Lincoln College

CANTERBURY AGRICULTURAL COLLEGE

RURAL EDUCATION BULLETIN

Vol. 7, No. 7 August, 1952

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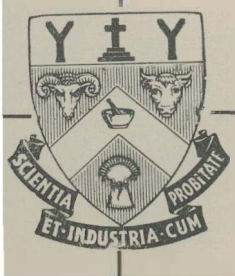


UNIVERSITY OF NEW ZEALAND

WHEAT PRODUCTION AND THE MAINTENANCE OF SOIL FERTILITY

A. H. Flay

(A talk broadcast from 3YA)

Wheat is a crop that depletes soil fertility. Pastures, fodder and leguminous crops restore fertility. Mixed farming consists of balancing the depletive and restorative crops. The balance should be such that maximum net-returns are obtained while at the same time maintaining the fertility status of the farm. New Zealand requires annually about 12,000,000 bushels of wheat—8,000,000 for bread and 4,000,000 for poultry. At our average yield of 33 bushels per acre this is the production of about 360,000 acres. Can New Zealand grow this area of wheat and maintain the fertility of her wheat lands?

An examination of the figures of the past shows that since 1900 such production has not been achieved. The highest production years gave about 300,000 acres with 354,000 acres in 1922. In recent years our production has fallen steadily to 140,000 last season and to 100,000 acres this year.

The production of our present-day requirements of 360,000 acres is mainly a matter of price, labour and opportunity for reward from alternative sources of income. It cannot be claimed that with the production of this area of wheat over a short period the drain on soil fertility would be significant. Over a longer period, however, the question of the maintenance of soil fertility is important. Not only does continuous wheat-production reduce soil fertility; it also allows an increase of weeds. Twitches, wild oats and Californian thistle are the worst and on the best soils these will prevent continuous wheat-production long before reduced fertility becomes a factor.

Wheat occupies the land for a long period compared with barley and spring-sown oats. This enables the weeds to become well grown before further attention can be given. With spring oats and barley there are several months between harvest and winter when cultivation can be exceedingly effective. Twitch and Californian thistle eradication usually requires a full summer fallow which is expensive, amounting on heavy land to £7 or £12 per acre. In addition there is no income from the area for this season. Further, a summer fallow will not eradicate wild oats. Control here requires the production of fodder crops and sowing the land to pasture.

It is well established, however, that on cropping farms soil fertility can be maintained and weed control carried out by recognised practices. These are:—

1. Sowing the land to first-class clover pasture.
2. Liming and topdressing this pasture.
3. Using a cropping rotation embodying the production of preparatory and restorative crops.

Cropping farmers apply these practices in various ways. Pasture may be allowed to stay down two years, four years, or much longer. The rotations in use are many. The general principle is that pasture of several years' standing is ploughed and sown to preparatory crops of rape, lupins, peas or potatoes, to be followed by wheat. According to the quality of the land, one, two or three grain crops may be taken in succession following the preparatory crop. On some soils after one wheat crop, oats or barley may be grown as a second grain crop. Sometimes on medium-light soil the area is sown to pasture with the first and only wheat crop. On the better soils the second wheat crop or the barley that follows the wheat may be under-sown with pasture. In other cases the grain crop is followed by restorative crops. Such crops are oats and lupins, lupins alone, or peas, according to the quality of the soil. Again, the restorative crops of lupins or peas may be followed by another wheat crop and the area then sown to pasture with this grain crop. A more recent development is to follow the last grain crop in the rotation with greenfeed oats and lupins, or lupins alone, this crop being grazed off in the spring when it is usually greatly needed. This grazing-off permits a summer fallow before sowing the pasture in the early autumn.

In the interests of weed control nearly all cropping farmers are forced to summer-fallow an area annually. Some farmers do this when taking land out of pasture. The land is skim-ploughed in October, November, or December. It is worked during the summer and autumn and sown to wheat in April-May. There is no preparatory crop grown when this method is followed. Others prefer to grow a preparatory crop and fallow at the end of the rotation in preparation for pasture. Pasture is the most valuable of all restorative crops.

