cover Pix

NEW LIVESTOCK WEIGHER FOR SMALL ANIMALS

A new mobile livestock weigher, the 'Multiway' designed specifically for small animals, weighing up to 400 lb (180 kg), has been introduced by a British Company and is being exhibited at this year's Royal Show at the National Agricultural Centre at Stoneleigh, Warwickshire, in the English Midlands.

The Multiway has a tubular steel frame sheeted on either side and the weigher is mounted on an advanced suspension system incorporating four join balls at the top and four at the bottom, for accurate weighing. Spring-loaded gates at both ends can be operated from either side. The scales can be turned through 360 degrees for reading from any angle and the operating level can be fitted for working from either side. The wheels operate when the weigher handles are raised.

One of the main themes of the 1974 Royal Show—Britain's premier agricultural exhibition — is Fuel Economy. The number of trade stands is up to 721 from last year's figure of 678 and many countries have extended their international pavilion areas. In the case of Canada and Holland these have been doubled.

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FARMSTOCK

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Managing Editor ABIODUN OJUGBELE

Contents page

LETTERS

ROADS TO FARMS

The roads leading to important agricultural sites in various parts of the federation have become so bad that farmers find it very difficult to transport their products to the markets.

It appears that the authorities cannot cope with all the road developments in the country particularly roads leading to farms

Moreover, I am appealing to the government to improve some of these roads before the next rainy season.

CALABAR PIUS EFFIONG

MANPOWER AND AGRICULTURE

The use of manpower in agriculture is among the main causes of poor agricultural outputs in the country. Superstition also contributes a lot to poor agricultural output as farmers maintain beliefs of irrelevant ideas.

Government should consider granting loans to farmers to buy modern implements. Such implements will reduce their task, do their chores efficiently and quickly so that more produce will come from the farms. Surely life will be easy for all and food will be cheap.

LAGOS BABA ADE

ESTABLISH TRAINING CENTRES

Illiteracy among farmers is rampant mainly because farmers from time immemorial do not believe in writing, learning or reading. This point made many farmers to remain illiterate today.

To boost agriculture in all aspects, illiteracy needs to be terminated. How can this be done as some farmers are already old enough to forget about learning, reading and writing? To me, I think illiteracy can be curbed if training centres are built for the training of our good old farmers by agricultural experts throughout the country.

If this is done with an immediate effect, Nigeria by 1978 will be better for it.

OSHOGBO. AYODELE BALOGUN.

FARMER'S GUIDE

Farmers throughout the country ignore essential points necessary for good results in grain storage.

Many farmers do not clean their store rooms and thereby allowing insect pests to hide all about in their stores. Additionally, they forget to harvest grains promptly when matured to minimise field attacks by plant pests.

I hope Farmstock can help the farmers by providing them with a farmer's guide in its next monthly.

ONITSHA ERNEST OBI

PRICE CONTROL BOARD

Food prices in Nigeria may never fall down if direct measures are not taken in the formation of an effective price control board.

Commissioners of Agriculture should help the nation in solving this drastic position of high prices of essential commodities.

I also suggest that an agricultural price control board be established with inspectors who can move into markets in rushing hours to arrest any person who may charge more than stipulated prices.

WARRI. AUGUSTIN OSAGIE

CONGRATULATIONS

I feel happy to congratulate the 'Farmstock' and it's entire staff for the useful and important ideas I was able to absorb from it's last monthly.

As a farmer and an agricult teacher I think I can never fo the "Farmstock" Monthly Magaz as a source for useful and impor hints on agriculture.

As such I appeal to everyone the side of agriculture to join in congratulating the 'FARMSTOC

IGBARIAM. PETER ZACCHE

AVOID BURNING IN FARMS

Burning of grasses and trees a bid to clear the farm up is v dangerous as this could cause m harm to the soil.

The cause of these burni proves that farmers do not want exhaust the energy they would u in making the farms, in cutting do the grasses and trees.

Furthermore, the use of fertilist should be encouraged.

IBADAN. ISHOLA OWOSE

FARMSTOCK

OPINION

School Farm

A recent report disclosed that a general world food shortage existed. The report also localised some danger spots, the causes of such setbacks in the production of food but it also suggested remedies.

On the West African Coast is Nigeria also

On the West African Coast is Nigeria also plagued like her neighbours by shortage of food. Though teaming with about sixty million three quarters of the population are under fifteen. This big chunk of the population though feeding like maggots cannot produce anything. To grow well they just need all the nutrients the nation can give them.

Even in the remaining quarter of the population are old people, infirm and aloof to worldly worries, hence equally unproductive. This batch constitutes about an eighth of the population. Briefly, in Nigeria our model country, one-eighth is feeding seven-eighths of the population. Anyone can see why a general food shortage exists. The same conditions apply in many places.

Of the many remedies suggested one is the involvement of our school population in Agriculture. They can be trained and will eventually become farmers or breeders as opposed to oldies who are on their exist and so can be excused from the whole task.

The prosecution of the programme involving school children demands compulsion. Unless agriculture is certified a compulsory subject some parents may support their wards who may refuse to study and practice farming. Such erring parents may think that agriculture will distract their childrens' attention from the Arts or Sciences for which their chaps are being groomed unmindful of the fact that the various disciplines are interwoven; thus to be successful in one calls for an inkling of the knowledge of the others.

Besides, since mechanisation is the answer to modern agriculture, farming therefore does not mean everyone going to till. The scientist has his part to play; so is the engineer and the financier. Only an early brush with agriculture can attune such minds to see what contribution to make to the industry in later life.

Quite surprisingly, many are unaware of the various departments of Agriculture. Therefore to attune young minds, supported by their parents, to the industry calls for much publicity not only on the grounds covered but also on the chances of becoming wealthy through agriculture since many view success in life not in terms of service but acquisition.

The Ghana experiment will continue to be a pilot scheme for many African countries and may be some countries will outshine Ghana eventually when the scheme is fully understood but as of now Ghana youths are in the frontline. That is as it should be; all those who want to eat ought to do something to help in the production of food.

From the Economic point of view:

AGRICUL

West

I shall discuss this topic on the problems of West African farmers, the consequent causes of low agricultural productivity and their effort to modernise agriculture.

I shall then try to emphasize why agriculture is of paramount importance to the growth of the West African economy and offer suggestions as to how the level of agricultural productivity should be raised.

A large number of West African farmers still rely very heavily on the traditional methods of farming such as shifting cultivation and bush fallowing which leave sizeable portions of cultivable lands "idle" for upwards of 3–5 years after being previously farmed for an equal number of years. During this period of "idleness", such lands – almost amount to 40% of the total arable lands in some areas – yeild nothing.

Besides, a lot of general labour as well as crude implements like traditional hoes, diggers, cutlasses are still being freely and widely used. The use of these consumes a lot of human energy and lowers the amount of work an average farmer can do daily. In some areas, such natural phenomena like flood, soil erosion, drought and unfavourable soil conditions conspire to make it impossible for modern implements to be applied.

In some areas, sophisticated farming machines are imported and later, it is discovered to the chagrin and woes of the people that many such machines are not tropicalised and when they get spoilt, hardly could their spare parts be found locally and where found, there are few technical experts to service such machines. These machines often break down and give rise to low productivity.

In the savannah regions (grassy areas), fire is usually set on the land for clearance. In the forest areas, trees are usually cut down and burnt. This process of burning often reduces the fertility of the soil. Very few farmers respond to the various government campaigns for the introduction of fertilizers and the application of insecticides on their farms.

A large majority of the farmers are uneducated and their activities are not properly organised. Even their costs of production are hardly related to their output. Ignorance and wholesale beliefs in superstition explain why many West African farmers attribute poor harvests and bad climates to supernatural causes and at times await the dictation of the local gods before harvesting certain crops.

COMMUNAL LAWS

The farmers' belief in the gods is so strong that large acres of useful lands are specially reserved for their dead ancestors as shrines or for the burial of local dignitaries. The land tenure system in West Africa is very complicated. Hardly are there genuine titles over certain lands especially in the rural areas. Most lands are communally owned but controlled by the village chief or family heads even though every adult has a right to use part of such lands.

