follows:—

		Rs.
Godavari Canals	... Sugarcane	... 30,000
	... Groundnut and other crops	... 10,000
Pravara Canals	... Sugarcane and other crops	... 10,000
Nira Canals	... Sugarcane	... 75,000
	... Groundnut and other crops	... 25,000

(h) Mr. G. N. Desai, Divisional Superintendent of Agriculture, Gujarat, estimates that in the badly infested areas the actual damage in individual fields is more than 30 per cent. of the crop.

* Please see accompaniment B.

(i) Mr. T. N. Jhaveri, Assistant Entomologist, Surat, considers the damage in many parts of the Surat District varies from 10 to 20 per cent. or even more in places.

(j) The Mamlatdar, Chorasi, Surat District, states that in his taluka all the crops are damaged except *wal* (*Dolichos lablab*).

9. These figures are, it is recognised, little more than guesses, though they are guesses made by responsible Government Officers and based on intimate local knowledge. It was considered advisable, however, to get definite data from actual observation in a particular season, in special areas, and the present report was delayed in order to allow this to be done. For this, in certain villages the area was gone over field by field, and the data while local, are, the Committee consider, fairly reliable so far as the particular special areas are concerned. The results are as follows:—

North Kanara District.—The village selected was Chandavar in the Honavar Taluka, a heavily forested village with 822 acres of cultivable area and 4,245 acres of forest. Out of the total cultivable area only 341 acres or about two-fifths were actually under crop in 1922-23; the remainder being uncultivated chiefly on account of wild pigs but also on account of increasing unhealthiness. Details with regard to the crops were as follows:—

Rice.—Total area 276 acres—

	Acres.	Per cent.
Area undamaged	35	13
Area with less than 1 per cent. loss of crop.	40	15
Area with 1 to 3 per cent. loss of crop	89	32
Area with 3 to 6 per cent. loss of crop	71	26
Area with 6 to 10 per cent. loss of crop	22	8
Area with 10 to 20 per cent. loss of crop	13	4
Area with 20 to 33 per cent. loss of crop	6	2

One quarter of the area sown was thus practically undamaged, 60 per cent. suffered a damage of from 1 to 6 per cent. and about 14 per cent. had more than 10 per cent. damage. This was *in spite of regular watching*. The amount destroyed is equivalent to the total crop over 9 acres (3.3 per cent.) or in this one village of a value of Rs. 550 per annum.

Sugarcane.—The area under this crop was only 8 acres—

	Acres.	Per cent.
Area undamaged	$\frac{1}{10}$	1
Area with less than 1 per cent. loss of crop	$2\frac{1}{2}$	28
Area with 1 to 3 per cent. loss of crop	$2\frac{3}{4}$	30
Area with 5 to 8 per cent. loss of crop	$2\frac{1}{4}$	27
Area with 17 per cent. loss of crop	$\frac{1}{2}$	7
Area with 55 per cent. loss of crop	$\frac{1}{2}$	7

The total loss is equivalent to the entire destruction of the crop over 0.58 acres or over 7.3 per cent. of the total area under sugarcane. This means an annual loss of Rs. 287 for the village.

Other crops.—Similar methods applied to other crops give a total loss for the village of Rs. 200. Cocoanuts which occupy 9 per cent. of the total cropped area are, when fully grown, of course, unaffected.

Thus the total direct damage in this village amounts to Rs. 1,037 on 341 acres cropped, or 332 acres, if coconut be omitted. It means thus a *direct* loss of just over 3 per cent. of the total value of the crops, apart from the 481 acres uncropped partly as the result of the wild pig trouble. These figures, which have been obtained by Mr. M. R. Gokarn, a very careful observer, may be taken as fairly accurate and reliable. As regards

their applicability to the North Kanara District in general, Mr. V. G. Gokhale (Deputy Director of Agriculture, Konkan) reports:—

“ Within the open plain belt of cultivated area two or three miles from the sea coast, the damage on account of wild animals is insignificant. This may represent one-fourth of the total area under the actual cultivation of rice. The Chandavar conditions hold good for about half the area under rice, and three-fourths of the area under sugarcane while for the eastern belt of somewhat larger blocks of cultivated land of Mundgod and Haliyal, about two-thirds of the Chandavar results for rice and sugarcane would fairly represent the actual state. Besides this the garden tract suffers appreciable damage to plantain and betel-nut for which Rs. 5-0-0 per acre would certainly not be an over-estimate.”

“ It must be emphasised here that all the above damage found and recorded in the survey is despite all possible efforts at night watching of the crop, and fencing done within the resources at the disposal of the cultivators.”

If Mr. Gokhale's estimate is correct it means an annual direct loss by damage to crops actually planted, of Rs. 7,05,000 in the North Kanara District.

North Konkan.— The results obtained in the Thana and Kolaba Districts are not so entirely convincing as those just given for North Kanara. They were made, however, by agricultural officers in the villages of Pali (Potal), Saydongre and Pali (Tarafe-Vasare), in the Karjat Taluka of the Kolaba District. These are situated at the foot of the Western Ghats, and adjoin a large forest area. Most of the damage here is done by wild pigs, but an appreciable amount is done by *nilghai (rohi)* also which are very common. Similar data were obtained, through the courtesy of the Mamlatdar of Karjat, from his *talatis* in a number of forest villages. All these damage surveys were done field by field.

The various results on the rice crop are as follows:—

Pali (Potal) (Observer, Mr. N. V. Hanmante)—0.25 per cent., Saydongre (Observer, Mr. N. V. Hanmante)—1.0 per cent., Pali (Tarafe-Vasare) (Observer, Mr. Deshmukh)—6.7 per cent., Forest villages (Observers, Talatis)—Average 4.0 per cent.

The damage to high land (*varkas*) crops is much greater than to rice, and varies from 12½ to 25 per cent. of the total crop. This damage is largely due to the isolated character of many of the patches.

It may be noted that the arrangements for watching, and for fencing are not so effective and complete as are those in the North Kanara District.

In commenting on these results, Mr. V. G. Gokhale remarks that “ it would not be far from the actual state of affairs if it be assumed that one quarter of the total area under rice in the North Konkan Districts, *i.e.*, Thana and Kolaba, will correspond to the Karjat results, while about half the total area might be receiving damage equal to one-fourth to one-third of the Karjat results.”

If we calculate on the basis suggested, and take Rs. 70 per acre as the average yield of rice per acre, and Rs. 40 per acre for *varkas* crops we get not less than Rs. 9,50,000 as the annual loss on account of direct damage by wild pigs and associated animals in the Thana and Kolaba Districts.

Surat District.—In this district very careful observations were made by Mr. I. P. Upadhyaya (Agricultural Overseer) in Pipal-gabhan in the Chikhli Taluka. In this village, out of a total area of 2,079 acres, 1,323 acres were under grass, 453 acres under dry crops and 53 acres under irrigated crops. It is probable that the large area under grass is a reflex of the difficulty of growing crops successfully and thus may represent, in part, the indirect effect of wild pigs and jackals. But taking the actual

cropped area, it was found that from the irrigated area, the direct damage by wild animals, chiefly wild pigs and jackals, was estimated at Rs. 3,064 out of a total produce value of Rs. 38,700 or 8 per cent. Unfortunately we have not got the result of detailed inquiry, field by field in the case of rice, but the observer estimates the damage to this crop at 4 to 5 per cent. of the total. With 381 acres under rice, and a normal outturn of Rs. 70 per acre, this means at least a loss of Rs. 1,067 annually to the village. For the *jowar* and *tur* the loss was carefully determined, and reached Rs. 9 per acre or a total of Rs. 160, almost all just as the crops were ripening. Cotton and *wal*, which are grown to a considerable extent in the village were not damaged by wild pigs and jackals. Altogether the loss in this village was Rs. 5,091 on a cropped area of 506 acres or Rs. 10 per acre. By far the greater part of the damage was done on the valuable irrigated crops, in spite of much labour in fencing and much watching.

The village chosen is undoubtedly in a badly infested area, and so the results cannot be applied to the whole of the Surat District. But if we exclude the cotton area, apply these results to one-quarter of the remaining area in the district, and take 25 per cent. of the damage in the rest of the district the total loss in Surat will be Rs. 15,00,000 per annum.)

Dharwar District.—The results of direct observation in the Dharwar District are limited to three villages in the Ranebennur Taluka (Kajjari, Kakol, and Shedginhal) where the damage by wild pigs is not really serious. Unfortunately the results were not obtained by a regular field to field survey, but the direct damage was estimated at Rs. 1,400 in the three villages, or at one per cent. of the total value of the crops.

This may be taken to apply to slightly affected areas. The west (*mallad*) of the Dharwar District will correspond with what has been noted above for the Mundgod and Haliyal Talukas of the North Kanara District.

10. —From the general figures given an estimate may be made of the direct damage done by wild pigs and the associated animals, in the Bombay Presidency annually, and this comes to Rs. 70,00,000. This is recognised as being a very rough figure, but it is probably below the mark, and is sufficient to show the magnitude of the problem with which we are confronted.

11. So far for the *direct* damage: but the indirect damage is very much more important though it is impossible to put a money value upon it. The directions in which such indirect damage takes place are chiefly as follows:—

Indirect damage by wild pigs.

(a) In the first place many areas infested with wild pigs are losing their population and going out of cultivation. Opinions differ as to the extent to which this is the result of the wild pig trouble, or how far the disappearance of the population has given the chance to the pigs to multiply. Local observers of experience take both views, but attention must be called to the fact that in an area where wild pig damage is likely, the crops (especially rice and sugarcane) have to be watched constantly and during the night especially, for a large part of their growth. Such constant watching means unhealthiness, and where such watching is necessary, the area seems always to become more unhealthy. Further, in an area where wild pig damage is likely, a man and his family cannot cultivate as much land as elsewhere, owing to the necessity for watching, &c., and hence the returns obtainable per family are much reduced. In Mundgod, the people estimated that they could cultivate double the area if the wild pig trouble did not exist. This, the Committee consider, is somewhat of an exaggeration, but there is no doubt that the general contention is correct, and the decreased crop returns obtained per family in an infested area means inadequate nourishment, and hence increased unhealthiness.

The tendency for land to go out of cultivation in such areas can be illustrated by the records of the last 30 years in a number of badly infested talukas. The Committee are far from suggesting that the decrease in cultivated area is entirely or even mainly due to wild animals but it is convinced that they form an important factor in such reduction of cultivation.

How important this particular factor is there are no data to show. The following tables will illustrate the above remarks:—

Nett cropped area.

	1894-95.	1902-03.	1914-15.	1921-22.
	Thousands of acres.	Thousands of acres.	Thousands of acres.	Thousands of acres.
<i>Dharwar.</i>				
Kalghatgi ...	76	71	68	73
Hangal ...	96	96	93	114
Dharwar ...	158	152	144	172
<i>Belgaum.</i>				
Khanapur ...	90	83	73	98
Belgaum (with Changad) ...	111	102	95	144
<i>Poona.</i>				
Mawal ...	81	64	69	78
<i>Nasik.</i>				
Igatpuri ...	118	111	114	100
Peint ...	119	84	85	80
<i>North Kanara.</i>				
Yellapur (with Mundgod) ...	31	32	24	19
Sirsi ...	29	30	26	25
Siddapur ...	20	21	19	19
Haliyal (with Supa) ...	48	47	40	23

The figures for 1921-22 are not strictly comparable with those of the previous years, as since 1915-16 the grass area is included in the "nett cropped area" which was not the case before. It is not possible now to get figures which will actually be comparable, but it will be noticed that in spite of this alteration in classification the continuance of the reduction in nett cropped area in the Nasik and North Kanara Districts is still obvious from the figures. How far it has really still continued in other cases the Committee are unable, on the available evidence, to say.

Percentage change of population.

	1901-11.	1911-21.
	Per cent.	Per cent.
<i>Dharwar.</i>		
Kalghatgi ...	-13	-15
Hangal ...	-9	-12
Dharwar ...	-16	+2
Hirekerur ...	No change.	-14
<i>Belgaum.</i>		
Khanapur ...	-12	-2
Belgaum (with Chandgad)* ...	-6	+1
<i>Poona.</i>		
Mawal ...	+6	+6
<i>Nasik.</i>		
Igatpuri ...	+19	-3
Peint ...	+16	-30
<i>North Kanara.</i>		
Mundgod ...	-14	-30
Yellapur ...	-11	-14
Sirsi ...	-10	-14
Siddapur ...	-9	-9
Haliyal ...	-19	-14

* Excluding Belgaum Town.

It is not suggested that the losses of population, especially during the last decade, are peculiar to the badly pig infested tracts, for in many other areas there have also been large decreases in the number of people. Moreover the influenza epidemic of 1918 was at least as bad in many of these talukas as elsewhere. But making all allowances for these facts, and taking into account the fact that the decreases have in many cases been going on since 1901, it may be considered that the above figures will confirm the position suggested by the former table. In North Kanara the population is steadily diminishing in all forest talukas. The *mallad* talukas of Dharwar, Belgaum and Nasik, exhibit the same tendency for the period of 10 years ending 1921 except in the talukas containing the Head Quarter Towns of Belgaum and Dharwar, where the problem has become complicated on account of urban conditions. Returning to the table regarding the losses in nett cropped areas in 1921-22, as compared with 1894-95, it may be said that during a period of 27 years these have been very marked. In the four forest talukas of North Kanara, this loss is 42,000 acres which is 33 per cent. of the cropped area of 1894-95. In the forest taluka of Peint in Nasik District, the loss is 39,000 acres which is again 33 per cent. of the cropped area in 1894-95. The Committee saw evidence of this loss in cultivation in Mundgod Peta. They witnessed several blocks of good cultivable land in that Peta, with irrigation advantages in some cases, that have been lying fallow for years together. The Peta is traversed by good Provincial Roads, has a considerable number of irrigation tanks in it, but notwithstanding these advantages over 5,000 acres of excellent Rice and Bagait land in it has been lying fallow for years past.

The Committee would again reiterate that they do not attribute this loss of cultivation and this loss of population wholly or even chiefly to wild pigs and other wild animals. Other areas in which pigs are not a very serious pest have also lost population and had the area curtailed. But in the cases quoted the damage by pig is serious, and the people attributed much of the result to the difficulties which pig bring. It may be worth while to quote, in connection with the western talukas of the Dharwar District, part of a letter from Mr. L. J. Sedgwick, then Assistant Collector, 1st Division, Dharwar, dated December 13, 1918, which has kindly been placed at the disposal of the Committee by the Collector of Dharwar:—

“.....I have toured in the *mallad* three seasons, and have come to the conclusion that, though there may be other causes for this tendency” (to complete depopulation) “those causes are absolutely trivial when compared with the wild pig.

“As regards the fact, there are many villages in Dharwar, Kalghatgi and Bankapur which at the time of the G. T. Survey (1887-94) were already uninhabited and are shown by a cross. There are still more which were then inhabited and have village sites marked on the Survey Sheets, but are now deserted. In almost any *mallad* village if you call for the birth and death register, ascertain the population of 1911, and ask if it is as much now as then you will be told that it is much less. Nor is this merely talk. You can see falling houses, fallen houses and places where houses used to be. In some cases of course the lands are still cultivated by rayats who come from larger villages a little way off. But often the lands go out of cultivation altogether; and the lands of villages still inhabited will also often be found gone out of cultivation, and if you ask the reason for all this you will always be told the same story—*pig*. You will find valleys where the soil remains moist up to the hot weather and where rabi crops could easily be grown. You ask why they are not being sown and you get the same reply—*pig*. It is not too much to say that the life of a cultivator in the *mallad* is a constant ding-dong struggle with this pest. We issue gun licenses and a few pigs are killed. But their numbers are legion, and are evidently constantly increasing.

“It may be urged that the climate is malarial, and that industrial expansion is drawing the people to the towns. These facts are

true. But the *mallad* of this district is not so malarial as many thickly cultivated tracts (for instance under canals) the rayats in which are only too glad to cling to their lands. Industrial expansion does not diminish the population of the *desh* tracts. It is highly undesirable that the *mallad* should become a desert. It is only on the borders of the forest climate and could never be converted into valuable high forests. Moreover its depopulation would render still more difficult the already serious problem of forest labour."

(b) The second indirect damage caused by wild pigs is the reduction in the value of crops, on account of the hindrance which they are to the growth of the more valuable crops, to the introduction of crops otherwise suitable, and to the prevention of any cultivation on lands which would otherwise carry valuable crops. This damage undoubtedly takes place more particularly in the Konkan, including Kanara, in the *mawal* and *mallad* tracts of the Deccan and Karnatak, and in the jungle talukas of Gujarat. The cultivation of sugarcane has declined in many of these areas, inferior types are being grown because they are more resistant to wild animals (pigs and jackals) and the introduction of this crop is being prevented, according to the evidence submitted, owing to the high cost of fencing against the wild animals. Other crops though proved to be admirably suited to various tracts, such as groundnut in the *mawal* and *mallad* tracts and in the Konkan, have been tried and abandoned on their account. The *varkas* lands in many parts of the Konkan would bear admirable crops in the rains, but largely remain uncultivated for the same cause.)

12. To summarise, therefore, with regard to the indirect damage done by these animals, it may be stated with confidence that there is evidence that their prevalence is one of the important causes of the reduction of the cultivated area, and of the population in many of the badly infested areas, and that among the results of their presence also is the increased unhealthiness of the population in these areas. They are also hindering the introduction of valuable crops and decreasing the area of such where already cultivated, and so reducing the value of the agricultural production of the country. Obviously these forms of damage cannot be given a money value, but if a figure were attempted it would evidently be one of several crores of rupees to the Bombay Presidency per annum.

13. The question has frequently been raised during the investigation of the Committee as to whether the number of wild pigs and the consequent damage are increasing. Are wild pigs increasing? Opinion on this matter in infested tracts seems, however, to be practically unanimous that the damage is increasing. At Karwar Mr. D. D. Nadkarni stated that he was sure that the wild pig trouble was increasing, and that four watchmen are now required to protect land for which two watchmen were formerly sufficient. He stated that rent is coming down in the areas he knew in Kanara owing to increase in cost for watching. The Collector of Kanara (Mr. P. B. Haigh) was more doubtful but considered that on the whole the number of pigs tended to increase and tended to spread from Kanara (which acted as a reservoir for pigs) into the adjoining areas of the Dharwar District. Mr. Basrur of Honavar stated that in his area the damage by wild pigs and hence presumably their number had increased much in recent years. The opinion at Nasik was the same, that the pest was increasing, and particularly in areas not previously much infested.

On the whole the Committee are inclined to believe that the wild pig infestation is increasing and extending into areas formerly much less affected. Some of this increase may be due to pigs congregating in less occupied areas, as these become less populated for various causes, but such evidence as has been obtained strongly supports the view that we are in presence not only of a serious, but of an increasing menace.

14. The main causes which lead to an extensive and increasing infestation of an area with wild pigs would seem to be the following:—

(a) The presence of a large amount of uncultivated land covered with forest or scrub, (which gives shelter to the pigs) in proportion to the cultivated area.

(b) Restriction of access of animals or men to such forest or scrub covered areas. The more undisturbed such areas are, the greater the chance for the development of pig.

(c) Anything which tends to bring the area occupied by forest or scrub into direct touch with the cultivated crops, tends to encourage the development of pig. An open area used for grazing or anything else between the crops and the jungle discourages pig.

(d) The cultivation of high class crops like sugarcane or groundnut, when not effectively fenced and protected, tends to encourage the growth and increase of pig.

(e) A declining population in the cultivated areas tends to reduce the watching of the crops and an increase of both pigs and pig damage.

(f) Anything which tends to decrease the energy of the people, such as reduced food returns from land, epidemic disease such as plague, influenza or malaria, will increase the infestation.

Before discussing these causes in succession, there is one observation that the Committee wish to make. If any of these causes are effective in an area, the effect tends to be cumulative, and the *rate of* increase both of pigs and pig damage will tend to get greater and greater according to the length of time during which the cause has been operative. This is very important, and would account for the recent rapid rise of the damage by wild pigs which will soon become a State question of the first importance.

15. The presence of a large amount of uncultivated land, covered with scrub or forest giving shelter to the pigs is the first cause of serious infestation of an area. Though an area may be badly infested with pigs without the existence of such a jungle area, as for example the canal tracts of the Nira Valley, which will be dealt with later, yet the really serious situation results primarily from the existence of such waste and forest areas. The Committee venture to state, therefore, that they consider that wild pig infestation is primarily the result of the existence of forests and similar unoccupied areas which serve as reservoirs where pigs can breed and multiply and which form the base of their activity.

If this is the case, and all the evidence tends in this direction, it has been suggested that the authorities, whether Government or private, which own such jungle and unoccupied areas are responsible for the damage done, and that they should be compelled to fence such areas in such a fashion as to keep the wild pig inside these jungle areas. This was seriously suggested by several witnesses from the Dharwar District, but the Committee consider the proposal as wholly impracticable. But it should be considered how far such owners of forest and scrub covered area, including Government, may be called upon to assist in the cost of the protection of cultivated land from the resulting damage. This matter will be further discussed below.

16. Restrictions of access by animals and men to such forest or scrub covered areas tends to increase the infestation of the surrounding areas with wild pigs. The habits of the wild pigs are such, from all the Committee can discover, that the less disturbed the conditions are, the more breeding there is. In former times, the numbers were kept down by carnivorous animals (tigers, leopards, &c.) to a greater extent than at present. The closing of forests, partially or wholly, to the free access of animals and men has probably caused increase in the infestation, but as the infestation appears also to be serious and increasing in the areas where all the forests have remained open, the Committee do not consider the closing of the forests to blame for more than a small

fraction of the present damage. The decreased disturbance in such jungle areas is at least as much due to decrease of population in the surrounding tracts as to the closing of the forests.

17. Anything which tends to give shelter to pigs right up to the cultivated crops tends also to their increase and to the increase of damage by them. All authorities agree that pigs normally live in shelter and a wide open belt round their haunts is a great hindrance to their movements. But it is clear that it is only when such a belt is really unsheltered that it is of much advantage. If allowed to grow with scrub, lantana, or tall grass it ceases to be of much advantage. Nearly all the witnesses insist on the value of such a belt of open land round crops, chiefly on account of the possibility of seeing and shooting the pigs in such a belt. Its advantage, the Committee feel, lies deeper, but only on the understanding that it is kept clear of jungle including grass. In fact, if too wide a strip is kept open, the very width may destroy its value, as it will then be very difficult to keep it clear of jungle and grazed. Its width in fact should be as great as possible, consistent with its being within the power of those concerned to keep it clear of jungle. In any case, however, the close contact of forest and cultivation is a positive encouragement to pig damage.

18. The cultivation of high class crops like sugarcane or groundnut if not effectively fenced and protected, tends to encourage pig increase. There is no doubt that crops of the kind specified draw pig from a wide area. Sugarcane areas are almost always damaged more or less. They give shelter as well as food, and some have held that they simply concentrate the pig population into a few places. But this is not all, and there seems distinct reason to believe that the increase of such crops not effectively protected, does lead to an increase of pig population and hence of pig damage not only to the crops themselves but to all the surrounding area.