The point that must be remembered is that in New Zealand economical wheat production cannot be carried out alone. It requires for the maintenance of soil fertility the cultivation and production of a large complement of other cash and fodder crops as well as the regular sowing of new pasture. The area ploughed from old pasture must equal that sown to new. The area of the farm in pasture will vary

from almost two-thirds on the medium-light soils to just under one-half on the heavy soils.

Although there is ample evidence to show that wheat production reduces soil fertility there is also adequate evidence to show that this lost fertility can be restored in a practical manner.

Over the years many cropping farmers have employed the rotations just discussed and today, with a higher annual acreage in wheat than is usual, their farms are in a good state of fertility. In other words, some farmers grow larger areas in wheat than their neighbours without reducing the fertility of their land. Canterbury mixed-farming lands may be divided into four main classes, viz., light, medium-light, medium-heavy and heavy. Wheat is grown on all but the light. On many successfully-managed medium-light land farms the complement of crops and pasture has included wheat. Examination of the figures for these well-managed properties shows that the wheat area is one-tenth to one-eighth of the entire farm. If wheat should take the place of oats, the figure is one-eighth of the farm in wheat. A similar examination of the position on successfully-managed medium-heavy soils growing wheat gives a figure of one-fifth of the farm in wheat, and for heavy soils, a quarter of the farm in wheat. And this without seriously affecting barley production. It is true that in 1951-52 only a few farms produced this quantity. The fact remains, however, that in the past these production figures have been common. A further examination of those farms with one-eighth, one-fifth and one-quarter of the farm in wheat will show that where the recommended methods for maintenance of soil fertility are followed the farms are in as high a state of fertility as they were 15 and 20 years ago—in some cases even higher. Cropping farmers, then, can maintain soil fertility and produce these areas of wheat. Farmers themselves have demonstrated this adequately.

An interpretation of soil surveys shows that there are in Canterbury almost 900,000 acres of medium-light land, and with one-eighth in wheat this gives 113,000 acres. Likewise, the area of medium-heavy soil is about 350,000 acres and with one-fifth in wheat this gives 70,000 acres. The heavy land with one-quarter in wheat gives 147,000 acres. This makes a total of 330,000 acres. Thus Canterbury could grow annually 330,000 acres of wheat and still maintain her soil fertility. This is an increase of 75 per cent. on the somewhat stable 10-year period of 1934-44 when there was produced in Canterbury an average of 190,000 acres. The area of wheat grown annually for the 1934-44 10-year period in other parts of New Zealand—Otago, Southland, Marl-

borough and the North Island—was 45,000 acres. This area could easily be increased by 75 per cent. and in Southland and the North Island by a great deal more, were it so desired, without any permanent drain on soil fertility. Thus the New Zealand wheat acreage can readily be increased to over 400,000 acres.

Since 1900 New Zealand has not grown this quantity of wheat. She could easily increase production temporarily beyond this point, but whatever happens there is little support for not growing wheat on the grounds that to do so would deplete the fertility of our soils. Crop rotations, pasture production and topdressing can readily maintain soil fertility while growing annually 400,000 acres of wheat.

CONQUEST OF THE LAND THROUGH SEVEN THOUSAND YEARS

(Continued)

(W. C. Lowdermilk)

Further west in the midst of the famous and vast loessial deposits of North China we found, in another exploration in the Province of Shensi, how an irrigation system that was first established in 246 B.C. had been put out of use by silt. Here again silt was the villain in the tragedy of the land. Silt was undoing the anxious and unending labour of the Chinese to establish a lasting adjustment to their land. We sought out the origin of the silt that had brought an end to an irrigation project which had fed the sons of Han during the Golden Age of China. The origin was found in areas where soil erosion had eaten out of the land gargantuan gullies 600 feet deep, that were advancing headward into the great mantle of fertile loessial soil. One may see remnants of terraces that were in use before the landscape was riddled by huge gullies. It was while contemplating such scenes that I resolved to challenge the conclusions of the great German geologist, Baron von Richthofen, and of Ellsworth Huntingdon, that the decadence of North China was due to desiccation or pulsations of the climate.