This means that no portion of su lands could be pledged as securit for loans. This constitutes a seriou handicap since such loans are badly needed and would have gone long way to enable farms acqu modern agricultural implements, fe tilizers, insecticides and improve seedlings. Besides, most lands a fragmented (broken) and each portio is seperated by fences erected her and there.

The market for the disposal of farm farm produce is limited. Moreover there is poor transport and communi cations system. Many roads are not well constructed, some areas have only bush paths while some are not easily accessible.

These limitations hinder the free flow of agricultural products to these areas and together with the limited earnings of the majority of the people constitute a discouragement to greater output.

Conscious of the importance of agriculture to the economic develop ment of their countries, the govern ments of West African countries have been trying from time to time to embark on certain bold steps to modernise and improve the volume and quality of agricultural output in their countries. Many of them established PLANTATION FARMING. GUINEA established the banana plantation.

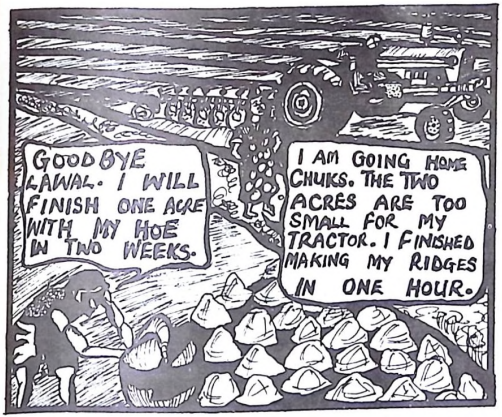
IVORY COAST had coffee, cocoa and rubber plantations whilst in the

FARMSTOCK

Courtesy of STUDENT VOICE

URE in Africa

by Fidelis O. Akpom
B.A. (Econs.) Durham
Dip. Ed. (Lagos)



CAMEROONS, there are oil palm plantations – even though most of them are foreign owned. In GHANA, State Farms have been set up. For instance, in 1965, state farms in Ghana occupied 66.4% of the total 960,784 acres of land under cultivation. They also owned oil palm plantations, irrigated rice farms and different kinds of plantations for mixed farming.

In NIGERIA, the FARM SETTLEMENT SCHEME was established. Carefully planned and organised farms were introduced for young and educated farmers who were exposed later to expert advice and credit facilities from the government. The potential farm settlers were properly trained in the various farm INSTITUTES established.

Later, these settlers with their families were offered sizeable farmlands – depending of course on whether such lands were for poultry, animal hunsbandry or for cash and food crops. Right now every state government in Nigeria has allocated considerable sums of money in their respective budgets towards improving the lot of the farmers and raising the level of agricultural productivity in the country. The overall aim is to prove that farming can be profitable and can effectively provide an adequate means of livelihood for all and sundry.

In LIBERIA, the American Fire-Stone Company realising the importance of rubber growth and development, pumped in a lot of money into the establishment of RUBBER PLANTATIONS. Improved modern and scientific methods of farming were introduced to raise the quantity and quality of rubber products in the country and then compete favourably in the world commodity markets.

Despite the obvious good intentions of these governments, the Farm Plantations, Farm Settlements and the State Farms encounter series of obstacles. Stated briefly, these include:

(a) the costs of financing these projects have been too probihitive.

(b) the local people are often very unwilling to offer lands to the governments and as

such, some governments have to resort to compulsory acquisition of their lands – subject of course to either adequate compensations or where they disagree, court actions. In either instance it is a protracted affair leaving the parties worse off and causing unnecessary split in families.

(c) The non-co-operative and apparent exhibition of disinterestedness on the part of the local farmers have even stultified the government's efforts and frustrated and realisation of the hope that the scheme would be successful.

Nevertheless the Operation-Feed-Yourself-Programme which has just gathered its first harvest is the boldest agricultural venture undertaken along West Africa. The bumper harvest – (Farmstock November 1974) cleverly shows the village farmer what discipline and machines working together can achieve within a short period.

ECONOMIC IMPORTANCE

Agriculture is the mainstay of the West African economy. It is the largest contributor to the gross domestic products of these countries. It is the dominant source of foreign exchange earnings. It supplies between 75% – 80% of West African exports and the foreign exchange earnings realised help them to pay for the agricultural equipments (machines, tractors etc.) that help to modernise and expand industries, infrastructures and agriculture itself.

The majority of the capital projects carried out by these countries for sometime now are financed from reserves accumulated by the Marketing Boards from time to time from the total earnings of farm produce.

It is the largest employer of labour. Since West African economy is highly dependent on primary production, agriculture absorbs more than 70% of the entire working population.

It is also the source of domestic food staples both for the expanding industrial and urban population. Food crops like yams, cocoyams, beans, rice, cassava, groundnuts, maize, millet etc., are now made available to satisfy the local food requirements.

It is the source of capital for the newly established industries in the country. It is the source from which labour is later released for work in the industries.

Agriculture supplies the old and new industries with the essential raw materials for production e.g. cotton for the textile industries; rubber and leather for the show factories; tobacco

leather for the show factories; tobacco for the cigarette industries etc. It also helps to relieve many local industries from relying helplessl·lon

industries from relying helplessly on the ever fluctuating world market prices for these commodities.

It also constitutes a potential market for the products of these new expanding industries – hoes, fertilizers, insecticides etc., produced in the industries are purchased for use in agriculture.

Taxes on agriculture, export crops and on the imports brought with the foreign exchange proceeds constitute the main source for public investment in many social, physical and economic infrastructures such as schools, hospitals, transport and communications, etc.

SUGGESTIONS

Apart from the current plans now being adopted for the promotion and improvement of agriculture by the various governments some helpful hints may still be welcome namely:

(a) the use of labour-saving machines
(b) the application of manures, fertilizers and the other soil enriching materials to improve the fertility of the arable lands
(c) how to be less superstitious.

These could be achieved through

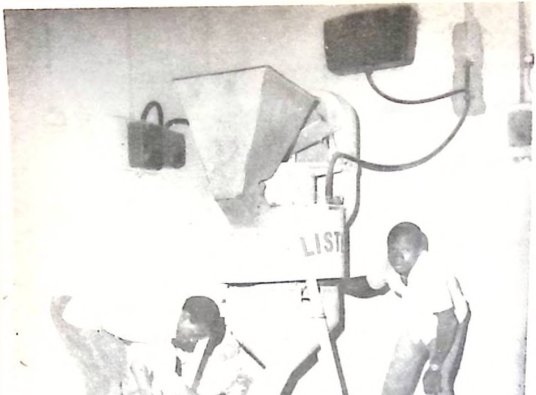
(a) public lectures in the local language by experts on the subjects.
(b) through mobile cinema shows and also
(c) through exhibitions and ope air demonstrations on th use of these implements an equipment.

Young school leavers should induced and encouraged to take agriculture. This could be done making the condition of living in rural areas very attractive.

The governments should liberal credit facilities for farmers and gr them loans without demanding unr sonable securities. Credit ins should offer short-term loans to the farmers. Farmers should be made buy improved seedlings and fa equipment etc., at subsidised price

The governments should endeavo to diversify their economies throug the establishment of more industrie that would consume considerab percentage of the farm produc instead of relying mainly as they d now on the export of few cash crop whose prices are ever fluctuating.

More markets, especially in Easter Europe should be explored while a the same time, the link with th traditional consumers in the U.S.A and Western Europe should be further strengthened.



Electricity plays a very important role in the life of a modern farmer be he a crop or livestock keeper. In picture above, animal and poultry feed is mechanically produced at the Government Farm Centre, Agege.

There is, however, still more to do in respect of making this country economically self-sufficient. One unfortunate aspect of this country's agriculture is that its massive support of the economy can be attributed to only one crop - cocoa. Cocoa alone cannot sustain the economy at all times so that it is necessary to seriously start diversifying the economy by growing other exportable crops.

There are also problems with the supply of machinery, seed fertilizers and insecticides to the farming population. Storage, transportation and marketing facilities have been inadequate and inefficient. The land tenure system has still not been properly put in the right perspective, hence prospective large farmers have had to contend with cumbersome procedures of acquisition of large tracts for their operations. It is no wonder therefore, that the country still continues to spend a sizeable portion of its hard earned foreign exchange on food imports.

