


Environmental Research



AMBASSADOR COLLEGE AGRICULTURE DEPARTMENT
BRICKET WOOD, ENGLAND

The Agriculture Department

The farm programme of Ambassador College is woven around TWO VITAL PURPOSES:

First, we must provide top-quality, naturally-grown meat, milk, eggs and vegetables to the College catering service. This is no small task since the 250 undergraduate students annually consume more than 35,000 pounds of beef, 100,000 pints of milk, and 150,000 eggs!

Since the area of the present farm is limited to 130 usable acres, we are as yet unable to provide *all* of these needs. We have, however, nearly reached self-sufficiency in beef, milk and vegetables, plus meeting over 50 per cent. of the egg requirements.

Then there is the second (and most important) purpose of the programme. Just over three years ago the Chancellor of the College directed the Research Staff to make an exhaustive study of the world's agricultural and environmental problems and provide the answers – both on paper and in practice. As you know the nation and the world are encumbered with seemingly unsolvable problems that demand a solution if the world is to survive. Providing these workable solutions is the vital motivating force

behind the Ambassador agriculture programme as you see it today.

The men involved

The individuals in this agricultural work are well acquainted with practical food production. The department supervisor is the College Lecturer in Agronomy, Mr. Colin Sutcliffe, B.A., who, before coming to Ambassador, was a successful owner and manager of wheat, sheep and cattle stations in Australia.

His research and liaison assistant, Mr. Stan Potratz, B.A., spent his early life on a general farm in the agricultural heart of the United States. From there he went on to study agronomy and farm operations at Iowa State University of Agriculture and Technology.

Both men were privileged to also study agriculture at our sister college in Big Sandy, Texas. Since then, Ambassador College has given them collective or individual opportunities to travel in most of Western Europe, visiting leading agriculture research organiza-



COLIN D. SUTCLIFFE



STANLEY R. POTRATZ



JAMES FRASER

tions in England, Scotland, France and Switzerland. An additional tour of the Middle East two years ago by Mr. Sutcliffe added immeasurably to our understanding of world agriculture.

The personnel in this Department are quite an international team. From Scotland comes Farm Manager Mr. Jim Fraser, with many years of experience. English market gardener Mr. Bill Templeman is in charge of our very productive **Vegetable Section**. He has just been joined by Mr. Robin Howard from The Republic of Ireland and the third staff member is a student from Australia.

Mr. Dave Whitaker from Yorkshire is now directly responsible for our **Beef and Dairy Section** and

American student Glen Weber is taking control of the **Poultry Section**. Other people in the Department come from such varied places as New Zealand, South Africa, England and Canada. Sounds like an impossible combination, doesn't it? But as a team they work together well.

We have a normal staff of twelve men, most of whom are college students gaining part-time practical experience. Our programme, though only three years old, has resulted in some astounding, but simple answers to many agricultural problems. As a quick tour of the College farm on paper will show you – these answers are so workable that they are already incorporated in the daily farm operations.

Cattle

Beef and Dairy Section

Yes – beef *and* dairy! The College catering service requires both meat *and* milk, but if you've had any acquaintance with present-day food production, you'll know that most farmers would consider these to be *two* units, not one. Modern farmers would have two separate, specialised breeds of cattle to meet these needs – one beef and one dairy.

Instead of *two* specialised herds on 130 acres, we have *one* that is *dual-purpose*, producing both meat and milk from the same animals. This system is unusual and possibly unique in all Britain.

How was it done? In 1967 we sold out the existing Angus and Jersey herds and purchased 40-50 Dairy Shorthorn cows. With these animals we mated the 1965 Perth reserve junior champion Beef Shorthorn bull. Our aim: to produce calves with the potential of top-quality beef animals from dairy-type cows – *without cross-breeding*.

But we have gone even further than that. It is a well-known fact among experienced stockmen that the only way to produce top-quality, tasty beef is to rear the animals on their mothers. Any method of artificial feeding (such as milk substitutes) is a weak second-best. But how could we allow the calves to

suckle their mothers and simultaneously extract 100,000 pints of milk per year to feed our student body?