Temple forests gave the clue; they demonstrated beyond a doubt that the present climate would support a generous growth of vegetation capable of preventing erosion on such a scale. Human occupation of the land had set in motion processes of soil wastage that were in themselves sufficient to account for the decadence and

decline of this part of China, without adverse change of climate. In other words soil erosion, unless controlled, will undermine a civilisation. I could see that it had already done so, and, unless ways to control it were found, it would bring desolation to others including my own country.

It was in the presence of such tragic scenes on a gigantic scale that I resolved to run down the nature of soil erosion, which had proved to be the insidious enemy of civilization and to devote my lifetime to study of ways to conserve the lands on which mankind depends. Out of this experience grew a series of scientific studies in China during the years 1923-27, which were transferred to the United States in 1927 and have been incorporated in erosion and stream-flow investigations of the U.S. Forest Service and later in our movement for land conservation in the United States, under the leadership of Dr. H. H. Bennett, Chief of the Soil Conservation Service.

SOIL WASTE IN ANCIENT CYPRUS

Let's now go back and follow the westward course of civilization from the Holy Lands through North Africa and on into Europe. We shall first stop in Cyprus where we found the land-use problems of the Mediterranean epitomized in a comparatively small area. If one wishes to study land use in the Mediterranean he will find in Cyprus a summary of all major problems brought together within a small area—an introduction to, or a summary of, problems of land use of the lands surrounding the Mediterranean Sea.

In the plain of Mesaoria is written a telling record in and about a Byzantine church. The church on the outskirts of the village of Asha in eastern Cyprus is surrounded by a grave-yard and its wall. The alluvial plain now stands eight feet above the level of the churchyard as we measured it. On entering the church we stepped down three feet from the yard level to the floor of the church; but inside the church we noted that low pointed arches were blocked off, and new arches cut for doors and windows. The aged vestryman told us that about 30 years ago a flood from the plain had filled the church with water and left two feet of silt on the floor. Rather than clean it out a new stone floor had been laid over the silt deposit. Thus, 8 plus 3 plus 2 equals 13 feet, the height of the present alluvial plain above the church floor. From these measurements we concluded that the plain had filled in not less than 13 feet, very probably more, with erosional debris washed off the drainage slopes. The church pro-

claims silently and eloquently the progressive wastage of soils of the surrounding hill lands that have been cultivated up steep gradients.

ACROSS NORTH AFRICA

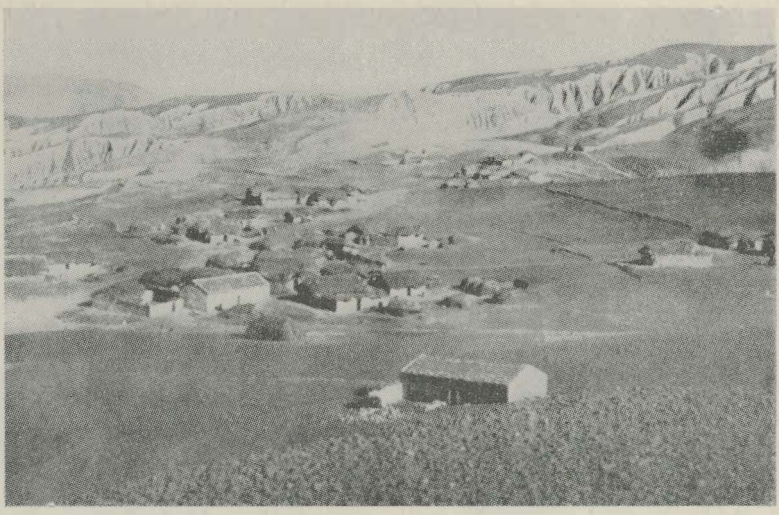
We shall now continue westward along the northern coast of Africa into Tunisia, and Algeria. Here we read the record of the granary of Rome in North Africa during the Empire, by surveying a cross section across North Africa from the Mediterranean to the Sahara Desert, from 40 inches of rainfall to four inches, from Carthage on the coast to Biskara at the edge of mysterious Sahara.