19. A declining human population in the cultivated area round jungle tends to reduce the watching of the crops, and hence an increase of both pigs and pig damage. In a badly infested area crops can only be obtained by constant watching or by effective fencing. The last has hitherto been out of the question except for certain very valuable crops, and hence watching has been depended upon as a protection. With a declining population, the watching was necessarily less effective, and so both pigs and pig damage increased under such conditions, in a continually augmenting ratio.

20. Reduced energy of the people, whether due to reduced food returns from the land cultivated, disease, or other cause, tends to increased infestation. This point follows from the last, and in like manner, the damage tends to increase in a continually augmenting ratio.

21. What has happened in the worst infested tracts, is, the Committee believe, something as follows: There have always been pigs in these tracts as long as there has been jungle. For some reason, which it is not now possible to trace, possibly plague, influenza or malaria, the energy of the people was reduced, and at the same time forest conservation tended to make, in some areas at any rate, the jungle areas less constantly disturbed by men and animals. More watching of crops was necessary. Hence less land could be cultivated, and one family's labour produced less return. The more energetic people left the place, and the rest found, as a result, that the area they could cultivate got less and less, they were worse and worse fed, more unhealthy, and more subject to disease. As the effect is cumulative, it would be anticipated that the areas where these causes are operative will get worse more or less rapidly and at an increasingly rapid rate, unless the action of some of the causes can be reversed. The most extreme case of the action of those causes is in the area of which the Mundgod Peta is the centre (which has been described as a "Region of Decay" in the Census Report of 1921). The same effect can, however, be seen all over the Kanara District, in the Dharwar and Belgaum *Mallad*, and to a less extent in the Satara, Poona and Nasik *Maval*. There are other centres also. But the Committee would emphasise the fact that in such areas we have a decline which tends to get faster and faster, and which, if unchecked, may in the end mean a reorganisation of agriculture on these areas on a basis of large estates and less production.

22. So far the Committee has dealt almost exclusively with the damage done to crops by wild pigs though a few remarks have been made regarding the damage done by jackals. It is now desired to indicate something of the evil effects of the other animals mentioned in paragraph 3 of this report. The first of these to be referred to is the jackal, because its damage so often goes along with and is associated with that done by the wild pig itself. These animals are, of course, almost universally found particularly in the neighbourhood of villages and towns and their principal food is usually all kinds of offal and dead carcasses, while they occasionally kill poultry and other young animals. The jackal is, however, by no means exclusively a feeder of such materials, but there are several crops of which this animal is particularly fond. The two which may be referred to at present are sugarcane and maize. The latter is relatively so little grown in the Bombay Presidency that the damage done to it may almost be neglected, but the damage done everywhere to sugarcane by the jackal is by no means a negligible factor and it is sometimes a question whether this animal or the wild pig is the one which is responsible for injuring the crop, as will be seen later. In attempts at poisoning among the animals damaging sugarcane, jackals have been quite as frequently found dead as wild pigs, and this applies equally to the *upghat* areas in Kanara and to the jungle talukas of the Surat District. It is unnecessary to go more deeply into the question of the damage actually done by the jackals to the sugarcane crop, as it is impossible to separate it from that done by the wild pig, and the methods to be later recommended in connection with wild pigs will apply equally in the case of the present animals.

23. The question of the damage done by deer and antelopes of various kinds may now be considered, including that done by *Nilghai* or blue bull. Some of these are of importance in the same tracts as have already been considered in connection with the wild pigs. The first of these deer is the Sambar (*Cervus unicolor*) which occurs in the forest areas almost entirely and which is particularly abundant in the Kanara area. The second is the Cheetal or the spotted deer (*Cervus axis*) which is likewise very largely limited to the Kanara forests.

This is the place, too, to consider the *Nilghai* or blue bull (*Bosephalus tragocamelus*), known as *rohi* in Marathi, which haunts the forest and jungles in many regions and more particularly at the foot of the Western Ghats where it is looked upon as a first class pest. Its range as a serious pest extends into the wilder areas of North Gujarat.

Closely allied to the latter are the true antelopes, the most important of which is the ordinary black buck. (*Antelope cervicapra*) which ranges over the open dry country in the eastern parts of the Bombay Deccan more particularly, and is there considered as one of the worst of agricultural pests.

24. With regard to the sambar it may be stated that all records seem to indicate that this animal almost always lives in forests, but leaves these forests at night in small herds of not more than ten or twelve in order to feed either on grass areas or on cultivated crops. "Its habits" says Blamford "are nocturnal. It may be seen feeding in the morning and evening and it grazes chiefly at night and at that time often visits small patches of cultivation in half cleared tracts returning for the day to wilder parts.....It feeds on grass, especially green grass near water and various wild shrubs of which it is very fond. But it also browses greatly on shoots and leaves of trees."

The damage done by this animal is not usually separated from that done by the cheetal, and in all the evidence the Committee has collected the two have been associated together. Mr. Haigh, Collector of Kanara, however, told the Committee that in his opinion the sambar is responsible in the Kanara District for only a small proportion of the damage done by deer.

25. With regard to the cheetal or the spotted deer it may be stated that according to all records this is usually found among trees and in bamboo jungles near water. It never goes far from its drinking places. It appears to care little for the neighbourhood of man provided it has plenty of jungle for shelter.

Unlike the sambar this deer is thoroughly gregarious, the animals associating at all times of the year in herds, which may number several hundreds. They are less nocturnal than the sambar and may be found feeding in the morning some hours after the sun rises and in the evening some hours before the sun sets.

The two deer just described have only been considered as a serious pest in the jungles of North Kanara, and there the cultivators in the forest tracts complain very much of the damage which they do. With regard to the second, Mr. Haigh, Collector of Kanara, told the Committee that in his experience the damage done by cheetal in certain areas, especially at the beginning of the growth of crops, was very considerable, and this is the experience given by almost all the cultivators who have been examined. Apparently the chief injury done to the rice crop is in the young stages, when in some areas the deer attack the growing crop and destroy it altogether, and in the later stages before the rice is ripe. It is the rice crop and other grain crops which are chiefly damaged, as the usual fencing put round the more valuable crop of sugarcane is adequate to keep out these deer.

26. One of the great difficulties in dealing with these deer is that they have been considered by Government in the Forest Department as valuable game and the permission which is given to shoot, snare or otherwise capture and kill pigs has not been extended to these animals. It has been held that if permission to shoot them were given, organised hunting would at once take place as the skins are so valuable as to constitute a very remunerative and unauthorised trade. The most recent orders issued in this matter giving a very free measure of permission to shoot and snare pigs, deliberately exclude deer from the permission and it has been ascertained from the Collector of Kanara that if a cheetal got into a snare erected for pig, it would have to be liberated and let go into the forests. The whole difficulty in this matter, however, depends on the kind of damage which is actually due to them. If the damage is serious then all question of consideration of these animals as game must, in the opinion of the Committee, be given up and free destruction of them must be allowed at any cost. If, on the other hand, the amount of damage done is small then it might be worthwhile to preserve them for their valuable qualities. As already stated the evidence which the Committee has received is that these deer, notably the cheetal, do cause a very great deal of damage in certain areas in Kanara. This has been acknowledged so far as the Kadra and Siddapur areas are concerned by the Collector of Kanara. In the extreme south of Kanara, to the south of the Girsappa river, also they are reported to do a very great deal of damage. The Committee think, that in certain areas the damage done is so great as to justify free shooting of these animals even at a loss to the Forest Department, and it might be worth considering whether in such areas free shooting should not be allowed even though the present rules may remain in force. This matter is, however, again referred to in paragraph 46 of the present report.

27. The damage done by the *Nilghai* or blue bull cannot be separated from that done by wild pigs, for the areas where it is particularly serious are also those in which wild pigs abound. This animal lives usually in thick jungles or in areas where scrub and open grass plains alternate with one another. It is rarely met with in thick forests. It is thus quite in its element in the areas which have been specified above at the foot of the Western Ghats northwards to Gujarat, and also in parts of Northern Gujarat. These animals feed a good deal during the day, sometimes single and sometimes in herds. The records indicate that they are very localised and each herd keeps to a comparatively small area. This may make it possible to deal with them effectively if systematic efforts at snaring or shooting can be undertaken.

There is no doubt about the damage which the nilghai do in the areas which have been indicated, though the relative amount of damage done by these and by wild pigs, where both are found, cannot be determined. In some areas the cultivators told the Committee that the nilghai are a more important enemy to their crops than pigs. In their case fencing is no use as the nilghai can jump over any fence that the cultivators are likely to erect, and it would seem that systematic subsidised efforts to snare and destroy the localised herds

may be the only means of dealing with this pest. The matter will be considered later on in this report.

28. The Committee now turn to consider the very large question of the damage done by antelopes and similar animals in the wide open areas of the Bombay Presidency. This damage is probably very much greater than has ever been realised and the evidence before the Committee leaves little doubt that it is increasing in recent years. As it was understood that the Committee was principally concerned with the damage done by wild pigs, only a limited amount of evidence has been collected on this matter. The principal evidence in hand is from the central tract in the Dharwar District, where in the district round Haveri, the total damage by these animals together with that by stray cattle was put by a competent observer at about 25 per cent. In this area the damage by deer is serious and increasing. In fact watching of the crops has only been needed quite recently. Other evidence with regard to the damage done by black buck in the eastern parts of the Poona District is similar, and a recent publication regarding one of the typical villages in this area states as follows:—

“There is, however, one very serious trouble which is common to almost all the crops, but which may be dealt with here. This is the prevalence of numerous flocks of deer over all this part of the Deccan, which do very serious damage to the crop from germination to maturity. In spite of their timid character, they are not afraid of the cultivators. All attempts to scare them away by watching, or by noisy devices on the fields, or by scare-crows seem to have little effect. The question of damage by deer in the eastern Deccan is one which has not hitherto been regarded seriously enough.”

It is stated that these animals principally damage the rabi crops and particularly the wheat, for as these crops are growing the grass is dry all over the neighbourhood and other food is hence less abundant. The black buck abounds in herds up to twenty, thirty or even more all over the wide open regions of the Deccan, and for some reason or other these herds appear to be increasing in numbers and causing increasing damage. It was stated before the Committee that this might partially be due to the fact that a smaller number of European sportsmen go out for black buck shooting than was formerly the case. The evidence as to the cause of the increase is, however, quite insufficient for any conclusions to be based upon it. In the regions where the population is decreasing the increase under black buck is quite comprehensible and the point made in connection with wild pigs would appear to apply also and the damage done would appear to be cumulative. At present no one who has worked in open regions in the east of the Presidency can help acknowledging the enormous damage to standing crops done by these black buck.

29. The only other animals with which the Committee propose to deal, and that very shortly, is with wild elephants, which occasionally do enormous damage in the regions into which they go. In recent years this damage in certain parts of the Kanara District extending into South Belgaum, has been almost sufficient to render agriculture impossible, and certainly would prevent a large population in an area in which they are accustomed to go. There is no doubt that wild elephants and agriculture cannot exist together, and if agriculture is to be carried on at all, wild elephants must be driven out from agricultural areas. The herds of elephants visiting this Presidency come chiefly from the Mysore Jungles though there are several herds which have inhabited the Kanara Jungles for a number of years. Every endeavour will have to be made to destroy them and scare them off from the agricultural areas. This matter will be again referred to later.

30. The Committee have now considered the principal wild animals which damage crops in the Presidency. It will be seen that by far the most important and widespread of these is the wild pig and the second in importance is undoubtedly the black buck and associated animals in the open country in the east of the Presidency. Jackals are also responsible for a lot of damage in

irrigated tracts and in Gujarat. The other animals mentioned, though very important in agricultural areas, are relatively limited pests. In the tracts which are affected either by one or another of these, it means regular and continual warfare between the agriculturists and these animals. This could perhaps be waged successfully and the animals ultimately exterminated or reduced to manageable proportions among populations which are accustomed to kill animals. But although the people in the districts where the damage is serious are quite ready to have the animals destroyed, yet it must never be forgotten in dealing with this problem that the bulk of the population do not care to kill the animals, and would not use them for food if they were killed. This forms a serious handicap in all methods of dealing with what is a very large and difficult problem, and the Committee are by no means confident that they have found any method of really doing so. They will, however, deal with the methods which have been suggested in evidence and otherwise, for either destroying the enemies or preventing damage by them, and indicate the conditions under which they are likely to be of value. In doing this the Committee will deal first with wild pigs and the animals capable of being dealt with by similar methods like jackals and then with the other animals already mentioned.

31. With regard to wild pigs the Committee have been forced to the conclusion that the only permanent method of dealing with this pest is the enclosure of cultivated land by pig proof fences of one sort or another. The alternative which has been recommended by some of the witnesses, is the actual extermination of the pig, but the Committee feel that this last is in most areas an impossibility. It can be applied in some areas, as for instance in the relatively isolated sugarcane tracts under the Deccan Canal areas. But these are local problems, which will be dealt with below. But for the enormously more important areas near extensive tracts of jungles and forests any attempt to exterminate wild pigs will, the Committee feel, be found to be absolutely futile. The Kanara forests, for instance, as well as other forest tracts, must contain possibly millions of wild pigs which are constantly increasing at a rapid rate, which are exceedingly difficult to find in the cover provided by the jungles, and which are well provided with food in their own haunts. These form an almost inexhaustible reservoir for pigs which is constantly overflowing into the cultivated tracts round about them, and which, while they exist, will always be likely to damage the crops which are grown actually inside such forest areas. The systems of extermination which have been proposed to the Committee are first the use of what is practically an army to drive and shoot the pigs in these areas. This we consider quite impracticable and probably ineffective except at the most for a very short time. The second method suggested consists in the introduction of diseases among the pigs, which will affect pigs but not other animals or men. This might be possible if such diseases exist. But all attempts to introduce such diseases in connection with other animals seem to have been either quite ineffective or only very partially effective. The method has been attempted in the case of rats in many countries and in the case of rabbits in Australia. But in no case does it appear to have had more than a very partial success. In the case of pigs evidence has been placed before the Committee that epidemic diseases have prevailed among pigs in the areas in the Bombay Presidency, but no details are available, and certainly no investigations into the matter have ever been made. It would seem worth while to instruct the local Veterinary Officers of Government and instructors and experts in Zoology to keep their ears open for reports of the diseases of pigs, which can then be reported to the proper authorities for further investigation leading to the isolation and use of the virus, which can be extensively employed. The third method of total extermination, that has been proposed, has been by poison baits. This report will deal later with the use of poison baits as a means of protecting particular areas of crops, but as a method of complete extermination there is not the remotest evidence that it is likely to be successful. Wild pigs are exceedingly cautious animals, and while there is any food at all (as there always is) in the jungles they will avoid any food which has already caused damage to one of the herd, and will also avoid any new type of food unless it can be made particularly attractive and spread all over the country. On the

basis of present knowledge, therefore, complete extermination seems impossible except as above noted in limited and isolated areas.

But this does not suggest that such a complete extermination will never be possible. In a letter previously quoted in this report Mr. L. J. Sedgwick suggests that if we know more of the habits of pigs we could quite possibly find out a method by which they could be completely eradicated and recommends that a special suitable officer should be deputed to study the wild pig, in its own habitat for some years in order that the weak points at which it could be attacked could be found out. The Committee would urge that this proposal should be duly considered and given effect to if practicable, as it is only after such a study that the possibility of complete extermination of wild pigs can be cleared up. The cost of making such a study, which may possibly amount to Rs. 20,000 per annum, is a very small affair when the crores of rupees of annual loss caused by wild pigs is considered.

32. But apart from complete extermination, which the Committee consider at present impracticable by any known method, the only really satisfactory method of dealing with the pest is by fencing. Now the system of fencing valuable crops like sugarcane is already in vogue in the badly infested tracts. Some of these fences consist of walls whether temporary or permanent, and some, particularly in forest tracts are built of timber and thorns. But all the methods hitherto used are vitiated by the fact that the actual land on which the valuable crops are grown varies from year to year, and must so vary, and that fencing, by one means or another, of small areas is too expensive except in the case of the most valuable crops. Now as a matter of fact though the damage done to crops like sugarcane, which might pay for fencing, is important, yet by far the greater part of the damage done to the country's produce is in connection with crops which would never pay for the adequate fencing of isolated small areas.

For the protection of valuable crops which have been mentioned there are three types of protection by fencing which have been used. The first of these is that of digging a wide ditch round the area containing the valuable crops. This method, though little employed in the districts of the Bombay Presidency, is, according to the evidence before the Committee, commonly used by progressive cultivators in the South Kanara District; and when the conditions are favourable is considered by those who have used it as better and more permanent than any type of fencing. The evidence on this subject was given by Mr. R. A. Hemmadi, Divisional Forest Officer, who has used it round his land for many years in South Kanara. It must be such a ditch as will be deep enough and with steep enough sides to prevent pigs from crossing, and this will mean four to six feet deep. The cost of making such a ditch would be high. Such a ditch can also only be made where the soil does not become soft when wet, and this occurs in a comparatively few cases. If it is otherwise, the ditch fills up every year, and ceases to be a protection. In any case it requires expenditure every year to clear out the silt which has been deposited. It is also impossible to make such a ditch in rocky land, and a very large proportion of the lands affected occur in an area where the soil is shallow and the rock very near the surface. It will thus be seen that this first method of fencing out wild pigs is of very limited application and can only be used in comparatively restricted areas in this Presidency.

The second method which has been used is the construction of a wall round the plots containing valuable crops. Such walls have been very common means of fencing in the North Kanara District. In the areas below *ghats* it has been quite common to have such regularly built walls; and all over the tracts adjacent to the forests in the Kanara District such walls are in existence in large numbers. Often, however, they are neglected and the areas within them deserted for reasons which the Committee could not easily make out. But such regularly built walls are, of course, very expensive and can hardly be considered as a practical proposition on a large scale.

In the up-ghat areas of the Kanara District, and in many other parts of the Presidency also, it has been the custom to build katcha earth walls round

valuable crops with the idea of keeping them in existence for not more than three years or so, and for this time they seem to be fairly effective, and probably can hardly be improved upon as a means of protecting valuable crops in districts where the kind of soil allows such a wall to stand without being washed down by heavy rains during the time specified. For this last reason their application is very limited. In all the areas containing black soil, or soils of similar nature, the first rains would tend to level the wall owing to the sticky and slimy nature of the material of which the wall would be made.

The most common present method of fencing the valuable crops in the Kanara District is by means of temporary fencing consisting chiefly of bamboos and other material obtained from the forests. The bamboos are placed vertically and are held together by means of creepers and other material from the jungle. The cost of such fencing has been estimated by the Mamlatdars of the various talukas in Kanara at from Rs. 4-8-0 to Rs. 18-12-0 per hundred running feet. All this cost, however as the Collector of Kanara remarks, is not out of pocket cost, as it is either done by the people themselves or by their house coolies. Such fences are said to be not entirely pig proof, as pigs can and do bore under them easily, though they can be made pig proof if more expenditure is incurred. If the minimum cost given is taken (Rs. 4-8-0 per hundred running feet), it will cost Rs. 37-8-0 to fence an acre if the latter is exactly a square. If the average rate of Rs. 10 per hundred running feet is taken the cost will be about Rs. 83 per acre under the same conditions. The fence will last three years as a maximum and will require considerable patching during that time. These costs are taken in the forest areas where the bamboos and other material are supplied free from the forests. If the material had to be paid for, as would be the case anywhere outside the forest areas, the cost would be very largely increased, and such fencing would become totally impracticable, even for valuable crops. While, therefore, such fences may meet the necessities of the case with valuable crops in special areas, yet any general use of them to protect other crops grown on extensive areas seems quite impossible. In other areas except Kanara similar valuable crops are often protected by fences made of babul (*Acacia arabica*) thorns. But these, though they prevent the invasion by deer or stray cattle, are by no means effective against pig which is the principal pest, and the crops require watching in an infested area almost as much as if the fence were not there.

With regard to the other crops which cannot bear anything like the same investment in protection per acre, very little fencing is at present done. The rice crop in the jungle areas of Kanara is often fenced with a light fence but this fence is intended not against wild pigs but against stray cattle and other larger animals.

On the whole, therefore, it may be stated that even in infested areas fencing has hitherto been restricted to the most valuable crops. For these the fences in existence seem to be on the whole satisfactory, but owing to their cost they are quite out of the question on a large scale, and equally out of the question for the less valuable crops which form more than ninety per cent. of the total cultivation.

33. Is there not a method by which large areas can be fenced which contain the ordinary crops of the infested areas, consisting chiefly of rice and upland crops which have been previously mentioned? The Committee believe that there are such fences, but in order that they may be used on a large scale three conditions must be met by such fences. These are:—

(a) that the fencing must not be a fencing of individual fields, but of the pig areas either belonging to one man or to a number of cultivators who use of it on a co-operative basis.

(b) that the fencing must be of a permanent character, that is to say, report will with ordinary attention and repairs must be at least thirty years.

(c) that adequate provision must be made for the proper and economical maintenance of such fencing, without which it will quickly become useless. It is exceedingly common in the district that a single gap in such fencing is easily found by always is) in the district, and much reduces the value of the fence. These points can be made particular reference to the discussion in some detail.

34. The first point is that the idea of fencing small individual fields must be abandoned and only large areas dealt with by a single fence. The necessity of this is obvious, for in the case of the areas fenced the cost per acre contained within the fence is very rapidly reduced as the enclosed area increases. If the area be square, then the length to be fenced with increased areas will be as follows:—

Area enclosed.	Length of Fence.
1 acre.	835 feet.
10 acres.	2,644 "
100 "	8,348 "
1,000 "	26,436 "
10,000 "	83,480 "

This means that the cost per acre will decrease as follows, the cost of fencing a one acre patch being taken as 100:—

Acres fenced.	Relative cost per acre. (Cost for 1 acre = 100.)
1 acre.	100
10 acres.	32
100 "	10
1,000 "	3.2
10,000 "	1

The reduction in cost will not be quite so great as these figures indicate but the difference will be somewhat of similar character. Thus if it costs Rs. 100 per acre to fence a one acre block it will cost only Rs. 10 per acre, or thereabout, to fence a plot of 100 acres, and it will therefore be seen that what will never pay for a small area of land will be an easy provision if applied to a large compact area.

On the other hand, it is evident that difficulties of another kind at once increase if the areas are too large. There is the difficulty of roads which must be kept open, that of gates which will require constant watching to see they are kept shut and hence the patrolling of a long line of fence, that of dealing with topographical features which are hard to negotiate and which cannot easily be avoided in a very large area, and, last but not by any means least, that of getting the necessary co-operation among the people when the area included more than one village. While recognising that there may be and are many exceptions to the rule, the Committee are inclined to feel that an area of one thousand acres included within one fence will usually be found to be about the limit of a practicable and economical fencing scheme.

In the case of a large extent of land held by a single owner the decrease in cost in fencing a large area is so obvious that in a pig infested country the yield on the capital so invested will be seen at once to pay, and to make such an investment a very good business proposition. The same is true in the case of a large compact area owned by a number of cultivators, provided they can be organised so as to act co-operatively in this matter. But all must act together, otherwise such a fencing scheme for a large area will collapse.

35. The second essential in a fencing scheme is that the fencing used must be of so permanent a character that it will not require renewal for at least thirty years.