It is hoped that with the launching of the third phase of the "Operation Feed Yourself" programme a long way would be reached in the country's search for a meaningful self-sufficiency in the economy. Greater emphasis ought to be laid on the marketing and storage systems so as to ensure efficient supply of food items on the markets.

In this regard the First National Agricultural Fair should be viewed in very important perspectives. All important agricultural requirements of the country can be effectively emphasised at the fair so that every achievement made whatever is still in the process, and the projections for the future would be seriously reflected

GHANAIAN FIRMS MAY JOIN IN KAISER RICE PROJECT

The Government of Ghana and a number of Ghanaian financial institutions may participate in the Accra Plains rice project. A State issued in Accra by Mr. J.V.L. Phili resident manager of the Volta Al nium Company, said the VALCO had discussions with the Natio Investment Bank, the Agricultu Development Bank and the Stand Bank of Ghana which had expres an interest in participating in t project.

Kaiser Aluminium have now enter into an agreement with Hawaiia agronomists to conduct a feasibili study and prepare a report on th development of a commercial ric project of 5,000 to 10,000 acres the statement said, adding If th feasibility study establishes the commercial desirability of a large scale rice project in the Accra Plains and the Government concurs in this conclusion, Kaiser Aluminium, in conjunction with the Government, its institutions and the technical partner, would hope to establish such a project.

Expressing the belief that the project would be fully consistent with the N.R.C.'s programme of achieving self-sufficiency in agriculture, the statement said if it "becomes successful and profitable", it would also serve to stimulate other agricultural projects in the area by Ghanaian and other investors.

The statement recalled that after a series of negotiations between the Government and Kaiser Aluminium its engineers arrived in the country in August, last year, to conduct a survey and make recommendations on the project.

ANIMAL FEEDS

The East Central State Agricultural Development Authority for livestock projects at Nekede and Nineth-mile Corner near Enugu will produce 24,000 tons of animal feeds annually when in full operation.

This was disclosed recently by the Manager of the livestock project at the Nineth mile Corner, Mr. C. Iheanacho

YAMS DONATION

The Enugu Yam Sellers Association recently donated about 300 yam tubers to the Enugu Social Welfare Council in response to the council's call on the public spirited organisations and individuals for financial and moral support to the council.

The Enugu Social Welfare Council is humanitarian organisation which caters for the less fortunate citizens.

The Principal Welfare Officer of the Enugu Social Welfare Council Mrs. Pauline Ojike expressed the need for agriculture and urged the Yam Sellers Association to encourage it's farming sector in abundant production of foodstuff.

BUMPER HARVEST

There have been bumper harvests of food crops from state owned farms in the North Western State, a Government Spokesman disclosed.

Stating further the spokesman said that in places like Sokoto, surplus crops of millet, rice and maize will be stored under the Governments grain reserve programme.

54m NAIRA FOR AGRICULTURE

Nigeria has received from the World Bank a loan of 54 million Naira for rural agriculture development.

This was announced recently in Lagos by the Cabinet Office.

It said that the loan represented 50 per cent of the estimated costs of rice project in the East Central and South-Eastern States and rural agricultural schemes in the North Central, North Eastern and North Western States.

TECHNICAL ASSISTANCE FOR LIBERIA

President Tolbert of Liberia said that he saw trade possibilities in rubber sales to, and purchase of sugar and rice from, Guyana, but the major problems would be transport.

He also raised the question of Guyanese technical assistance for Liberia, particularly in agriculture.

Speaking further, Mr. A.C. Jackson, Junior Registrar of the Episcopal High School, expressed dissatisfaction about the Educational Policy of Firestone Plantations.

He said Firestone, the oldest foreign company in Liberia exporting huge quantities of best grade rubber had not provided a single high school, since it began operations in 1926.

SUPPLIES TO FARMERS

Farmers in Kwara State are to be supplied with fertilizers, insecticide and tractors for hire at moderate charges. They would also benefit from irrigation, soil reservation, fisheries project and granaries.

This was announced by the Publications Department of the Ministry of Home Affairs and Information, Ilorin.

At present, according to the report, a sum of 610,000 Naira had been spent on the expansion and improvement of two agricultural Training Centres in Osaro and Ilorin, and the establishment of a farm centre in each of the eleven administrative divisions of the state.

FARMERS GET GOVERNMENT SUBSIDIES

The East Central State Department of Agricultural Extension has presented large qualities of various food commodities to 49 progressive farmers in Arochukwu division. This is as a result of the world food programme "project 775" now being implemented throughout the state.

Project 775 is a world food programme whereby tree-crop farmers, mainly oil palm, rubber and cocoa farmers who have established new plots of tree-crops since 1970 are given encouragement to enable them maintain their plantations up to good standard.

MECHANISED AGRICULTURE

Farmers cannot derive full benefits from the agricultural programmes prepared for them unless there is a dynamic knowledgeable and efficient extension service, the Military Governor of South Eastern State, (Brigadier U. J. Esuene has said in Obubra.

It was with this understanding, Brigadierr Esuene pointed out, that the State Government made consistent efforts to train junior and middle-level technical manpower in the five schools of agriculture in the country and later decided to establish a multi-discipline school of agriculture in Obubra.

Esuene was delivering a lecture at the graduation ceremony of the pioneer students of the School of Agriculture at Iyamitet in Obubra division recently.

N27,000 SET ASIDE

The Area Development Board in Sokoto has set aside N27,000 for the improvement of general environmental sanitation in the township. Chairman of the Board, Alhaji Abdulkadir Abubakar J. Kalgo said, of the amount, N25,000 had been spent in the exercise.

The Chairman said his Board, in collaboration with the Local Authority and the State's Ministry of Health staff was trying to educate house owners to construct socket pits in their respective houses to the public drainage.

NEW FARMERS TO GAIN

The North Western State Government has reached an agreement with the Nigerian Agricultural Bank (NAB) to grant a loan of 4.5 million Naira for the establishment of a loan scheme for farmers in the State.

Announcing this recently in Sokoto, the States Commissioner for Agriculture and Economic Planning, Alhaji Ibrahim Tako Galadima said the agreement on the loan would soon be signed.

GARI INDUSTRY

The foundation stone of a 6,000 Naira gari industry has been laid at Omege Achara, in Ezzikwo Division, East Central State.

The ceremony was performed by the senior Co-operative officer for Ezzikwo, Mr. D.M. Chuku Nwosu on behalf of the registrar of Co-operatives at Omega Achara Ikwo.

Nwosu described the industry as an important milestone of the economic and social development in Ezzikwo.

The industry is expected to give employment to more than 50 workers.

FOOD CRISIS AHEAD

The Food situations in Nigeria is going to get worse before it gets better.

The report is alive with alarming facts and figures pointing to many years of hardship for Nigerians.

The basic fact is that the gap between food production and food needs is growing rather than diminishing.

The basic cause of this is that the rural population which provides the food, is growing less slowly than the urban population. An additional factor is that about half the population of independent Nigeria is under the age of fifteen, meaning that it needs to eat well, but plays no part in food production.

Some months ago tubers of yams were donated by the Mid-West government to drought victims in the North Central State to avoid massive hunger.

Government and the people must invest more in agriculture to avoid food shortage.

GHANA APPLIES FOR AID

The Chief Executive of Ghana Cocoa Market has appealed for N5 million from the World Bank for Ghana's Cocoa Industry's development. Limited, Col. Kwatu and Takyi (Chief executive) made the appeal during a meeting with the World Bank representatives and Cocoa Association in London. From a peal of 557,000 tons in 1964-65 representing 38% of world production, Ghana declined to 400,000 tons in 1973-74 representing 30% of world production.

These were caused by the age of the cocoa trees and the death of some of the farmers. A number of spraying machines, chemicals and matchets have been provided for farms to boost production.

LOAN FOR RICE

The Bank of Ghana will guarantee loans from the Commercial Banks to the rice mills for the purchase of rice during the current harvest season.

