*Sheep.

For the sake of brevity this paper has been given a title, which if comprehensive, errs on the side of indefiniteness.

I have, however, limited its scope to a general consideration of the improvement of the sheep of the Presidency in the light of the experience we are gaining from our work at Hagari, which work will be referred to in detail.

Before proceeding further I wish it to be understood that there is no pretence of treating this subject profoundly; we have not been experimenting long enough for that. But in work of this nature it is well periodically to re-state to one's self the problem that one is attacking, to take stock of the progress that one has made and to consider whether the methods adopted are such as are likely to bring one as quickly as possible to the desired end or whether they merely lead to a side track. At such times, honest criticism from others including the man whom one is endeavouring to influence and aid is helpful and welcome. It is mainly with this object in view that this paper has been prepared.

I propose, in the first place, to review very briefly, the different breeds of sheep that are to be found in this Presidency, secondly to treat fully the one breed, with which we are working giving an account of the breed the local method of breeding sheep, the work we are doing, and the results we are obtaining &c., and lastly proceed to the wider question of how to bring about a general improvement.

First then, as to the breeds. So far as I have been able to learn from inquiry and observation there appear to be five main breeds of sheep in this Presidency. In two of these, the coat is hairy and in the other three woolly.

The hairy breeds are (1) the familiar red-brown sheep to be met with in practically every district but in greatest numbers in those

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districts bordering on the east coast which has been honoured by the name of "The Madras Breed" and which is, I should say, numerically the strongest of all; and (2) a white sheep found in greatest numbers in the more easterly taluks of Guntur District, but also to be found in other districts and which differs little from the red-brown breed and may possibly be just a white variety of that breed.

The woolled breeds are (1) the coarsely woolled breed of the Nellore District, specimens of which are commonly white in colour and very long in the leg. It is the biggest of the breeds and bears the doubtful distinction of being the tallest breed in India; (2) your own local breed, named after this district (Coimbatore) which is in good repute for the quality of its mutton and which is, I think, the smallest of the breeds; and lastly, the Bellary breed, with which we are working and which I shall refer to again shortly.

None of these breeds are pure, either in the sense in which the term "pure breed" is generally understood or in the sense that the various flocks of which a breed as a whole is comprised contain the same variations. Each breed has contributed to and received contributions from one or more of the others. The Madras breed because of its being so widely distributed, has contributed to all the other breeds.

Differing greatly from one another as these breeds do, they have one point in which they closely resemble and that is their conformation. Take whatever local flocks you please, you will find that the greater portion of the individuals therein, are high in the shoulder, razor-backed, flat-sided, narrow-chested and wear an air of depression suggestive of a long course of steady and persistent ill-management.

So much for the breeds. We now turn to the Bellary breed. Though named after Bellary District, flocks of this breed are to be found all over the Ceded Districts and in Chittore. I have seen specimens as far south as Koilpatti and as far north as Vizagapatam. It is probably an offshoot of the Mysore breed and tradition has it that there is some admixture of merino blood which came in through the dispersal of a Government flock of merinos maintained some years ago

in Mysore. This may be so, but I can find no evidence of it, either from inquiry or from the breed itself. As a breed it is less leggy than the two hairy breeds or the Nellore and usually a few individuals of fairly good shape are to be found in each flock. The ewes are remarkably good mothers. A few other points connected with the breed will be found in the following account of the local sheep industry which I have taken verbatim from the annual report of the Hagari Agricultural Station.

"The size of the flocks varies from village to village and from about 200 up to as many thousand and in a few cases more. Usually (practically always) the sheep in a village are owned by four or five shepherds and are treated as one flock. From February to May inclusive they are grazed on the black soils of the village after the crops have been harvested, when as the shepherds say "there is good grazing." In the jonna fields, however, there is not much to be got as these are harvested too cleanly by their owners who want all the fodder they can get, but in the cotton fields grazing is better. During this period the sheep are at their best.