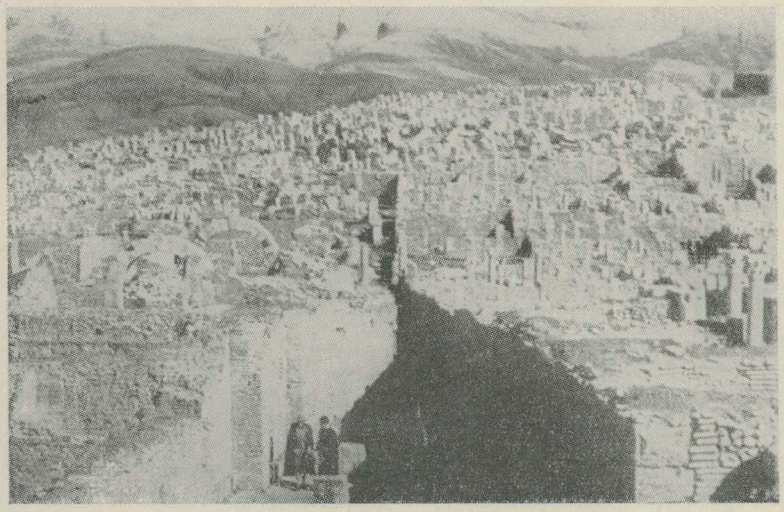
In Tunisia we found that it rains in the desert of North Africa in winter time now as it did in the time of Caesar, who in 44 B.C. complained of how a great rainstorm with wind had blown over the tents of his army encampment and flooded the camp. It rains hard enough to produce flash floods in the wadies. At one place muddy water swept across the highway in such volume that we decided to wait until the next day until the flash flow had gone down before proceeding.

As we make a rapid survey of land use across Tunisia and Algeria from the Mediterranean coast to the edge of the Sahara, through the centre of what was the granary of Rome, we shall begin at Carthage the principal city of North Africa in Phoenician times.

We stood on the site of ancient Carthage, one of the colonies of Phoenicia that grew to be great and powerful—the city that produced Hannibal and became a dangerous rival of Rome. In 146 B.C. at the end of the Third Punic War, Scipio destroyed Carthage, but out of the doomed city he saved 28 volumes of a work on agriculture written by a Carthaginian by the name of Mago, who was recognised by the Greeks and Romans as the foremost authority on agriculture in the Mediterranean. These works of Mago were translations of the existing works of such Roman writers on agricultural subjects as Columella, Varro, and Cato. This incident tells us that the traditions of conserving soils and waters that we believe were first discovered on the slopes of ancient Phoenicia had been brought by their colonists to North Africa; we suspected these measures furnished the basis of the great agricultural production that was so important to the Romans during the Empire.

Over a large portion of the ancient granary of Rome we found the soil washed off to bed rock and the hills seriously gullied from overgrazing. The valley floors are





The ancient city of Djemila buried by erosion from the soils which shifted down from the surrounding hills, tells the story of much of North Africa. Once a great olive centre, with a population of more than 11,000, the only village around the old site of Djemila today supports but a few families. Erosion still gouges out the denuded slopes.

usually still cultivated but are still eroding in great gullies fed by accelerated storm run-off from barren slopes. This was in an area that once supported many great cities in Roman times.

We found at Djemila the ghosts of Cuicul, a city that was once great and populous and rich but later was covered completely, except for about three feet of a single column, by erosion debris washed off slopes of surrounding hills. For 20 years French archaeologists had been exvacating this remarkable Roman city and unearthed great temples, two great forums, splendid Christian churches, and great warehouses for wheat and olive oil. All this had been buried by erosional debris washed from the eroding slopes above it. The surrounding slopes once covered with olive groves are now cut up with active gullies.

The modern village that falls heir to this once beautiful Roman city houses only a few inhabitants. The flat lands are still farmed to grain but the slopes once planted to olives are bare and eroding and wasting away. What is the reason for this astounding decline and ruin?

TIMGAD, LOST CAPITAL OF A LOST AGRICULTURE

Further to the south we stopped to study the ruins of another great Roman city of North Africa, Thamugadi, now called Timgad. This city was founded by Trajan in the first century A.D., laid out in symmetrical pattern and adorned with magnificent buildings, with a forum embellished by a statuary and carved porticoes, a public library, a theatre to seat some 2,500 persons, 17 great Roman baths, and, if you please, with marble flush toilets for the public. After the invasion of the nomads in the seventh century had completed the destruction of the city and dispersal of its population, this great centre of Roman culture and power was lost to knowledge for 1,200 years. It was buried by the dust of wind erosion from surrounding farm lands until only a portion of Hadrian's arch and three columns remained like tombstones above the undulating mounds to indicate that once a great city was there.