Mr. C.T. Nelson, Executive Director of the mills, has said that negotiations to this effect has been completed that the loan, based on a system called "Special Credit facility for agricultural produce marketing" will be a revolving fund to be refundable when the cheques matures after 80 days as in the case of cocoa.

AID FOR SIERRA LEONE

Dr. Waldheim, UN Secretary General, has authorised disbursement equivalent to 750,000 Naira from the UN Special Account for the Emergency Operation (UNEO) to Sierra Leone in continuation of the UN's effort to aid countries most severely affected by the prevailing economic crisis.

In a message to recipient governments, the Secretary - General has suggested that the funds will be used for buying fertilizers.

continue on p.15

New weapon in the war against Insects

by **Arthur Motte**
a London journalist

Insects eat about one third of all the world's food production before hungry people have a chance to get at it. In the developing countries much more food is lost in this way — and some of the insects kill millions of people every year by spreading diseases like malaria.

It is not surprising that the insect is one of the principal targets for the scientist; without his pesticides no amount of fertiliser would be able to make up the losses in food crops.

Twenty years ago it was thought that heavy applications of synthetic chemicals would solve the problem. But insects developed a resistance to them, and the chemicals steadily polluted the environment.

Call For New Control

There was an urgent call for a new pest control which would protect the growing plant and also its crops when they reached the food storehouses of the world, without making them harmful to man and his environment.

To find it, scientists at the oldest plant research station in the world at Rothamsted, near London, turned to one of the longest known natural insect killers in the world — pyrethrum

This is found in the flowers of the pyrothrum plant, which grows in Kenya and other parts of Africa.

They triumphed with a new pesticide — a synthetic chemical known as NRDC 143 — which does not pollute the environment. NRDC 143 kills off insects that have become resistant to existing pesticides and is many times more potent than products already discovered.

Earlier synthetic pyrethrins break down very quickly when exposed to the air and sunlight and, although this makes them non-polluting, it limits their use to indoor pest control.

Effective - And Cheaper

NRDC 143 remains active for about three times as long as natural or earlier synthetic pyrethrins, is cheaper to produce, and is highly effective on a wide variety of insects, among them the Army worm, white fly, aphids and grain beetles. It kills only insects and is said to be completely harmless to human beings and all forms of livestock.

This means it will be of great value in protecting stored crops without frequent application. It is difficult to protect stored crops with present insecticides because of the risk of harmful substances getting into the food.

There will be plenty of room in the world for both NRDC 143 and natural pyrethrin. Kenya is growing new plants with higher insecticidal content and other advantages. Vast quantities of both are needed to conserve the world's food supplies. ■

Diseases of poultry

FOWL POX

by Our Livestock Correspondent

FOWL POX IS A VIRUS DISEASE OF POULTRY, WHICH MAINLY AFFECTS CHICKENS, BUT CAN ALSO OCCUR IN TURKEYS, PIGEONS, GUINEA FOWL AND QUAIL. DUCKS AND GEESE ARE NOT AFFECTED. NEITHER ARE HUMAN NOR ANIMAL. IT IS ONE OF THE OLDEST KNOWN DISEASE AND CAUSES LOSSES IN MOST COUNTRIES.

The most typical symtoms are pox marks on the comb and and wattles. These marks start as small grey-white spots, which grow rapidly, and turn yellow. There may be few or many. In severe cases the bird's head may be covered in rough, wartlike growths, which may also be found under the wings, round the vent, or on the legs and feet.

In time the pox marks dry into brown scabs surrounded by red inflamed areas. After a few weeks the scabs drop off, leaving a smooth scar, unless bacteria have entered the site, when the whole is more severe.

AREAS OF INFECTION

In some birds the virus grows in the cells lining the mouth and throat, causing yellow-white nodules which grow rapidly, and may become thick enough to interfere with eating. Similar growths may come in the sinuses, and interfere with breathing, or in the eyes.

The effect of growth and production depends on the extent of the disease in each bird. In some flocks the disease spreads rapidly, and in others quite slowly. Wounds caused by sharp pieces on the cages or equipment may increase the spread of the disease.

DIAGNOSIS AND PREVENTION

Diagnosis can usually be made by inspection of the birds. Laboratory methods can be used if there is doubt, and include the examination of thin slices of the comb to look for "inclusion bodies" which are typical of fowl Pox.

Another method is to apply diseased material to the com of a susceptible bird to see if it gets the typical pox.

There is no cure for Fowl Pox. Good husbandry wi generally reduce the effects of the disease, otherwise must run its course.

Prevention is by vaccination. A live virus vaccine is used, and is applied to the wing web by jabbing it with a two pronged needle which has been dipped in suspension o the virus.

Because the virus is applied by such an unnatural rou as the wing web it does not produce the disease, but does produce an immunity, which should last for the life of th bird.

WHEN TO VACCINATE

The vaccination is best made between six and twelv weeks for best results. If it is used before six weeks the birds immunological system is not fully developed, and s the immunity produced is weaker.

By twelve weeks the birds ought to be protected. How ever these are not rigid limits. For example the vet ma advise vaccination earlier than six weeks if he considers the risk of early infection great.

Again the time may be planned to fit in with other vacci nation.

Fowl Pox virus is exceptionally long lived outside the bird. A survival period of twelve months has been quoted in some conditions. There are related Pox viruses, which take their name from the bird most commonly affected by them: Fowl Pox, Turkey, Pigeon Pox and Canary Pox.

Each virus can infect each species of bird, but more mildly than its own kind. An attack of one virus will give the bird partial immunity against attack by the other kinds.

continued from p.12

West to aid Farmers

Several agricultural projects, designed to meet high cost of living in the Western State, have been embarked upon by the state's Ministry of Agriculture and Natural Resources.

The projects will serve as an impetus to farmers in the efficient production of food in adequate quality and quantity for the state.

This was made known recently by the state's commissioner of Agriculture and Natural Resources Dr. Gbolahan Ashiru at Shegamu while performing the official opening of the sixth Abeokuta/Ijebu Circle Agricultural Show.

In addition, he pointed out that 354 acres of rice and 230 acres of Western yellow maize as well as 469 acres of cassava had also been planted to ensure that farmers had the same quantity of these crops in the next planting season.

To assist farmers to accelerate more food production, he said loans totalling N16,000 has been made available to farmers in the circle through the Agricultural Credit Corporation (ACC).

RISE IN COCOA IN GHANA

Cocoa values have risen sharply and the London terminal market Dealers were at a loss to identify the precise reasons for the rise in cocoa. The USAID'S Foreign Agriculture Service put World Cocoa Bean Production in 1974-75 at 1.45m tons up by 1 per cent over 1973-74. It said the improved weather conditions will boost African production.

HAWAIAN AGRONOMISTS IN GHANA

A Team of rice experts, agricultural and irrigation engineers will arrive in Ghana very soon to prepare plans of large scale agricultural development - in the Accra plains.

The team, from Hawaian Agronomics Company an international agribusiness, engineering and management consulting firm, will undertake the project in partnership with Kaiser Aluminium and Chemical Corporation.

This was disclosed by Mr. Wayne Richardson, President of Hawaian Agronomics. He disclosed that between 5,000 and 10,000 cultivated acres would be agriculturally and economically feasible

He said they believed that this project would further Ghana's "Operations Feed Yourself" programme by meeting basic food need, producing a viable new commodity entity and reducing the over-flow of foreign exchange for a commodity which they felt could be economically grown.

African students

● *The Patrice Lumumba Friendship University in Moscow trains highly qualified national cadres of specialists for the developing countries. The most capable of its graduates, having received experience in their speciality at home, return to the university for a post-graduate course.*

Here in Moscow, at a modern clinic of the Ministry of Railways of the USSR, the Nigerian doctor Mustafa Dapo Saliu-Lawal underwent post-graduate practical work. He and colleagues enjoyed sitting in clinic's park during intervals, to converse about their affairs and concerns. Three years of post-gradu work have gon by. The friend decided to bid farewell to the cli to its people, and the Russian ban

(Photo shows (left to right) Cost Michailidis (Cyprus), Karuna Aju hamy (Sri Lanka) and Mustafa Da Saliu-Lawal (Nigeria).