Of course, this does not mean that it will not require repairs. Probably in any fence up to five per cent. of the original cost will have to be spent each year on repairs if the fence is to be kept in first class order. But in addition to this, depreciation should not be so great as to require provision to be made for complete renewal after a short period. There have been in the past very frequent disappointments in this matter and many of the advertised forms of fencing have not had anything like such a long life as was expected by those who erected them. This has been, of course, partially due to the neglect of

timely repairs. Many of the manufacturers of fences have not realised the rapid decay to which they are subject under tropical conditions of high rainfall. In any fence proposed this matter must, therefore, receive a very careful consideration.

36. The third essential in a fencing scheme is that adequate provision must be made at the beginning, especially where the fencing is cooperative, for the proper and continual repairs of such a fence. The Committee consider that this will probably be the rock on which most fencing schemes are likely to split ultimately, and would, therefore, draw very particular attention to the matter at present. Wherever they went they found walls built, but partially broken down, and wire fences which were probably fairly effective at first but which are in their present condition of no earthly use as a protection against pigs. Once more it is necessary to emphasise the fact that in dealing with pigs continual repair is absolutely necessary, otherwise disappointment and loss are certain to follow and the whole scheme will be condemned as a failure.

37. With these considerations in view the question of the most suitable type of fencing and the most suitable arrangements under which it can be applied may now be considered. Leaving aside the types of fencing, which can be used very locally on account of special conditions there are two types which may have possibilities, and in which experiments to a considerable extent have been made. These are, first, dry stone walls, made of loose stones, in all districts where suitable material is to be found, and secondly, wire fencing of the special types which have been devised to exclude pigs.

With regard to the first of these, it may be said at once that such walls will be possible in many parts of the area most badly infested with wild pigs, because these are the areas where rock is frequent and loose stones very often abound. Little more has been done hitherto than experiment. Such an experiment on a very large scale has recently been made at the village of Mandihal near Dharwar, under an organisation which will be described a little later, details being as follows:

The whole area amounting to 875 acres has been walled in two blocks. The first of these with an area of 360 acres was walled by a dry stone wall 3 feet high, 2 feet wide at the bottom, and $1\frac{1}{2}$ feet wide at the top. The total length of the wall round this block was 3 miles and it cost 8 annas per running yard or 880 rupees per running mile. It has since been found, as would be noted below, that this wall is not high enough and not satisfactory as a protection against pigs. The second block had an area of 514 acres. One side of the wall of the first block serves as a common wall for the two areas. But the wall built in the present case is much more substantial than the first, and is $4\frac{1}{2}$ feet high, 3 feet wide at the bottom and $1\frac{1}{2}$ feet wide at the top. The area included in this is 514 acres, and the cost per running mile was Rs. 1,382. This wall was built in 1921, and was visited by the Committee in June 1922. It was recognised at once that certain difficulties would be likely to arise in connection with it, particularly as to the guarding of the entrances into the area, and as to the proper maintenance of the loose stone wall, which can so easily be destroyed, intentionally or by accident. It was feared that the repairs to such a wall would be likely to be very expensive. As a result of the doubts on these points, two members of the Committee have made special enquiries later as to the condition of the wall towards the end of 1922, and the beginning of 1923. Their enquiries have proved that a wall 3 feet high is not sufficient to keep out pigs, and that pigs can jump over a wall even $4\frac{1}{2}$ feet high. They came to the conclusion that $4\frac{1}{2}$ feet was the minimum height for such a wall to be effective, and that hence the cost even with sufficient stones within half a mile of the site of the wall would be at least Rs. 1,400 per running mile, without counting the cost of gates. They also found that at the time of their inspection, within about one year of the erection of the wall, it has fallen down in its $5\frac{3}{4}$ miles' length in seven or eight places, with roughly a length of 15 to 20 feet at each place, in spite of the fact that in the rainy season a good deal of repairs had been made by the ryots. There is no doubt that a part of this was due to the fact that sufficient care

was not taken in selecting stones for the wall, many round stones being used along with flat stones, without proper bond in them. The round stones should have been roughly squared before being put in.

One of the necessities in a wall like this, and in fact in any fence, enclosing a large area, is to provide proper entrances to the area enclosed; that is to say, to provide gates. This has not been done in the present case so far, but will have to be added to the cost of any scheme. In the present case five such openings have been left, and five gates will be required, and this will, the Committee expect, bring the cost of a $4\frac{1}{2}$ feet wall to at least Rs. 1,500 per running mile under the favourable conditions of the village in question. It is also recognised that adequate arrangements will have to be made for maintenance of the wall, and for closing the gates and any other openings at night, if the wall is to be really effective against pigs.

In spite of these difficulties, however, the wall we are discussing has, during the present year, proved itself of very great value, and the Assistant Collector for this part of the Dharwar District (Mr. L. N. Brown) has been kind enough to supply the Committee with a statement as to the increased area cultivated, and as to the increased value of the land in the area protected. The figures furnished indicate that *in one year* the area cultivated has increased from 364 acres to 411 acres, or by nearly 13 per cent. while the rental value has increased by 25 per cent. in the same period. The Assistant Collector adds that further increases are expected in 1923, especially if the wall is raised in height, and if gates are provided.

This one-experiment has shown that the very imperfect wall which has been constructed at Mandihal has proved of considerable service in protecting the area from damage by wild pigs. It has also shown that even when stone is abundant on the spot, such stone walls will cost including gates at least Rs. 1,500 per running mile. The people, it may be said, have offered to keep the wall in repairs for Rs. 100 per annum, but it is doubtful whether this can be done. This, probably, with the other annual costs for maintenance, will be considerably greater. As the construction of this wall is of very great importance from the point of view of protection from wild pigs and similar animals, a sketch* showing its shape and position is attached. It may be said that this wall was built by a contribution from the various land owners and cultivators in the village, whose holdings are protected, a portion of the money being supplied from *tagai* sources. But the exact arrangement will be described later on.

The second type of fencing has been the specially prepared woven wire fence of which several types are on the market. It may at once be noted that the ordinary barbed wire fences, however, closely the wires are placed, are of very little value against wild pigs, though they are quite effective against larger animals. The fences which are effective are composed of galvanised wire covered for a portion of their height with woven wire netting, the latter being buried at least 6 inches in the ground. Specifications† of two or three available types of such fences are attached to this report. The prewar cost of such a fence including erection came to about Rs. 900 to Rs. 1,000 per running mile. The present price may be taken at Rs. 1,400 to Rs. 1,800 according to the quality of the fence, per running mile. We have satisfactory records of such fences when well erected and well maintained. One of these which was erected in 1914 so far as being a protection against pigs is concerned, has been completely effective. The posts have required some renewals, but the wire being kept well stretched has given little or no trouble. If the wire netting is buried six inches in the ground there is little burrowing under it. The principal difficulty in making such a fence effective is the existence of road and *nalas*, the latter being particularly difficult to deal with. On the whole it may be stated that an expenditure of between Rs. 1,400 to Rs. 1,800 per running mile will provide a pig proof fence which with small costs for annual repairs will continue effective for at least the thirty

* Please see accompaniment C. † Please see accompaniment D.

years, which we have considered to be a necessary condition. In no case should a scheme be undertaken without a special estimate, especially of the cost of meeting the peculiar conditions of each case.

But it is not yet certain whether the best and cheapest pig proof fence has yet been discovered. Further experiments will be necessary and must be continued to obtain the most effective and economic type.

38. - The question of the conditions under which fencing can be a successful method of dealing with the pig problem on a large scale has now been discussed, and also the two types of such fences, which seem to have the greatest possibilities for the future. The organisation by which such fences can be erected must now be considered. As the area must be large before such a fence can be economical, it follows that except in the case of large areas owned by a single man, such fences must be built either by mutual agreement among those whose land is protected or else by an outside authority which is able to collect the necessary cost either annually or otherwise from those whose land is protected. The question of large property owners need hardly be considered, as they will be able to judge whether fencing in the manner described will pay them as a business proposition, and they will be able to command the finance necessary to build it. By far the more important question is how to deal with those cases where the land is owned by a number of individuals. Naturally the first method to be considered will be that of some system of fencing by mutual agreement along those protected, and that such an agreement is possible is evident from several cases in which it has either occurred or only been prevented by outside circumstances. The most striking of these cases is that of the long wall recently constructed at Mandihal near Dharwar at the collective cost of those who are protected. In this case the whole of the land owners within the circuit of the wall agreed to take a share and *tagai* corresponding to their land assessment, in order to have the wall built, which together with a contribution in cash from the same owners enabled its construction to be undertaken. In another case the cultivators at Tadas in the Dharwar District have agreed to contribute in a similar manner towards the cost of a large fencing scheme which has been intended to protect several villages by the construction of a wall on the jungle side only of their area. Though the scheme in the latter case cannot be approved, yet it shows how in the pig infested portions of the country the people are ready to cooperate for the purpose in question. Similar schemes have been proposed in several other cases, and with the view of bringing about such cooperation and enabling the cultivators concerned to obtain the advantages of the Co-operative Societies Act, the Registrar of Co-operative Societies has issued a set of model byelaws of which a copy* is attached to this report. These cooperative byelaws provide for financially unlimited societies with a limited period of existence during which the whole of the capital will be repaid, and the fence of whatever kind it may be, maintained at the cost of the society. At the end of the period for which the society is established it would be wound up, or a fresh society formed with the maintenance of the fence simply in view. Under these conditions a Cooperative Bank would be authorised to lend eight times the actual share contribution of the members to the society, the whole being recovered with interest by annual instalments from those protected. The Committee would commend this cooperative scheme to the notice of Government as being in their opinion a method by means of which a good deal can be done, but this and all schemes for cooperative fencing are liable to be subject to certain difficulties which must be met. The difficulties which have come before the notice of the Committee are :—

(a) It has often already been proved impossible to get *the whole* of the cultivators or owners within the protected area to contribute to the construction of such a protection. This is due to the fact that in any cultivated area the most outlying portions are more attacked by wild animals than those nearer the centre. In fact, the outer cultivated portions serve as a protection for the rest, and those who are already so protected object to pay for a protection which they do not need to anything

* Please see accompaniment E.

like the same extent as the rest. This opposition is particularly objectionable as the land in the centre of such a protected area is likely to be much better in quality than that near the edge and so, on any equitable grounds, would be liable to be charged at a higher rate. On the other hand it has rarely been found that the cultivators will go on with a very expensive scheme of improvement such as is being considered unless the whole of these contained in the protected area are made to pay their quota of the cost.

The Committee fail to see how this difficulty can be met except by one of the two courses. The first is that if Government is satisfied of the utility of a scheme and of its being economically sound they might acquire compulsorily the land of the recalcitrant owners, not exceeding twenty-five per cent. of the whole, and then resell such land after the improvement has been made to those who are willing to bear their proportion of the cost. While the Committee consider that such an arrangement would be in most cases perfectly safe, financially, to Government, as the land would increase in value immediately such fencing as is being considered is erected, yet it was found in evidence that almost every witness was strongly opposed to this method of dealing with the situation. In view of this objection the Committee cannot recommend that Government should, except in very exceptional cases, acquire the land compulsorily in the manner described for the sake of the construction of such an improvement.

The second method which has been suggested and which nearly all the witnesses before the Committee approved, was that legislation should be undertaken whereby if the owners of a definite proportion of the land to be protected (say 75 per cent.) agree to make such an improvement the others could be compelled to come in under the scheme and to make their necessary contribution compulsorily to it. If this were done there seems little doubt that a number of cooperative fencing schemes would come into existence in the very near future, more particularly in the *mallad* country of Dharwar where the scourge of wild pigs is extremely severe.

(b) The second difficulty in the way of the construction of fences is the very large capital cost involved, and also the feeling that the owners of the jungles from which the pigs come should also contribute to the cost of protecting the land. Such owners are of course usually the Government Forest Department, though this is by no means universally the case, as jungles or scrub covered areas in private ownership are also in many cases the reservoir from which the land is attacked. The Committee have carefully considered this matter, and have come to the conclusion that such a contention is fair and that there should be a definite contribution say of one-fourth of the cost from the owners of land outside the fence from which the pigs or wild animals come. If this liability is exacted then the Committee is hopeful that the pig problem would be easily solved in many of the areas where the damage now done is the greatest. A contribution to first cost should only be given where the scheme was considered economically sound, and where adequate arrangements were made for the continued maintenance of the fence. It would also be required that the fence should be properly designed and that the whole arrangements were conducted in a businesslike fashion and under definite Government supervision. With these conditions the Committee would definitely recommend that so far as the Government forest areas are concerned a definite liability towards initial cost of construction should be accepted in somewhat like the form suggested.

As an alternative to the direct contribution which is just proposed from Government or other outside owners it has been suggested that in the case of Government half the assessment of the land protected should be remitted for a number of years in the case of effective cooperative fencing schemes and this alternative method is worthy of the attention of Government, though it does not meet the difficulty of raising the original capital required.

(c) The fencing of a large area is a difficult matter as various animals, and wild pigs especially are apt to take advantage of any method of access to the area in question through *nalas* or other openings which are very difficult to deal with, and hence a design of the fence and the method of getting over difficulties in any particular areas is by no means a simple matter, and requires a good deal of expert attention. The Committee saw in the course of their investigations many cases where fences were rendered entirely useless owing to the incorrect treatment of such openings and difficult places. It would seem, therefore, that especially if Government is prepared to undertake any responsibility in the matter, all fences to be erected under the scheme suggested in this report should be built so as to make them most effective. Expert advice and assistance are required in getting up large cooperative fencing schemes and their construction. The Committee recommend that this expert advice and assistance should be given free of charge by the Agricultural Officers of Government.

(d) It must be recognised that the scheme now being discussed is not applicable to many of the smaller isolate areas now under cultivation in the interior of forests. Unless such an area is large enough to make, with the Government contribution which has been above recommended, an economical scheme the matter becomes impossible and the only resource of the cultivators will be one of the palliative measures to be considered later. If these are ineffective, such areas will and must ultimately pass out of cultivation and be incorporated in the adjoining forests.

(e) The last difficulty in connection with all cooperative schemes is the difficulty of repairs. No fence will maintain itself, and an annual cost for repairs will be essential if the method of dealing with wild animals trouble which we are considering is not to fail. Hence in any approved scheme provision will have to be made for an annual expenditure for repairs of up to possibly five per cent. of the original cost. This will probably not be used entirely in the first years of a well designed scheme, but the contribution will have to be paid and the money allowed to accumulate until it is required, as it certainly will be required, if the fence has stood after a number of years. This contribution must be considered as an essential part of any scheme and must be added to the annual levy made towards the capital cost.

39. From the Committee's inquiries, it may be said that the people in badly pig infested areas are quite willing to accept schemes of this character. In Surat, schemes are now practically ready at Pipalgabhan (Chikhli Taluka) enclosing 135 acres owned by 35 people, and at Tekwada (Pardi Taluka) also enclosing 135 acres. Four or five schemes are likely to be brought very shortly into operation in Dharwar and Kanara, but the interest at current rates on the whole cost involved tends to kill what are otherwise very good schemes. In any case arrangements must be made to pay the cost in instalments, and encouragement should be given by advancing *tagai* freely to satisfactory schemes, through cooperative societies.

40. So far the methods of fencing required in the case of wild pigs only have been discussed. In the case of jackals, the fence must be as efficient as that required in the case of wild pigs. But as these animals are chiefly injurious in the case of the more valuable crops, the difficulties in their case do not seem anything like so great as with the other pests. In the case of most other animals the ordinary barbed wire fence will be enough provided it is of sufficient height, but it seems doubtful whether the construction of such a fence with these animals will be an economical proposition, and whether cooperation of the people is likely to be obtained in their case for fencing on a large scale. With most of them some of the other methods, to be later described, can probably be used more effectively.

41. While general enclosure and fencing of cultivated lands in the neighbourhood of jungles and scrub covered area form in the opinion of the Committee the only real way to deal with the question of wild pigs, there are a number of other means of reducing the damage, which may now be discussed, and which have been recommended many times in the evidence collected.

42. The first of these methods is the liberal and wide distribution of guns, under much easier conditions than have prevailed in the past. ^{Distribution of guns for crop protection.} Almost all the witnesses who have been examined believe in the effect of the presence and use of guns by cultivators as a protection for individual fields and villages. In the case of wild pigs it is astonishing, however, how few pigs are ever shot, and even where most complete success in protecting crops has been obtained the actual number of pigs killed has been small indeed. It is evident in fact that even for a very expert Shikari the shooting of pigs is a difficult job and the reduction in numbers on account of such shooting, even when it is systematic and when the men with guns know the paths of the pigs and await them there, is always very small. The undoubted effect of such shooting seems probably due to the scaring of the pigs which diverts them from their old tracts into another direction, and it might be supposed that any other noise of a similar explosive character might be used in their place. All opinion, however, seem to indicate that frightening with such explosive noise is far less effective than the use of guns, even though the actual number of pigs killed or injured is negligible. If the general advantage to the country is taken into account, it is probable that the use of a gun in any particular village does not materially reduce the total pig population and really only diverts them from one village to another, that is to say, from the village provided with guns to villages which for some reason or other have not been able to get a license or have not either the knowledge or energy required to use them. From all accounts, however, any village in a badly infested area is indeed fortunate if it possesses one or more gun licenses, and also possesses men who can handle the guns effectively.

Four objections have been raised to a more wide and extended distribution of guns for the purpose of protecting crops against wild animals. These are as follows:—

(a) *The Political reasons.*—The matter of these reasons is one which the Committee does not feel qualified to discuss, and it must be considered by other advisers of Government. It may be stated, however, that what is wanted for the protection of crops against wild animals is a smooth bore gun and not a rifle.

(b) *The inability of the cultivators to use guns.*—There is no doubt that over the whole of the area with which the Committee is dealing, the average cultivator cannot use a gun, and it is only a man here and there who is capable of doing so with real effect. It is evident that it is no use distributing guns to individuals who cannot use them, but it must also be recognised that even where the men are not expert shots if they can so shoot as to scare the pigs from the crops, the work may be quite useful. As a matter of fact there are many guns at present in the hands of people, who do not hold them for use, but rather as a matter of honour. Any system which is going to be really effective should provide that where a gun is held there must be at the same time evidence that the man who is entitled to use it, can use it.

In order to meet this difficulty it has been suggested that the distribution of guns for crop protection should not be made only to individuals but also to villages as a whole the guns being placed in charge of the village Panchayat, where such exists or in the absence of a village Panchayat in the hands of the village Officers. A general license to use the gun to all villagers with the approval of the village authority would be given.

Two objections have been made to the storing of guns and ammunition under the control of the village authorities. It has firstly been stated that there would be a partiality in allowing the use of the guns, and those who need the protection most for their land would often not get the chance to use them. There is no doubt about the validity of this objection and in villages where there are parties, it is more than probable that the tendency will be for the party in power or the party with influence with the village *patil* to monopolise the use of the guns kept in the village. The Committee, however, see no reason for not recommending guns on a communal basis on this account. It is better

that half the land of a village should be protected, than that none should be protected and if the matter becomes serious it will soon come to the knowledge of the Revenue authorities, who will probably be able to put the matter right. The more serious objection, however, is that a gun is a very delicate weapon, and that unless kept in first class order and especially in a state of absolute cleanliness it may either become useless or more dangerous to the person who fires than to the object at which he is aiming. This is undoubtedly a very serious objection to the communal distribution of fire-arms in the manner suggested and unless careful and frequent inspection is made the scheme would undoubtedly break down. Such a frequent and careful inspection must be, therefore, an essential part of the business, and the Committee would recommend that a special man be attached to the Local Police Thana where this system is tried, in say more than a dozen villages, whose duty it would be to inspect the village guns and see that they were kept in good order. If not, a report would be made, and if proved correct, the license would be withdrawn.

Apart from the question of the communal distribution of fire-arms in the manner suggested above, which the Committee think is the most feasible method of extending widely the advantages of guns in badly infested tracts, the Committee is of opinion that a good deal can be done to place the whole question of the granting of gun licenses for crop protection on a more satisfactory basis than it is at present. The Committee has been kindly supplied by the various Collectors with particulars as to the number of licenses actually given in their districts during the last complete year and also the number of licenses refused during the same period. The attached statement shows the general result of the enquiries made:—

Name of District.	Licenses issued during the last complete year.	Licenses refused during the last complete year.	Remarks giving licenses granted in previous years and renewed as supplied by the District Magistrate.
Ahmedabad ...	12	Nil.	
Kaira ...	No licenses were applied for during the Calendar year 1921.		20 licenses granted in previous years.
Panch Mahals	1	Nil.	
Broach	115	11	
Surat	13	Nil.	107 licenses granted in previous year already in force.
Thana ...	110	204	
Ahmedragar	141	107	
East-Khandesh ...	441*	250	* Besides this 43 licenses to Europeans, &c.
West Khandesh ...	231	41	
Nasik ...	33	16	
Poona ...	50	26	235 licenses previously granted were renewed.
Satara ...	27	13	Previous 229 renewed.
Sholapur ...	20	5	
Belgaum ...	570	125	
Bijapur	108	The total number of licenses is 596.
Dharwar ...	130	93	539 licenses previously issued were in force.
Kanara ...	360	333	Total number of licenses in force on 31st July 1922 is 3,351.
Kolaba	10	The total number of gun licenses issued is 837.
Ratnagiri ...	621	219	In the year 1921.
	542	105	In the current year.

It will be seen from the above that the principle adopted in the different districts seems to vary very widely indeed. In some cases practically all

applications for gun licenses have been granted. In other places almost all applications have been refused. In other words, it would appear that in some areas wide and free distribution of licenses has been the policy and in others that crop protection licenses have only been given in relatively rare cases. The Committee would like to see a policy adopted whereby crop protection licenses should be granted as freely as possible particularly in tracts infested by wild animals. Strong evidence that there is a likelihood that the gun will be misused should be required before the license is refused.

Great objection was raised by a great many witnesses to the delay which occurred in the granting of the crop protection gun licenses and to the way in which such a grant is hedged about by restrictions which usually involve a police inquiry into the status of the applicant.

Various proposals were made for the reduction in the delay including proposals that the grant of such crop protection licenses should be made by Mamlatdars or by Prant Officers. The Committee would recommend that the latter should be permitted to issue crop protection licenses as it is important that licenses should be granted with the least possible delay. As guns are issued only for protection of crops the details of the enquiry which is now made seem to be unnecessary. The Committee would commend the suggestion made by one of the official witnesses before the Committee that gun licenses should be issued to any owner of ten acres of land or more on application.

If the Committee's suggestion of the issue of communal crop protection licenses be accepted, it is strongly recommended that this should not be a reason for reducing the number of licenses for crop protection issued to individuals. It is only a method of securing protection to those who cannot afford guns, and should not reduce the much better protection secured when a man has his own gun.

Another difficulty which reduces the number of guns available for crop protection is the fact that the police require guns for inspection at intervals at the Taluka Office. This is distinctly a burden on the people, whose homes and villages are in many cases distant from the Taluka place, and if guns could be inspected by the Police at the villages of those who hold them, a good deal of encouragement would be given to those who would like the use of them.

