



FARMING IN A ZOO

A NEW LOOK AT AN OLD AGRICULTURE
WITH SOME POSSIBLE SIGNIFICANCE FOR NEW ZEALAND

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This Bulletin has been written in the hope that it might stimulate critical discussion of some problems of national importance. The views expressed are the personal views of the author and do not necessarily reflect those of the College or of any organization with which the author is associated.

New Zealand's agriculture has for a long time been more than an industry of purely local significance. It is now a part of world agriculture. Conversely, we take more and more note of the developments occurring in other countries. And we might well do so:—It has taken the human species hundreds of thousands of years to reach its present numerical level of 3000 million but at the rate things are now going it will take a mere 40 years more to add another 3000 million. One continent just beginning to experience this terrifying population explosion (with its two conflicting demands of more and more resources and more and more living space) is Africa. Here, with newly-independent nations appearing at about monthly intervals, are peoples with their minds fixed on achieving Western standards of living as soon as possible. What happens in Africa during our life times must be of great significance to us in New Zealand; so, as an ecologist (one who studies the interactions between living things or their environments) I think it is well worth while for us to examine some of the consequences of one heritage we have left Africa—Western agriculture.

The colonisers found little they considered worthy of encouraging or perpetuating in African primitive

agriculture and understandably strove to introduce more advanced European techniques into the various colonies. These were usually very different from what was traditional to the continent and the hybrid African—European agriculture that resulted was not only frequently rather less satisfactory than had been hoped for, but as such was largely the responsibility of the colonial governments concerned.

Originally, the human population of Africa was moderate in numbers and in harmony with its environment. It was stable (admittedly because of a high death rate) and the methods of taking plant and animal crops from the soil were, although inefficient from our viewpoint, such as not to deplete natural resources. To obtain their animal protein Africans fed upon a variety of mammals, most of which we now regard as game animals, and each of these fed in their turn upon different plants or, when they had a food in common, upon different parts of the same plant. Some grazed on grasses, some browsed on shrubs, others on the lower branches of trees, others on roots and so on. The great herds were mobile, moving over great distances with the seasons and, having evolved in Africa, were resistant to most of the local diseases.

Understandably, this stable pattern of which man formed an integral part, seemed inferior to the developers of Africa and, along with industrialisation, education and medical science, the administrators and missionaries praised the advantages of a new agriculture which promised more than enough to eat for all and decried the old traditions.

As this attitude has been increasingly accepted in the new Africa, Raymond F. Dasmann writes in his book "The Last Horizon"—"no natural thing remains secure, for nothing that is primitive and wild is valued. Unless wild animals can prove their worth to the critical eyes of the new leaders, they have no chance . . . We must face the question, avoided in older settled lands: How much is a wild animal worth?"

But before I try to answer that question—and the answer has some significance for New Zealand—let us look at some of the consequences of introducing Western stock into Africa. In spite of all their most obvious advantages they are susceptible to the many natural diseases of Africa and their feeding habits are such that they concentrate on relatively few plants of a particular kind. To make way for these desirable creatures the meat-bearers native to Africa (which carry proportionately more meat per carcass than any introduced stock) are now killed mainly for skins and trophies and game ranges are destroyed. The great herds are now almost gone (except in National Parks of precarious future; after all why preserve the despised native flora and fauna?) and the range lands which supported them are now burned or reburned to provide grazing for domestic breeds. These lands are then frequently overgrazed because of the still strong tradition (not confined to Africa!) that one's status in the community is directly proportional to the amount of stock one owns. Over great areas, natural ranges that once supported a tremendous number of a considerable variety of species feeding on a broad spectrum of vegetation are being continually burnt and impoverished to try to get them unsuccessfully, to carry more and more head of cattle feeding mainly on grasses. A not-unfamiliar vicious circle is the result but one on a far grander scale than anything we could have previously imagined. And this is occurring in a continent hungry for animal protein where the population is only just beginning to increase at an alarming speed because of the continuing fall in death rates at all ages. All this seems wrong to an ecologist who would have expected that attempts would have been made to introduce or use meat producers already present that

are more suited to the existing environments.

Is a great potential not only being neglected but destroyed? Can wild animals be used to feed an ever-growing, ever-hungry Africa and at the same time be saved from what at present seems to be certain extinction? In other words is there room for **two** agricultures and conservation at the same time? And what advantages, if any, would "farming in a zoo" have over more traditional methods?

Dr Dasmann (the author of "The Last Horizon") and Dr Mossman, two American scientists, recently made an economic study comparing the production of meat from domestic and wild animals from adjacent regions in Southern Rhodesia. The area was the Henderson Ranch of about 135,000 acres near Bulawayo. The owners, who were interested in both wildlife and cattle raising, used about half the property for the cattle and the other for the game animals. It was agreed that if the wild animals could be cropped economically the owners would harvest and market the game on the basis of maintaining a sustained yield.

The area is scrubby veld with an approximate rainfall of about 15 inches and supported, at the time the survey was made, about 6000 impala (a kind of antelope), 1800 zebra, 400 wart hogs, 500 kudu, 400 gnu, 100 giraffes and a lot of other game animals besides. There were various predators (lions, leopards, cheetahs, hyaenas, etc.) helping to keep the numbers of the herbivores down below the grazing and browsing limits and among the predators man was present as a poacher. After study convinced the investigators that the natural rate of reproduction of the various game species was sufficient to replace those to be cropped, shooting of a calculated proportion of impala, zebra, kudu and other antelopes began.

