On the Influence of the Australian Climate and Pastures upon the growth of Wool.

(IN ABSTRACT.)

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I confess that it is with the greatest diffidence that I approach the subject indicated by the title of this essay, knowing as I do that the question to be considered is one whose solution involves interests of vital importance to the progress and prosperity of the Colony—a Colony teeming with undeveloped natural resources, and awaiting only the expenditure of capital and industry to bring forth her inexhaustible treasures to the light of day. I must at the outset crave indulgence if I should advance ideas or hypotheses at variance with popular opinion or the expressions of recognized authorities.

It has been asserted that a change for the worse has been taking place of late in the character of Australian wool; and various causes have been assigned as having operated to produce this alleged deterioration. By some it is attributed to the want of proper care on the part of sheep-owners in the selection and crossing of breeds and in culling the flocks, while others put it down to an insane attempt to breed the same class of sheep in every part of this immense territory under widely varying climatic and other conditions. But it seems to me that a very obvious cause—one far more likely to produce the deterioration complained of than either of these—has been almost entirely overlooked.

One authority asserts that "the characteristics of our Australian Merinos have been ruined by the introduction of Rambouillet, Nigretti, Saxon, and other fine-woolled rams, undoing all that our fine climate had effected for generations past in establishing the qualities for which our wool was so renowned." Here, it will be seen, the high degree of perfection attained by Australian wool is ascribed to the influence of climate alone; and this view appears to have been generally accepted for many years past. Mr. Henry Hughes, wool-broker, London, before a Committee of the House of Lords, as far back as 1828, says:—"The Australian and Van Diemen's Land wools have been of varied qualities, but all possessing an extraordinary softness, which the manufacturers here so much admire that they are sought for far more than any other description of wools, from that peculiar quality which is supposed to arise from climate alone." But the climate, I am
convinced, has undergone no material change since 1828, and why
should not our wool present the same remarkable qualities now-
a-days as then; for surely the influences which produced these
effects fifty years ago are capable of producing the same effects at
the present time, and the sheep now being imported ought to be
benefited just in the same way as the early English merinos
were. If these authorities are correct, the introduction of a few
foreign sheep need cause us no alarm.

It appears to me, however, that these causes which have been
suggested are quite inadequate to account for any great deterio-
ration in the quality of our wool, or in the type and character of our
sheep; and I am convinced that if any change has really taken
place at all, the true source of the mischief is to be found in the
operation of a very different set of causes, to which until lately the
majority of our sheep-owners have paid little or no attention, and
whose importance even now they seem very imperfectly to realize.
I allude to the gradual but wholesale destruction of the native
grasses and herbage all over the country, resulting from the prac-
tice which prevails in almost every part of the Colonies of grazing
immense flocks of sheep year after year on the same pasturage,
without giving any rest to the land to allow of the renewal of the
herbage or the reproduction of seeds. Every blade of grass, as it
appears above ground, is immediately eaten down; and thus those
species which are best adapted to the constitution of the sheep are
in time either entirely eradicated or become so altered in their
growth and chemical composition as to be utterly unfitted to
maintain the animal in the healthy thriving condition necessary
for the production of a good sound staple of wool. If we carry
our thoughts back for a moment to the profuse richness of the
native grasses and succulent herbage abounding at the time when
Mr. Macarthur first introduced Merinos into these Colonies, and
then look at the scanty juiceless roots and grasses that are to be
found on the majority of our runs now-a-days, a little considera-
tion ought to make it clear even to the most sceptical that the suicidal
policy so unremittingly pursued in our system of sheep-grazing is
ruining our pastures, depriving our runs of their fertility, and must
inevitably have the most disastrous effect upon the production of
our wool. How can it be expected that sheep will thrive and pro-
duce good wool when they are badly or insufficiently fed? Under
such conditions scurvy or a cachectic state of constitution is as
readily produced in the lower animals as in man. Stinted feed
gives imperfect stinted fleeces, with a brittle, harsh, irregular,
yolkless staple; and breaks or flaws in the wool truly indicate
irregularities in the quantity or quality of the pasture, just as the rings
in the trunk of a tree denote variations in the seasons. It is absurd
to think that sheep can ever be maintained in the same uniform
condition unless proper attention is paid to the nature of the food
on which they have to live and grow wool and mutton. I do not
deny that some improvement may occasionally be effected in a
flock by crossing with a fresh breed and paying careful attention
to culling, but this is not enough; breed, import and cull as we
may, if the supply of food be irregular or defective in quality, our
labour, notwithstanding all our vigilance and industry, must prove
abortive.