The answer is as simple as it is effective! We milk the cows only once a day – in the morning. After milking, they go out to pasture with their calves. All during the day the calves suckle their mothers. In the evening we quickly separate the calves from their mothers into a nearby paddock or yard. Milk accumulates in the cows' udders during the night and is taken the next morning. Then the hungry calves go back with their mothers all day and the cycle repeats itself.

The advantages of this totally unique system are these:

1. Since milking is done only once a day, the cattleman is no longer tied to his cows morning and evening.
2. No farmer, or cow-hand wants to be tied to a milking herd for seven days every week. All he need do is to leave the calves with the cows the previous night and the calves will do the milking for him.
3. The same system works at other periods such

as vacation time. Whenever milk is not needed the herd turns instantly into a full-time beef herd, needing no daily supervisor.

4. By this system, we are able to produce fast-growing beef-type calves from dairy-type cows – a result that is extremely difficult to achieve by normal methods without cross-breeding. We challenge you to see it to believe it! We have both living and photographic evidence of the difference between our system and other methods of calf rearing.

Naturally, this unique method has not been without its teething difficulties, but the results now speak for themselves. This herd supplies 90 per cent. of the milk and over 75 per cent. of the beef needs of the student body, plus supplying most of the faculty with their daily home milk supply.

Winter feeding – a possible breakthrough?

Still in the testing stage is a management technique that would eliminate the need for stored winter feed such as hay or silage. If this technique proves successful, it will eliminate much of the laborious hay-making, straw-handling, and dung-shifting of modern cattle rearing, plus making many common farm implements and buildings a thing of the past! The implications of this technique for world agriculture are truly earth-shaking – if it can be successfully developed by Ambassador College Agriculture Department.



ONE WHOSE MOTHER DIED (above) AND ONE WHOSE MOTHER DIDN'T (below)—Two 1970 heifer calves, same breed, same herd, and the same age! Which one do you think is best equipped (as the result of an adequate and balanced diet) with a healthy body for a long and productive life?