Since the discovery of the site, the French Government has been excavating this great centre for 30 years and has disclosed remarkable examples of building, of art, and of ways of living during Roman times in North Africa, all supported by the agriculture of the "Granary of Rome." The mosaics that lined the public baths were beautiful in design. Within the city we found ruins of a great bakery with its many grist mills turned by slaves to grind the wheat that grew on the plains. But today this great centre of power and culture of the Roman Empire is desolation;

it is represented by a modern village of only a few hundred inhabitants who live in squalid structures, the walls of which are for the most part built of stone quarried from the ruins of the ancient city.

We saw also where water erosion cut a gully down into the land and exposed an ancient aqueduct that supplied water to the city of Timgad from a great spring some three miles away. Within and surrounding Timgad, we studied remarkable ruins of great olive presses where today there is not a single olive tree within the circle of the horizon.

On the plain of Tunisia we saw in El Jem, the ruins of a great coliseum, second only in size to that of Rome, for the amusement of a city in a populous region. It was built to seat some 65,000 people, whereas it would be difficult to find 5000 persons today within this district. The ancient city now lies buried around the coliseum and a sordid modern village is built on the buried city.

What was the cause of the decadence of North Africa and the decline of its population? Some students have suggested that the climate changed and became drier, forcing people to abandon their remarkable cities and works. But Gsell, the renowned geologist who studied this problem for 40 years, challenged the conclusion that the climate has changed in any important way since Roman times. So Director Hodet, of the Archaeological Excavations at Timgad, decided as an experiment to plant olive trees on an unexcavated portion of the city where there would be no possibility of sub-irrigation. He planted young olive trees in the manner prescribed in Roman literature, watering them in the following two long dry summer seasons. These olive trees are thriving, indicating that where soils are still in place, olive trees will grow today probably very much as they did in Roman times.

On the plains about Sfax, ruins of olive presses were found by early travellers, but no olive trees. An experiment was decided upon 40 years ago to plant olive trees there, and they grew. Now more than 150,000 acres are planted to olive trees, and their products support thriving industries in the modern city of Sfax. These plantings indicate that the climate of today, as far as production of olives is concerned, is not unlike that of Roman times; in other words, that the climate has not become drier in a significant degree since Roman times.

Other students of this baffling problem have suggested that pulsations of climate with intervening dry

The only existing remnant of Roman culture of the olive near Sousse in which trees were planted in the basins of banked earth designed to catch and store water.

This desolate scene near the ruins of Timgad in North Africa, where the small flock appears to be eating rocks.

periods have taken place, sufficient to blot out the civilization of North Africa. Such undoubtedly might have been the case, but at Sousse we found telling evidence on this point in an olive grove that has survived since Roman times. These olive trees are at least 1,500 years old, we were informed. I was interested in the way these trees were planted—in basins bordered by banks of earth with ways of leading in unabsorbed storm runoff from higher ground. We passed along this area at a time of heavy rains which showed just how this method had worked since the trees were first planted. If there have been pulsations of climate since Roman times this grove should show that the drier periods were not sufficiently severe to kill the olive trees. We conclude that it does not seem probable that either a progressive change of climate or pulsations of climate account for the decadence of North Africa. We must seek other causes for this colossal tragedy.

On hillsides between Constantine and Timgad, we found written on the land a record that indicates what has happened to soils of the granary of ancient Rome. We found some hills which, according to the botanists, were covered with savannah vegetation of scattered trees and grass. Vegetation had conserved a layer of soil on these hills for unknown ages. With the coming of a grazing culture brought in by invading nomads of Arabia, erosion was unleashed by overgrazing of the hills. We can see written here on the landscape how the soil mantle was washed off the upper slopes to bedrock. Accelerated runoff from the bared rock cut gullies into the upper edge of the soil mantle, working it down hill as if a great rug were being pulled off the hills, and depositing material at lower levels.