43. The next palliative measure which the Committee wish to discuss is that of giving rewards for the killing of pigs, and using this as a means of reducing the pest. This method has been used for many years, and in many districts as a method of dealing with wild pigs and has been considered in a large number of Government Resolutions. In 1915 it was reported by the Commissioner, Southern Division, that it was customary in his division to give a reward of rupee one for a full grown pig and annas eight for a young pig killed and that the number for which such rewards had been paid had arisen from 777 in 1909 to 2,712 in 1914. The bulk of these were killed in the pig infested talukas of the Dharwar District. In 1915 the Commissioner, Southern Division, recommends that the method which has proved effective in Dharwar of giving licenses on condition of killing four pigs and of cancelling them freely for non-compliance may be commended for use in other affected areas. This policy was approved by Government and the rules framed at that time with regard to the giving of rewards were as follows :—

Rules for the grant of rewards for killing wild pigs.

(a) When a rayat has killed a pig he may obtain the reward either by personal application at the taluka kacheri or by application through the patel or kulkarni of his village.

(b) The patel or kulkarni (whichever may be authorized in this behalf by the Collector) should keep a special register and enter the name of the person claiming the reward and date of the application. He should cause the tail of the animal to be cut off and retained and note the fact in the register.

(c) At the end of every month in which any claims are pending he should send a copy of the register to the Mamlatdar with the tails collected during the month.

(d) The Mamlatdar should verify the claim destroy the tails and send the reward by money order or by hand to the applicant.

(e) On visiting a village, Sub-Divisional Officers and Mamlatdars should examine the register there maintained and verify the entries, and if any claims are pending should when possible make the payments necessary on the spot.

The rate of reward given was increased in 1920 to Rs. 2, for a full grown pig, Re. 1, for a half grown pig and 8 annas for squeakers. (See G. O. No. 11416 of 13th November 1920, G. D.)

This policy may, in the opinion of the Committee be continued, but it cannot be suggested that it will be a really effective method of dealing with the trouble except in isolated areas. If shooting is employed for the purpose of obtaining the pigs, then it will be more a question of the extent to which the pigs are scared by shooting than the number of those actually killed which will be a measure of the advantage obtained. And the same will be the case if other methods are adopted for capturing or killing pigs. Everything should be made as easy as possible for those who kill pigs to obtain rewards. While recommending that the policy laid down by Government should be continued, the Committee are not sanguine that the extension of the system of giving rewards will make an appreciable contribution to the solution of the problem.

44. The next method of palliating the nuisance by wild animals, and particularly by wild pigs in jungle tracts is that where a
Clearance of land round cultivation. Government forest is adjacent to cultivated lands, the cultivators should be allowed to clear a wide strip of land round their cultivation, in order to interpose a bare strip of land between the jungle and cultivation. This matter has been frequently before Government more particularly in connection with the Kanara forests and the final orders of Government on the matter are attached to Government Resolution, Revenue Department, No. 414-A of April 7, 1922, and a copy* of these is attached to the present report. These rules allow generally the occupants of the rice and garden lands to cut and clear undergrowths, except sandal wood, within the strip of land adjoining their cultivation, the exact width of the strip being not less than 44 yards and not more than 100 yards, according to the decision of the Collector in each case. On this area all undergrowth except sandal wood, and trees except seven specified ones may be cut for *bona fide* agricultural purposes. Further with the approval of the Divisional Forest Officer fire may be used in clearing such strips but cultivation of these strips will not be allowed except as a temporary measure, to make the clearing of the strips more easy. The only real criticism of these official orders of Government from the point of view of protecting crops against wild pigs was that the strip allowed was not wide enough, and that in forests Government assistance should be given in clearing such strips. It was maintained before the Committee that the strips cleared should be up to a quarter of a mile in width, but the Committee feel that the width now allowed is probably of as much advantage as a much wider strip would be. The value of such a cleared strip depends on its being kept clear and it is as much as a cultivator can do to keep the present sanctioned width of land clean. Under-growth very quickly grows, and unless it can be continually run over by domestic animals it will be beyond the power of the cultivator to keep the wider strip now allowed in a sufficiently clear condition. If a still wider strip were taken it could only be kept open with the assistance of the Forest Department.

With regard to the other complaint that when such a strip is allowed to be opened by the cultivators round their cultivation they often fail to clear it on account of the original difficulty and cost and that hence help should be given at this time, the Committee are of opinion that the contention of the cultivators

*Please see accompaniment F.

in this matter is entitled to a very great consideration. It has already been contended in this report that the forests are the reservoir of pigs, and that hence the owners of forests have a responsibility with regard to the damage which the animals from their forests do to cultivated crops. (And hence the Committee are inclined to feel that the cultivators should not only be allowed to clear the strip of land round their cultivation in the manner already described, but they should also be given assistance in the first instance in clearing the strip, they themselves being responsible for keeping it in such a clear condition later on. In order to make the clearing easy it has been suggested that the cultivators should be allowed to cultivate on such strips for the first two years after the clearing commences.)

45. The next palliative measure to be discussed is the use of poisons as a method of dealing, on a wholesale scale with the pig trouble. *Use of poisons.* A good many experiments in this direction have been made in recent years chiefly by the Agricultural Department, both in the Southern Division and also in Gujarat. The first experiments on any considerable scale were made between 1910 and 1912 in the Gokak area, where the poisons used were Arsenate of Soda, Copper Sulphate, Potassium Cyanide, White Arsenic and Perchloride of Mercury. Of these White Arsenic was the only one successful, the animals being induced to eat the material by mixing it with wheat flour and making it into balls each of which was placed in tracks along which wild pigs were in the habit of coming. This method with slight modifications has been continued, but equally good results have been obtained by the use of strychnine instead of white arsenic, more particularly in poisoning jackals rather than wild pigs. Details of the method have been worked out and the following is a note which was issued in 1921 by Mr. T. N. Jhaveri, the officer in charge of this work in the Surat District:—

"A note for the destruction of wild pigs by poison.—The poison that is used for the destruction of wild pigs is pure white arsenic powder without any smell or odour, and slightly sweetish in taste. A dose of about half a tola is quite sufficient to poison and kill one animal if it is taken in by the animal and allowed to assimilate in the system.

This white arsenic is a powerful irritant poison, which causes intense thirst, nausea, depression and faintness followed by severe burning pain in the stomach which makes the animal to run from one place to another when first affected by the poison. It also causes vomiting and purging.

In acute cases of poisoning the animal may die at any time from 2 hours to 2 or 3 days or rarely more.

The method and proportion of preparing poison balls are as under:—

Recipe.	Wheat flour	... 2 ozs.
	Jaggery	... 1 oz.
	White arsenic powder	... 1 tola.
	Sufficient cold water for preparing two balls of the above mixture.	

Take the above quantity of flour in a brass or enamelled dish, then add to that one tola of white arsenic and mix it thoroughly, then add jaggery and properly mix it with the above two. Thereafter with the help of a little pure cold water make two balls of the above mixture.

Such prepared balls should be placed on frequented paths of pigs as well as in the outlets in hedges from whence pigs might be entering into fields and also in their abodes. This should be done in the evening after the return of the village cattle from grazing and at each place one to two balls may be put over a plantain or some other leaf and a sprinkling of some groundnut kernels may be made round about these balls.

Next day early morning all the baited places should be gone over and examined without fail and the uneaten balls should be collected and kept at a safe place and a note of balls which have been eaten should be made.

Again in the evening some more fresh balls should be prepared and put similarly in the frequented area of pigs together with the stale ones.

The old balls should be used for about 2 to 3 days and if no longer eaten should be buried deep in ground.

This way the baiting should be continued as long as the poisonous balls are being eaten by those wild beasts and their raids and depredations to the crop cease."

This note deals with the use of white arsenic, but as to the use of strychnine the same officer writes as follows:—

"For getting the best and immediate results of our poisoning trials, especially in case of jackals, I made use of both the poisons under my personal supervision as under. I took about one pound of raw flesh available in the bazar, to that 4 tolas of pure white arsenic powder were added (*i.e.*, sprinkled over) and thoroughly mixed and divided into 16 pieces or parts, then into the central pit of each piece or part two grains of strychnine hydrochloride were put and covered over by placing and pressing another small piece. In this way the baits were prepared and put on a leaf or tile on the ground in places frequented and haunted by these animals, which used to eat away these pieces very readily and were found dead on the spot or in the adjoining fields each morning."

The most systematic trials of these were made in Gujarat, that is to say, in the jungle talukas of the Surat District, where the work was carried on particularly in 1920 and 1921. The method adopted there was to form pig poisoning associations in villages and supply such responsible bodies with the necessary poison for killing the pigs and jackals and with instructions for its use. The people did the rest at their own cost. In most cases the poison baits as described above were used for the protection of sugarcane, and not for the protection of the ordinary crops of the village. They proved very much more effective against jackals than against wild pigs, and the principal results in the case of the latter animals seem rather to have scared them away from the village than to have actually killed them in large numbers. On the other hand the number of jackals destroyed was considerable.

Three associations were formed in the Surat District. In the first of these (Tojlav and Maliabra), on the whole 108 baits of the type described were laid out. Of these 98 were eaten either by animals of one sort or another. 62 jackals were found dead, 10 pigs and two other wild animals also died. In the case of jackals probably the whole of the animals killed were found. In the case of pigs it is probable that the number found represents only a fraction of what were killed and the result in this village has been that the sugarcane and other valuable crops have been very much less affected by wild pigs and jackals than previously, and the people are well satisfied. People themselves spent Rs. 8 of their own and gave the labour necessary for spreading the baits and collecting them again.

In the second village (Pipalgabhan) the people have spent Rs. 23-8-0, and have laid out 143 poison baits. Of these 51 were taken by animals, and 12 dead pigs and 9 dead jackals were found in the area which was protected. The third association (Malavada) spent nothing, but distributed 162 baits, of which 60 were eaten. 23 dead jackals were found in the area, and 8 pigs and 9 other animals. The most intensive work was done in the year 1920-21 and the relief obtained is stated to be very considerable. The poison was supplied free in all these cases, and the cost for poison to Government per animal killed came to annas 1½.

Beyond the use of these associations, packets of poison with instructions have been distributed in the South Surat District to a number of private cultivators. In nearly every case a large number of the baits put out were taken. Dead jackals were frequently found and dead pigs less frequently, while in a number of cases it was reported that the damage to the intensive crops protected have ceased.

Another systematic trial was made at Mundgod, probably the most infested centre in the whole of the Bombay Presidency. The poison was used as before to protect an area of sugarcane, about 150 baits being distributed at various times each containing either half a tola of arsenic or two grains of strychnine

hydrochloride. A large number of jackals was killed and found either within or not very far from the area. A small number of pigs were found dead, but these animals are much more resistant to the poisons than jackals, and probably died at a greater distance, and so were not discovered. In reporting all these experiments, Mr. Gokhale states that "it is generally agreed at Mundgod that the trouble has been greatly reduced. Up till now there has been no mishap on account of the baits being utilised by domestic animals. A previous notice to the villagers has been found to be sufficient to guard their cattle and other domestic animals. The method of using the poison in this case was somewhat different from that used in Gujarat, the recipe used being as follows:—

"A small ball as big as a dried and peeled arcon-nut is prepared of rice flour and jaggery and after boring a hole in the centre of the substance, strychnine is put in and the hole closed. This pill is kept in about five tolas of fried rice. With this method it has been found that the inviting smell of the fried rice has always induced the animals towards the place where the bait is kept and in the act of eating the bran the pill has been used up."

Beyond these two areas where poison baits have been systematically used, a good many poison baits have been distributed in the various parts of the country with varying results.

After consideration of the results of the experiments made, the Committee are inclined to look upon poisoning as a method of dealing with the trouble of wild animals which is chiefly applicable in the case of valuable crops, and not as a means of protecting very extensive areas. They also feel that it must be looked upon purely as a palliative measure, the principal purpose of which is to scare animals rather than to destroy them. It is far more effective in the case of jackals than in the case of pigs as the latter are very much more wary animals and are unlikely to continue to visit an area where some of their number has been killed. The Committee feel moreover that this method should be followed systematically under the control of a responsible person or a body of persons, and the stock of poison must be kept in the hands of somebody who will be responsible for its not being tampered with. (It is, moreover, certain that we have not yet reached an ideal method of baiting; that is to say of making the poisoned material so attractive to the wild animals that they will take it even though they know it to be dangerous.) If this method is placed in the hands of a responsible body it does not seem likely that the use of these poisons will be a serious danger to domestic animals in the areas where they are used, and the Committee does not consider that any restrictions should be made in the distribution of poisons by the Agricultural Department to such responsible associations.

The question arises whether if this method could be employed on a larger scale with a special staff and the whole conducted as a systematic campaign, the whole trouble with wild pigs could be materially decreased. Such a policy, as is well known, has been adopted in certain other countries not with wild pigs but with a number of other animals, with great success. Thus, for instance, a tremendous campaign was conducted in certain parts of the United States of America against prairie dogs and ground squirrels, which involved the clearing in one year of 28 million acres of farm and range land by this method. Special survey parties were sent out and in cooperation with the farmers used more than 4 tons of strychnine and more than 1,000 tons of poisoned grain. If Government are prepared to work on a large scale like this the Committee feels that in many areas where the jungle has not been too extensive the pest with which this report is to deal can be brought under control, and if the campaign is repeated after ten years the pest can be made of little importance in the Bombay Presidency. This, however, involves a very large expenditure, and while the Committee feel that such an expenditure would almost certainly pay for itself in the bigger returns of crops, yet it is such a new idea in India for Government even to think of undertaking such a campaign, that it is very doubtful whether any practical recommendations can be made in this direction. The matter is worthy of consideration, however, and except in the areas immediately adjoining the big Kanara forests, which form an inextinguishable

reservoir of pigs, a large campaign such as that suggested would probably pay handsomely for the considerable expenditure that would be incurred.

46. The next method of palliating or removing the nuisance of wild animals is by the organisation and maintenance of hunting parties in badly infested areas. Such hunting parties have been customary in many of the forest tracts for many years and have been referred to in many Government Resolutions and notes, &c., and particularly in the papers submitted to the Provincial Board of Agriculture, 1921, which was the occasion of the appointment of the present Committee.

The matter, however, is one which takes two forms in different areas. In the forests it is a question as to the extent to which the people can be allowed to hunt freely in the forests either singly or in parties or to follow up the wild animals which have been damaging their crops into the jungle. In other areas, and more particularly in the areas where irrigation is largely practised, it is a question of the extent to which the employment of hunting parties is an effective method of eradicating the wild pig pest, and can be economically used against it.

In the case of the forest tracts, the pursuit of game is controlled by rules under the Forest Act and found in the Bombay Forest Manual. Two sets of such game rules are in force, one set applying to all forests except those of Kanara, Belgaum and Dharwar, and the other applying to these divisions alone. In both cases, such hunting is only allowed under license, but licenses are not to be refused except for special reasons to be stated in writing.

The outlook of these rules, in both cases, seems to be the preservation of game rather than the destruction of animals, and except in the case of carnivora, bear and pig, the number which may be destroyed under the license is strictly limited. Further it is provided that a man or men who are shooting or hunting in the forests must be accompanied by a Forest Guard or by one of the village officers of their village. The people have long objected against these restrictions, and it has recently been decided to modify the game rules in certain areas in Kanara, as a temporary and experimental measure, giving much freer powers to hunt game in these areas. By a Circular issued by the Collector of Kanara on March 10, 1923, it is notified that in the areas to which these modifications apply the following modified rules will apply:—

“ 3. The unrestricted hunting of pig will be permitted in the forests of these areas.

“ 4. In these areas, all holders of gun licenses for crop protection may (1) shoot pig in any forest, (2) shoot tiger, panther and all animals which damage the crops in the forests comprised within the limits of the village in which their fields are situated, or if their fields are close to the forest of another village then in that forest also.

“ Provided that (a) the skins of tigers and panthers shall become the property of the Forest Department, (b) there shall be no traffic or barter in the skin or flesh of any such animal. Abuse of these concessions will lead to the withdrawal of the license.

“ The setting of spring guns for any animals and the setting of snares or traps for other animals than pig is strictly prohibited.”

The extension of the rules which have just now been quoted to other forest areas should, in the opinion of the Committee, be considered, and is recommended so far as it can be done consistent with the protection of forest property. There is some difference of opinion how far such extension should include permission to shoot animals other than pigs, such as deer, and the Committee would deprecate any measures which would lead to the destruction of animals, unless they are source of grave agricultural damage. But, as is suggested in para. 25 of the present report, the Agricultural interest is so infinitely more important than the game interest, that if any animal is found to do serious agricultural damage, this fact should dominate the situation. If such serious agricultural damage is proved against any animal, there seems no reason why it should not be snared as well as shot. At present under the new

rules above quoted, if a cheetal gets into a snare set for pig, it must be immediately liberated when found, and will be liable in any case to be a basis for blackmail by subordinate forest officials.

At the same time, it should again be repeated that in the case of pigs at any rate, free hunting in the forests will not do away with the pest. Such hunting should be encouraged by every method, whether organised or unorganised, and will certainly reduce the damage in the villages which are the centres of such operations but will form rather a protection of individual villages than a solution of the pig problem.

47. So far we have dealt with the question of the value of hunting and of organised hunting parties in the forest areas. There are, however, many parts of the country, outside the forests where the organisation of such hunting and shooting does, in the opinion of the Committee, furnish a real contribution to the solution of the problem of wild pig. The areas referred to are those, like the Deccan Canal tracts, which form definite isolated units of area, where intensive crops are largely cultivated, and which are not connected with large jungles acting as reservoirs of pigs and in which the pests live chiefly in the crops themselves. In such areas, the organisation of hunting may be a means, if not of completely eradicating the pig, at least of reducing it so much in importance as to be almost equivalent to such eradication.

This opinion is based on experience in the Nira Valley, where in the years 1919-20 and 1920-21 a definite campaign at Government cost but with the cordial cooperation of the cultivators, was undertaken in certain villages for a large part of the season. The campaign was organised with men, dogs and four guns. The number of men in the party was twenty, three of whom were shikaris, three were with the hunting dogs, and the rest were beaters. On the first year's work it was found that the cost per pig destroyed was Rs. 6-12-9, and in the second year Rs. 9-13-0. Full details are given in reports printed with Government Resolutions Nos. 680 (R. D.) of February 27, 1920, and No. 2156 (R. D.) of August 25, 1921. The cost per pig destroyed seems high, but when it is considered that each pig is calculated to do at least Rs. 100 per annum of damage each year, and that they breed very fast, the cost is not excessive. The effect is, however, remarkable. All the witnesses examined at Baramati agree that the effect of the two years' work in that valley has been very great, and that pig damage has been almost negligible, in the Nira Valley since. The cost of the maintenance of one party such as was used in 1919 to 1920 amounts to Rs. 5,000 per annum, but of this the cultivators have professed themselves ready to contribute up to half the cost if it is necessary to restart the operations, and have actually collected a substantial sum in advance.

The evidence, in the opinion of the Committee is conclusive that in such relatively isolated areas such as those under the Deccan Canals, the use of definitely organised hunting parties will pay, and that two years' work in one area will clear that area to such an extent that little further trouble need be anticipated for some years. If two such hunting parties with men, dogs and guns could be maintained for various Deccan Canal areas and for use in any similar tracts, at a cost of Rs. 5,000 each per annum, it appears likely that these few areas of intense damage could be eliminated. It is, therefore, recommended that two such parties should be maintained for five years under the control of the Agricultural Department and should be employed in the tracts named provided the cultivators will pay half the cost of their maintenance (Rs. 2,500 each). These parties will be able to pass from area to area as required and back to their original areas if the pig again increase there.

48. The recommendations so far made deal chiefly with wild pigs, but incidentally the methods which in the opinion of the Committee should be adopted with other wild animals have been referred to. The treatment of the question of protection of crops from deer and antelopes in the wide open tracts of the Presidency is, it must be confessed, inadequate, and the evidence available is so insufficient that it must, we feel, remain inadequate. Fencing in these areas even when large units are taken is impracticable and of the palliatives suggested,

the wider distribution of guns seems alone to be possible of application under these conditions. This, it is recognised, will very largely drive the animals to other villages which are less protected, but no large scale organised effort seems possible at present. But there is evidence that the seriousness of these pests is increasing and such increase, as has been pointed out, is apt to be cumulative and to increase at a more and more rapid rate. Though the present Committee cannot make very definite recommendations on this subject, they desire to draw attention to its increasing seriousness, and to the need for a special enquiry.

With regard to wild elephants, the Committee feel that in view of the fact that where the herds roam, agriculture is impossible, and also in view of the fact that their number is only small, the proper way to deal with the situation is to make the rewards for their destruction high enough to attract good shikaris to shoot them. Ordinary villagers or even ordinary hunters are of little use against elephants, but if adequate rewards were offered, say up to Rs. 50 for a full grown elephant, together with the hide and tusks in the case of a tusker, there are enough elephant shikaris in the Presidency who would be prepared to devote themselves to the work.

49. The following is a summary of the recommendations of the Committee regarding the protection of crops from wild animals, and particularly from wild pigs, the basis for which have been discussed in the previous paragraphs :—

Summary of recommendations regarding wild animals.

(a) The direct damage annually done to crops by wild pigs and associated animals is estimated by the Committee at seventy lakhs of rupees in the Bombay Presidency (para. 10) and is increasing (para. 13). The indirect damage done to the country due to loss of population, reduction of cultivation, increased unhealthiness of infested areas and the like cannot be given a money value, but if this were attempted it would mean an annual figure of several crores of rupees, para. 12.

(b) As the eradication of the destructive wild animals and particularly of wild pigs is impracticable except in special cases (para. 31) the methods adopted to deal with them must be essentially designed for the protection of crops from damage.

(c) Though extermination of wild pigs seems at present impossible there is no reason to suppose that it will never be so if the habits of these animals are better known. It is recommended that a specially suitable officer should be deputed to study the wild pig in its own habitat for some years in order that the weak points at which it can be attacked may be ascertained. This will cost possibly Rs. 20,000 per annum and the study should last at least three years (para. 31).

(d) The only really satisfactory method of protecting crops from wild animals, and especially from wild pig is by fencing. This may take the form of a dry stone wall or of a special woven iron fence, either of which can be made under suitable circumstances (and in the former case if suitable stones are on the spot) for Rs. 1,400 to Rs. 1,800 per running mile (para. 37).

(e) Such fencing, except with very valuable crops, must be the fencing of large area, up to 1,000 acres, in order to reduce the cost per acre (para. 34).

(f) Where cultivators are willing to cooperate to build such fences, *tagai* should be freely given for the purpose (para. 38). The model bye-laws recently issued by the Registrar, Co-operative Societies, for such a cooperative effort are commended.

(g) Where the whole of the cultivators are not willing to cooperate in carrying out such fencing schemes, legislation should be undertaken to provide that if the owners of 75 per cent. of the land are ready to bear their share of the cost and of maintenance, and if Government is satisfied of the utility of the project, the remainder of the land owners should be compelled to contribute [para. 38(a)].

(h) Government, as the owner of the forest areas from which the wild pigs came, should accept a definite liability towards the cost of the construction of such fences, when they are properly designed and conducted under supervision. It is suggested that such contribution should be one-fourth of the cost. The remission of half the annual assessment for a number of years where such schemes are carried out is worthy of the attention of Government as an alternative [para. 38 (b)].

(i) Expert advice and assistance in the construction of such fences should be given free of charge by the agricultural officers of Government [para. 38 (c)].