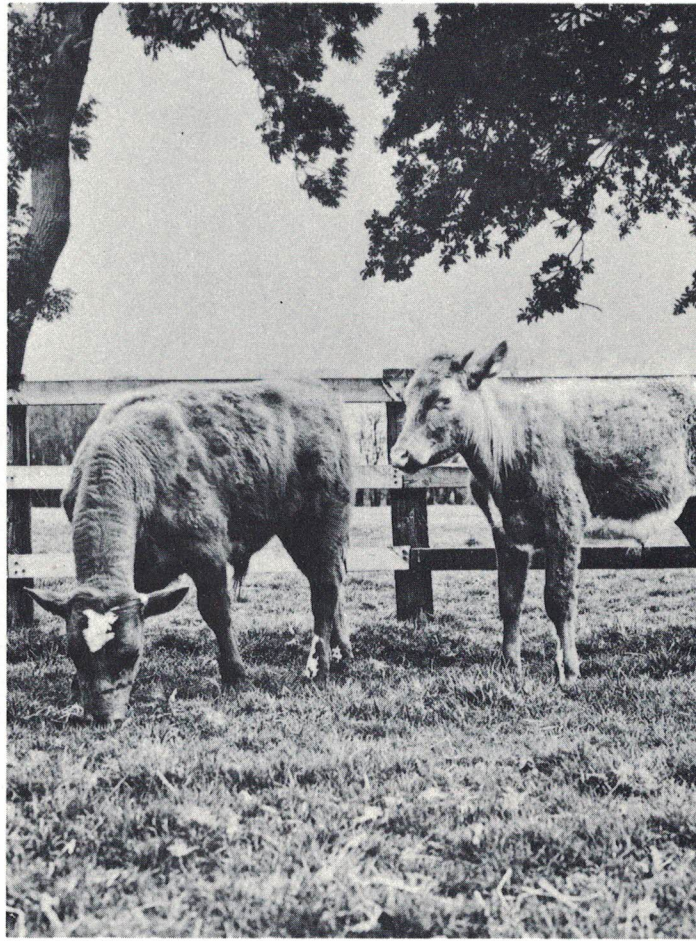


TEN-MONTH-OLD, DUAL-PURPOSE, SHORTHORN CALVES—These animals were suckled throughout their first seven months by their mothers. Half the milk production of our herd goes to the College faculty and students. The other half went down the necks of these calves who look as though they have really benefited from it. A few calves will become replacement cows in the herd, but the majority will end up as steak in the College dining room.



RUMP, SIRLOIN AND FILLET—Coming-up!—No, he wouldn't win at Smithfield, but he will be a lot more popular with our catering department (and the average housewife) than one that would! Neither has he been specially selected and prepared for the photographer. This well-proportioned shorthorn steer is typical of many we raise on their mother's milk for seven months.

RESULTS FROM TWO SYSTEMS OF CALF-REARING—Both calves are of the shorthorn breed and both are from the same herd. Note the dramatic difference in the weight of these two calves. One has been suckled by its mother, who has at the same time been milked daily in the College Dairy throughout the life of this calf. The one on the right was among those bought in with the herd and is typical of millions of dairy replacements that spend their early life struggling for survival. The poorly-fed calf is barely *half* the weight of its counterpart. Yes, and that undernourished calf is just *double* the age of the big, healthy, robust one!



Pastures

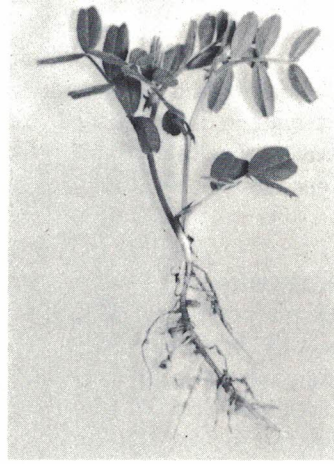
The importance of pastures

We know that livestock are essential to the permanent well-being of the soil, the people and the nation. But it is impossible to profitably own livestock unless grassland and pastures (the staple diet of man's sources of animal protein) are at optimum fertility and productivity. Worn-out, rundown pastures are one of the unrecognised, but major world-wide curses of modern food production. If Britain's pastures were in top condition, her financially hard-pressed livestock producers could avoid having to feed their animals so much expensive barley, brewer's grain, maize, beans, beet pulp, oilcake, fishmeal, and dried poultry dung. (These are the substitute proteins that are widely used today to bolster the feeding value of poor quality grass, silage and hay.)

Their composition

The current fashion in grass management is pasture swards of straight ryegrass, intensively managed and liberally dressed with artificial nitrogenous fertilizers. (The units of applied nitrogen are now measured in *hundreds* per year and the word 'intensive' is just a trendy euphemism for soil robbery!)

Farmers are discovering that these methods are



7

A LEGUME PLANT—The world's most efficient fertilizer factory! Root nodules on this vetch plant, containing billions of nitrogen-fixing bacteria, convert atmospheric nitrogen into nitrates for protein production. Up to 200 lbs of nitrogen per acre per year can be fixed in this way—*free of charge!* Legume bacteria 'fix' over 100 million tons of nitrogen annually (four times the production of ALL chemical factories in the world)!

becoming exorbitantly expensive. They are paying dearly for the nitrogen fertilizer and the resultant increases in animal disease and veterinary bills.

The Ambassador approach is less expensive and yet equally productive. We have a major pasture improvement programme well underway. Our basic aim: to produce a balanced pasture of grasses, herbs and *legumes*. Special emphasis is placed on the legumes due to their ability to 'fix' nitrogen from the air and add it to the soil. Their roots are tiny, natural, nitrogen fertilizer factories – capable of turning out 200 units of nitrogen per acre per year – free of charge and complications. The result is increased plant growth of legumes and grasses alike, at no cost to us. By this method we have negated completely any need

for artificial nitrogen fertilizers and provided our cattle with a varied diet high in minerals and top-quality protein. The result: healthy, fast-growing animals with increased disease resistance and longer life.