The accumulation of torrential flows during winter storms is cutting great gullies through the alluvial plains just as it does in New Mexico, Arizona, and Utah of our own country. The effect of this is to lower the water table, bringing about the effects of desiccation without reduction in rainfall. In this manner has the country been seriously damaged and its capacity to support a population much reduced. Unleashed and uncontrolled soil erosion is sufficient to undermine a civilization, as we found in North China and as seems to be true in North Africa as well.

GREAT FARMERS

(IV) ROBERT BAKEWELL (1725-1795)

B. G. Broadhead, Assistant Lecturer in Rural Education.

About 200 years ago a young man named Robert Bakewell became tenant of a 500 acre farm in Leicestershire in succession to his father. During the next 40 years this farm, Dishley Grange, became a meeting place for visitors from all parts of Europe who came to inspect the results of Bakewell's revolutionary experimentation in stock breeding and general agriculture. Bakewell apparently welcomed the interest of strangers for they were always received with politeness and accorded every attention. He had a special building constructed for the purpose of showing his sheep to visitors. In fact the quality of his hospitality was such that he was once declared a bankrupt and finally died in poverty.

Bakewell never married, being apparently wedded to his stock even to the extent of keeping the skeletons of his most celebrated animals in the hall, and of draping his walls with pickled anatomical specimens illustrating some of his contentions as regards livestock breeding. One of his many attributes was the possession of shrewd judgement where business matters were concerned and this may have accounted for his reticence concerning his breeding methods. The shepherd seems to have been the only one to have shared his confidence.

Although Bakewell is primarily known for his work on livestock improvement, his activities were by no means confined to that province. He was a pioneer in many new and improved methods of land management, notably that of irrigation. By cutting channels over his farm he was able to water 200 acres, and this he did all the year round. The grass on these paddocks was cut four times a year and carted to the cattle—in winter to their stalls and in summer to the fields not under irrigation. His plan of having small plantations of Dutch willow scattered over his farm enabled his fences to be kept in good order. Each year a seven-year-old tree was cut down and used for posts, gates and rails. Bakewell was interested in anything which might lead to the improvement of the countryside and his advocacy of the convex-surfaced road as opposed to the concave is an example of this.

But Bakewell's genius reached its highest power when directed toward the improvement of livestock. Why Bakewell should have embarked on this work, is not certain. Possibly the new agriculture instituted by Tull, Townsend

and others, and the subsequent movement toward enclosure, brought home to him the need for better types of animals to utilise more fully the improved feed supply. The increased demand for meat in the cities as a result of the increasing population brought about by industrialisation, was doubtless also a factor. That some sort of improvement was necessary is made clear by the evidence of one, Marshall, who described the old type of Leicestershire ram. "His frame large and loose, bone heavy, legs long and thick, terminating in large splaw feet. Rump as sharp as a hatchet; his skin rattled on his ribs like a skeleton wrapped in parchment." Apparently it was a most unsavoury looking beast. Out of this unpromising material Bakewell created an animal possessing compactness of form, smallness of bone, fattening power and early maturity. In doing so he was accused of impairing the wool-producing ability of the breed, wool having long been an item of great importance in the economy of England.

Stockbreeding at that time was "the haphazard union of nobody's son with everybody's daughters," the result being rawboned, leggy sheep and cattle which were wellnigh useless as meat producers. Bakewell's success was doubtless due to his initial perception of how a desirable meat-producing animal should look and then to his ability to retain this image in his mind's eye through the processes of mating and selection. His method is perhaps illustrated by the axiom "all is useless that is not beef." However Bakewell's methods are conjectural for he never talked of them to visitors. Selection of suitable foundation-stock in the form of neat, small sheep which he had seen were earlier-maturing, and the subsequent concentration of desirable characteristics by close breeding, must have played an important part in his system. That he clearly grasped the practical side of genotypic inheritance is obvious from his recognition of the value of what is now known as progeny testing. He would never sell his rams, but would merely hire them out at fees which rapidly increased as his fame spread. Then by observing the nature of the progeny of each animal he was able to decide the value of the sire for breeding purposes before he used it to develop a particular line in his own experiments.