(j) Other methods are palliatives but are nevertheless important (para. 41).

(k) Guns for crop protection should be allowed as freely as possible, particularly in tracts infested with wild animals. It is recommended that such gun licenses should be issued to any owner of ten acres of land or more on application and free of any license fees (para. 42).

(l) Guns for crop protection should not only be held by individuals but also by villages as a whole, the guns being in charge of the village panchayat (where such exists) or of the village officers. Where such communal guns are held in a number of closely adjoining villages a man should be attached to the local police thana to inspect them and see that they are kept clean. The issue of communal licenses should not be held as a reason for reducing the number of individual licenses granted.

(m) Gun licenses for crop protection should be granted with the least possible delay, and by the prant officers of the district. Inspection of guns held under license should be done in the village where they are held (para. 42).

(n) The policy of giving rewards for killing pigs now in force should be continued. Success in crop protection with guns cannot, however, be measured by the number of pigs killed. Everything should, however, be made as easy as possible for those who kill pigs to obtain rewards. The Committee are not sanguine that the extension of the system of giving rewards will make an appreciable contribution to the solution of the problem (para. 43).

(o) The orders regarding the clearance of a wide strip of land round cultivation in forests contained in Government Resolution No. 414-A of April 7, 1922 (Revenue Department), seem satisfactory in this matter. The cultivators should be given assistance in the original clearing of such strips, and cultivation should be allowed on such strips for two years after the clearance commences (para. 44).

(p) The use of poisons has given promising results more especially in the protection of the more valuable crops; and not as a means of protecting very extensive areas. The use of poisons (arsenic and strychnine) should be done systematically under the control of a responsible person or body of persons. If this is done there does not seem much likelihood that their use will be a serious danger to domestic animals. No restriction should be made in the distribution of poisons to such responsible bodies of persons (para. 45).

(q) The most efficient way of using poisons and preparing poison baits should be further investigated by the Agricultural Department (para. 45).

(r) While the Committee feel that poisoning on any ordinary scale will not deal with the pig trouble as a whole, they are not convinced that it might not do so (except near the Kanara forests) if Government would be prepared to plan it on a large scale as a regular campaign as has been done in the case of prairie dogs and some other animals in the United States. Whether such a campaign should not be undertaken is worthy of consideration, as it would probably pay well in the end (para. 45).

(s) As regards hunting in the forests the extension of the rules issued by the Collector of Kanara on March 10, 1923, to other areas than

those specified in the order should be considered, and is recommended so far as it can be done consistent with the protection of forest property. All such rules should recognise that the agricultural interest is paramount, and that if any animal is found to do serious agricultural damage, this fact should dominate the situation. Hunting of wild pigs, organised or unorganised, should be encouraged everywhere (para. 46).

(t) In isolated tracts like the Deccan Canal areas the wild pig pest can be kept completely in check at a limited cost by the maintenance of hunting parties. It is recommended that two such organised hunting parties should be maintained for the Deccan Canal areas, at a cost of Rs. 5,000 per annum for five years, and should be employed in these areas provided the cultivators will pay half the cost of their maintenance, under the control of the Agricultural Department.

(u) With regard to the trouble with deer and antelopes, the Committee cannot make very definite recommendations, but wish to draw attention to the increasing seriousness of the trouble and to the need for a special inquiry (para. 48).

(v) Wild elephants are a serious pest in a limited area of Kanara and Belgaum. Adequate rewards should be offered for their destruction and if this is done, they can be eradicated or driven away from cultivated areas.

II.—STRAY CATTLE.

50. The second question referred to the Committee is the protection of crops from stray cattle, a matter which is of great importance in many parts of the Bombay Presidency. The problem, however, is not the same in different areas. In the neighbourhood of towns and large villages it is a question of cattle being deliberately allowed to stray by their town owners, more particularly in the night, in order to save the cost of feeding them. In the Konkan, it is a question of using the whole village as a common grazing ground after the rice crop is reaped, though the cropped areas are carefully guarded during the rice growing season. This makes, however, the growing of a *rabi* crop, in these areas difficult, if not impossible. In Upper Gujarat a distinctly separate problem appears, in the existence of definite breeding castes (*rabaris*, &c.) who have been accustomed to graze their cattle on large open areas, free for many generations, such free grazing being the basis of their business. With increased cultivation these free grazing areas are curtailed, or eliminated in many cases and the trouble ensues, which the Committee has been asked to investigate.

51. Whatever be the conditions under which the damage from stray cattle takes place, it is of a very serious character. It makes cultivation in the neighbourhood of towns and villages a very onerous business and one which requires continual watching to make it successful. It is largely, according to the evidence received, responsible for the gradual reduction in the area devoted to a second crop after rice (usually *wal*) in the North Konkan, the abandonment of which means not only a loss to the cultivators concerned, but also to the country as a whole. In North Gujarat the development of new cultivation is being seriously impeded and the cultivators as a whole are suffering large losses on this account in the Kaira, Ahmedabad and Panch Mahals Districts. The situation in North Gujarat is aptly described as follows by Rao Saheb Bhmibhai M. Desai :—

“The nuisance caused by stray cattle is another scourge to Gujarat cultivators, as they are more in Gujarat, than other places. These stray cattle are owned by (1) *Rabaris* and *Charans* (professional breeders), by (2) well-to-do people residing in cities and towns and by (3) poor or low caste people also residing in towns and cities, who mainly depend for their livelihood upon the animals they keep :—

(1) The *rabaris*' and *charans*' cattle damage cultivators' crops in two ways, *viz.*, (a) the owners themselves or their herders grazing

their whole herds at nights and odd times in standing crops of surrounding cultivators, (b) by letting loose the cattle at night as mentioned in (2) and (3). This latter practice is not resorted to, *rabaris* living in villages. Generally the cattle owned by the *rabaris* and *charans* are never tied but are always herded loose in open and sheltered yards.

(2) These cattle are generally housed, but let loose in day and night time, and in the case of poor people they are never tied or housed except when required for milking purposes. The owners are never required to spend anything for their food. During day time they generally live on the charity of the town people and at night time or a little before night time they begin to collect at specified places, and as soon as it is dark they follow their ring leader like a regular trained batch of military or police headed by its Naik or Subedar, to far off places outside the town limits and graze there on the standing crops of *jowar* or any other crop they like best till 4 a.m. when they return to the town in perfect order and go to their owners' place for being milked. These animals are so shrewd and so trained that with the slightest sign of danger they take to their heels like deer, and disappear in no time, jumping over wire fencing and other fences and even over men who try to surround them and catch them or take them to the cattle pound. It has mostly been impossible to impound these animals by villagers unless and until they are in some favoured places. If by chance one or two are caught in a big trial, they will not walk to the cattle pound or village, but will sit down there and will have to be carried to the pound in carts."

52. The remedies which are available to persons whose crops are injured by stray cattle are contained in the following enactments, and attempts have been made to apply all of these at various times:—

Remedies provided
by law.

- (a) Indian Penal Code, section 425 ("of Mischief").
- (b) Criminal Procedure Code, section 110 (d) ("Habitual Mischief").
- (c) District Municipal Act (Bombay Act III, 1901), section 137 (only applies to Municipal areas).
- (d) Indian Forest Act (Indian Act VII of 1878), Chapter XI (only applies to protected forests).
- (e) Cattle Trespass Act (Indian Act I of 1871) with the rules made thereon by the Bombay Government.
- (f) Bombay District Police Act (Bombay Act IV of 1890), section 61-K.
- (g) Bombay District Police (Amendment) Act (Bombay Act IX of 1918) adding a new section 61-A to the Bombay District Police Act.

In practice all these mean that the cattle doing the injury must first be placed in the cattle pound, if they can be caught, and have the owner to reclaim them and pay the requisite fines, and in some of the above cases to submit to a prosecution. Essentially the remedies provided by the legislature may be summarised as follows:—

- (a) Where the action of the owner of the cattle is mischievous and is done with the definite intention of damaging a cultivator's crops, it comes within the scope of section 425 of the Indian Penal Code ("of Mischief"), and this section has been used from time to time in connection with this offence. If the deliberate placing of cattle in the fields of a particular cultivator becomes habitual it comes within the scope, moreover, of section 110 of the Criminal Procedure Code, and security may be taken against a repetition of the offence. But the application of these sections is very limited because it cannot usually be contended that the damage done by stray cattle amounts to mischief, as defined by the Indian Penal Code. It is at the most the liberation of cattle to stray, with the knowledge that they *will* damage somebody's crops but without any mischievous intent against any particular owner.

(b) The Cattle Trespass Act of 1871 was passed to meet the very problem, which is now facing us, but can hardly be claimed to have succeeded very well in doing so anywhere. Mr. Keatinge in 1915 stated that "the Cattle Pound Act is quite ineffective," and this is the position taken by most of the witnesses before the Committee.

The sections of the Cattle Trespass Act, which are important in the present discussion on the subject are as follows:—

"10. The cultivator or occupier of any land, or any person who had advanced cash for the cultivation of the crop or produce on any land, or the vendor or mortgagee of such crop or produce or any part thereof may seize or cause to be seized any cattle trespassing on such land and doing damage thereto or to any crop or produce thereon, and send them or cause them to be sent within twenty-four hours to the pound established for the village in which the land is situate."

"12. For every head of cattle impounded as aforesaid, the pound-keeper shall levy a fine according to the following scale:—

Elephant	... Two rupees.
Camel or buffalo	... Eight annas.
Horse, bull, bullock, cow or heifer	... Four annas.
Calf, ass or pig	... Two annas.
Ram, ewe, sheep, lamb, goat or kid	... One anna.

Provided that when it appears to the Local Government..... that in any local area.....cattle are habitually allowed to trespass on land and damage crops or other produce, the Local Government may by notification in the official Gazette direct that for every head of cattle of any kind specified therein which may be seized within such local area and impounded as aforesaid, the pound-keeper shall levy such fine not exceeding double the fine mentioned in the foregoing scale as may be prescribed in the notification...."

"26. Any owner or keeper of pigs, who through neglect or otherwise, damages or causes or permits to be damaged any land or any crop or produce of land,by allowing such pigs to trespass thereon shall on conviction before a Magistrate be punished with fine not exceeding ten rupees.

"The Local Government, by notification in the official gazette may from time to time, with respect to any local area specified in the notification, direct that the foregoing portion of this section shall be read as it has reference to cattle generally or to cattle of a kind described in the notification instead of pigs only, or as if the words 'fifty rupees' were substituted for the words 'ten rupees,' or as if there were both such references and such substitution."

Despite the curious manner of legislation in section 26 the meaning is plain and the Act allows by notification a fine of Rs. 50 for trespass with damage by any kind of animals. The Committee, however, feel strongly that the Act needs revision in this particular at least and a direct provision for prosecution and fine of owners of stray cattle included in place of this roundabout provision. The power of the Local Government to issue notifications under this Act can be transferred to any local authority, and this power has been used by the Government of Bombay (*see* Bombay List of Local Rules and Orders, Volume I, Edition 1896, pp. 85 and 86).

(c) The Bombay District Police Act (Bombay Act IV of 1890) also deals with this matter [section 61 (k)], and the matter has been amplified by Bombay Act No. IX of 1918, which introduces a new section after section 61 of the original Act as follows:—

"61-A. (1) Where it appears to Government from the report of the magistrate of a district or on the representation of a local authority, that in any local area subject to the jurisdiction or control of such magistrate or authority cattle are habitually allowed to stray and that such cattle trespass on land and damage crops or other produce

thereon, Government may by notification direct that the provisions of this section shall have operation in such local area. In such notification Government may direct that this section shall apply to cattle generally or such kind or kinds of cattle as may be specified in the notification and the provisions of this section shall in such local area be read and construed accordingly.

(2) In any local area in which this section is in operation any person who through neglect or otherwise fails to keep in confinement or under restraint between one hour after sunset and sunrise any cattle which are his property, or in his charge shall be punished with fine which may extend to one hundred rupees, or on a second or subsequent conviction with fine which may extend to five hundred rupees, or with imprisonment which may extend to six months or with both.

Explanation.—Cattle shall not be deemed to be kept in confinement within the meaning of this sub-section unless they are effectively confined within a fence, wall or other enclosure and shall not be deemed to be kept under restraint within the meaning of this sub-section unless they are effectively restrained by means of a rope or other attachment.

(3) Any person may seize any cattle not being kept in confinement or under restraint as required by this section and may take or send the same to the nearest cattle pound and the owner and other persons concerned shall thereon become subject to the provisions of the Cattle Trespass Act, 1871. All officers of Police and all police patels and all members of the village police shall when required aid in preventing resistance to such seizures and rescues from persons making such seizures."

The meaning of this is that in any area where the straying of cattle at night is habitual, with the resultant damage to crops much higher fines can be inflicted than under the Cattle Trespass Act previously described. Imprisonment also can be given in such cases.

The application of some of these Acts is so local as to be unimportant in the present consideration of the subject. This is the case with remedies (c) and (d). The former only applies to Municipal areas, and the latter to forest areas. As regards the provision of remedies (a) and (b) above it is extremely doubtful whether the sections of the Indian Penal Code and Criminal Procedure Code quoted can be made applicable to more than a very small minority of the cases of stray cattle. This is made clear from a judgment of the Sessions Judge of Ahmedabad in 1918. In this he says "I do not think that a person who is responsible for the damage through negligence, however gross, can be criminally made responsible for such damage in the absence of special statute, as in the case of 304-A unless indeed the damage was inevitable or so extremely likely that no reasonable man could be supposed to contemplate anything else. If the appellant had driven his cows to the plot of the complainant and turned them loose there, in or near a suitable gap there in the hedge, then I think he would be rightly convicted of mischief, although there might have been possibility that the cow would have done no damage As a general rule, a person who is indicted for offence is entitled to acquittal if it is not shown that he intended the consequence and though if that consequence be the inevitable result of his act, he is not allowed to plead that he did not intend such consequence, yet such results must be really inevitable and known by him to be such."

53. So far as repressive measures are concerned, we are driven back on the three enactments cited above. The criticisms of these Application of the Cattle Trespass Act. have been many in the evidence recorded by the Committee, more particularly of the Cattle Trespass Act. These criticisms with the remedies suggested by the Committee may be stated as follows:—

(1) The penalties prescribed by the Cattle Pound Act in withdrawing animals that have been impounded are far too small, and even when

doubled (as provided for in the latter part of the section 12 after notification) they are still very small indeed. It was repeatedly urged before the Committee that the penalties would still be far from sufficient even if they were four times those specified in the Act. The Committee certainly feel that the time has come for a large increase in the penalties prescribed, making them at least four times the present ones.

(2) The areas notified under sections 12 and 26 of this Act are not easily found out. The power of notification is primarily with the Local Government but has been delegated to local officers in many cases and nobody can find out at all easily to what areas either of them do actually apply. The Committee would urge that a complete list of such area should be issued at once and kept up to date.

(3) The number of areas in which section 26 has been applied so as to include all cattle and so as to make increased fines up to Rs. 50 possible, should be increased if this extension of the provisions of the section cannot be made universal. The Committee are inclined to recommend that the extension of the provisions of this section, both as to including all cattle and as to increase in fine should be made universal.

(4) When cattle are impounded for damage, the owner of the cattle should be made to pay for the damage done, this being assessed on the spot by a *Panch* of whom one member should be appointed by either party with a *Sar Panch* chosen by the two already appointed. If a properly elected village *panchayat* is in existence it might be used for the purpose of assessing damage in the place of the *panch* suggested. The assessed damage should then be recovered in a summary fashion by the Revenue authorities. The Committee cannot recommend the whole of this proposal. They are in favour of the immediate assessment of the damage in the manner suggested, but they feel that the payment for damage should only be recovered after conviction before a magistrate. It should, however, be made possible to compound for the damage done, in the same way as is provided for under sections 67 and 69 of the Forest Act, and so avoid a prosecution before a magistrate. It should also be within the power of a magistrate to hand the whole or a portion of the fines realised under section 26 (in its extended form) of the Cattle Trespass Act to the sufferer from the damage.

(5) When the cattle of one owner are habitually allowed to stray and damage crops, the fines authorised by section 26 in its extended form should not be the only penalty, but imprisonment should also be possible as is already the case under the provisions of Bombay Act IX of 1918. The Committee think that this is reasonable and that legislation should be undertaken for this purpose.

(6) In many areas, notably in North Gujarat, the Committee were told that it is often impossible to find the owners of impounded cattle, who accordingly leave them to be fed and finally sold. There are usually no buyers at the time of sale except the caste fellows of the owner and the cattle are knocked down to them at a nominal price and the owner ultimately gets back his cattle at less cost than it would have taken to feed them while in the pound. It is not certain how far these statements of fact are literally true, but it is difficult to suggest a way out of such an abnormal state of affairs. It might be possible in many cases to send them to other talukas for sale outside the area where they and their owners are known.

(7) Cattle pounds are often far away from the village where damage is done. One case was brought before the Committee where the usual cattle pound was eight miles away, and it was suggested that any properly constituted *panchayat* should have power to establish its own pound. This seems a good idea, and is recommended by the Committee. Another grievance was that cattle pounds are often entirely unattended during the greater part of the day, and it is a difficult work to seek out the pound keeper and hand the cattle to him. The bigger pounds are always in

charge of a proper man and the fees recovered are amply sufficient to maintain this arrangement. The pound fees at Nadiad in 1921-22 amounted to Rs. 1,417, and this enables the Municipality not only to employ a pound-keeper, but also to maintain a peon to impound stray cattle in the town. In the small pounds this matter is undoubtedly a difficulty. In the larger pounds at all events there should be pound employees present at specified morning and evening hours, to take charge of cattle brought to the pound. Under the Act in villages, at present the pound-keeper is the *Patil*. The Committee consider that he should not necessarily be the *Patil*, but a man definitely appointed for the purpose by the District Magistrate.

54. The Act amending the District Police Act (Bombay Act IX of 1918) has already been applied with considerable effect in certain areas in Gujarat to which it has been made applicable. On this matter the Mamlatdar of Chorasi (Surat) gave very interesting evidence to the Committee, regarding the damage done by stray cattle in the neighbourhood of Surat, and regarding the effect of the application of the Act above named. He estimated that in the Chorasi taluka the damage done by stray cattle and wild pigs was from 2 to 5 per cent. of the whole outturn in the taluka. The Act has been made applicable to a number of villages in the taluka and he had had one hundred convictions under it in the previous six months. The policy he adopted was to fine the offender lightly on the first offence, but if it occurred again to use the full rigour of the Act. This rigorous administration had, he thought, reduced the damage by seventy-five per cent. and was sufficient in his opinion to deal with the damage by stray cattle (in the neighbourhood of cities and large villages). He recommends that the operation of the Act should be extended to all urban areas, and places within five miles of large centres of population, and to other places where serious complaints occur. He considered that in all cases in addition to imprisonment and fine as laid down in the Act, compensation up to 25 per cent. of the fine should be given to the person who seizes the cattle and places them in the pound. Compensation for damage should also be paid out of the fine. In the cities the municipalities ought to form parties to seize stray cattle and impound them, the owners then to be dealt with under the Act in question. This last measure was strongly urged by cultivators in the neighbourhood of Surat. The Committee agree generally with the recommendations of the Chorasi Mamlatdar.

According to the evidence of the Mamlatdar of Nadiad the Act under discussion had much relieved the situation with regard to stray cattle and provided exemplary punishments are given, especially imprisonment, it would meet the case. He considers that in a town round which damage is very serious, peons should be specially appointed at the cost of the cultivators, if the latter are willing to subscribe, to watch the cattle which may be found straying at night and impound them which should be followed by prosecutions under the Act of 1918. This will be a very good measure and should be followed in towns where the stray cattle damage problem is intense.

55. The Committee feel that the Act of 1918 has considerably relieved the situation round the towns in Gujarat and that it should be applied to all the towns and large villages from which there are complaints, and for a certain distance round them say five miles in the case of towns. It is clear that small fines are not deterrant and hence heavy fines should be imposed.

56. Proposals were also placed before the Committee for regular registration of the cattle kept in or near towns with their owners and that the number of cattle allowed to be kept be limited to the sources which the owner has for feeding them, including the share of the public grazing land (if such exists) to which he is entitled. The Committee, however, see such difficulties in carrying out and maintaining such registration that they hardly think it is practicable.

57. On the whole the new clauses of the District Police Act (Act IX of 1918) seem sufficient to enable energetic local authority to deal with the matter, provided it is allowed to be applied in such local areas as need it. Round towns and large villages little more than this is, in fact, required. The very large questions of the cattle belonging to regular breeding classes (*rabaris*, *charans*, &c.) in North Gujarat and of cattle in the Konkan areas will, however, require some special treatment.

58. The question of how to deal with the professional breeders' cattle in North Gujarat is one of the most complicated and difficult of those placed before the Committee. On the one hand there is no doubt that the whole production of cattle in that part of the country is based on free or practically free grazing. The herds of the professional breeders have for many generations wandered freely over the country and grazed, paying at a most nominal amount for permission to graze. There is no doubt too that the cheapness of working cattle has been very largely due to this fact, and that if payment for fodder (grass) consumed is charged at anything like its economic price, the price of cattle will become double or even more than it is at present, or else the professional breeders will be driven into the State area of Khathiawar, or elsewhere and the price will again rise very greatly. The loss of practically free grazing areas owing to the extension of cultivation (as in the Kapadwanj and Thasra Talukas of the Kaira District) has made the problem a specially acute one in certain parts of Kaira, and the Committee feel that the time has come when both sides of the question should be fairly considered and a future line of policy laid down.

On the one hand, cultivators, who purchase land, or who have land in these areas, are entitled to claim protection from damage to their crops provided they take reasonable precautions against such damage, and on the other hand it would be a disaster if the price of cattle and of certain milk products were to rise very largely on account of the elimination of the breeders or on account of their being driven far away from their present areas, or on account of their having to pay the full cost of the fodder consumed by their cattle.

The problem is particularly acute in North Gujarat, because many if not most of the cultivators there are not likely to become breeders themselves, (as is the case in most other parts) owing to their objection to castrate any animals they produce, a necessary preliminary to using house bred cattle as work cattle. So long as this objection is maintained the professional breeder is necessary and this being the case, the price of cattle and of milk products will have to bear the cost of the fodder which the cattle eat, and this it may be repeated will probably double the cost of the cattle if it is paid for at an economic rate.

If the position is taken that the breeders (*rabaris*, &c.) are entitled to the practically free grazing which they have enjoyed for so many generations, then the only way of keeping this position and still protecting cultivators from damage is to preserve sufficient areas of waste land in the districts in question to provide the necessary grazing area for the breeders. It is obvious that the professional breeders cannot be maintained at the expense of the cultivators' crops. Hence if they are to be maintained at all, there must be areas of free or very cheap grazing land to which they can be relegated. Outside such areas they would only be allowed where they would feed their cattle and pay for the fodder under pain of the application of Act IX of 1918 to them.