Seeding methods – simple and effective

In the past we relied on powerful tractors and rugged tillage machinery to churn up the soil in preparation for re-seeding pastures with legumes and herbs. The system was successful – but very expensive and time-consuming. Then we tackled thirty acres of recently-acquired ‘pasture’ whose ‘soil’ was composed of hard-packed clay and rock. The existing flora of weeds and poor grasses were having a tough time in soil so closely related to concrete. Discs, rotovators, ploughs and harrows were all incapable of penetrating the soil surface without tearing the machines apart.

Desperate necessity forced us to ‘discover’ a method of seeding that, if it continues to succeed, will eliminate the need for expensive, powerful, tillage equipment for seeding.

What is that technique? Simply the same as that which plants have used to re-seed themselves ever since creation!

The cost to establish the basics of a top-notch pasture on derelict land? Only the seed, a hand-operated fiddle-sower, a mower and some understanding of the laws of plant growth.

If the technique continues to succeed in future tests, it will be the simplest, quickest, most economic and effective soil restoration process yet known. It offers proof that natural methods in agriculture are effective and yet not expensive, complicated or dependent upon heavy machinery.

If agricultural education includes a working knowledge of the laws regulating our environment, food production will become simple, inexpensive and productive.

Grazing management

A study of the laws regulating plant growth has enabled us to develop a method of grazing management that may be of some interest. The basic principle: never allow the vigour of the pasture to be exhausted through repeated random grazing.

The grass is allowed to grow until well developed. The cattle then ‘mow’ the sward to within 2 in. of the ground. As soon as this is accomplished they are then given an entirely fresh section of grass to eat. An electric fence – technology’s shepherd – is used to keep them from repeating the regrazing of the old area. When the first grazed area has had sufficient time to replenish its roots’ reserves, the cattle are again allowed to graze the area. The cycle continues around the pastures – a controlled, rotational grazing programme. The programme has given us increased productivity from every acre while drastically reducing the danger of internal parasites to our cattle.



**NEW ZEALAND STUDENT
GAVIN CULLEN IN A NEW
CLOVER-DOMINANT PASTURE**
—This area is in its first year of
growth and the pasture mixture
includes white clover, alsike
clover, ryegrass, timothy, cocks-
foot, chicory, ribgrass and yarrow.

Poultry

Free range

The production of chickens and eggs is a controversial topic in this day and age. The old-time, backyard flock has largely disappeared. Financial pressure has been primarily responsible for the sweeping change to battery egg production.

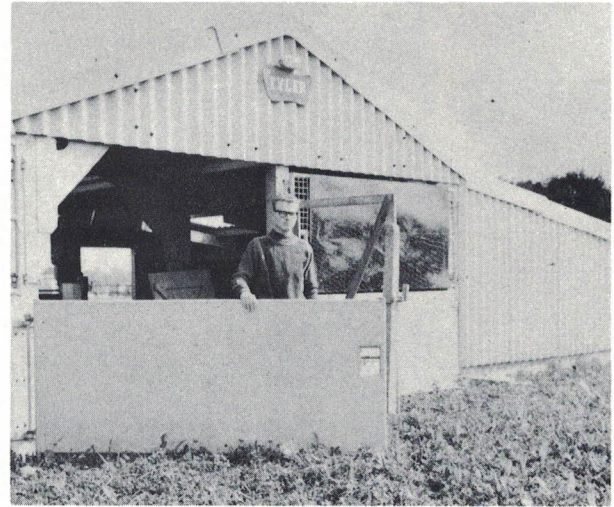
This system of poultry management has brought an increase in eggs laid per bird per year, but with it has come higher replacement costs, increased disease and deterioration of egg quality.