In these days, when the Soviet people are marking the 20th anniversary of the cultivation of virgin lands (immense spaces in the south of Siberia and Kazakhstan), APN's correspondent approached the Editors of the Druzhba newspaper put out by the Patris Lumumba University in Moscow. Among those who sowed and reaped the grain on those tracts, who built houses, schools, granaries and workshops, were students from Africa. Their impressions were featured at different times in Druzhba, and the Editors kindly permitted us to cite some of them.

"The work of the student building teams," wrote a group of African students who were members of the University's International Teams, "enabled us to familiarise ourselves closely with the cultural and spiritual values of the Soviet people, to see the country not on a map, but in reality."

"We saw how gigantic electric stations went up on the virgin tracts, how the grain ripened, how cities were built and village appointments improved."

TESTING GROUND

"The virgin land is a place where friendship is tested," wrote Narandranat Luchmaya, a Mauretanian student of the Department of economics and law. The virgin land is a place where we saw how man rendered barren land fertile.

"I worked in building teams twice, and was amased by the boys' preparedness to sacrifice a great deal for the sake of carrying out the set aim, of surmounting all difficulties.

Also, I liked the virgin land because it offered a great field for youthful endeavour. The members of our team worked on eight units and did the jobs in time. Everything done by our hands will remind the local people about us students of the Friendship University.

"I shall never forget our form student friendship which became still stronger in the building teams," wrote F. K. Mwanya of Uganda, an undergraduate of the Department of economics and law. There we worked, and rested too, delivering lectures and giv concerts.

"I am often asked: 'What the virgin land do for you?" a student from Botswana. "To I want to reply that for me the gin land was a school which tau me to work. Now I can do the j

Fish Offal For Pigs

Minced and acidified fish offal an acceptable form of protein for p according to experiments at Harper Adams Agricultural Co in Shropshire, England.

In two trials, each lasting months and involving more than animals, the fish offal replaced traditional fish meal in the ratio without any adverse effect on eit liveweight gain or feed conversi

Moreover, one advantage of fish offal was that it was liquid therefore, suitable for pipeline ding.

Analysis of the fish offal show that its protein, oil and ash percen tages were 15.66, 2.60 and 3 respectively. Dry matter was 22 per cent.

A concept of feeding covering the lactation cycle as a whole is thus built up particularly when health and fertility are added as further factors dependent on adequate nutrition.

Good quality forages always assist the farmer in reaching his multiple objectives, the report says.

to such an extent that it was no longer always valid to say that maximum yield was commensurate with maximum profit. In other words - the last few pounds of cake might not increase yield enough to pay for them.

Hence the proposition: how much more milk does a cow produce from extra food and how does a "good" cow compare to a "bad" cow in this respect?

Selenium Vital In Poultry Feed

Although needed in only minute amounts in poultry feed, selenium is nevertheless a very necessary part of the birds' diet, according to Hy-Line International expert Dr. C. Howe.

Selenium, a non-metallic element resembling sulphur, has previously found its way into diets via fish meal - now in seriously short supply.

"Although selenium can be poisonous in excess amounts it is very necessary in smaller amounts," said Dr. Howe. It was a vital trace element for many species, including poultry.

Lack of it induced poor growth rates and feathering, and the birds developed fibriotic degeneration of the pancreas, while breeder flocks suffered from reduced hatchability.

Only one gramme of sodium selenite was needed per five tons of feed, according to Dr. Howe, and in countries where its addition to feed was banned, the additive could be given with water at the rate of 50 parts per billion.

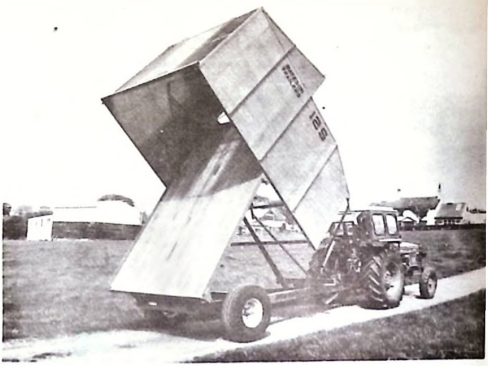
Robot Tractor A Step Nearer

The completely automated tractor is reckoned to be a step nearer following work on a new driverless system being developed by the National Institute of Agricultural Engineering at Silsoe in Bedfordshire.

Still at the beginning of a five-year programme, the system utilises an optical sensor linked to the wheel of the tractor.

The experts in charge, Messrs J.R. Stansfield and G. Harries of the control and instrumentation division, believe that with increasing labour shortages greater reliance will have to be placed on such systems.

The new system follows earlier research with acoustics and a pneumatically-operated furrow wall steering device. And while it is expected to cost more - present estimates put it at well over £1,000 - the fact that it has fewer moving parts makes for simplicity plus the fact that it need not be lifted each time for turning at



NEW SILAGE TRAILER HAS REVOLUTIONARY SAFETY FEATURE

A revolutionary tipping action, incorporating an anti-jack-knife safety feature, is claimed for this new silage trailer hwich has recently been introduced by a British manufacturer. Known as the "Model S" silage trailer is won the supreme award in the new equipment competition at an International Dairy Show in Britain recently.

A recurrent hazard with conventional trailers is the possibility of the container jack-knifing when tipping a compacted load – this danger being totally eliminated with the Model S. As the floor tips to hte rear the silage container, which is anchored to hte front chassis, rocks forward on a central pivot allowing the load to discharge freely through the base of the container. At no time during the opertaion does the centre of gravity pass behind the rear axle, thus eliminating the danger of jack-knifing and allowing tipping to take place close to previous loads or other obstacles.

The Model S, which can be towed by any make of tractor, also features full remote control allowing the farmer to position the trailer and un-load the grass or similar fibrous material without leaving his driving seat. Three versions of the trailer are available; two basic models, the 12S (5 ton capacity) and 14S (10 ton capacity); and the 16S which is a 4-wheel turntable trailer.

Bateson Trailers Limited, Doodfield Works, Windlehurst Roda, Marple, Chesire, England.

The firm is interested in appointing overseas agents or manufacturing licencees.

1974 ROYAL SHOW AWARDS FOR NEW FORESTRY COMMISSION TRACTOR

Two major British awards were made to the Forestry Commission for this new hydrostatic four-wheel drive forest tractor at the 1974 Royal Show at Kenilworth, Warwickshire, in the English Midlands. These are the Burke Perpetual Challenge Trophy for new implements awarded by the Royal Agricultural Society of England, and one of nine silver medals awarded by the Society for entries in the annual Silver Medal Machinery Competition.

The tractor is powered by a Ford 1000 engine and the frame is articulated about a centre pivot. In the front section is the engine, hydraulic pump and the driver; the rear section contains two hydraulic timber winches. The main hydraulic pump provides a stepless variable transmission with reversing and dynamic braking. The timber winches have axial flow motors inside the drums and are controlled either electrically from the cab, or by UHF radio transmitter worn by the driver. Prototype tractors for test work were built in the Forestry Commission workshops and commercial production is being undertaken by a British company.

The three main themes of the 1974 Royal Show were fuel economy crop health and forage conservation. This was the 126th Royal Solw and the 12th at the present permanent site. There were 721 trade stands against 678 last year and international interest were reflected by seven overseas pavilions which in the case of Canada and Holland were doubled in size.

FORESTRY COMMISSION, 25, Drumsheugh Gardens, Edinburgh SH3 7RS,

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headlands if a suitable device for the latter operation can be incorporated into the equipment.

While designed primarily for ploughing, the equipment will, it is hoped, be further adapted for cultivation and drilling, although for that it must be developed to follow less clearly defined ground features than those necessary for ploughing only.

At present it consists of a side-mounted projector which casts a 12 in. beam on the ground at 90 deg to the furrow, with tractor and plough lined up when the beam is split equally between the furrow bottom and the unturned soil.

An optical receiver is angled towards the light bands and images produced on photo-detector cells are amplified for transmission to an electric motor which operates the steering wheel.

"Early field trails look promising", Mr. Harries says. "We have worked the machine unattended at up to 3 mph and by modifying the power steering mechanism should make higher speeds possible."