But the question arises at once as to whether the areas required for such segregation of the breeders are available in the districts where the question is a serious one. The actual figures for the four classes of land which may be available for the year 1903-04 and for 1921-22 are as follows:—

	Current Fallows.	Land available for cultivation.	Forest	Other uncultivated land.
	Acres.	Acres.	Acres.	Acres.
1903-04.				
Ahmedabad	531,976	147,799	13,116	454,474
Kaira	102,911	97,836	Nil.	117,134
Panch Mahals	244,112	128,329	211,930	91,480
1921-22.				
Ahmedabad	496,472	110,854	12,017	478,458
Kaira	64,336	14,340	Nil.	152,787
Panch Mahals	115,592	75,832	212,280	110,265

The first of these columns (current fallows) may be grazing grounds, for village cattle in which professional breeders can participate to a small extent

only in so far as they are inhabitants of the village. They may be excluded as a serious contribution to the question. The "unassessed and uncultivated land available for cultivation" is available so long as it is not given out for cultivation, and the forest is available so long as it is open to grazing and has been included. The last column contains *kuran* and free pasture (*Gairan* or *Gurcharan*) as well as rivers, roads and *nalas*, &c., which are of no use. If we take half this area as being available for breeders, it may be some guide. The total area available for breeders in the two years quoted may, therefore, at a rough guess be taken as follows:—

		1903-04.	1921-22.
		Area available.	Area available.
Ahmedabad	...	388,152 acres.	362,100 acres.
Kaira	...	156,403 "	90,733 "
Panch Mahals	...	385,999 "	343,244 "

There has been, thus a substantial reduction in each case since 1903-04. In addition, it may be said that in Ahmedabad, by far the greater part of the area is in Dhanduka, which is really in Kathiawar, and that the greater part of the area in the Panch Mahals is forest, and hence will be affected by any restrictions of forest grazing. The biggest reduction is, however, in the Kaira District where the problem of the professional breeders' cattle is the most acute.

Now on the class of land which is chiefly included in this area we must allow at least ten acres to one animal and thus the number of cattle this waste land will supply will be at present about 36,000 in Ahmedabad, 9,000 in Kaira and 34,000 in the Panch Mahals. The number of cattle required for cultivation alone would, however, be (allowing 5 acres of crop per animal) in 1921-22, 271,000 in Ahmedabad, 159,000 in Kaira and 103,000 in the Panch Mahals. Giving each animal a working life of ten years, it means that the annual requirement of each district is as follows:—

Ahmedabad	...	27,000
Kaira	...	16,000
Panch Mahals	...	10,000

If one-fourth of these are bred by the cultivators themselves, the requirement from breeders will be 20,000 in Ahmedabad, 12,000 in Kaira and 7,500 in the Panch Mahals. It is obvious that in no case the waste land at present can supply this number or anything near it, the biggest deficiency being in Kaira, and that even at present, if the professional breeders (*rabaris*) are segregated in the present waste land in the district they will not be able to produce even a small fraction of the number of cattle required for the use of the district.

The ultimate solution of this problem must undoubtedly be the cultivator becoming his own breeder and devoting a part of his area to fodder crops (when probably one acre can support one animal), but the day for this is not yet come. At present the cattle are produced in the district to a very considerable extent at the cost of the cultivators' crops, a limited number being brought from Kathiawar, the Palanpur Agency, Central India, &c. Segregation will reduce the number produced in the districts, raise the price of the bullocks required, but at the same time help in saving the cultivators' crops.

On the whole, therefore, the Committee feel that while the *rabaris* and other breeders who elect to stay in villages must find their fodder by growing it or paying for it, the penalty for not doing so being the application of the penalties under Act IX of 1918, yet the whole of existing available land in these districts including forests should be kept available for grazing and not given out for cultivation. Every effort should be made by providing good bulls, by arrangements for castration by the new methods, by making co-operative insurance of cattle easy, &c., to encourage the cultivators, especially those of the lower castes to breed and rear their own cattle.

In dealing with the problems of the *Rabaris*, *Charans* and other professional breeders of North Gujarat, the Committee feel that while repressive measures against the damage to cultivators' crops should be taken, these alone will not only not suffice, but also be positively unfair unless they are accompanied by a constructive scheme which provides them at least with limited opportunity to continue to exercise their profession, giving at the same time every inducement to them to settle down as cultivators, with cattle breeding as the main work on their farms. This is required, it is felt, both in the interest of the breeders, and also in the interests of the existing cultivators and their supply of bullocks. In the meantime every effort should be made to get the ordinary cultivator to breed and rear his own bullocks. Some of the methods to this end have been suggested. It is not the function of the Committee to work out details of such constructive schemes as are suggested, but they recommend that if the principles enunciated are accepted, the details should be worked out at the earliest opportunity.

59. The only question still to be considered in this report is that of dealing with the stray cattle problem in the Konkan, where it takes on special features, peculiar to that and very similar areas. The cattle in the Konkan and especially in the North Konkan are exceedingly poor and exceedingly numerous. The poorness of the cattle is what is usually found in wet rice districts, and the number is due to the fact that they are largely maintained for no other purpose than to provide dung to be used as *rab* for rice. As long as the demand for *rab* continues, so long must there be many cattle, however poor and useless they otherwise are. These cattle graze on the rocky and *varkas* land and on the remainder of the area when rice is not being grown. While rice is growing the villagers combine to keep the cattle off the area under that crop, and they are watched carefully though they are liable to ravage any *varkas* area on which an effort is being made to obtain a crop. With the removal of the rice crop general watching ceases and the cattle wander about taking what they can get.

Thus, with the many cattle that exist (and necessarily exist) which are allowed to wander at their will by night and day, the chances of growing second crops on the rice land and any crops at all on the *varkas* land seem very small unless every field in which a crop is grown is fenced or unless watching, which is not justified by the value of the crops grown, is undertaken. Only the more energetic do this, and these seem in very large measure to be leaving the villages and so the growing of second crops is diminishing, and very little use is made of *varkas* land for growing the crops for which it is eminently suitable. The effect is seen in the small area under *rabi* crops in the Konkan Districts, which chiefly consist in the second crop on rice lands above referred to. These *rabi* crops are steadily decreasing year by year.

The universal custom in the Konkan is to leave the very numerous cattle loose and without any one in charge except during the rice season, and it is obvious that unless this can be altered, or unless the crops are fenced, the advance of agriculture and the increase of the area under *rabi* crops cannot be achieved. Valuable crops like sugarcane are, of course, fenced and so are crops in the neighbourhood of houses. Sometimes when there is a large area of *val* in one block a light temporary fence is put round, but this depends on the existence of such a large area.

It is exceedingly difficult to propound a remedy for this state of affairs. If the grower tries to use the Cattle Trespass Act and impounds the cattle, he is at once in bad odour with his fellow villagers who probably do not take the trouble to reclaim the miserable animals impounded. The numerous other cattle of the village continue to do damage to the growers' fields. There is not a pound in every Konkan village and it means a long journey and much loss of time to impound cattle under such conditions. No wonder, when there is alternative occupation in Bombay a really energetic man gives up the struggle and the production in the countryside to that extent ceases.

No method of meeting this difficulty has been suggested, though it was recommended that section 26 of the Cattle Pound Act should be applied to any

village on the request of the inhabitants and the Committee approve of the recommendations. It is felt, however, that beyond a very limited amount of palliation that may be secured by the use of the Cattle Pound Act, the matter requires a very fundamental alteration in the system of agriculture really to prevent the damage. Before Bombay became such an important rival to agriculture as a field of labour the cultivators struggled on. Now the energetic ones go, and the remainder grow neither *varkas* nor *rabi* crops. The change in the system of agriculture referred to means the use of other methods of preparing rice seed-beds than by the use of *rab*, and hence the removal of the necessity of such a large number of animals, however weedy and poor these may be. The use of *rab* substitutes is known and they do as well as *rab* itself, though they represent an out-of-pocket cost which the cultivator cannot usually bear. The quantity of *rab* material required can be reduced by methods of making better use of the seedlings in the seed-bed and so reducing the necessary area of seed-bed, but as cattle dung represents the best type of *rab* this may not lead to much reduction in the number of cattle. There are other ways, but it seems clear that only by the reduction in the necessary number of cattle in the villages in the rice areas of the Konkan can the damage referred to be avoided and the trespass of cattle be placed on a similar basis to that which it holds in other parts of the Bombay Presidency.

60. The following is a summary of the recommendations of the Committee regarding the protection of crops from stray cattle, the bases for which have been discussed in the previous paragraphs :—

Summary of recommendations regarding protection of crops from stray cattle.

(a) The Cattle Trespass Act (Indian Act I of 1871) should be strengthened in various directions and particularly as follows :—

(1) The penalties prescribed under the Act should be increased to at least four times the present amounts.

(2) A complete list of the areas notified under sections 12 and 26 of the Act should at once be issued and kept up to date.

(3) The provisions of section 26 should be extended to as, in any case, to include all cattle and so as to make the increased fines provided therein applicable everywhere without notification.

(4) When cattle are impounded for damage, the owner of the cattle should be liable to pay for the damage done. The damage may be assessed by a *Panch*, but should only be recoverable after conviction before a magistrate. It should, however, be possible for the owner to compound for the damage done as is provided for under sections 67 and 69 of the Forest Act. Any fines realised under section 26 of the Cattle Trespass Act might be, at the discretion of the magistrate handed over to the sufferer from the damage.

(5) Imprisonment should be a permissible penalty under section 26 of the Act for habitual damage.

(6) Where reasonable prices cannot be obtained for impounded cattle, they should be sent into adjoining talukas for sale.

(7) Any properly constituted village *Panchayat* should have power to establish its own cattle pound.

(8) The pound-keeper should not necessarily be the village Patil, but might be a man definitely appointed for the purpose by the District Magistrate.

(b) The Bombay District Police (Amendment) Act of 1918 has been proved a success, but it should be extended to all urban areas or places within five miles of large centres of population and freely to other areas where complaints occur. In addition to imprisonment and fine compensation up to 25 per cent. of the fine should be given to the person who impounds the cattle. Compensation for damage should also be paid out of the fine. In the cities, municipalities should be invited to form parties or to engage peons to seize stray cattle and impound them.

(c) With regard to the question of the cattle of professional breeders (*Rabaris, Charans, &c*) in Gujarat who have been accustomed to graze cattle almost free, it is recommended that these must either find their fodder by growing it and paying for it, or be segregated in the available waste areas in the districts. If they settle in the villages and near cultivated areas and their cattle stray in the crops, they should be dealt with under Bombay Act IX of 1918. The whole of existing available land in the districts of North Gujarat including forests should be kept available for grazing and not given out for cultivation (*see para. 58 of report*).

(d) With regard to the question of stray cattle in the Konkan section 26 of the Cattle Trespass Act should be applied to any village on the request of the inhabitants. But the matter here is incapable of more than a limited amount of palliation, without a very fundamental alteration in the system of agriculture involving doing away largely with the present system of growing rice and *Nagli* with *rab*. Suggestions to this effect are made (*see para. 59 of report*).

61. Before concluding this report the Committee wishes to place on record its high appreciation of the valuable services rendered to it by Dr. H. H. Mann, who in addition to being a member of the Committee was also its Secretary. Dr. Mann's intimate knowledge of the Agricultural conditions of the whole of the Bombay Presidency has been of great help to the Committee in conducting its enquiries and in the compilation of the report. The latter was drafted by him almost unaided,

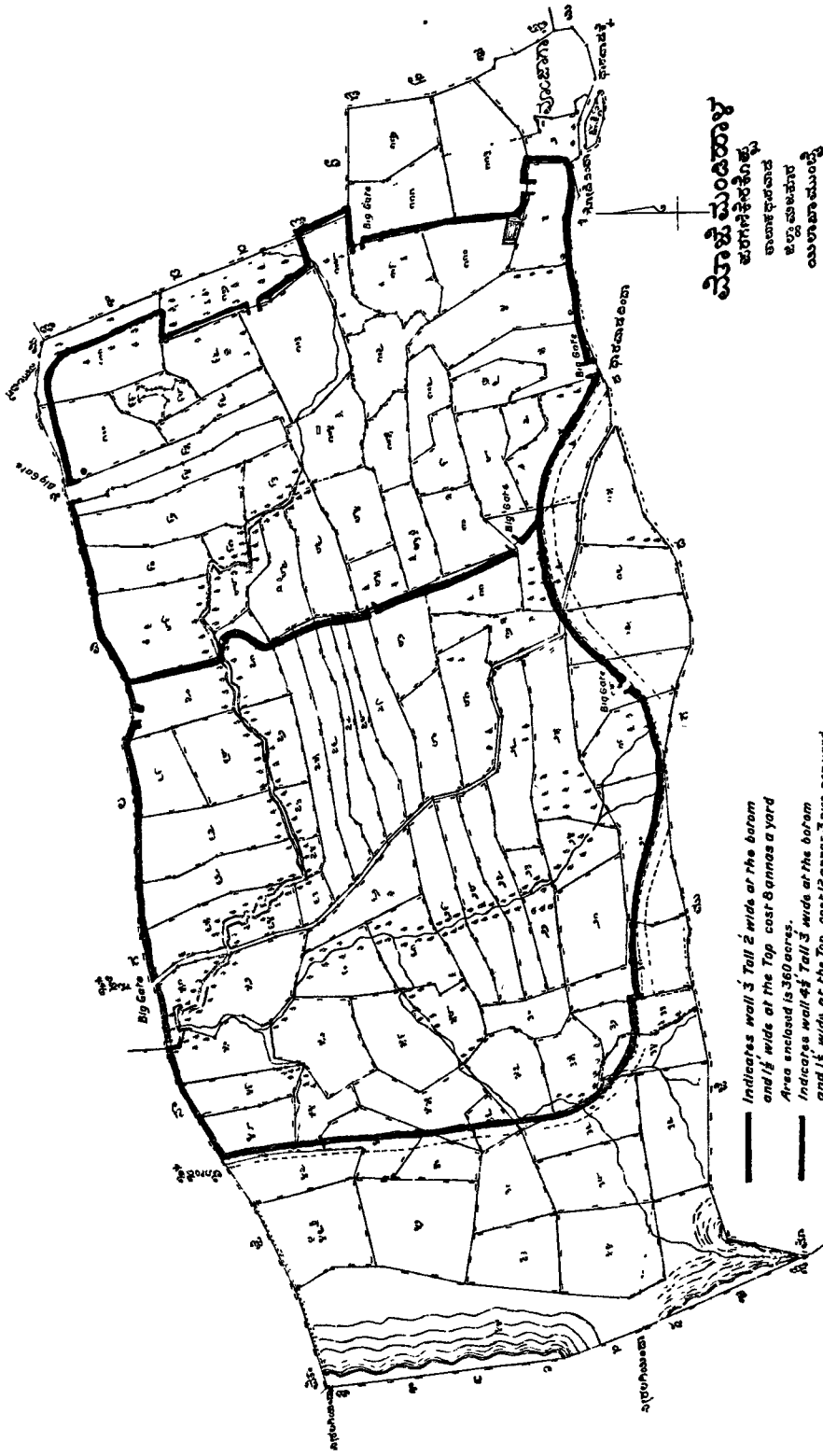
(Sd.) K. R. GODBOLE.
 (Sd.) VENKATESH S. NAIK.
 (Sd.) M. L. KULKARNI.
 (Sd.) BHIMBHAI M.
 (Sd.) G. E. MARJORIBANKS.
 (Sd.) HAROLD H. MANN.

ACCOMPANIMENT A.

[Referred to on page 1 of the Report.]

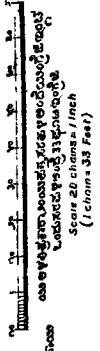
QUESTIONS TO BE ASKED FROM WITNESSES.

1. What is the damage done in the area you represent to crops by wild animals ?
 2. What animals are chiefly the causes of damage ?
 3. What crops are chiefly attacked ?
 4. Has the attack by wild animals affected the character of the crops grown ? Is the introduction of new and valuable crops being hindered on this account ?
 5. Has any land gone out of cultivation primarily as a result of the attack by wild animals ?
 6. Is the attack definitely connected with the presence of forest land ? Are the wild animals harboured to any serious extent by waste land, not forest, used for grazing or otherwise ?
 7. In cases where damage by wild animals is definitely connected with the presence of forest land have you noticed whether the damage is greater where Lantana abounds ?
 8. Have any attempts been made in your area to reduce the damage ? If so, what are the methods and what have been the results.
 9. Has any use been made of fencing against the depredations, and if so, with what success, by what method and at what cost ? What kind of fence has been most successful ? What local facilities are there in your area for constructing fences ?
 10. Have you had any experience in the use of poison against wild animals ? If so, give an account of the poison used, the cost of the operations and the success attained.
 11. Have you any experience of the value of organised hunting parties against wild animals ? If so, what has been the method adopted, the cost of the operations and the success attained ?
 12. In your opinion, is the wide distribution of firearms among the people a very valuable means of checking the depredations of wild animals, and can you produce any statistics or evidence to support it ?
 13. Would you advocate any change in the rules of the Forest Department with a view to reduce damage by wild animals in cultivated areas in and round forests ?
 14. Are there any cultivated areas inside forests which you would advocate being exchanged for land elsewhere and the areas being given to forest purposes ?
 15. Have you any further information to give with regard to methods of preventing or reducing damage by wild animals ?
 16. Have you any experience or knowledge of drawing wild animals into pits and killing them there ? If so, please state methods to be adopted and the results that can be achieved thereby.
 17. Have you to suggest any modifications in the existing Cattle Pound Act, forest laws, gun licensing rules and other regulations for the more effective protection of crops from wild animals and stray cattle ? If so, state the nature of the changes that you propose ?
 18. Is damage by stray cattle a serious matter in the area which you represent ? Can you give any idea of the amount of damage caused ?
 19. Are the cattle responsible for the damage owned by cultivators or by others ? Are the depredations usually known to the owners of the cattle ? Are they usually intentional or are they usually accidental ?
 20. Is the damage by stray cattle due either (1) to restrictions on forest grazing or (2) to the undue reduction of the public grazing area or (3) to the small penalty imposed when cattle are caught ?
 21. Can you suggest a way of checking the damage without unduly interfering with cattle breeding or with the number of cattle kept by the cultivators ?
 22. Can you suggest any method of dealing with the damage done in Gujarat and elsewhere by urban cattle in the surrounding cultivation ?
-



ಮಾಚಿ ಮಂಡಲಾಳ

ಪ್ರಾಚೀನ ಸಿಂಹ
 ಅಧಿಕಾರಿಗಳಿಂದ
 ಜಿಲ್ಲಾ ಮಹಾಸವ
 ಯಾಚಾರ್ ಮುಂದೆ
 76, 19, 12, 10, 10, 10

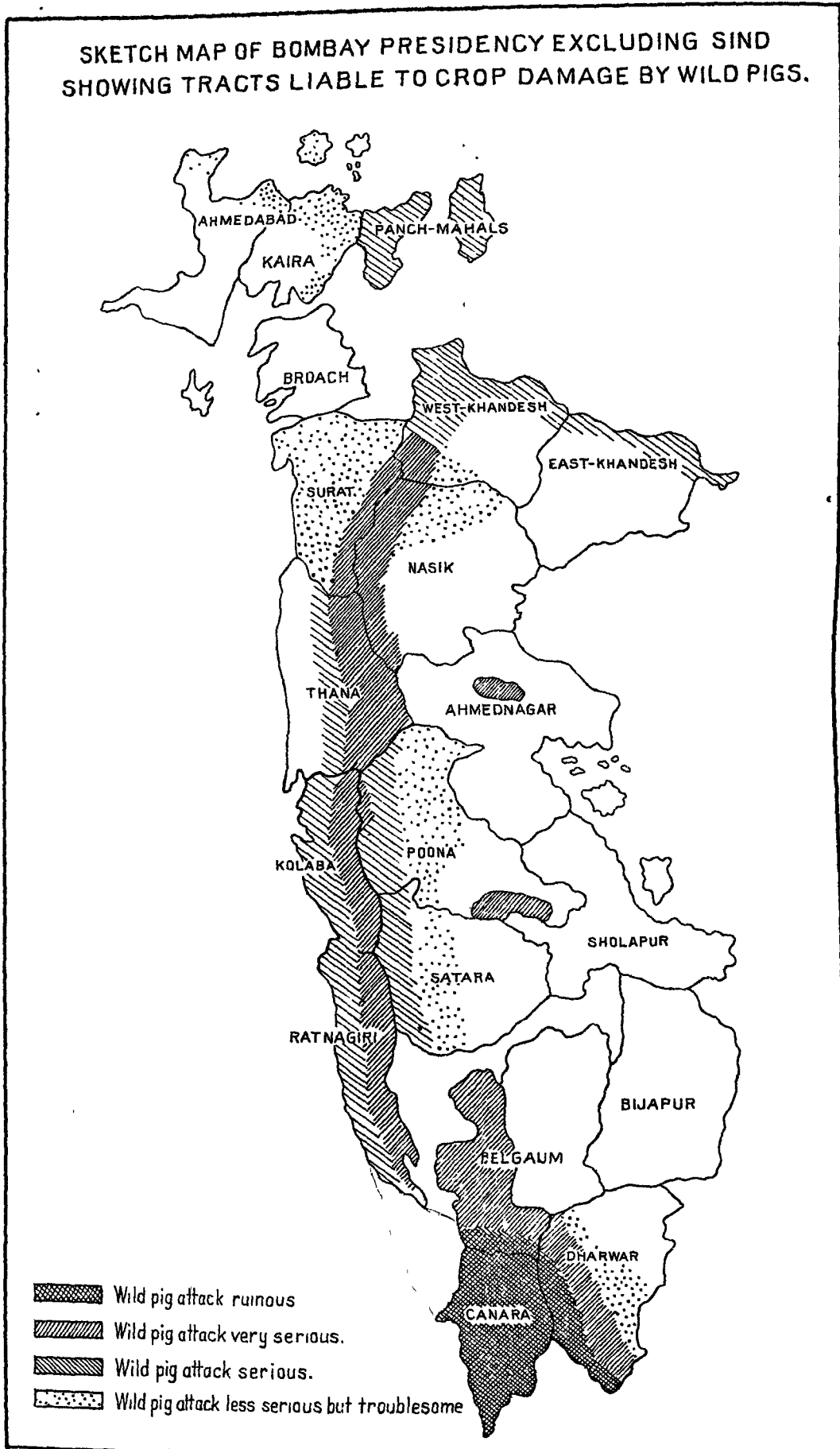


ಬೆಂಗಳೂರು ಮತ್ತು ಅಧಿಕಾರಿಗಳಿಂದ
 ಒಂದು ಸಾವಿರಕ್ಕಿಂತ 33 ಭಾಗಗಳಲ್ಲಿ
 Scale 20 chains = 1 inch
 (1 chain = 33 Feet)

Indicates wall 3' Tall 2' wide at the bottom
 and 1 1/2' wide at the Top cost 8 annas a yard
 Area enclosed is 360 acres.
 Indicates wall 4 1/2' Tall 3' wide at the bottom
 and 1 1/2' wide at the Top cost 12 annas 3 pias per yard
 Area enclosed is 514 acres

Accompaniment B
(referred to on page 47 of the Report).

SKETCH MAP OF BOMBAY PRESIDENCY EXCLUDING SIND
SHOWING TRACTS LIABLE TO CROP DAMAGE BY WILD PIGS.



ACCOMPANIMENT D.

[Referred to on page 21 of the Report.]

SPECIFICATIONS.