These complications, plus rising feed and equipment costs, are forcing poultry farmers to look for more profitable alternatives. Ambassador College is supplying just such an alternative. We know that the only successful way of producing chickens is to copy their natural conditions as much as possible. Our spacious houses include ample roosting area, roomy nestboxes, and a well-ventilated scratching floor. Outside each house are two strips of fenced pastures for rotational free range grazing. Each strip of pasture includes a row of trees.

Why the trees? Because the birds enjoy scratching in the decaying leaves and twigs in the shade of the trees. The pasture strips provide a free choice in

worms, grass and seeds. Specially selected top-quality cereal grains are available in feeders on the scratching floor. Instead of expensive fish-meal or meat and bone-meal for protein, we obtain, at no cost, all the meat and vegetable scraps from the kitchen. These free 'wastes' provide the birds with additional protein.

We have found that this poultry system of free 'kitchen' protein, free range grazing, free-choice cereal grains and spacious housing has enabled us to maintain adequate productivity. It also keeps costs low and avoids the usual big disease problems of battery producers.





'EGG-FACTORIES' AMBASSADOR COLLEGE STYLE—Poultry thriving in our free-range environment and on a diet containing no specially-prepared expensive feeds, or antibiotics.

ONE UNIT OF OUR POULTRY SECTION—Each building contains perching, laying, scratching, watering, dust-bath and grain-feeding facilities and will ultimately accommodate 300 birds. One end gives controlled access to either of two pastures. The other end has a full-spread, sixteen-foot opening for easy cleaning, either by hand or tractor-mounted front-endloader.

Vegetables

Fertile soil – the key

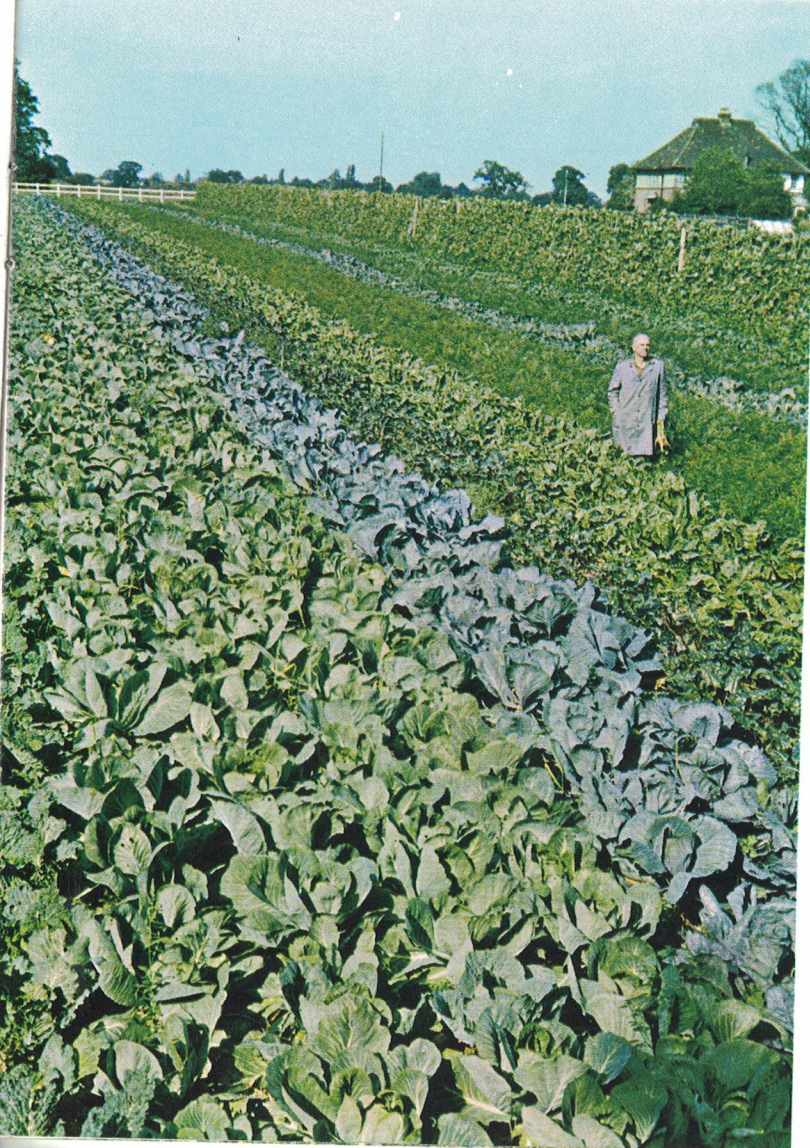
Vegetable production as it is done today involves expensive fertilizers, herbicides and pesticides, extensive cultivation and rigorous weeding. The Ambassador College system requires none of these, but instead an educated understanding and adherence to the laws of soil and plant management.