The increase in the number of our store sheep affords a too true
index to the real poverty of many of our runs. If we improve our
grass lands we take the most effective measures to transform
crawlers into marketable wool-bearing sheep; and by increasing the
grazing capabilities of the soil the Colony may be made to support
a much larger number of sheep than 30 millions, as at present.
If proper attention be paid to this subject, I feel assured that the
time will come when instead of allowing 4 acres to one sheep, the
land will be able to carry four sheep to the acre.

The ignorance of most of our sheep-owners with respect to the
kinds of grass best suited for the sustenance of their flocks is a
fruitful source of failure. I question whether many of our
grazers are able to tell what species of grasses are to be found on
their runs; a great number of them, I believe, are even incom-
petent to distinguish between one species and another. A flock-
master riding over his run, and seeing abundance of grass in
every direction, immediately concludes, perhaps, that there is no
scarcity of food for his sheep, whereas this very abundance ought
to make him suspect, if he were to think for a moment, that
something was radically wrong; because, with his flocks con-
tinually grazing over the same ground, the grass should not be so
plentiful. In almost every such instance, the cause of this
supposed superabundance of forage lies in the fact that it is not
the food congenial to the animal's constitution—that it does not
contain those elements which the sheep require for their sub-

The really valuable grasses are cropped down to the
ground again and again, and eventually become very much deteriorated
or entirely disappear, while the tall, worthless weeds are left to
thrive and spread and become permanent fixtures on the soil. If
more attention were paid to the study of the nature of our indi-
genous grasses, their suitability for sheep pasture, and their times
of flowering and seedling, much of the annual loss of sheep which
now takes place would be avoided, and stock-owners would not remain
half so much at the mercy of the periodical droughts that
tell so severely on the flocks and affect so injuriously the yield
and quality of the wool. Sheep must be provided with those
grasses which contain the elements best suited for their animal
economy and the nourishment of the wool. It is as impossible
for wool to be sound, healthy, and elastic with an insufficiency of
yolk as it is for trees to flourish without sap; and this yolk can
only be derived from the grasses and vegetable matter consumed by the sheep. It contains a great quantity of potash, and if the food be deficient in that substance, the flocks cannot thrive and produce good wool.

The Government, I think, ought to adopt some means of acquiring and disseminating a more familiar acquaintance with the various native grasses, their characteristics of growth, and their nutritive qualities, in order that graziers might be enabled to discriminate between the wholesome species and those which are valueless or noxious, and distinguish the early from the late varieties, and the hardy from the too delicate. They could then take steps to propagate or conserve those only which are valuable for grazing purposes. A proper classification of our grasses would furnish far more satisfactory means of describing the character of a run, by stating the nature of the pasture, than the present method of merely stating that it is timbered with gum, pine, myall, box, or iron-bark, as the case may be. From a list made out by Linnaeus, in Sweden, of the grasses of that country, it appears that there are 387 different varieties, not less than 141 of which sheep will not touch. A list of the grasses will be found in the second volume of the Annals of Agriculture. There are scores of indigenous grasses in these Colonies that sheep refuse to eat. If not poisonous, they are at least instinctively avoided by the flocks as unsuited to their nature; and it would be a most advantageous thing if our graziers had some reliable guide to assist them in picking out these species, so that they might do their best to eradicate them. If a School of Agriculture should ever be established in the Colony, I hope a study of the grasses will form part of the curriculum. In a young country like this, practical information on matters of this kind is of the highest importance, and unless some effort is made to keep up the standard of our pastures, our reputation as wool-growers in the British markets will soon be gone for ever.