(1) Titan Woven fence No. 845 from Messrs. A. & J. Main & Co., Calcutta, 45" height, 7 strands.

Prewar price Re. 0-4-6 per yard, but in this case it had gone to Re. 0-6-0 per yard.

During 1914, the fence was erected round Rao Saheb M. L. Kulkarni's field 30 acres ($7/8$ miles circumference). The following are the details :—

	Rs.	a.	p.
Price of the fence at 6 annas a yard and railway freight from Calcutta to Dharwar.	620	0	0
Price of 400 wooden poles on the plot	...	182	0 0
Cost of fencing	...	168	2 0
Total	...	970	2 0

i.e., approximately per running mile fence including railway freight.

Post and fencing	...	400	0 0
Total	...	1,110	0 0

At Amblikop the same fence was erected in the same year and the cost came to Rs. 900 per running mile since posts and labour were cheaper there.

In 1917, the price of this fence went to annas 12 per yard and in 1919 to Re. 0-13-3. At present it is out of stock.

(2) Empire fence No. 748 and 640 from Macbeth Brothers, Bombay. Quotations received from time to time :—

Year.	Kind		Prices.		
	Height.	Strands.	Rs.	a.	p.
1916	{ 40"	6	0	5	9
	{ 48"	7	0	6	9
1917	{ 40"	6	0	9	3
	{ 48"	7	0	10	3
1919	{ 40"	6	0	11	0
	{ 48"	7	0	12	0
1920	{ 40"	6	0	11	0
	{ 48"	7	0	12	0
1921 March	{ 40"	6	0	14	0
	{ 48"	7	1	1	6
1921 Decr.	{ 40"	6	0	10	0
	{ 48"	7	0	12	0

The cost of fencing with the fence 48" height 7 strands estimated in 1916 was per running mile—

Fence at $6\frac{1}{2}$ annas per yard Rs. 760-0-0.

Posts and fencing Rs. 400-0-0.

While preparing schemes for Dhumwad and Devikop villages in Kalghatgi Taluka in 1920, the estimation made at the time per running mile is as under :—

	Rs.	a.	p.
Cost of fence at annas 12 per yard	...	1,320	0 0
Railway freight	...	50	0 0
Posts on the site	...	300	0 0
Cost of erecting the fence	...	300	0 0
Total	...	1,970	0 0

(3) Ideal woven wire fence of Messrs. Burn & Co., Howrah, No. 8390, 8 strands, 39 inches height surmounted by a barbed wire. Estimation made for Mr. Kirloskar's field measuring 14 acres 36 gunthas (circumference 3,563 feet), in March 1922—

	Rs.	a.	p.
Price of 3,563 feet fence	...	891	0 0
Railway freight and cartage	...	100	0 0
Wooden Posts, 360	...	180	0 0
Corner posts, 20	...	30	0 0
Barbed wire 3,563 feet (5 cwt.)	...	48	0 0
Labour, concrete, &c.	...	120	0 0
Miscellaneous	...	20	0 0
Total	...	<u>1,379</u>	<u>0 0</u>

Roughly Rs. 1,400, *i.e.*, approximately Rs. 2,050 per running mile.

ACCOMPANIMENT E

[Referred to on page 22 of the Report.]

LEAFLET HH.—SOCIETIES FOR CO-OPERATIVE LAND IMPROVEMENT.

Objects.—It has been evident for some time that any large scheme of land improvement—badly required as such schemes are—would require the organisation of a special type of society. A small land improvement may be undertaken by an individual cultivator in his own holding and be financed for him through his credit society. But any larger improvement, especially in a land where fragmented and subdivided holdings are ordinary must touch the interest of several, if not many, cultivators, while in most instances it would also require an expenditure that goes beyond the resources and legal limits of a village credit society. It is, therefore, necessary in order to meet such cases to establish special societies for the purpose. Any considerable scheme of fencing, the building of a Bandh, a large and useful operation of drainage and similar schemes can only be undertaken and financed by co-operative societies created for this special purpose. The matter has become urgent and important since Government has made the great and valuable concession to the co-operative movement of diverting to it a considerable share of the annual *tagavi* allotment for the purpose of land improvement to be used, as pleased, by the co-operative movement under its own self-determined rules, and as Government has further accepted the policy of gradually transferring its *Tagavi* or banking business to the banks and societies of the co-operative movement.

Methods.—Land improvements except irrigation works as a general rule are not trading operations directly and continuously remunerative. They are or ought to be indirectly remunerative to the owners of the fields protected by increasing the produce harvested from the fields. But this indirect profit is not susceptible of exact calculation nor will the owners of fields submit to paying each year variable amounts assessed in proportion to annual valuations of such indirect profits to the society for an indefinite period. Hence it is not possible to organise such a society as if for existence for an indefinite period or as if to obtain variable profits. The first thing to recognize, therefore, is that any such society can be organized only for a definite clearly stated land improvement for a definite period such period to cover (a) the period of completing the improvement, and (b) repaying the loan which may be required for the purpose of the members. The by-laws should, therefore, at the outset provide for the automatic dissolution of the society at the end of that period. During that period of course repairs should be undertaken by the society. Such a type of society formed for a definite purpose and definite period is new to India but common in other countries. There is no reason why it should not be tried. Indeed such a type of association is congenial to India where similar informal and unregistered associations have for many centuries been known among cultivators, e.g., for irrigation.

Two further points require notice: (a) Contributions cannot with justice be charged at a *uniform* rate per acre. The indirect profit gained by improvement is much greater for garden land or irrigated land than for dry crop land. The rates should, therefore, vary according either to each field or to classes of cultivation. The villagers will probably be able themselves to fix quite equitable rates and they should be left to do so themselves, the only condition being that they attach a schedule of rates and list of annual payments to be made to the by-laws and get the legal acceptance of those rates and conditions by all members before the loan is claimed or obtained. (b) In the districts specially ravaged by wild pigs a great deal of the land is owned by non-cultivating landlords and cultivated by tenants-at-will. The landlords will gain more by the protection given by fencing than the tenants. It is, therefore, equitable that they should contribute—probably in a higher proportion than the tenants. It is, therefore, necessary to have a copy of the Record of Rights for each field which it is proposed to fence and legally binding agreements from all concerned, landlords as well as tenants, of the payments each respectively is to make in repayment of the loan. The villagers may be left to settle the terms as between the parties, but the results must be attached in the form of legally enforceable agreements and bonds. It is only on the security of these bonds that a loan can be made to the society. (*Note*—In all cases of Land Improvement Schemes to be financed by societies similar agreements and copies of the Record of Rights will be required.) Although “shares” have been introduced for the purpose of raising capital, these “shares” will be like those in other parts of India and in Sind, and the liability of the members must continue to be unlimited, in order to furnish that wide security required both on business principles and under the general intention of the Land Improvement Loans Act. This unlimited liability should not, however, prevent the member from belonging also to a village credit society with unlimited liability. It has seemed expedient—and indeed the only possible way—to give the society large powers of self-determination in respect of the contributions to be made. It is only the villagers themselves who can equitably adjust the burden to the right shoulders, and it must be on their responsibility as a corporate and co-operative body that the detailed application of the rules can be made.

Remarks—The period put down in by-law 3 is of course only intended for general guidance and must be modified in each case to suit the actual requirements. In one case it may be 5 years, in another 20. Similarly though the by-laws actually drafted are for a fencing society (in order to supply detailed guidance), yet it is of course intended that they should be modified to suit any other type of land improvement. It may be added that such separate societies are intended only for works which involve large expenditure and troublesome management. Other land improvements may be undertaken either by individuals or by small groups of individuals obtaining loans for the purpose from their credit society.

MODEL BY-LAWS OF THE SOCIETY FOR CO-OPERATIVE (LAND
IMPROVEMENT), UNLIMITED.

I.—Preliminary.

1. The society shall be called Co-operative Fencing Society, Unlimited.
Its registered address shall be

2. The object of the society is to erect and keep in repair fences, walls, &c., in the cultivable lands of the village of for the protection of crops against wild pigs or other animals and to obtain loans for the purpose within the co-operative movement, and to secure the regular repayment of the said loans.

3. The existence of the society is limited to a period of 10 years from the date of receipt of the first loan obtained for such purpose but its existence may be continued for a further period or further periods not exceeding three years at each renewal by a resolution of the General Meeting, with the sanction of the Registrar such sanction not to be accorded without the approval of any co-operative bank or other society to which this society is indebted at the close of each period. At the close of the sanctioned period the society shall be wound up and dissolved according to the provisions of the Co-operative Societies Act.

II.—Membership and Funds.

4. No one shall be a member of the society who does not own or cultivate land in the village of and who has not paid up an entrance fee of Rs. a share or shares in the capital of the society as determined in section of these by-laws and whose written application for membership has not been approved by the Managing Committee. All persons who have signed the application for registration are original members.

5. The society will raise funds by—

- (1) Entrance fees.
- (2) Shares.
- (3) Loans from other co-operative societies or banks.
- (4) Donations.

The amount of loans raised shall not exceed eight times the share capital of the society.

Shares will bear no dividend and will not be repayable.

6. A member may resign his membership with the approval of the Committee on giving three months' notice after a period of one year from the date of receipt of the first loan received by the society, provided that he has first discharged all his liabilities to the society. But no member resigning before the dissolution of the society will have any interest of any kind in any of the property of the society, including all or any of the fencing erected by the society, whether it encloses a field owned or cultivated by him or not.

7. The heirs or representatives of any deceased member or any owner, mortgagee or other person succeeding to his lands or rights of cultivation shall be deemed to be members of the society and shall be liable for all debts or claims against the deceased member of the society.

8. The Managing Committee may, subject to appeal to the next General Meeting, expel or fine up to a limit of Rs 50 any member of the society for deceit or breach of rules or orders passed by the Managing Committee and any member so expelled shall have no further claim against the funds or interest, in the property of the society but shall be bound by all liabilities of the society attaching to him or his land.

III.—*Procedure of the Society.*

9. Within three months of registration the Managing Committee shall draw up and a General Meeting shall approve a schedule stating in annas or fractions of annas to the rupee in what proportion each member, whether owner or cultivating tenant, shall contribute to the share capital of the society and to the repayments of the loan or loans, if any, obtained by the society for the execution of its common purpose. A copy of this schedule shall be submitted to the Registrar for registration as portion of the by-laws. If in any case only the owner or the cultivating tenant or tenant of a field is assessed to contributions in this schedule, then the agreement of the other party, whether tenant or owner, to this assessment of contributions and his waiver of other claims shall be obtained and attached.

10. As soon as possible after the completion of the schedule, an estimate of the cost of the fencing shall be made and 20 per cent. shall be added to such estimate. At least one-ninth of the total so arrived at shall, thereupon, be collected from members according to the Annawari of the schedule prepared and be credited in their names as being their paid up share capital and the funds so raised shall be deposited in the Central Bank to which the society is affiliated.

11. The society shall, thereupon, apply to the Central Bank for a loan not exceeding eight times the amount so collected and deposited and ask that the amount shall be deposited in the society's name in its current account at the Bank.

12. On the loan being sanctioned and credited, the society will proceed to order the materials required for fencing and shall proceed to erect the fencing according to estimate. Any balances remaining after the execution of this project shall remain in deposit in the Bank and shall serve as a repair fund and to meet contingent and establishment expenses.

13. If the funds so raised prove to be insufficient for the execution of the project or for the purposes of a repair fund, then any additional amount required shall be raised by a levy in the proportion fixed in the schedule from all members and by the raising of additional loans, if obtainable.

14. As security for all loans each owner member shall execute mortgage bonds in the form attached which shall be endorsed by the society and transferred to the Central Bank which grants the loans. (For form, please, refer to page 1425 of the Bombay Government Gazette, Part I, dated 6th July 1922.)

15. Entrance fees shall be Rs. each. Any amounts remaining over from entrance fees after preliminary expenses have been paid and any amounts recovered as fines or penal interest or surplus amount recovered as interest shall be added to the balance kept as a repair fund.

16. Each member shall be bound to repay his share (settled according to the schedule) in each instalment of the loan or loans obtained by the society at the due date with interest at 9 and 3/8 per cent and shall be liable to penal interest at 18 and 3/4 per cent. for any period of default. But the liability of each member is unlimited and any amount remaining unpaid after one month of due date shall be liable to be recovered in any proportion fixed by the Managing Committee, as enquiry officer under section 35, or a liquidator from each or all of the members.

17. On the dissolution of the society, the amount remaining to its credit may either be divided among the members in the proportion fixed in the schedule or devoted to any co-operative purpose as may be determined by a General Meeting subject to the approval of the Registrar.

18. The first meeting of members shall have the same powers as are herein given to the Annual General Meeting.

19. The Annual General Meeting shall be called in the month of April. Its duties are—

(1) To elect a Managing Committee, to appoint a Secretary, and any other officers required for the ensuing year, and to fix their remuneration;

(2) to receive from the Committee a report on the preceding year's working of the society together with statements showing the receipts and expenditure, assets and liabilities and profits and loss for the year;

(3) to consider the audit memo., and any other communication from the Registrar;

(4) to consider any other business laid before it by the Registrar.

The proceedings of General Meetings shall be recorded in a minute book.

20. - A Special General Meeting of members may be called at any time by a majority of the Committee or on receipt of a requisition from one-fifth of the members or from the

Registrar. A Special General Meeting shall always be held in October to receive and consider the half-yearly accounts, to forecast the probable amount of recoveries and the probable needs of the society for the ensuing year.

21. In the case of the Annual General Meeting ten days' notice and in the case of a Special General Meeting five days' notice shall be given by the publication of a written notice outside the office of the society and in any other conspicuous place that may be convenient. The notice shall specify the date, hour, and place fixed for holding the meeting and shall state the nature of the business to be transacted at the meeting.

22. With the permission of two-thirds of those present at a General Meeting any member may bring forward a proposal regarding any matter not specified in the notice of the meeting, provided that he may not so propose the expulsion of another member or an alteration in the by-laws or in the rate of interest affecting loans or deposits.

23. If on the day of the meeting there is no quorum or if all business is not completed, the consideration of the remainder of the business may be abandoned or adjourned to another day. If on the day to which the meeting is adjourned no quorum is obtained, the business shall be disposed of without a quorum.

24. At all General Meetings the President shall be elected by the members present.

25. Each member present shall be entitled to attend and exercise one vote. The President shall have a casting vote in addition to his ordinary vote.

26. Three-fifths of the total number of members or 25 members whichever be less shall form a quorum at any General Meeting.

27. The society may by a vote of the General Meeting become a member of or affiliated to a Union or a Central Bank or any other registered combination of co-operative societies and may accept all the liabilities and duties entailed by such membership.

28. A Committee consisting of five members shall be appointed to manage the affairs of the society. This Committee may exercise all the powers of the society subject to the provisions of these by-laws and to directions for its guidance conveyed in resolutions passed at General Meetings of the society. Three members shall form a quorum.

29. The Committee, which shall be elected by the Annual General Meeting, shall hold office for one year. Vacancies occurring in the course of the year shall be filled by co-option.

30. The Committee shall hold meetings not less often than once a month.

31. A Committee member may be removed during his term of office by a majority of votes obtained at a Special General Meeting called for the purpose.

32. The Committee shall elect its own Chairman for the year. When present, he shall preside at all Committee Meetings. When he is absent, the members present may elect a Chairman from among themselves. The Chairman is entitled to give a casting vote in addition to his ordinary vote.

33. All acts done by the Committee or by any person acting as a member of the Committee shall, notwithstanding that it is afterwards discovered that there was some defect in the appointment of such Committee or person, be as valid as if the Committee or every such person had been duly appointed.

34. The business of the Committee shall be to arrange for, execute, and control all the work of the society and in particular (1) to dispose of applications for membership, (2) to check the accounts of the Secretary, (3) to sanction working expenses, count the cash balance and supervise all payments to workmen and others, (4) to collect all dues and take all necessary steps to secure their payment.

35. All decisions of the Committee shall be recorded in the Committee's minute book which shall state also the names of the members present, and shall be signed by the Secretary and two members.

36. The duties of the Secretary shall be—

- (1) To summon and attend all meetings of the society and of the Committee.
- (2) To record the proceedings of such meetings in the minute books,
- (3) to make disbursements and to receive payments under orders of the Managing Committee;
- (4) to keep all accounts and registers required by the rules and by-laws, to prepare all receipts, vouchers, balance-sheets, and other documents required for the transaction of the business of the society, to conduct correspondence and to supply all needful information to the members.

In the absence of the Secretary the Committee may authorise any other person to perform his duties.

All documents or receipts passed on behalf of the society shall be signed by the Secretary and one member of the Managing Committee.

37. Each member shall have a pass book in which the Secretary shall enter amounts paid to, or received from, such member.

38. The balance of the society's funds, not utilized as loans to members, shall be kept in the Post Office Savings Bank or as provided in section 32 of the Co-operative Societies' Act. A sum not exceeding Rs. 10 may be kept in the custody of the Secretary to meet petty expenditure. Balances in excess of Rs. 10 should be kept in the custody of the Chairman who will be responsible for them until they are paid into the Bank. No outlay may be incurred from this sum by the Secretary except under the authority of a resolution of the Committee recorded in the minute book.

39. Any member of the society may inspect any of the registers or accounts. A copy of the Act, Rules, and By-laws shall also always be kept open to inspection.

40. None of the by-laws herein contained shall be altered or rescinded and no by-law shall be added except by a vote of a majority consisting of at least two-thirds of the members present at a General Meeting convened for the purpose. The notice convening the meeting shall specify the proposed alteration, addition, or rescission and shall be issued not less than 10 days prior to the meeting. The amendment shall not take effect until it has been approved and registered by the Registrar.

41. An appeal shall lie from all decisions of the Managing Committee to the General Meeting except in cases under by-laws.

42. When by these by-laws it is provided that written notice shall be given to any member, the delivery of such a notice at the house at which such member ordinarily resides shall be sufficient service of notice.

ACCOMPANIMENT F,

[Referred to on page 28 of the Report.]

Forest Privileges.

Amendment of No. 3 of the rules for the regulation of privileges in the reserved forests of the Kanara District.

GOVERNMENT OF BOMBAY.

Revenue Department.

Resolution No. 414-A.

Secretariat, Fort, Bombay.

Dated the 7th April 1922.

Letter from the Commissioner, S. D., No. F. O. R.—95, dated 2nd October 1920:—

“ With reference to Government Order, Revenue Department, No 1964, dated 1st July 1920, I have the honour to report as follows:—

“ 2. Under Kanara privilege rule 3 the occupants of rice and garden lands may cut and clear undergrowth and brushwood and lop unreserved trees for soppu within a strip of forest land adjoining their cultivation which shall be of a minimum average width of 44 yards.

“ 3. The origin of this rule appears in the Forest Rules appended to Volume XV, Part I, of the Kanara Gazetteer, where owners and cultivators were permitted to clear away small brushwood and thick low jungle within 50 feet of their land to secure their cattle from the depredations of wild animals and were allowed to use brushwood and small wood of unreserved trees.

“ 4. Under Government Resolution No. 1550 of 19th February 1910, paragraph 5, it was clearly laid down that cultivation should be surrounded by a broad belt of land administered and controlled by the Revenue and not the Forest Department, to be given out for cultivation when required otherwise to be kept as woodland or hadi, communal or private.

“ 5. The strip or belt can be used for other purposes than merely clearing undergrowth, to the great advantage of the rayats. The Conservator of Forests, S. C., has no objection to allowing the occupants of rice and garden lands in Kanara to cut trees and bamboos for fencing purposes from the strip. I consider this is reasonable. He also agrees that they should be allowed to remove for fencing, wood of all kinds except teak, sandal, shisham, matti, hirda and kajri; and that the Forest Department should be allowed to remove all timber such as teak, shisham, matti and honne as thought advisable and to keep kajri, sandal, hirda under Forest control. There is some difficulty in this proposal as the Forest Department is not to have any control over this strip. Indeed it is to be disforested if used for cultivation and in this case the Forest Department could not exercise control even if they were permitted control before. Any trees that are to be preserved should be under the Revenue Department just as teak, blackwood and sandalwood are now under the Land Revenue Code in occupied lands.

As regards the trees proposed to be reserved: Kajri recommended by the Collector and by myself as useful for ploughs has already been negatived by Government (Government Order No. 2687 of 20th September 1920). I consider matti should not be removed by the Forest Department at all in the strip. It is specially esteemed in Kanara for soppu and the agricultural expert (Mr. Mollison) reported it was the best for soppu. As regards the rests, if the strip is to be of use, the less restrictions we leave the better and I would allow use of honne. This would leave as reserved teak, shisham, kajri, sandal and hirda. Abuse of this concession should involve forfeiture of the strip.

“ 6. I would strongly recommend that the forest strip be left with these reservations to the occupant to use for agricultural purposes, but not for sale, in any way he likes, *i. e.*, for any purpose for which he could get a permit under the rules if the strip were a part of reserved forest as also for the exercise of all privileges allowed in unorganised forest (even when the strip is situated in organised forest). I would like the strip to be the rayat's agricultural store-house and I need hardly point out that our reserved forests will be relieved of the burden *pro tanto* according as this use is availed of by the rayat, and the rayat will be saved all the worry and loss of time involved if he can get what he wants from the strip instead of having to apply for permits to satisfy his requirements elsewhere.

Whatever sacrifice of revenue is involved is small compared with the contentment secured.

"7. I have the honour to recommend that demarcation may be dispensed with temporarily at the Collector's discretion where demarcation cannot be carried out without undue delay."

Government memorandum No. A—414, dated 14th October 1920, to the Chief Conservator of Forests, Bombay Presidency.

Memorandum from the Chief Conservator of Forests, Bombay Presidency, No. 1612, dated 23rd October 1920:—

"Returned with compliments.

"The use of the strips in the Kanara forests is regulated by the privilege rules sanctioned under Government Order No. 6079 of 27th June 1911, *vide* rule 3.

"Government Resolution No. 1550 of 19th February 1910 refers to the revision of the rules being under consideration, *vide* paragraph 2.

"Obviously the latter Government Resolution is nullified by No. 6079 as regards the belt.

"The recent Press Note on Kanara forests grants additional privileges but does not cancel any already existing under the revised Privilege Rules of June 1911.

"The additional privileges and alterations in policy are—

- (1) Free bamboos for fencing.
- (2) Bettas to be under the Revenue Department.
- (3) Stakes for hedging to be allowed from the next year's coupe in tracts Nos. 2 and 6.
- (4) Extension of minor forest by about 20,000 acres.
- (5) Reduction of reserved trees from 25 species to 7 species.

"The instructions issued in the Press Note are the result of a prolonged and close enquiry on the spot by the Commissioner, the Collector and Forest officials and I cannot see any reason for this reference to Government Resolution No. 1550 of February 1910."

Letter from the Commissioner, S. D., No. F. O. R.—95, dated 4th February 1921:—

"I have the honour to forward copies* of a letter, dated 7th January 1921, from the Collector of Kanara forwarding a draft rule to be substituted for rule 3 of the Kanara Forest Privilege Rules published with Government Resolution No. 6079, dated 27th June 1911. It will be seen from the copy of the Conservator of Forests, S. C.'s letter that he agrees to Mr. Haigh's proposal. A reference is requested to Mr. Mountford's letter No. F. O. R.—95, dated 2nd October 1920, in which very similar proposals were submitted to Government.