This past season the Ambassador College garden has produced so many vegetables that we had a problem disposing of them even after supplying all interested employees. Many are now going to waste as we write because of the abundance.

What is the cause of such abundance during a season which endured eight weeks of drought when it could have hurt the most?

The secret is the straw mulch that now covers 80 per cent. of the garden soil. Most of the straw was laid down in the winter and early spring. Only the vegetables were allowed to grow through it. The straw prevented the soil from drying out, thus providing the much-needed moisture during the severe drought period. The mulch also smothered most of the weeds, kept the ground cool and provided a spectacular feast for earthworms. The tons of straw





CABBAGES GROWING IN A STRAW PILE? (Far left, top)—No, just a three- to four-inch layer of straw mulch which the head of our *Vegetable Section*, Bill Templeman, regards as a key to abundant production of disease-free vegetables.

POTATO PRODUCTION (Far left, bottom)—No digging, hilling, weeding, irrigating or spraying were needed. Here in this picture are the results of one seed potato that was placed under a three inch layer of straw. Nothing more was done until the mulch was parted by hand in order to take this photograph. See the rich harvest ready to be gathered in *without* special digging equipment, or even so much as an old-fashioned garden fork!

VEGETABLES BY THE TON (Left)—We agree—proof is in the eating. The staff and students around the Bricket Wood campus will tell you that these healthy-looking vegetables taste as good as they look! No artificial fertilizers and no poisonous sprays! Here you see parsnips, carrots, spinach and cabbages between two giant rows of prolific runner beans. This picture shows the production on approximately *one and a half* of our *eight* acres of vegetables and soft fruits.

the earthworms have 'ploughed' into the soil will provide fertilizer for next year's crops.

No chemical fertilizers or sprays were used in the garden. None was needed, for the vegetables have been so vigorous and healthy that no insect cared to attack them.

The head gardener's job has been one of simply planting the seeds, surrounding them with straw, pulling any incidental weeds, and harvesting the crop. To believe this report we encourage you to walk through this area and see it for yourself.

Even more remarkable is a totally unique system of gardening presently being tested. It has advantages that make it far superior to even the straw method. It eliminates the need for buying, hauling and spreading straw, controls weeds more effectively and involves even less labour or digging. If this system succeeds, then the garden will become totally self-sufficient, providing its own fertilizer, its own mulch and its own insect and disease resistance.



EARTHWORMS AND THEIR CASTINGS—Insignificant in appearance, but not in value. The straw mulch in our garden has produced an unprecedented amount of earthworm activity. Last year earthworm castings buried four inches of straw mulch in less than six months, thus completely renewing the surface of our top-soil.

Cereal Grains

In perspective

We have not neglected this vital part of world agriculture at Ambassador College. But its emphasis has been decidedly toned down in comparison with other aspects of food production.

Surprising as it may seem, the average family could grow enough grain to supply themselves with bread and cereal products on just half an acre! Cereal grains could be as much a product of the family garden as of the farm.