From June to February again, they are grazed on the waste lands and as no one thinks of doing this judiciously and in rotation these are kept as bare as it is possible for them to be, with the result that with the cessation of the rains the sheep begin to lose condition and rapidly become emaciated. No fodder is ever fed to the sheep and no shepherd ever dreams of growing a crop for the express purpose of feeding his flock. The only form of concentrated food they get is babool pods, which are to be had during the same period that the sheep are grazed on the black soils.

In most cases black sheep are preferred as they are supposed to keep condition better when food is scarce and are also supposed to withstand heat and cold better than white sheep. Also in some cases it is easier to get a market for black wool than for white, though the latter usually brings about 8 as. per maund, more than the former. Our experience on the farm is not in agreement with the statement of the shepherds on the first two points. In spite, however, of this

preference for black sheep, there is hardly a pure black flock to be seen anywhere. The ram lambs kept in the flock are for the most part black, but the desire to have a large flock prevents the shepherd from ruthlessly discarding all white lambs whether ewe or ram.

The usual proportion of one ram to about 40 ewes is maintained, but as no trouble is taken with the mating and as the rams are usually chosen from the flock itself, the members must be all fairly closely related. The rams are kept in the flock till useless and the ewes till they have dropped five lambs. The two chief mating seasons are June and November, but lambs are dropped all the year round. Three lambs are said to be obtained in two years but this does not appear to be true for all the ewes. Clipping is done twice a year in June and December as it is the belief that sheep allowed to carry their wool for a whole year lose condition. The shears used are of soft iron and of similar pattern to English shears, and the average annual clip per sheep is about one pound of coarse wool. The sheep are always washed the day before clipping as they are usually so dirty and the wool is so coarse that it is almost impossible to clip them unless this is done. Lambs are sold when the grazing on the black soils is finished, and usually bring Re. 1—8—0 to Rs. 3/ according to size. These are poor prices, but it is due to the fact that the ewes rarely get more than a bare subsistence allowance and the lambs are deprived of some of their mothers' milk owing to the desire of the shepherd to make a little money out of curds—a very short sighted policy, since he lowers the price of his stock for sale and also does not give his breeding stock a fair chance from the beginning."

The local method of raising sheep varies in detail from tract to tract but we may take it that in the main the system is as careless as I have detailed above throughout the whole Presidency.

And now as regards our work: We started work in the hot weather of 1912 by purchasing a few ewes and ewe lambs from local shepherds. These were all white woolled and with two exceptions black faced. The ram we used was white woolled and black faced and was obtained from a village (Tornagall) from which no ewes had been

bought. We were fortunate the first year in that one ewe shortly after its arrival at the farm dropped a good black-faced ram lamb and then within the year improved upon this performance by giving us by the Tornagall ram a still better ram lamb, also black-faced. The first of these lambs we called Hagari No. 1, and the second Hagari No 2. They have both been used as stud rams. The latter is in use at present. We have, however, been unfortunate in that most of the lambs dropped have been ram lambs, though this has had its compensations.

I have said the breed was not pure. The following account will abundantly prove this. From known matings of these white woolled ewes and the three rams already mentioned we have obtained if we consider colour of coat alone at least 7 different types:

(1) altogether black. (2) Black, except for a white blaze on the forehead similar to that seen on many specimens of the red-brown breed. (3) Black on the back and sides and red underneath. (4) Black and white i. e. pie-bald. (5) Black-faced and white woolled. (6) White all over but with pigmented skin. (7) White with pink skin. Add to this that both rams and ewes may be horned or hornless, that some give more wool than others, some have coarser wool and some finer, and some fatten more readily than others and you will have some idea of the mixture with which we are working.

What we are trying to do is to establish a pure white-woolled breed, which with fair treatment will give an average annual clip of about 3 lbs of wool and which will fatten readily. We have chosen white wool because it brings a better price than what is ordinarily termed black and because after the first clip a black sheep begins to turn grey.

In order to get the colour right as quickly as possible our first plan was to use the same ram for all the ewes and continue to do so until each ewe in turn had produced a ram lamb. Each ram lamb when old enough would then have been used on its own dam and her progeny. From the numbers we expceted to be able to tell how the inheritance of colour ran and would also find out which of our strains

were pure. The care and trouble required to do this is enormous and too much dependence has to be placed on the shepherd who does not understand what is being done. The plan has therefore been abandoned, except for one or two of the best ewes.