Specialist Power

Vehicle Demand Forecast

While the two-wheel drive tractor will continue to be the main farming tool for some years to come, demand will increase for specialist self-propelled vehicles, predicts Dr. M. Dwyer, head of the tractor department at the National Institute of Agricultural Engineering, Silsoe, Bedfordshire.

For example, the mass-produced tractor working at about 4½ miles per hour on most cultivations tended to become less efficient at converting engine horse-power into draw-bar power as the size of the engine increased.

On heavy land the maximum draw-bar power which can be utilised efficiently is 54 hp while on light land the figure is about 67 hp, corresponding to engine horse-power of 63 hp and 79 hp.

"In both cases reversible ploughs provide better tractive efficiency and on light land they should be semi-mounted to retain adequate steering ability" Dr. Dwyer said.

Beef Building Type Not Important

A two-year survey of 589 farms by the Meat and Livestock Commission has found that the type of building used in beef production makes no difference to the performance of the cattle finished intensively.

"Cheap covered yards are as good as expensive purpose-built buildings," said MLC beef specialist Mr. J. E. Sunderland, commenting on the survey at a recent conference held at the National Agricultural Centre, Stoneleigh, Warwickshire.

continued from p. 30

husbandry in West Africa. Detailed study of the more common diseases of local farm animals, preventive and control measures, in respect at least one of each type of

(i) Virus-fowl pox, foot and mouth diseases, rinderpest.
(ii) Bacteria-Anthrax, tuberculosis, contagious abortion.
(iii) Fungi-Scabbies, ringworm.
(iv) Protozoa-trypanosomiasis, coccidiosis.
(v) Metabolic-milk fever, ketosis, rickets, bloat etc.
(vi) Mycoplasmatles-pleuro-pneumonia.

6. MANAGEMENT OF FARM ANIMALS

Detailed study of management aspects of the following farm animals from birth to maturity:
Monogastric e.g. pigs, poultry
Ruminant e.g. sheep, goat, cattle.
Herbivore e.g. rabbits, guinea-pigs.

A field study of at least one animal from each class is essential.

7. BREEDING AND IMPROVEMENT OF FARM ANIMALS

(a) Aims.
(b) Principles of genetics in respect of animal breeding.
(c) Methods: Selection, inbreeding, crossbreeding and effects. Artificial insemination. Castration.

E. AGRICULTURAL ECONOMICS

1. Factors of production-land, labour, capital, entrepreneurship.
2. Law of diminishing returns.
3. Principles of demand and supply.
4. Marketing of agricultural products.

(i) Operations-Processing and storage, packaging, transportation and distribution.
(ii) The role of the producer, middlemen and the consumer; individuals, co-operatives, corporations, firms, Marketing Boards.
(iii) International Trade with respect to agricultural produce.

5. Agricultural Financing-sources and nature of farm credit and financing.
6. Farm Record
Farm diary, imput records, production records, farm inventory, farm log-book.
7. Simple Accounting

Preparation of entries of sale and purchases, profit and loss accounts.

PRACTICAL EXAMINATION

During the course the candidate is expected to have carried out and participated in practical work on livestock management, farm and vegetable gardening practices. Candidates should also be exposed to the major products of the forest type in their locality.

It is essential that candidates go on field trips to farms in different ecological areas and game reserves within the country.

The Practical Examination will test comprehension, skill observation and recognition.

SYLLABUS

A. GENERAL AGRICULTURE

Identification, uses, and maintenance of common farm tools, implements and simple farm machines.

B. SOIL SCIENCE

1. Identification of common rock types (igneous, metamorphic and sedimentary).
2. Soil profile from practical field work.
3. Laboratory work on physical properties of soil:

(a) Mechanical analysis using the hydrometer method and sieves.
(b) Determination of particle density and total pore space.
(c) Determination of moisture content of a moist soil sample.
(d) Determination of maximum water holding capacity.
(e) Determination of wilting point to be demonstrated.

4. Laboratory work on chem properties of soil:

(a) Demonstration of use

(a) Demonstration of use of meter.
(b) Demonstration of active reserve acidity using the meter, and colorimetrica using a comparator.
(c) Evidence of cation exchan by displacement of cati with potassium and precipi tion of the displaced calci with ammonium oxalate.

C. CROP SCIENCE

1. Identification of seeds, seedlin fruits, storage organs and oth essential parts of the more comm crop plants, local weeds, pastu grasses and legumes.

2. Identification of casual organis (where possible), nature of dama prevention and control methods f the common crop pests an diseases.

3. A working knowledge of plantin dates, seed rates and plant pop lation, germination testing of th more common local crop and pla population, germination testin

population, germination testing o the more common local crop plant is essential.

4. Candidates may be tested in the following skills:

Preparation of seed beds, fertilizer applications, mulching, watering, use of spraying equipment, vegetative propagation, germination testing.

D. ANIMAL SCIENCE

1. Identification of the more useful breeds of animal types available in the student's locality. Methods of restraint, handling, and grooming farm animals.

2. Identification of the major internal organs of farm animal (no microscopic studies), e.g. organs of the digestive systems, liver and kidney.

3. Identification of the common ectoparasites (e.g. ticks and lice).

Agriculture for schools

and endoparasites (e.g. live-fluke, tape work) of the farm and fish.

4. Recognition of the features of all stages of the life-cycle of pests and diseased condition in animals.

5. Recognition and uses of major animal feeds and feedings stuffs and their local sources.

6. Simple methods of hygenic control, drugging, dipping, spraying and simple medication methods for farm animals.

7. Ability to select

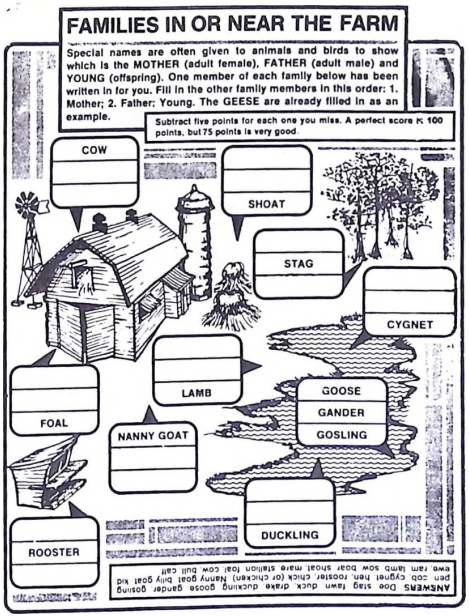
   (i) Animals and poultry for breeding,

   (ii) Eggs for hatching and to separate good and poor layers, sick and healthy animals.

E. PROJECT WORK

1. A Farm Project is to be carried out by each student OR a group of not more than four (4) students and a report submitted on it individually during the second term of the year of examination.

2. Field Note Books, Farm Records and account books related to the Project work the candidate has chosen.



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Note:

The Master for Agriculture using this chart as a guide can draw up similar exercises. – Editor

VEGETABLES

— A Special Correspondent

Growing of vegetable in the dry season entails much labour but the suffering is nothing when compared with the profit made from the harvest. Why is this so? Does this mean that dry season garden produces more vegetables than the rainy season garden?

The answer is "No." It is an accepted economic fact that "when the demand is higher than the supply, there is a sharp rise in price" and this is truly portrayed in dry season gardening. For the reasons mentioned below, we cannot easily avoid the demand being higher than the supply.

FACTORS GOVERNING DRY SEASON GARDENING

Certain factors limit the establishment of a dry season garden. Most important among them is lack of adequate water supply. Shortage of water in a vegetable crop will result in a low yield, poor quality of leaves and fruits, even the plant may wither.

This makes it very necessary to acquire a suitable site near a water supply. This may be by a stream, a pond, a well, a river, a dam or even a pipe borne water from where it could be drawn. A second limiting factor is lack of a suitable land close to both a water source and a market or at least a motorable road.

I am confident that all secondary schools in the country have very good roads so schools may not be perturbed by the second factor unless your school is far from a water course. A school may be lucky to acquire a garden site near a water course, but the venture may not be a profitable one if the water course is very far from a market or motorable road.

While making a choice for site, it is very necessary to remember that an extra profit awaits you if your water course is close to a market.