Bakewell's greatest success was probably with sheep improvement. Up to the middle of the eighteenth century, sheep were valued chiefly for their wool, mutton as food being greatly neglected. Sheep were classified as Short Wools or Long Wools and it was with the latter that Bakewell decided to work. Hitherto any effort made to improve the breed was confined to fleece characteristics or to fancy

points such as shape and colour of horns. Bakewell, however, while combining a certain beauty with utility of form, produced an animal characterised by quality of flesh and a propensity toward early maturity. Whereas four years was previously required to prepare a sheep for the market, two years was now sufficient. The average weight of sheep slaughtered in the years 1710 and 1795 presents the most convincing illustration of Bakewell's success. That of lamb rose from 18 to 50lb, and that of adult sheep from 28 to 80lb. Once the reputation of Bakewell's sheep had been established and their superiority over those of other breeders admitted, he was enabled to form the Dishley Society, the forerunner of the modern breed societies. This society had as its chief object the protection of its members' interests but this in turn led to the preservation of the purity of the new Leicestershire breed. A rule of this society which might well be included in those of modern breed societies, stated that rams must not be fed any special feeds, but should be treated in the same way as the sheep of the flock in which they were to be used.

His success with cattle was less marked, probably due to the inferior material with which he started. The Longhorn was at that time in the hey-day of its fame but was apparently a raw-boned, wall-sided sort of beast not greatly productive of either milk or beef. In Bakewell's hands it was greatly refined and attained a uniformity previously lacking. His ideal was again a meat-producing animal but progress in this direction was naturally attended by a deterioration in the milk-producing capabilities. The slaughtering figures for 1710 and 1795 are again a measure of his success in improving the carcase quality of his stock. The weights of calves rose from 50 to 148lb and of beef cattle from 370 to 800lb.

Horses and pigs also received attention at Bakewell's enterprising hands. But it was not so much the individual results of Bakewell's experimentation which have been his greatest contribution to posterity. More important was the illustration which these animals afforded of the results to be obtained by careful selection and breeding. His Longhorn cattle and New Leicestershire sheep suffered in time from various shortcomings but they clearly illustrated the efficacy of his methods and provided the stimulus which resulted in a host of imitators rising up. The Shorthorn breed of cattle which largely supplanted the Longhorns was evolved by methods based on those of Bakewell and those methods are as applicable now as they were then.

PLEASURE

The imparting of pleasure is a very important part of education. People who have a reasonable amount of leisure should have a habit of spending that leisure and a capacity for spending that leisure in a way that brings interest and pleasure. For this purpose if you can impart the power of taking real pleasure in the best poetry and the best literature no doubt you will have given the most easily accessible and most permanent form of making leisure satisfactory, because books, even the best, are easily accessible and all that is necessary for the enjoyment of them is that you should, in fine weather, find some quiet spot out of doors or that you should have access to a room in which there is no telephone.

Books I would put first. By books I mean the power of taking pleasure in the best literature. But next to books I would put the capacity for finding pleasure in outdoor nature. Two great qualities belong to it. One is that it means a capacity for taking pleasure in common things. The beauty of the world and the interesting things in wild nature are there for everybody to enjoy, and the fact that one person enjoys them does not diminish the power of others to enjoy them, provided only that everybody will observe the one simple rule which is far too often broken, "that you should take your pleasure in outdoor nature without destroying or disturbing." As long as you do that, your pleasure is not diminishing anyone else's pleasure. The other quality is that the best kind of pleasure in outdoor nature does not depend on novelty but upon enjoying things which recur in the seasons of the year. Every season brings its own aspects of beauty or its own subjects of interest. They recur year after year; it is precisely because of this that they become increasingly familiar and we look forward to them every year. If you wish to cultivate pleasure there are three parts of it to be cultivated. One is anticipation, another realisation and the third is retrospect. You can only have perfect anticipation of pleasure if it is a pleasure you have enjoyed before, so that you know before it arrives exactly what it is like and the sort of feeling you are going to get.

—Earl Grey of Fallodon.

The Bulletin is issued on the first of each month from February to November. The annual subscription is five shillings post free, or four shillings for two or more copies. Correspondence should be addressed to: The Editor, Rural Education Bulletin, Lincoln College, P.B., Christchurch.

Printed by Simpson & Williams Ltd., 169 St. Asaph Street, Christchurch.