Regarding the weight of fleece we are not, I think, aiming at an exceedingly high mark. Hagari No. 2 has every year so far given us a clip of 3 lbs or over, so that we have made a step in the right direction and if his progeny take after him at all as we expect, we have every hope of succeeding in our aims.

As regards fattening quality I propose to give you an account of an experiment which we have carried on now for two years which will show that we are likely to achieve our aims in this respect sooner than in the case of the other two points.

The plan on which we are working now, is to use the best ram we have, considered from all points of view, for all the ewes and to discard all ewes below a certain standard. If a good ewe gives us a ram lamb, not good enough to displace the stud ram but as good as *that ram*, we will use it on its dam, and try and get something better.

Our grazing grounds at Hagari consist of about 50 acres of uncultivated land, which I shall describe more fully later. We have also about 9 acres of garden land and it is in connection with this land that the fattening experiment was tried. On this land we are in the habit of growing green-manure crops during the hot weather months. We have found some difficulty in getting these crops well worked into the soil if they have grown at all well, even if a light iron plough is used. If however the crop is grazed (not heavily) by sheep, this difficulty disappears. Then the question which arose was why the average garden cultivator should not grow a leguminous catch crop, buy a few store lambs, fold them on this crop, fatten them and sell them at a profit, making some money and at the same time getting his land well manured.

To solve this question, we bought some lambs in the hot weather of 1914, folded them on green crops of cow-pea and teegapesalu, and fed them with cotton seed.

We got some useful information but on the actual transaction no hard cash was received as profit. There were three reasons for this: (1) that the lambs themselves did not, owing to their previous treatment, thrive as well as they ought, (2) that the cost of raising the green crops that year was high and (3) we charged the whole cost of raising these crops against the lambs and credited them only with the value of the manure they gave, which we valued at 50 per cent., higher than the local rate for penning sheep.

We, however, had the consolation that whatever may have been the result as regards the lambs there was no doubt about the advantage on the crops of ground-nut, ragi and tobacco we raised on the fields that were penned in this way. They were easily the best we had ever obtained. Ground-nut in particular gave us a yield 75 per cent. higher than our best yield previously recorded and that on one of the sandiest fields in the garden. I consider we gained by the whole transaction.

This hot weather we tried again, using the ram lambs we had been so plentifully blessed with. They were fed for a short time with hay and groundnut cake and then with hay, green crop and cake, until the green crop was finished. The weight of each animal was recorded at the beginning of the experiment and thereafter at intervals of one month until sold. I have here some statements giving the results of both these experiments and if you will bear with me I will trouble you with some figures.

THE 1914 EXPERIMENT—100 DAYS.

The total charges including the cost of lambs, the cost of producing the green crop and folding charges, feeding with hay and cotton seed amounted in all to Rs. 147/ in round figures. Our receipts amounted to Rs. 132-8-0 in round figures. We thus made an apparent loss of Rs. 14-8-0. Against this, we have to place Rs. 20 as the value of penning calculated at twelve annas per hundred sheep. Also considering the excellent crops that the penned fields produced, part of the cost of producing the crops might very well be charged against the fields. If we allowed nothing for the penning and charged half of

the cost of producing the crops against the field, our loss of Rs. 14-8-0 will be converted to a gain of (Rs. 27-12-0 – 14-8-0) or Rs. 13-4-0.

For the experiment the lambs we bought were about 6 months old and on the details we have recorded one cent of crop would graze eight lambs for one day.

THE 1915 EXPERIMENT—150 DAYS.