In Bulawayo butchers paid 1s to 1s 3d a pound for the fresh meat and the sun-dried meat (biltong) fetched 4s 6d a pound. This means that an impala was worth about £4, a kudu £12, a gnu £14, and a buffalo £24.

By a careful analysis of income and expenditure Dasmann and Moss-

man found that one truckload of game was worth £125 after the cost of ammunition and transport had been deducted. Furthermore, if the whole 135,000 acres were cropped the net annual profit from about a dozen game species would be a minimum of £8000. With rather less than the whole area being at present used for game the net income from the 125,000lb of game meat obtained from it would be £3200. If the same area were developed and stocked with cattle (one cow to 30 acres, the present carrying capacity of the farmed area) the net income would be just over £500. If, after many years' development, the game block could be made to carry one cow per 20 acres then it might eventually yield £2500 a year—still £700 below the game income. Of course, the developed land could then carry even more game. So there is no doubt that farming game is, as John Hillaby says in an article in the *New Scientist* for March 1961, "both practical and more profitable than cattle ranching on land that requires 20-30 acres to support a cow . . . The profits made on the Henderson Ranch were for meat alone . . . the sale of hides would have to be taken into consideration, as well as the potential income likely to be derived from hunting fees."

In the Republic of South Africa game exploitation for meat and hides is a well-established business and some farmers have found that production of springbuck or blesbuck is more attractive and profitable than that of sheep in certain areas.

Exploitation of wild animals for perpetual yield is not limited to Africa. In the Soviet Union in some areas it is more profitable to produce the saiga antelope in place of domestic stock, and in Scotland the Nature Conservancy is carrying out a most interesting experiment on the Hebridean island of Rhum. When privately owned these mountainous 26,000 acres carried some 50 cattle and 1200 breeding ewes and ewe hoggets. The land was suffering serious deterioration through excessive burning and through grazing by sheep and so, on taking over, the Conservancy removed them. Also present on the island were about 1500 red deer. These have been allowed to remain while restoration pro-

grammes in soil fertility and forestry have been put into action to raise Rhum to the highest possible level of biological productivity. Now the deer are harvested for venison on a perpetual scheme and the meat sold mainly to Germany. It has been found that this is not only a more profitable undertaking than the sheep farming ever was, but that, in spite of a deer population of some 1500, the island's soil and vegetation are standing up much better to grazing than ever they did when they supported sheep. Furthermore, the various conservation projects are advancing while the income from venison is still coming in.

All I have stated so far may be interesting, but has it any relevance to New Zealand? Well, into a country that was—with the exception of Antarctica—the largest in the world, without mammals (except two species of bats), we have introduced for better or worse (very frequently, alas, for worse) some 30-odd species of mammals including rabbit, deer and domestic stock. All of these have become wild and some—deer, rabbits and possums, have caused or are causing such destruction to soil and vegetation that millions of pounds are being spent to try to control them. Can we make these wild animals of ours give us anything back as do the benign game animals of Africa, Britain, Russia and the United States?

Surely no one is now so gullible that he believes that the last rabbit (or last deer, possum, pig, goat, etc., etc.) in New Zealand **will** be destroyed? Dr Walter Howard's remarks on the rabbit in the **New Zealand Farmer** of 14th March, 1963, applies equally well to all our introduced mammals: "If the rabbit cannot be eradicated, then why not learn to live with him?" There is no reason why people should not enjoy the rabbit *where he is not a pest.*" (The italics are mine, and for "rabbit" read "deer," "hare," "pig"—and even "possum" which is good eating too, by the way.)

Instead of wasting money on attempts at total rabbit eradication in areas where, at present population levels, they are no problem why shouldn't we consider getting some sort of economic return by using meat and fur? We've heard all the

old objections many times; they should be critically re-examined.

Deer, of course, are much more of a problem. There **are** parts of New Zealand where these animals are not pests and where the Forest Service apparently has no intention of trying to exterminate or even reduce them so long as their numbers remain at present levels and damage to vegetation and soil does not increase. Examples of such places are parts of Fiordland, the rolling scrublands of the Volcanic Plateau and indeed any areas where there is no erosion problem or serious competition for grazing between deer and domestic stock. On the other hand, there are large areas where **any** browsing mammal **at all**, domestic or otherwise, is a liability. The problem is to reduce deer numbers to a safe level in danger areas and to prevent immi-

gration into these from outside. Deer exploitation, already a good business in Westland (the meat is also sent to Germany, by the way) might be possible in a number of places if the animals could be contained in favourable blocks of country. But there's the rub—how to economically fence land to keep deer in. If it **could** be done (and one would first have to carefully go into the long-term economics of the venison trade, the hide trade and the potential income from shooting-licence sales) we might do very well out of deer in some localities and yet not interfere with the essential job of soil and forest conservation which always must come first. Game farming in Africa could have significance for us in New Zealand, though, of course, we may eventually find that the African techniques are not applicable here after all.

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