The vast majority of cereals now grown (with tons of fertilizers and expensive machinery) are fed to animals, not to humans! For the most part, these animals would be better off eating their natural food – grass and hay. It is a fact that, with good pasture, grain has a possible role only during a brief two to three month fattening period for cattle just prior to slaughter.

Ambassador College results

It is often stated that England's climate makes it impossible to produce wheat high enough in protein to rival that of the U.S.A., Canada and Australia. For this reason Britain spends over £200 million annually to import high-quality bread wheats, mainly

from North America.

Trials conducted at Ambassador College Research Farm have proven that it *is* possible to produce wheat *equal* in protein content to the rich soil areas of Canada. In our office we have a sample of wheat grown on Ambassador College soil in England that equals most imported wheat in protein quality.

Tests have been conducted in our own fields and elsewhere, and in each case the protein level matched the level of natural fertility in the soil. The high protein grain produced at Ambassador College was grown on what is recognised as some of the poorest soil in England and the seed was obtained from soil that is naturally low in fertility. But both of these soils had their fertility level raised by additions of organic matter prior to the wheat sowing.

Trials are also being conducted to see to what extent the nitrogen-fixing abilities of legumes can be used to increase the yield and quality of cereal grains. Also just getting underway at Bricket Wood is a series of test plots to determine what effect environment has on the characteristics of various cereal seeds. We hope to be able to release further information on this work before too long.

Land Reclamation

Environmental re-birth

In many ways, the last section of the Ambassador College Farm is the most exciting. This spring we were given access to thirty acres of derelict land opposite the College. The area has been worked over for gravel by Inns Gravel Company and the resultant pits were then filled with London garbage. These pits were then back-filled with a foot of raw clay. After a quick seeding of ryegrass, the area was then turned over to us to do with as we liked. The Inns Gravel Company representative, an experienced man, predicted that it would take twelve years before the land would become productive. We think we can do it in perhaps *three*.

Already we have sown the land with a variety of legumes and herbs, whose roots will be invaluable in penetrating the 'soil'. They will add organic matter and nitrogen to stimulate even more growth. Even at this early stage there is enough plant cover to allow a light grazing if we cared to do so.

The plans for this area include a re-afforestation project. In conjunction with the Forestry Commission we hope to plant the edges of the field with wide shelter-belts of oak, sycamore, pine, fir, larch and other species.

Success in reclaiming this land that is now devoid

of top-soil will prove to the nation that Ambassador College has the answers for the millions of desolate acres in the Welsh Hills, the Scottish Highlands and many near-derelict areas of England.

Instead of polluting or destroying, Ambassador College is actively engaged in developing techniques to restore and improve Britain's soil and environment.





PASTURE FOR THE FUTURE—Newly-appointed Head Stockman surveys that which he hopes may become a pasture for his cattle. David Whitaker is standing on an area of land opposite the College that has had some fifty feet of gravel excavated from it, then filled with all manner of garbage from London and finally backfilled with a mixture of clay and gravel. In the spreading process the covering material has become mixed with all manner of objects from underneath. And the 'soil' you see in the picture is therefore a mixture of gravel, concrete blocks, old bricks, discarded furniture, worn-out refrigerators and empty plastic containers, all cemented together with a particularly sticky and obnoxious brand of clay. *Some* will think us over-optimistic, but we hope to begin reclamation of this area within the next year!



PROGRESS IN LAND RECLAMATION—(Far left). Not exactly the Garden of Eden, but still a far cry from the soil condition we have described above. Here we see ryegrass, clover and vetch establishing themselves on a backfilled gravel pit area. An experienced representative of the gravel pit owners told us not to expect any worthwhile results in less than *twelve* years. You can therefore see for yourself why we are pleased with this progress in less than *one* year!

CONTINUOUS ARABLE FARMING RAVAGES SOIL FERTILITY IN HUNTINGDONSHIRE, ENGLAND—The 'Garden of England' becomes more barren and desolate every year. Timber and hedgerows are fast disappearing and soil structure is breaking down under grain monoculture on these newly-created English prairies. Our Agriculture Department is meeting the challenge to provide workable solutions for restoring such denuded and depleted environments to beauty and natural productivity.