The reason that sheep prosper so well on box-timbered country is that this wood contains a large amount of potash, which, as I have before pointed out, is one of the chief ingredients in the yolk of wool. Of this fact any one may satisfy himself by watching a box-tree burning. However green it may be, it will be found to consume readily, leaving behind a large quantity of fine white ashes, which are to a great extent composed of potash. This alkali in solution is taken up by the vegetation which forms the food of the sheep; and it is found that the sheep in such districts are remarkably free from disease and produce excellent samples of wool, requiring very little washing. The amount of potash extracted from a run by a flock in the course of a year must, however, be something enormous—in some instances it forms a
very large proportion of the entire weight of the fleece—and unless some measures are taken to supply the loss, the grazing capabilities of the land must be seriously impaired.

Oleaginous and saccharine plants furnish the chief source of animal heat, whereas salt (chloride of sodium) is principally expended in keeping the organs of digestion in an active state. Its action is as follows:—The chlorine unites with hydrogen (from water) and forms hydrochloric acid, an ingredient abundantly contained in the gastric juice, while the soda goes to the liver to aid in the formation of bile. The bile is to the animal economy what tannin is to the vegetable—it is that which prevents a too rapid decay taking place in animal or vegetable matter before it has undergone a thorough process of digestion and assimilation. Without bile or tannin, all things would have a tendency to decay and putrefy; they are the chief agents, in fact, in the preservation of vitality. It is the presence of tannin in wines, for instance, which causes them to keep so well. Who knows but that foot-rot, catarrh, and many of the other diseases which sheep are subject to, owe their origin to the absence of a sufficiency of saccharine, oleaginous, and saline matter in the food, reducing the vitality of the animal so that the various organs become incapable of performing their functions. It must be remembered, however, that an excess of salt has the effect of impoverishing the blood, and that if the nutritive elements are wanting in the food, it is likely to do more harm than good. The degeneration of the grass which I have alluded to has robbed the food of the sheep of its natural sweetness and nourishing properties, and yet as a rule nothing is supplied by the owners, with the exception of salt. I think that it would be far more beneficial if sugar, in some form or other, were furnished to the flocks, and I would suggest the cultivation for this purpose of saccharine plants, such as sugar-cane, turnips, sugar-beet, mangolds, &c. These plants would be very valuable in case of such ailments as catarrh, worms in lungs, &c.; oil-cake, too, might be used with advantage.

The practice of over-stocking, unfortunately almost universal in these Colonies, has had much to do with the falling off of our pastures, and the consequent depreciation of the wool. Quantity rather than quality seems to be the aim of almost all our squatters, and the result is that we find thousands of sheep on almost unlimited runs with but little wool, where, with reduced runs, and smaller but more select flocks, there would be abundance of grass and a good yield of wool. Good grass lands, in small divisions, will keep and fatten many more sheep than when in large blocks. A good plan to adopt is to subdivide runs into paddocks of convenient size, and allow them in rotation intervals of rest; the grass will then have an opportunity of arriving at maturity,
and time will be given for the production of seeds and the growth of new herbage. It is especially necessary that some of the paddocks should have a spell, say for a few weeks or months, so as to have abundance of grass for the ewes during the beginning of the lambing season. They will then have no difficulty in filling their bellies, and will not have to be continually walking from place to place in search of food. The milk will be found to be richer and more plentiful, and the lambs as a consequence will be stronger and healthier. It is only natural that sheep should suffer materially if they have to be dogged and driven backwards and forwards all over the run to get enough grass to satisfy their hunger. A good percentage of healthy lambs, with a healthy constitution, cannot reasonably be expected when lambing takes place at some miserable barren station, with hardly a vestige of food, except, perhaps, a little trefoil. If proper care were taken at this season, a great deal of trouble later on would be saved; for culling is generally simply an attempt to remedy defects that have arisen from the ewes being starved or neglected at lambing-time. Rest to the ground is quite as necessary for the growth of grass as for that of cereals. No matter how good grain may be, it will never come to perfection in exhausted soil, and the same rules hold good with regard to pasture. From carelessness in this respect on the part of sheep-owners, many of the most valuable plants and grasses that grew so luxuriantly in the early days of the Colony are fast disappearing, and the carrying capabilities of our runs decreasing enormously. Take a ride over any of our squattages now-a-days, and the experienced eye cannot fail to detect the absence of numerous grasses, and those the species most noticeable for their fattening qualities, our annuals or summer grass especially.