A third factor is limitation of funds because a dry season garden needs more attention than the rain season garden. This is especially so before December when most people make a final struggle to raise fund for Xmas and New Year celebrations.

CONTENT

There are several types of vegetables. But in order to succeed, certain conditions must be examined before we make a final selection of the vegetable we plant. Some local vegetables are more in demand than others.

It is not, however, out of place if our choice of vegetables includes the common species of the African Spinach (Amaranthus), onions (Allium Cepa) Tomato (Lycopersicum tamuter), Chillies (Capsicum annuum), Sun hemp (Crotolaria junecea) and Okro, etc.

Where you have a good European population in your vicinity, the inclusion of the following may be very profitable :-
Cabbage (Brassica-Oleracea), Carrot (Danceos Carota), Lettuce, Leek, beet root, radish, and so on.

TIME

The period, October/March generally dry and it is necessa for us to start our gardening fro the onset of the dry season say - 2 week in October, or a little before after this week. The first cultur operation is clearing, follow immediately by bed-making. Th bigger the size of the garden, th earlier one starts work but a squa chain-sized garden is consider fair for a school.

It is even better to be o commercial scale since if it is wel cared for, the proceeds will b fantastic. Some garden plants nee nursery attention, e.g. Tomato lettuce, onion, pepper, etc. while okro does not.

We shall have to transplant those that need nursery attention int nursery beds and sow the others direct into permanent beds. For a little illustration, we shall consider the cultural operations in one of the above mentioned crops — the Lycopersicum tamuter.

TOMATO (LYCOPERSICUM TAMUTER)

Variety: There are many species of tomato. Prominent among them are — the "dwarf gem," the "Zu rungu" the "Bony best," the "Pak the "money maker," the "Valiant etc.

The difference between a variety and another may be in the size of the plants, the size of the produced fruits, resistance to diseases,

palatability, ability to grow well with very little water, etc.

We learnt from our biology class that trees shed their leaves in the dry season in order to help conserve water which carries its food till the rain comes. We shall, therefore, consider the size of the plant (tree) before making a final choice.

The "Zuarungu" makes a big tree, the same thing with "Valiant" and the "Pak". The "dwarf gem," as the name implies is "dwarfish" in size with small sized leaves.

Its food consumption rate is considerably lower than the others. It thus suggests that this variety is ideal for dry season cropping.

NURSERY

Make beds of 4' x 25', plant your seeds in rows along the beds – 6" apart from one row to another. Cover with grass and allow 5 days to germinate.

Remove your grass on the 5th day to avoid disfiguring your young seedlings. Water in the morning every other day.

TRANSPLANTING

After four weeks i.e. when most of your tomato seedlings would have attained the height of 4", prepare your permanent beds 4' x 25'. Manure them properly and transplant, spacing distance - 24" x 12" – i.e. one foot along the rows by 2 feet avenue.

MULCHING

Mulching is the art of spreading some grass or leaves on top of a bed or ridge as protection for roots of plants. It has two advantages -

(1) It conserves water in the soil so that the plants are not parched.

(2) The mulching material serves as manure when it is completely decomposed. It is thus very essential for us to mulch our permanent bed crops.

WATERING

When there is no rain there is need to water our bed – using a watering can. 3–4 gallons of water per bed will suffice. This should be done one in two days, usually between 6 and 9 a m

please turn over

On the air in POLAND

FARMING BY T.V

A Foreign Correspondent

The TV Technical Farming School not only helps to increase knowledge on a particular subject, this being true of all TV school programmes, but it is also possible to obtain from it a secondary school certificate which is just as valid as any other secondary farming school certificate. This type of extra-mural tuition is an entirely novel and unique experiment which has emerged so as to meet certain domestic demands.

One of these demands is the giving of good specialized education to people who are to settle down to farming and in future run a farm on their own. And to run a farm involves developing it, rationally making use of all it offers, and also improving and modernizing it. This is why it is so important for farming knowledge to reach the most distant parts of the country.

The students of the Television Technical Farming School number about 15,000 and this figure embraces only those who are formally registered at the local correspondence technical farming schools where they will take all their end-of-term examinations.

The TV Technical Farming School students are mainly young people, round about 25 years old, who seem to have made up their minds about what they really want. And this is the best guarantee of their diligence.

They gather in Young Farmer's, Ruch and other clubs, in schools, and everywhere else where a television set is provided. They also follow the lectures in their own homes, but this method is considered as a last resort by experienced pedagogues.

Self-education – the basis of the TV experiment – is a difficult skill to master. It can be made more efficient with an exchange of views, discussions, the immediate explanation of doubts, which is possible only in a group. This is why the School founders and organizers continually stress the necessity of forming discussion groups, however small they may be.

The methods of the TV Technical Farming School, the new ways of educating have not yet been fully worked out: it is in practice that new formats will evolve and in the course of time, bring about changes in this unique School. Now a special team is touring the country and making inquiries on the effectiveness of the TV secondary school programmes. Even before they finish their work, one thing can be stated with certainty: systematic work is an indispensible factor guaranteeing success in the TV Technical Farming School.

And this is the reason why the organizers have introduced the so called "guide-notebooks". Every student is provided with such a book, and in it there are blank spaces where homework is to be filled in. These books, properly completed, are one of the conditions for taking each examination. It also allows the teachers to learn something about the student's individual work.

In order to help students preparing for examinations in Agriculture, we publish below this year's syllabus for the West African School Certificate at both Ordinary and Advance Levels.

It is desirable that schools presenting candidates for Agricultural Science should keep a School Farm, but where this is not possible, a well planned garden with small plots of farm crops ofr regular observation during growth is essential. At least two species of livestock, preferably one monogastic e.g. pigs, poultry, and one ruminant e.g., sheep, goat, cattle or a herbivore e.g. rabbit, guinea-pigs must be kept. The Practical Field Note Books of the candidates should contain records of individual projects, farm activities and observations carried out on the school farm or garden.

It is also recommended that the study of Agricultural Science in the School Campus be supplemented by visits to well organized farms and/or Agricul ural Research Stations.

SECTION A: INTRODUCTION TO AGRICULTURE

SYLLABUS

1. The meaning and importance of Agriculture.

This should involve a discussion of the importance of Agriculture to man generally and its role in the economy of the relevant West African country, emphasizing that agriculture is a business.

2. General principles of land use.

This should be discussed in relation to the use of land for Agriculture, Forestry and wild life conservation purposes, bearing in mind the physical, economic and social factors, commercialisation, communication and marketing.

3. Agricultural Systems: land tenure problems; shifting cultivation; crop rotation; continuous cropping, monocropping, mixed-cropping, pastoral and mixed farming.

4. Development of Agriculture: role of science and technology in development of Agriculture, including tools and source of farm power. Problems of development of local Agriculture.

Role of Government-Agricultural policies, regulations and programmes. Agricultural education, research and extension, credit facilities, subsidies, quarantine, vaccines and farm settlement schemes.

5. Simple farm tools and Agricultural machinery: their uses and maintenance.

Engineering details should be avoided.

6. An elementary study of climate with particular reference to its effects on Agriculture. The main types and ecological distribution of crops (cereals, legumes, roots, vegetables, edible fruits, beverages, spices, drugs, oils, gums, latex, fibre), and animals (cattle, sheep, poultry, rabbits) found in West African countries.

7. Use of Agricultural and Forest products and their by-products.

The discussion should include the use of agricultural and forest products for the provision of

(1) Food: fresh and processed;
(2) Clothing: hides and skins, fibre, rubber etc.,
(3) Shelter: Timber, gums, resins, etc.
(4) Health: Drugs;
(5) Fuel and Power: oil, minerals; and
(6) Others.

SECTION B: SOIL SCIENCE

1. Soil formation and properties: rocks-main types, rock weathering and factors of soil formation. Composition and properties of the soil, sand, silt, clay, organic matter, soil acidity. Soil texture and structure, and their importance. Water-retaining properties of humus and clay.

Different soil types should be handled and the separation of a soil into snad, silt and clay fractions demonstrated. Water-holding capacity and drainage of a sandy soil, clay and soil with a high percentage of organic matter should be simply demonstrated by these soils in funnels.

