Agriculture and Milk Supply*

By PROF. HENRY E. ARMSTRONG, F.R.S.

"Nought shall make us rue
If England to itself do rest but true."

WE take our time in minding the Bastard's advice—concerning ourselves more with Far Eastern questions than with our own, even with such minor, polar moments as hard hitting above the cricket belt and dog totes. In fact, our one popular use of our land is playing games upon it: also as gladiators but upon rubber tyres and oil-fouling our tracks as we go, mercilessly and without turning down of thumbs running each other down, under sanction of third party insurance! Those who set themselves over us, by right of caucus, have long ceased to think of the land in constructive, sympathetic terms or otherwise than as affording opportunity for the greatest of all games—taxation! Agricultural research is become an underground business, with little interest in sun-bathing; dealing with bacteria mostly—a form of life to which, ultimately, we must all succumb. In Egyptian times, some care was taken of our bodies—to-day we are simply handing them over to commercial exploitation: to universal undertakers called canners. We calmly cut our food not from the joint with two vegetables but out of sealed 'coffins'. Fresh food will soon be unseen and unsold! Health must steadily deteriorate. We call the game we are fatuously playing—Progress; perchance, the name will ere long perforce be changed to Perdition. Well may we ask with Bunthorne:

"Is it and can it be
Nature hath this decree
Nothing poetic in the world shall dwell?"

Nothing natural? Is our agriculture coming to an end?

The issue I would raise is—*Are we to use our land to produce fresh whole food—to make ourselves a whole people, our animals whole stock?* Alternatively, are we to allow tubercular disease, cancer, appendicitis, foot and mouth—deficiency diseases generally—to ravage our population? Malnutrition to prevail everywhere? Is our land to be highly fed and used up to the hilt of production and employment or is it to go derelict—to favour machinery and commercial lust? Many industrialists would calmly put the countryman aside—just use him to keep the hedges trim; so that they may sell their wares abroad, they would allow unconditional free entry to other people's farm products without reference to quality. Such form of civil war is even looked upon as a means of cementing family ties: it was at Ottawa. In the sacred name of Imperial Preference, we are to allow our wheat to be grown in Canada and Australia, our milk to be made in New Zealand! Our eggs and butter also at the Antipodes. As to

meat, we help in every way its introduction into our markets, in merciless competition with that raised upon our own soil: under the aegis of the Department of Scientific and Industrial Research, public funds are lavishly spent on the study of the means of preserving it and other food, so that they may be brought to us from long distances. Home produced food materials receive little scientific attention.

The fault lies with our own fraternity of science, in that we have in every way aided commercial, industrial development, without considering the ultimate effect upon the general welfare. No proper social use has been made of knowledge—the national education has been and still is in the hands of people who have no eyes to see and but play with words: the Head of Eton becomes Dean of Durham. We are still under monastic rule.

"New times demand new manners and new men."

The cry was uttered long ago by an American advocate of freedom. The men who would lead the world to-day are old and without any manners that are new: they have no regard for the method of discovery—the one gift the world has received in modern times; unfortunately, by unrighteous and partial use the gift has brought the world to its present intolerable position.

A decision must soon be taken—what proportional share and part agriculture is to have in our social economy. That we must play the game with our land cannot be denied. It is the only ultimate asset we shall have, as an island people, if and when all else fail us. To maintain a fit and happy race, we must needs preserve a rural population. Prices must be established at such agreed levels that we can make most use of men and least use of machines. It cannot be that we shall sink so low, through commercial avarice and worship of the unholy doctrine of always buying in the cheapest market, that we shall decline to use to the full the great God-given machine that we have in the sun. Chemistry forbids: the forgotten law of the conservation of energy. Manufacturing industry is but dissipation of energy, when carried on with coal.

To-day, the chemist can have but one opinion, if he consider the needs of the world. This is, that the first use we make of our science—of scientific method—should be on behalf of our food supply, in farming. Thus far, the farm has been considered from the point of view of a far too narrow economics—commercially and statistically, in terms of output. So great, however, has been our progress in the scientific study of food problems, especially during the past twenty years, that we are now able to envisage the place and object of agriculture from an entirely new angle: *that of nutritive value.* We know that malnutrition prevails the world over.

The future fulcrum of our agriculture must undoubtedly be milk—the food of foods, the food

* Ministry of Agriculture and Fisheries. Report of the Reorganisation Committee for Milk. (Economic Series, No. 38.) Pp. 228+xx. (London: H.M. Stationery Office, 1933.) 6d. net.

of infancy, the one and only complete food known to man. America is far ahead of Great Britain in its appreciation and use of milk. Here, the medical profession has never properly encouraged its use—being so deadly afraid of the organism provocative of tubercular disease. There has been no public opinion on the subject and too little attention has been paid to quality: although, of late, there has been a marked improvement, none the less, the average quality is far too low.