A great deal of harm, in my opinion, is occasioned by the interference of wool-brokers in advising their clients to cross with this breed or that, to cure imaginary defects in the wool. If the sheep-farmer is unable to transact his own business without such assistance, it would be far safer for him to sell out at once. If he is anxious to obtain trustworthy advice as to the quality of his wool, he should seek it of the manufacturer, and not of the woolbroker, whose interest it is to be always fault-finding in order to be able to buy to advantage. He is almost certain to find some excuse to depreciate the clip, no matter how well the wool may have been got up, or how good the breeds from which it has been shorn. Suggestions are gratuitously made to correct this fault and remedy that imperfection; the breed is changed, perhaps year after year; and, shuttlecock-like, the unfortunate owner is tossed backwards and forwards from broker to stud-breeder until his purse becomes exhausted, his flocks are ruined, and the Insolvency Court stares him in the face.
The importation of new breeds is frequently resorted to for the purpose of curing evils arising from negligence and mismanagement in the system of grazing; but unless the root of the evil be attacked no improvement can be lasting. Any one who will devote serious attention to the nature and quality of pasture may save himself the expense of going beyond his own district or Colony for fresh blood. There seems to be an idea that if sheep only possess breed, no matter how they are fed, the owners must turn out successful graziers and wool-growers; and we find immense sums—30, 300, or even 1,000 guineas—paid for a single ram of some choice breed by persons who think that in this way they will improve their flocks and secure for themselves a reputation as thorough sheep-farmers. With the immense amount of money that has been expended in the importation of so much blood and pedigree, our flocks to-day ought to shear from 6 to 10 lbs. of wool per head, whereas the average barely exceeds 1½ to 2 lbs. And there is a remarkable uniformity in the quality of the wools from all parts of the Colony, because the same system of grazing is followed by nearly all our wool-growers. Where an exceptional price has been obtained for a clip, it will in nearly every instance be found that the sheep have been paddock-fed and supplied with artificial grass, or that the customary old-fashioned methods of grazing have been departed from. It must be evident to every one that the same knowledge and experience as regards sheep and wool cannot have existed in 1828 as at the present day; and yet, notwithstanding all our boasted advance in every direction, the wool produced in the Colony then had a far higher reputation than, with a few isolated exceptions, any we send to the English market now. All our wools in those early days were alike remarkable for possessing a silky softness; and this quality, I feel confident, will be regained when the necessity for an improved rational system of management has become fully recognized.

The practice of wholesale ringbarking, I feel sure, exercises a very deleterious influence upon the growth of vegetation. Not only is the grass deprived of the protecting shade of the trees, scorched and withered by the unintercepted rays of the sun, but the radiation and reflection of the solar heat is far greater from the surface of uncovered mountains or treeless plains than from forests. The superincumbent air, therefore, becomes hotter, its capacity for sustaining vapour in suspension is increased, and thus the probability of rainfall is much lessened.

To sum up: the following are the principles which I should lay down as essential to successful wool-growing. In the first place, select an eligible breed of sheep suitable for the locality. Of course the same class of sheep will not thrive equally on hilly lands and on plains, on scrub and salt-bush country, or in the districts
of Bourke and Mudgee and those of Kiandra and New England. It is necessary that the breed should be one adapted to the conditions of climate, &c., by which it will be surrounded; and when once chosen it should be adhered to. Secondly, the flocks should be provided with proper shelter, plenty of good water, and an abundant supply of suitable grass. In the next place, the land should be allowed periodical seasons of rest, so that the various grasses may have an opportunity of being renewed by the reproduction of seeds. With this end, large runs should be subdivided into smaller blocks, which might be given a spell in rotation. Where the choicer varieties of our indigenous herbage are wanting, roots and artificial grasses should be cultivated, and agriculture and grazing can thus be profitably combined. And finally, the ruinous practice of ringbarking should be discontinued, as being prejudicial to man and beast, and injurious in its effects upon climate. If these rules are closely adhered to, I feel confident that our wool will once more take the place which it so long occupied in the English and European markets.

I have been actuated by no other motive in taking up this all-important subject, in response to the interest displayed in our welfare by the Royal Society of New South Wales, than a sincere desire to make my humble services useful to the Colony; and should this paper be the means of inducing a few of our squatters to try the cultivation of artificial grasses or the conservation of the best of our indigenous ones, I shall feel well rewarded for the trouble I have taken in writing it.

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