This experiment was made more elaborate than last year. The lambs used can be divided into two lots. One lot varying in age from 11 months to 14 months at the beginning of the experiment and the other from 4 months to 8 months. For the first month progress was slow and the average increase per head for the older lot was only 4. 7 lbs and for the younger 2.8 lbs. In the second month, the increase was more rapid being 15 lbs and 12. 6 lbs respectively. In the third month the amount of increase fell in the case of the older lot to only 3. 8 lbs and in the case of the younger lot to 7. 5 lbs. Thereafter the amounts of increase were small and after the 4th month which brought us to the beginning of the monsoon the older lot actually began to fall off in weight. We ought to have sold at the end of the second month and certainly not later than the end of the third month. Why we did not do so was because the market at Bellary was dull and we tried to sell in ones and twos but could not get decent prices. Finally in desparation we sent them to Bangalore and are regretting that we did not do so sooner, although it cost us Rs. 2 per head to get them there.

Our charges on this experiment, taking cost of cake including crushing, cost of hay, wages of the cooly who looked after the sheep while they were grazing, half the cost of producing the crops and cost of taking the sheep to Bangalore amount to Rs. 120 in round figures. Our receipts amount to Rs. 142—8—0 in round figures, leaving us with a profit of Rs. 22—8—0. The figure for receipts is obtained by subtracting the estimated value of the lambs at the beginning of the experiment from the actual price received at the end of the experiment. Unfattened sheep sell at about 12 lbs. per rupee live weight, and our values have been estimated on this basis. The figures obtained tally closely with actual offer made for these lambs just

before we began the experiment and I have if anything rather over-estimated their values than underestimated them.

When fattened the sheep sold at $7\frac{1}{5}$ lbs. per rupee live weight. The crops this year were hardly so heavy as the crops of last year but did not cost so much to produce. One cent supplied sufficient grazing for four sheep.

And now gentlemen, I think I have said enough to give you some idea of what we are doing. It now remains to link up our results and experience with outside conditions.

The first conclusion that is forced on one is that improvement of the local sheep will have to start with improvement in management. Under this head I place improvement in pasture and general care of the flock.

When all the sheep of a flock are given no more to eat than is sufficient to keep them alive, they all appear very similar and very bad. But when given ample food it speedily becomes obvious which are the better animals and which are most likely to do credit to their pasture. Also one cannot grow good lambs either for sale or for keeping up the stock of breeding ewes if their development is retarded before birth by ill-feeding of the ewes and after birth by depriving them of some of their mothers' milk.

Our pasture at Hagari was at one time part of the common grazing ground of the neighbouring village and was then as bare and lacking in shade as that area is now. By roughly fencing it, restricting grazing and planting trees, it has been greatly improved and will now carry comfortably 30 ewes with their lambs. It has now become valuable enough to fence in properly. For its further improvement we are depending on babool trees and kolaikattai grass.

Hagari farm is situated in the driest tract of the Presidency and if sandy land such as we have there, can be converted into fair pasture, it is not unreasonable to suppose that it can be perfectly well done in other parts with a better rainfall. Improvement in pasture will have to proceed on the lines of fencing and judicious grazing combined

with planting with grasses and babool trees. For lighter lands Kolaikattai is as good a grass as one could wish for and for heavier soils, Chengali, Marawalli and Hariali, may be recommended.

As regards care of the flock I have already referred to the points in which it is defective.

If these points are attended to, further improvement can be brought about by proceeding on the lines which we are now adopting. By limiting the size of the flock to the grazing area available, breeding from the best rams and discarding all poor stock rapid improvement can be brought about. One ewe which with fair treatment will give one lamb worth Rs. 6, is more valuable than 2 ewes, which with bad treatment will give 2 lambs each worth Rs. 3, because it does not eat so much as the two ewes.

And now one word as to the shepherd himself and I have finished. He is conservative, he is poor and some of his practices are bad, but there are among them men of intelligence who understand that there are possibilities of improving their flocks and we hope when we have got sufficient results to show them to get hold of some of these men and get them to make a start.

Improved Agricultural Implements.*

Ever since the various Governments in India decided to interest themselves in the improvement of Indian Agriculture the question of improved implements has bulked very largely in their programmes so largely indeed that in this respect one may say enthusiasm has run riot. But as you are aware, the attempt to introduce any of them into general adoption proved a failure and beyond a few dilapidated relics of some of these implements which one occasionally comes across in Government farms, there is little left to remind us of these attempts. But even though it was a failure and became a fit object for ridicule I

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