**CONSERVING WINTER FODDER
AT AMBASSADOR COLLEGE—**
Haymaking under way in one of the lush green legume grass pastures. The light, gravelly Hertfordshire soil in this field is beginning to 'bloom like the desert', but only through 'rain in due season' and careful grazing management.

Can you begin to imagine the productive capability of the earth if it was all like the field in this picture? Such a balance between verdant pasture, hedges and beautiful trees, is enough to make everyone desire this kind of environment in the future!



Research and Education

The agriculture office

Our office is the headquarters for two men and at least one secretary. The purpose of reporting on this section is not to tell you of the usual paper-shuffling that goes on in any old office. In this one, many interesting things take place, such as the answering of letters from people seeking guidance on food production. From here a small, but steadily increasing stream of information and guidance has been going out to more than twenty-five countries, including most of the British Commonwealth. And questions asked cover the full scope of agriculture.

This is where our Research Programme comes in. It is another important function that is centred in the office under Messrs. Sutcliffe and Potratz. There are two unique aspects to this part of the programme. First – it does not depend for its success on multiple thousands of pounds worth of scientific equipment and laboratories.

Outside, every function on the College Farm offers us an opportunity in the field of *Applied Research*. Whereas in the office, we are very much in the business of researching the findings of *other researchers*. This involves us in the important task of constantly sifting the writings of men who have based their work on at

least some of the fundamental laws that control man's environment.

Secondly – our whole approach to the innumerable problems facing man in his relationship with his environment is based on getting to the trunk of the tree. Our prime interest is in dealing with root causes, rather than treating symptoms. And in doing this, we always try to work from an understanding of the way the natural laws function. Experience repeatedly shows that man's problems always result from breaking laws. It therefore seems obvious that success can come only by finding out which laws are being broken and by getting in harmony with them.

Other office activities include:

1. The maintenance of an international *News File* which is used for reference and lecturing purposes.
2. The steady acquisition of a high-quality library of books relating to all facets of agronomy and environment.
3. The preparation of a monthly *Research News* which is circulated within the Faculty and among the students of agronomy.
4. The building of a photographic file (which

made this booklet possible) to record the progress of all work in the department.

5. Conducting and recording regular tests on the soil in the various fields used in the Farm Programme.
6. Preparation of a type-written, indexed Reference Manual containing pertinent quotes from the most valuable sources with which we come into contact. It has been added to steadily over three years and is now approaching 1,000 pages.

The future

Now you know something of the major facets of our department. But of course agriculture is just one of the seven divisions of the Ambassador College education programme and Bricket Wood forms only the European part of the Agriculture Division.

Even after three years in England our work in food production and environmental studies has barely begun. However, many who have heard of our activities in this direction are already requesting information. Some of this interest is just academic, but most people want to use it on their own farms and gardens immediately.

If you would like further free information, write to:

The Agriculture Department,
Ambassador College,
Box 111, St. Albans,
Hertfordshire, England.

We are happy to supply all the guidance we have available, though our main job is in preparing for the future. That which we are now learning and beginning to apply is the basis upon which the whole of world agriculture can be re-structured. If our environment is not to fall apart at the seams, world agriculture **MUST** be re-structured.

Humanity has a 6,000 year-long record of destroying the environment. We in the western world are rapidly tearing up our surroundings by almost everything we do. We pollute, we pervert and we poison. We denude, we defile and we destroy!

Today's news media are full of Jeremiah-like descriptions of the ecological problems of our environment. But where are the answers? Most being offered are too costly and too complicated to be practical. Learning to manage our environment is *NOT* difficult! But man must begin to RESTORE, to PUT-BACK and to RE-BUILD. Only then can we look forward to the benefits of healthy soil, plants, animals and people! Ambassador College is now deeply involved in this most rewarding job.