"I have discussed Mr. Haigh's proposals with him. I think they involve a very real and useful concession to the cultivator which will go a very long way to remove legitimate grievances. I would recommend that the sanction of Government be accorded to the rule now proposed, and that the Collector be instructed to make it wide known, and to put its provisions into effect as soon as possible."

Government memorandum No. A.—414, dated 15th February 1921, to the Chief Conservator of Forests, Bombay Presidency.

Memorandum from the Chief Conservator of Forests, Bombay Presidency, No. 2221, dated 20th February 1921:—

"Returned with compliments.

"Rule (f) cannot stand and any firing of the strips must be carried out under the supervision of the Forest Department.

"Wherever there is valuable teak forest the danger from fire must be guarded against assiduously.

"In many cases the cultivation is along narrow strip of land in the midst of extensive forests. Giving 44 yard strips may mean giving more than three acres of forest to one acre of cultivation, so that the total area conceded is considerable. Consequently the chances of fire spreading from the strip to the forests are great.

"Government employ five Divisional Forest Officers and a large staff of Sub-Divisional Forest Officers, Rangers, Foresters and Guards in Kanara and one of the most important and difficult duties of these men is the protection of forests from fire. Let the

* Printed as accompaniment to this Resolution.

firing of strips is to be permitted at the discretion of the Collector. The latter may or may not be particularly interested in forests and his local knowledge of the Kanara forests may be *nil*. His staff usually have little or no time to attend to forest matters.

"Let us suppose that the Collector grants permission to a rayat to burn his strip and the fire spreads—as it most certainly will in many cases—into valuable forests. The damage may be many thousands of rupees to a valuable stand of teak. Possibly the fire may spread into an area of young teak planted at great expense to Government and ruin the plantation.

"In some cases the expense of regeneration of teak amounts to over Rs. 50 an acre, so that a few thousand acres burned may mean a serious loss.

"The person granted permission to fire his strip is to be held responsible that fire does not spread into the forest. This responsibility amounts to nothing. If detected the man might be prosecuted, he would come before a Mamlatdar, furnished with the Collector's permission to fire his strip. At the most the Mamlatdar would fine him a rupee or so.

"Experience has shown time and again how difficult it is to burn a clearing adjacent to forests without letting fire get out of control.

"Government are spending a considerable sum of money on fire protection in Kanara in educating future Rangers how to protect their forests from fire, how to burn fire-lines without risk. Only a week or so ago the Principal of the Forest College had all his students out most of the night giving them an object lesson.

"Every Divisional Forest Officer in this Presidency has had many a desperate struggle against forest fires.

"Perhaps the Collector has not realized that to prevent a fire from spreading from a clearing requires a large number of men and in many hamlets there would not be half a dozen to help the man who had obtained permission to fire his clearing to keep the fire under control.

"The Collector is not the person responsible for keeping the fires out of the forest. The forest staff must do this, but they will not have a chance if rule (f) is put into force.

"For rule (f) the following rule is suggested :—

The use of fire for the clearing of the strips may be permitted by the Divisional Forest Officer, provided that in localities where valuable forest will be endangered the firing is carried out under the personal supervision of a Forest Officer of rank not below that of a Range Forest Officer.

"Rule (h) better be omitted altogether.

"The land in question remains reserved forest and Divisional Forest Officer may order the cutting and removal of certain species.

"He and his subordinates must be in a position to stop reckless firing of the strip.

"Rules (a), (b), (c), (d), (e) and (g) leave the management of the strips in the hands of the Collector and the rayats themselves as far as possible.

"It is the duty of forest subordinates to see that these rules are attended to and that the privileges accorded are in no way curtailed.

"Rule (h) is really unnecessary and paradoxical.

"The area concerned is extensive and in many parts of Kanara especially in the teak areas, strips granted in 1911 have not been made use of by villagers and are not likely to be in certain areas.

"Furthermore there is really no need to remove forest control entirely. The people are wide awake now as regards their privileges and any forest subordinate interfering would at once get into trouble.

"When large forest areas are handed over for Kumri purposes, the Forest Department must continue control otherwise trading in timber will arise. In the protected forests of Thana, forests which are nominally under the Revenue Department, the control therefrom amounts to several lakhs of rupees a year.

"In Thana without the assistance of the Forest Department the whole of the Revenue Department forests would be looted."

Memorandum from the Collector of Kanara :—

"Forwarded with compliments to the Commissioner, S. D.

"The Chief Conservator's position is very clearly stated in his note. He evidently contemplates the possibility of a Collector giving permission without due consideration in areas where the danger of the fire spreading is very real and where immense damage might result.

"If as he suggests the words 'Divisional Forest Officer' are substituted for 'Collector' in clause (f) there is the possibility of Divisional Forest Officer's refusing to grant permission to use fire in an area in which the danger was negligible, and the necessity for its use keenly felt by the rayats, and the Collector would have the power to insist on permission being granted.

"I have every reason to believe that the Divisional Forest Officers will be prepared to do all in their power to assist the rayats in making the best use of their strips, and will not raise unreasonable objection to the use of fire. Should experience prove that serious conflicts of opinion arise, it will be necessary to raise the whole question again. It is very desirable that the rules should be settled soon.

"I think a clause (h) ought to be inserted and would suggest the following wording—

(h) The strips shall continue to be portions of reserved forest. The Divisional Forest Officer may order the cutting and removal of any sandalwood, blackwood or teak trees standing in the strip, and shall have power to permit, refuse and regulate the use of fire therein; but in other respects the strips once demarcated are to be considered as withdrawn from the administration and control of the Forest Department and to be under the administration and control of the Revenue Department"

Memorandum from the Commissioner, S. D., No. F.O.R.—95, dated 11th December 1921:—

"* * * * *

"2. * * * * *

"3. It is generally agreed that firing though necessary is dangerous and can only be carried out in favorable circumstances and under careful supervision. The reason for recommending that the Collector should decide whether firing should be allowed was to reduce the chances of friction between the people and the Forest Department. I agree however that it is safer to leave it in the hands of the Forest Department and as the Collector now agrees to this being done I would recommend that rule (f) should run as follows:—

(f) The use of fire for the clearing of strips may be permitted by the Divisional Forest Officer at his discretion. He may if he thinks fit direct that the firing should be carried out under the supervision of an officer of the Forest Department. The person to whom permission for firing is granted will be held responsible that the fire does not spread into the Forest and such responsibility will not be removed by the presence of a Forest Officer if it appears that the person to whom permission has been given has not done everything in his power to prevent the spread of fire into the Forest.

"4. As regards the proposed clause (h) I think that some clause is required to show that the strips are really under the administration of the Revenue Department. I think this is necessary in the interests of the Forest Department themselves, as otherwise allegations will continue to be made that the Forest Department seeks to curtail the privileges given by Government. I think that clause (h) now proposed by the Collector meets the case and I hope that the Chief Conservator will be able to agree to it."

Government reference No. A.—414, dated 14th February 1922, to the Chief Conservator of Forests, Bombay Presidency.

Memorandum from the Chief Conservator of Forests, Bombay Presidency, dated 18th February 1922.

RESOLUTION.—Rule 3 of the rules for the regulation of privileges in the reserved forests of the Kanara District published in Government Notification No. 6079, dated 27th June 1911, should be replaced by the new rule submitted by the Commissioner with his letter No. F. O. R.—95, dated 4th February 1921, with the modifications in clauses (f) and (h) subsequently proposed.

2. The requisite notification should be published in the *Bombay Government Gazette*.

4. A copy of the notification should be forwarded to the Oriental Translator to Government for necessary action, with reference to Government Resolution No. 8170, dated 30th August 1911.

By order of the Government of Bombay,

SHAMRAO D. MANKAR,

Under Secretary to Government.

G. R. No. 414-A., R. D., dated the 7th April 1922.

To

*The Commissioner, S. D.,	*The Forest Settlement Officer, Kanara,
*The Collector of Kanara,	*The Remembrancer of Legal Affairs,
*The Chief Conservator of Forests, Bombay Presidency,	*The Oriental Translator to Government,
*The Conservator of Forests, S. C.,	*The Superintendent of Government Printing and Stationery, Bombay,
*The Director of Agriculture,	*The Manager, Government Central Press,
*The Settlement Commissioner and Director of Land Records,	*The Accountant General, *The General Department.

*With copies of the Notification.

*Accompaniments to Government Resolution, Revenue Department, No. 414-A,
dated the 7th April 1922.*

Letter from the Collector of Kanara, No. F.O.R.Strip/C.—I, dated 4th/7th
January 1921, to the Commissioner, S. D.

I have the honour to forward herewith for submission to Government a draft rule 3 to be substituted for existing rule 3 of the Kanara Forest Privilege Rules published with Government Resolution, Revenue Department, No. 6079 of 27th June 1911. The proposed rule has been drafted by me after numerous discussions with forest and revenue officers and represents the result of the final consultation held to-day with the Conservator of Forests and the Forest Settlement Officer.

2. The main object of a strip is to provide a belt of land between cultivation and forests in which the cultivator can do pretty well what he likes without fear of infringing any regulation. The exact use to which the strip will be put depends on local conditions and on the wish of the cultivator. In some places, the main thing is to get it cleared of jungles; in others the cultivator will wish to use it as a store house of forest material: in others he will use it mainly for lopping for söppu.

3. It is not desirable that the cultivator should be allowed to fell valuable timber trees of large size indiscriminately as it might lead to a certain amount of illicit traffic in timber. Hence the exception in clause (e). But if a cultivator needs a timber tree standing in his strip for a *bona fide* agricultural use he ought to be able to get it from the Collector without having recourse to a Forest Officer for a permit, or to a timber depot which may be miles away.

I have deliberately excluded Hirda, *Khair* and *Kajra* from the list of exceptions. It is true that the use of such trees in forests may be given out to contractors; but the contracts ought not to extend to the strips. Ebony is so rarely found in strips that it is not worth while to reserve it.

4. Clauses (f) and (g) are intended to give the Collector a free hand in facilitating the clearance of the strips and in dealing with applications for cultivation. The clearing of a strip in some places will be an expensive matter; and permission to raise a temporary crop of ragi or wari will assist the cultivator in effecting a clearance which he might otherwise not wish to undertake. Circumstances vary so much in the different parts of Kanara that it is not desirable to lay down hard and fast rules.

5. Except for permanent cultivation, the strips should not be disforested. It would mean a colossal amount of work, in the alteration of records and maps, and would be very costly: and the advantage would be almost nil.

6. I request that Government may be moved to pass early orders in this matter. Full use of the strips has not been made up to now, chiefly owing to the rules not being satisfactory. I understand that Mr. Mountford has already referred the matter to Government, but without drafting a precise rule. The rule now drafted is, it is believed, in general agreement with Mr. Mountford's suggestions.

Endorsement from the Conservator of Forests, Southern Circle,
No. S/I, dated 8th January 1921.

Forwarded with compliments to the Commissioner, S. D.

2. Undersigned has discussed the question of revising the strip rules with Mr. Haigh and the draft rules now submitted by him have the approval of the undersigned subject to the following remark.

3. Undersigned would be glad if the lopping of teak trees in the strips could be prohibited. Mr. Haigh points out that the lopping of teak is permitted at present and that it would be unwise to cancel such permission already given. As it will be advisable for the Forest Department to remove all the marketable teak, blackwood and sandalwood trees from the strips as early as possible the question whether teak trees should be lopped or not is not a very important one.

4. It will be advisable to allow contractors whose harda contracts are now in force to remove hardas from the strips provided that they do not interfere with the lopping or cutting of the trees by the holders of the strips. In future, contracts for minor forest produce given by this Department will have to be given out for forest lands in charge of the Forest Department only.

5. The rules provide very liberally for the privileges of the people and are recommended for submission to Government.

Draft Rule 3.

3. (a) The occupants of rice and garden lands may cut and clear undergrowth (except sandalwood) within a strip of the forest land adjoining their cultivation the limits of which shall be fixed by the Collector provided—

B—General.

(i) that generally the average minimum width of such strip shall be 44 yards. The maximum width shall not exceed 100 yards;

(ii) that the exercise of this privilege shall not be allowed in kans;

(iii) that this rule shall not be applicable to any land assigned for *betta* or *ben*;

(iv) that the land to be cleared has first been demarcated in accordance with the directions of the Collector;

(v) that in cases where the cultivated area consists of a number of occupancies only some of which adjoin forest land the occupants may exercise this privilege jointly or according to such agreement as they may make among themselves, save in any portion of such forest land which may be separately demarcated and assigned to any individual in consideration of the payment of assessment.

(b) Such occupants may, if they wish, enclose the demarcated area with a fence, ditch, or wall, and they may erect on that area cattle sheds, sugarmills, or other temporary buildings connected with their agricultural requirements, and dig ditches, wells and drains, and construct roads or paths.

(c) They may lop any tree except sandalwood standing in the area for cattle bedding and manure.

(d) They may also remove from the area clay and stones for agricultural purposes, and dead wood for firewood:—

(e) They may also for *bona fide* agricultural purposes cut and remove any tree except the following:—

Sandalwood, teak and blackwood of any size.

Matti.

Karimuttal.

Nandi.

Honne.

} When they exceed 36 inches in girth at breast height.

Permission may be granted, at the Collector's discretion, to individuals to cut and remove any of the above excepted trees (except sandalwood, teak and blackwood) on such conditions as the Collector shall prescribe.

(f) The use of fire for the clearing of the strips may be permitted at the discretion of the Collector on such conditions as he may prescribe. Persons to whom such permission is granted will be held responsible that the fire does not spread into the forest.

(g) Permanent cultivation shall be permitted in the strips only on payment of assessment and in areas specially assigned for the purpose. But the Collector shall have power in order to facilitate the clearing of a strip, to grant permission for temporary cultivation, either with or without assessment as he shall think fit.

(h) The strips, once demarcated, are to be considered as entirely withdrawn from the administration and control of the Forest Department; provided that the Divisional Forest Officer may order the cutting and removal of any sandalwood, teak or blackwood tree standing in a strip.

No.

of 1922.

Copy forwarded for information and guidance to

REVENUE DEPARTMENT.

Secretariat, Fort, Bombay, 7th April 1922.

No. A.-414.—The Government of Bombay are pleased to direct that the existing paragraph 3 of the rules for the regulations of privileges in the Reserved Forests of the Kanara District, published in Government Notification No. 6079, dated 27th June 1911, printed at pages 1026 to 1029 of Part I of the *Bombay Government Gazette* of 29th idem, should be replaced by the following:—

“ 3. (a) *B. General.*—The occupants of rice and garden lands may cut and clear undergrowth (except sandalwood) within a strip of the forest land adjoining their cultivation, the limits of which shall be fixed by the Collector : provided—

(i) that the minimum width of such strip shall be 44 yards and the maximum width shall not exceed 100 yards ;

(ii) that the exercise of this privilege shall not be allowed in Kāns ;

(iii) that this rule shall not be applicable to any lands assigned for *betta* or *ben*;

(iv) that the land to be cleared has first been demarcated in accordance with the directions of the Collector ;

(v) that in cases where the cultivated area consists of a number of occupancies only some of which adjoin forest land ; the occupants may exercise this privilege jointly or according to such agreement as they may make among themselves, save in any portion of such forest land which may be separately demarcated and assigned to any individual in consideration of the payment of assessment.

(b) Such occupants may, if they wish, enclose the demarcated area with a fence, ditch, or wall, and they may erect on that area cattle sheds, sugar-mills, or other temporary buildings connected with their agricultural requirements, and dig ditches, wells and drains, and construct roads or paths.

(c) They may lop any tree except sandalwood standing in the area for cattle bedding and manure.

(d) They may also remove from the area clay and stones for agricultural purposes, and dead wood for firewood.

(e) They may also for *bona fide* agricultural purposes cut and remove any tree except the following:—

Sandalwood, teak and blackwood of any size.

Matti.

Karimuttal.

Nandi.

Honne.

} When they exceed 36 inches in girth at breast height.

Permission may be granted, at the Collector's discretion, to individuals to cut and remove any of the above excepted trees (except sandalwood, teak and blackwood) on such conditions as the Collector shall prescribe.

(f) The use of fire for the clearing of strips may be permitted by the Divisional Forest Officer at his discretion. He may, if he thinks fit, direct that the firing should be carried out under the supervision of an officer of the Forest Department. The person to whom permission for firing is granted will be held responsible that the fire does not spread into the forest and such responsibility will not be removed by the presence of a Forest Officer if it appears that the person to whom permission has been given has not done everything in his power to prevent the spread of fire into the forest.

(g) Permanent cultivation shall be permitted in the strips only on payment of assessment and in areas specially assigned for the purpose. But the Collector shall have power in order to facilitate the clearing of a strip, to grant permission for temporary cultivation, either with or without assessment as he shall think fit.

(h) The strips shall continue to be portions of reserved forest. The Divisional Forest Officer may order the cutting and removal of any sandalwood, blackwood or teak trees standing in the strips, and shall have power to permit, refuse and regulate the use of fire therein; but in other respects the strips once demarcated are to be considered as withdrawn from the administration and control of the Forest Department, and to be under the administration and control of the Revenue Department.”

By order of the Government of Bombay,

G. A. THOMAS,

Acting Secretary to Government.

Wild Animals.

Report of the Committee appointed to consider the question of protection of crops from — and stray cattle.

GOVERNMENT OF BOMBAY.

REVENUE DEPARTMENT.

Resolution No. 4058.

Bombay Castle, 31st January 1924

Letter from the Director of Agriculture No. A-5498 dated 17th July 1923—Submitting the report* of the Committee appointed to consider the question of protection of crops from wild animals and stray cattle.

RESOLUTION—The thanks of Government are due to the Committee for the extremely interesting and useful report submitted by them. The recommendations of the Committee as summarised in paragraphs 49 and 60 of the report are dealt with below

2 *Paragraph 49-c of the report.*—The proposal of the Committee that a special officer be appointed is under the consideration of Government. Meanwhile the attention of the Principal, Bombay Veterinary College, and the Superintendent, Civil Veterinary Department, Bombay Presidency, should be invited to the suggestion made in paragraph 31 of the report regarding the investigation of the diseases of pig, and they should be requested to submit a report to Government on the point

3. *Paragraph 49-f*—Government agree with the Committee that co-operative schemes of fencing should be encouraged. Takavi should be given for the purpose exclusively through the Co-operative Department. The model bye-laws drawn up by the Registrar of Co-operative Societies are approved. Persons willing to go in for schemes of co-operative fencing should be organised in Co-operative Societies which can then be financed by loans from District or Central Banks under the bye-laws framed by the Registrar. It will also be open to the Registrar to grant takavi under the scheme sanctioned in Government Resolution No 57-A, dated 4th July 1922.

4 *Paragraph 49-g.*—The Commissioner in Sind and the Commissioners of Divisions should be requested to favour Government with their opinions on the proposals made by the Committee

5. *Paragraph 49-h.*—Government are not prepared to accept any liability for damage done by pig or contribute to the cost of fencing

6 *Paragraph 49-i*—Government agree with the proposal made by the Committee, and the Director of Agriculture should be requested to take steps to give effect to it

7 *Paragraph 49-k, l, m and n*—The Commissioners should be requested to favour Government with their remarks.

8 *Paragraph 49-o*—The Commissioners should be requested to state whether a rule similar to the Kanara privilege rule 3 for the clearance of strips round cultivation can be introduced elsewhere than in the Kanara District

9 *Paragraph 49-p.*—Government agree that the use of poisons should be extended. Associations should be formed in the villages for the purpose and the administration of poison should be entrusted to some responsible person or body of persons. Government will be prepared to consider the appointment of a small special staff under the Agricultural Department which would travel over the infested areas, advise the people and show them

*Copy appended.

how to use the poison. The officers of the Revenue Department should also co-operate. The Director of Agriculture should be requested to submit detailed proposals on these lines for starting a poisoning campaign.

10 *Paragraph 49-g.*—Government agree with the proposals made by the Committee. The Director of Agriculture should be requested to submit a report.

11 *Paragraph 49-r.*—The Committee's proposal cannot be regarded as a practical proposition under the present circumstances. Until the people are accustomed to the idea of using poisons widely, action cannot be taken on the lines proposed.

12. *Paragraph 49-s.*—The Commissioners of Divisions should be requested to report in consultation with the Chief Conservator of Forests.

13. *Paragraph 49-t.*—Government agree with the recommendation made by the Committee and are pleased to direct that a provision of Rs 5,000 should be made in the next year's budget as an item of new expenditure. The Director of Agriculture should be requested to report whether the rayats would be willing to pay half the cost of the operations. The provision should be made for one year only, the period being extended if the operations prove useful.

14 *Paragraph 49-u.*—Except in a few areas the damage caused by deer and antelope is not so great as to require drastic measures for their extermination. As regards *Nilgai*, which are a serious pest in parts of Thana and Gujarat, the Commissioner, Northern Division, should be requested to report whether any special measures such as revival of the system of giving rewards for killing them or the grant of permission to follow and shoot them in reserved forests are necessary.

15. *Paragraph 49-v.*—Elephants are an extremely localised nuisance which can be dealt with, when necessary, by granting permission to sportsmen to shoot them and retain the tusks in case of tuskers or by deputing a special officer for destroying them.

16. *Paragraph 60-a and b.*—The Committee's proposals regarding the amendments of the Cattle Trespass Act and the problem of stray cattle should be forwarded to the Commissioner in Sind and the Commissioners of Divisions for favour of remarks.

17 *Paragraph 60-c.*—The question regarding the cattle of professional breeders is being dealt with separately in connection with the Cattle Committee's report.

18 *Paragraph 60-d.*—The problem of stray cattle in the Konkan has been well set out by the Committee but no remedy can be devised until the Agricultural Department succeeds in finding effective substitutes for rab.

By order of the Government of Bombay
(Transferred Departments),

A. R. DALAL,
Deputy Secretary to Government

G. R. No. 4058, R. D., dated the 31st January 1924

To

The Commissioner in Sind,
The Commissioners, N., C. and S.
Divisions,
All Collectors, including the Deputy Commissioner, Upper Sind Frontier,
The Chief Conservator of Forests, Bombay Presidency,

The Conservators of Forests, N., C. and S. Circles,
The Agent to the Governor, Kathiawar,
The Resident, Kolhapur, and Political Agent, Southern Maratha Country States,
All Political Agents,

<p>The Director of Agriculture, The Registrar of Co-operative Societies, The Superintendent, Civil Veterinary Department, Bombay Presidency, The Superintendent, Civil Veterinary Department, Sind and Rajputana, The Principal, Bombay Veterinary Col- lege, The Director of Information, The Inspector General of Police, Bom- bay Presidency, The Accountant General, The Finance Department, The Home Department, The Political Department,</p>	<p>The General Department, The Public Works Department, The Editors' Tables, The Editors of Newspapers, Non-official Members of the Legislative Council, *All Local Governments and Administra- tions *Devan Bahadur K. R. Godbole, *Rao Bahadur V. S. Naik, T. Gilbert, Esquire, Rao Saheb M. L. Kulkarni, Rao Saheb Bhimbhai M. Desai, Dr H. H. Mann</p>
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*By letter.

No of 1924

Copy forwarded for information and guidance to