So far are we from being alive to the need of using scientific method and knowledge in the service of the State, that only laymen were appointed by the Ministry of Agriculture, as members of the special commission the Report of which on the Reorganisation of the Milk Supply has recently been issued. Only commercial organisation is considered, though measures against the spread of disease are recommended: these involve the appointment of fresh veterinary inspectors, doubtless with power to order the slaughter of infected animals. Hitherto, the Ministry of Agriculture, unfortunately, has had only one remedy in mind, in dealing with cattle disease—to kill. If it had charge of the community, it would re-Herod Herod and order all children with measles to the destructor—as it does cattle with foot and mouth disease. Preventive vaccine treatment also is at best a palliative. We need to put Pasteur aside and start afresh: having learnt something since his day, the time is come to go forward with constructive ideas of our own. The more we rely on pasteurisation, the less we are likely to go forward with measures to place our milk supply upon a scientific basis.

It is useless to shut the stable door after the steed is stolen, even in dealing with tuberculous cattle. Assuming that the organism were gone from milk, the ever-present far greater danger of the pulmonary form of the disease would remain. It is impossible to kill off the contacts: you can only cure victims at high cost—but how? Definitely, by high feeding!

Why not apply the cure to prevent the disease? The one chance of eliminating tubercular and other zymotic diseases seems to be to feed them out—both from cattle and ourselves. Let us seek to feed both our cattle and ourselves with whole food, rich in all the adjuvants. We know that there is disease whenever one or more of them is absent. In one region in New Zealand the animals suffer from a recognised deficiency in iodine: in another, from lack of iron. Ours often suffer from want of available iron; in sandstone regions especially the effect of a deficiency of lime and perhaps phosphate is particularly noticeable in the poor development of the horns; calcium is undoubtedly lacking over large areas. Australian and South African soils are known to be greatly deficient, particularly in phosphate, potash and lime. The produce from these countries must often be deficient in quality, on this account.

Proof has been obtained, from numberless experiments on animals, that health is greatly influenced

by feeding and that properly fed animals are little if at all subject to bacterial infection. Minor deficiencies may not be easily followed up but, in the long run, their effect may be deep seated. The experiments made with pasteurised milk are all suspect, if only on this account; valid results cannot be obtained with children. Just as milk has been taken to be worthy to be called milk, if only it came from a cow, even from a tuberculous animal, after pasteurisation: so grass was long taken to be grass, if only a cow would eat it; only when it came to fattening animals, was a distinction made. The most important of all cereals, grass has been the least studied: no imagination has been put into the foundations of milk. The Rothamsted plots, however valuable botanically, have taught nothing of grass as a fodder crop. All we know is that grass needs to be treated as well as wheat. Not until the War and in Germany was inquiry directed to the use and special value of nitrogenous fertilisers on its growth. The great value of young grass was then brought to the fore.

In the last few years, inquiries into the growth and use of grass have been carried out in various parts of England, for the production of milk, under the direction of Sir Frederick Keeble, formerly professor of botany at Oxford. The results are in part described and discussed in his book "Fertilizers and Food Production on Arable and Grass Land", a work of great interest, nothing short of a revelation of grass.

One of the most significant results is that obtained last year by the winter feeding of cows with grass, cut young in the summer and forthwith rapidly dried, the grass being taken from pasture fully fertilised with minerals and also with an ammonia salt. Comparison was made with a grass from an adjoining pasture to which no nitrogenous manure had been applied, only minerals. The milk from the cows fed on the 'nitrogenous grass' gave a butter of full summer value in appearance and character; the butter from 'minerals only' was but slightly better than the poor product ordinarily obtained from stall-fed cattle. The result is as striking as that shown at Rothamsted on the celebrated Broadbalk Field, on the two plots, both fully dressed each year with minerals, one or the other only receiving nitrogenous fertiliser each year. Without nitrogen, the crop each year goes down nearly to the level of the nearby permanently unmanured plot.

During last winter, I was able to initiate an experiment with young boys, with the object of determining whether milk, produced with the aid of such summer-cut dried grass, be of special food value compared with the ordinarily 'stall-fed' milk. It is too early to pronounce upon the result but I have been astounded at the way in which the cattle fed upon the dried grass are 'swelling visibly', like 'the Fat Boy', in comparison with their neighbours. The carotene content of the milk is at a high level. Who shall say what other components may not be equally affected? It is

impossible to believe that improvement is in one necessary component only.

With such evidence before us, the way is clear : selfishly, to care for our cattle as much as we care for ourselves : in fact, through them really to care for ourselves, particularly for our children. Housing is of no importance compared with proper feeding.

The supreme value of milk is beyond all question —particularly to the pregnant mother, to the child

from the moment of conception, throughout infancy and early youth. Our task now is to make the general supply of such quality that it may serve as a defence against all disease arising in any way from a lowered vitality in ourselves or in farm animals generally from imperfect feeding.

Our cry should be not merely : 'Back to the Land' but 'Honour the Land', by raising its fertility to its fullest extent and enjoying the fruits thereof.

The Indian Institute of Science, Bangalore

THE retirement of Dr. M. O. Forster last month from the directorship of the Indian Institute of Science, Bangalore, after ten years service, and the appointment of Sir C. V. Raman to succeed him, afford an appropriate opportunity to give a general account of this remarkable Institute and its work. In recent years the number of workers in the various departments has greatly increased, and many of the researches carried out by them are of high scientific value, while others have a direct bearing upon the development of the country's natural resources and industrial expansion. There are four scientific departments in the Institute, concerned respectively with general chemistry, organic chemistry, biochemistry and electrical technology, and the range of investigations carried on in each of them is very wide.

Dr. Forster himself is to be congratulated upon the continued progress of the Institute during his directorship and the maintenance of the object for which it was established, namely, to promote original investigations and their use for the benefit of India. His services to the cause of higher scientific education and research in India are widely known and highly appreciated. A remarkable testimony to the regard in which he is held at Bangalore, and a tribute of gratitude from the staff and students of the Institute, were afforded by a large and distinguished company which assembled at the Institute on March 14 to express regret at his departure and convey the best wishes to him and Mrs. Forster. Dr. Forster was presented with an address and a silver casket of exquisite workmanship, and Sir Mirza Ismail, Prime Minister of Mysore, who presided, referred in glowing terms to his zeal and devotion to the Institute. In the course of his speech, Sir Mirza said : "Dr. and Mrs. Forster have come to love this State as much as we do. They have identified themselves with us completely. I need not tell them, for I am sure they know it well enough, that their decision to continue to live amongst us, after retirement, is a source of the utmost gratification to their friends and even to those who are not privileged to know them personally. We feel that we shall be enriched by their presence in our midst. . . ." As Dr. Forster is retiring to the beautiful garden city of Mysore, which is only a couple of hours journey from Bangalore, he will be able to

continue in touch with the Institute and its activities.

The Institute originated in the munificence and foresight of Mr. Jamsetji Nusserwanji Tata who, about the year 1896, proposed to place in trust Bombay properties with a capital value of Rs. 30 lakhs (£225,000) to endow a research institute for India. During the development of a scheme for implementing this benefaction, the Government of Mysore allocated 371 acres of suitable property about three miles from the outskirts of Bangalore, contributed Rs. 5 lakhs (£37,500) towards the buildings and promised a subsidy of Rs. 50,000 (£3,750) per annum without limit of time ; while the Government of India agreed to make an annual grant of Rs. 1.5 lakhs (£11,250).

On the death of Mr. J. N. Tata, his two sons, the late Sir Dorabji and Sir Ruttonji Tata, announced their intention of giving effect to the wishes of Mr. J. N. Tata, and transferred the Bombay properties to the Treasurer of Charitable Endowments. The vesting order having been signed in May 1909, the Council appointed thereunder authorised the construction and equipment of the buildings already planned by Dr. M. W. Travers, who had been appointed director in August, 1906. The first students were admitted to the departments of general chemistry, applied chemistry and electrical technology in July 1911, the department of organic chemistry being opened in September of the same year.

It was hoped by Sir Dorabji Tata that the Institute would become an all-India institution, and this intention is to some extent realised by the students in it being drawn from all parts of the sub-continent, though for geographical reasons those from Mysore and Madras predominate. On the financial side, however, it cannot be said that the support to the Institute is of an all-India character. Excepting Mysore and Hyderabad, which have uniformly and generously supported the Institute, contributions from other States and Provinces have been altogether disproportionate to the benefits received by their students. Bombay has approximately the same number of students in the Institute as Mysore and Madras, yet it contributes nothing to the finances. The absence of support from Bombay and Bengal is much to be regretted, for it means that other regions are influenced by it and neglect to afford the aid