2. Soil and water conservation: depletion of soil resources by leaching, cropping, burning and oxidation of organic matter, erosion—its importance, causes, prevention and control—irrigation and drainage.

3. Soil fertility: plant nutrients; major sources of nitrogen, phosphorus and potassium. Maintenance of soil fertility, crop rotations, including cover crops and green manure; the living population of the soil and its role in the carbon cycle (especially Earth-worm and Termite) and nitrogen cycle (especially nitrogen fixing bacteria), the use of commercial fertilizers and lime, the principles and practice of cultivation and their effects on soils.

SECTION C: CROP SCIENCE

1. A review (with emphasis on their Agricultural implications) of plant parts, their functions, growth, development and reproduction.

2. Annual and perennial crop plants: external morphology, life-history, propagation, growth, cultivation, harvesting, storage, marketing and uses of local crop plants. Minimum of two

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crops from each of groups 1 to 6 should be selected from the list in the Appendix table below.

Where there are two or more types in each group not more than one member of each type should be studied.

3. Pastures and forage crops; recognition and study of main grasses and legume species commonly used in pastures. Natural pastures and their distribution. Important forage grasses and legumes and their uses.

Detailed botanical studies are not required. Students will be expected to recognize on the basis of gross morphological appearance, at most for species of grasses and at least one specied of legume used in pastures.

4. Crop improvement: aims, methods, introduction, selection and cross-breeding.

Chromosomes and Medel's 'Laws' need not be treated in detail. A brief study of sexual and asexual methods of crop improvement. A comparison of a local variety and an improved variety of a crop plant can be made for demonstration.

5. Weeds: their importance in Agriculture. Recognition o common annual and perennial weeds of local importance. Methods of dispersal and control of weeds.

Herbicides can be mentioned but not details of chemical structure and mode of physiological action should be dealt with.

6. Disease: a simple general account of diseases caused by fungii, bacteria, nematodes and viruses and nutrient deficiences affecting crops. The nature of the damage, methods of transmission and common methods of control.

Microscopic recognition of the causal organisms may be demonstrated where feasible.

7. Pests: a general account of pests of crop plants and stored products, their types and importance; principles and methods of pest control.

Study should include a general account of pests including rodents, birds and insects. An account should also be given of the life-cycle of a biting insect, e.g. grasshopper, a boring insect, e.g. a weevil, a sucking insect, e.g. an aphid.

SECTION D: ANIMAL SCIENCE

1. A review (with emphasis on the Agriculture implications) of the organs and tissue of animals and their functions.

A discussion of various species of domestic animals, their uses, and the common breeds (exotic and local) of each of the species.

2. Farm Animals: purposes of their production. Types and economic value of domestic animals locally proced

3. Elementary study of Animal Nutrition Functions of carbohydrates, fats, proteins, minerals and vitamins. Feeding stuffs–sources of main nutrients, balanced rations; maintenance and production rations; malnutrition in farm animals.

Details of formulation of diets and bio-chemical details of these major nutrients are not required.

4. Reproduction in farm animals; heat period (oestrus), a general outline of the development nourishment, respiration and birth of the young. Mammary glands, milk, lactation; egg formation; weaning of young.

Details of cell division and of the anatomy of the early embryo and the formation of the foetal membranes are not required.

5. Study of one animal from of the following groups; study in ding the main aspects of gener agement, feeding and breeding

(a) cattle, sheep and goats;

(b) pigs, rats, and dogs;

(c) rabbits, guinea-pigs, hor donkeys;

(d) chicken, ducks, turkey guinea-fowl.

6. Animal improvement: aims, thods: introduction, selection an cross-breeding (including the use artificial insemination).

Chromosomes and Mendel's 'La need not be treated in detail. Co parison of a local breed and an im roved breed of animal can be made demonstration purposes.

7. Diseases: a general account important diseases in farm animal Control: preventive and remidial me sures.

Local examples should be emph sized.

8. Pests and parasites: insects and ticks and carriers of disease i farm animals. Life-history of one endoparasite of farm animals, e.g. ticks or lice. The principles and me hods of control of pests and parasite of farm animals.

Details of struction are not required.

APPENDIX TABLE

List of annual and perenial crops (Se SECTION C. 1.2 of Syllabus).

Group 1: Cereals: maize, millet rice, guinea corn, wheat tamba, acha.

Group 2: Legumes: beans, cow peas, groundnuts, soya beans, bambaragroundnuts, yam beans, pigeon pea.

Group 3: Roots, tubers and vegetables: cassava, yams, cocoyams, potatoes, onion, charlots, pumpkins, tomatoes, carrots, okro, spinach, vegetable jute, luttuce, cabbage, cauliflower.

Group 4: Edible fruits and nuts: avocadeo pear; bananas,

citrus fruits, guavas, mango, jackfuit, pawpaw, pineapple, cashew, watermelon.

Group 5: Beverages, spices and drugs: cocoa, coffee, colanut, peppers, benni-seed, ginger, sugar-cane.

Group 6: Oils, latex and fibres: coconut, cotton, oil palm, shea butter sun-flower, sesame, rubber, sisal, kapok, jute, hemp.

PRACTICAL AGRICULTURAL SCIENCE

One hour and a half will be allowed for the practical test which can be taken in an ordinary classroom. The principal aim will be to test skill in observation and recognition. The practical note book covering the work of the entire syllabus, field work farm diary and project work will be examined and assessed.

NOTE: It is assumed that candidates will have gained adequate experience of every practical aspect of the entire syllabus.

1. Soil samples, rocks, and fertilizers.

Soil samples to be examined for texture by feel only, acidity by simple tests. Common rock types of igneous, metamorphic and sedimentary origin. Soil profile description. Recognition of common types of fertilizers and manures.

2. Growth, habitat and form of plants and animals studied as listed in Appendix Table (Groups 1 to 6) and sub-section 5 of Section D of the syllabus.

Recognition of parts and whole of the crop plants and farm animals studied.

3. Main pests and diseases of crops.

Recognition of main pests, their damage to crops, e.g. cotton stainer stem borers of cereals, weevils of grains and yam beetle. Recognition of main diseases of crops and their casual agents where feasible with characteristic symptoms, e.g. smut of cereals, maize rust, swollen shoot of cocoa, mosaic of cassave rosette and leaf-spot of groundnut, blast of rice and brown-rot of pineapple, nematodes of crops, parasistic seed bearing plants such as dodder and mistletoe, and nutrient deficiency symptoms.

4. Seeds, fruits, food storage organs and other parts of the main plants and local weeds.

Recognition of the structure of seeds and fruits of the main crop plants and of weeds in relation to the mode of their dispersal.

5. Tools

Recognition of common hand tools, e.g. cutlasses, hoes, forks, mattock, trowels, rakes, budding knives, shears, secateurs, chain measurer, sprayer etc. and their uses and maintenance.

6. Animal feed-stuffs.

Recognition and comments on the use of main animal feed-stuffs, e.g. palm kernel meal, blood meal, bone meal, maize, guinea corn, groundnut cake, fish meal and common forage crops, e.g. guinea grass, elephant grass, giant star grass, andropogon, calopogonium, pueraria, centrosoema and stylosanthis.

7. Main pests and parasites of farm animals.

Recognition of main ectoparasites and endoparasites of animals, e.g. ticks, lice, tape-worms and round-worms, recognition of ill-health symptoms.

AGRICULTURAL SCIENCE

(ADVANCE LEVEL)

The syllabus that follows has been designed to portray Agricultural Science as an applied science with emphasis not only on the depth of but also in the acquisition of skills that are associated with the theory. It is therefore essential that candidates should make field trips to farms in different ecological areas and game reserves within the country, and in different ecological areas and game reserves within the country, and should be exposed to the major products of the forest types in their country.

The syllabus has been designed to meet the needs of private candidates as well as those of school candidates. Candidates who wish to do a University course in Agricultural Science are advised to offer along with this subject at Advanced Level some other science subjects as may be necessary for entry requirements of the Universities.

It is desirable that candidates should have reached Ordinary Level standard in at least one of the following subjects:

Agricultural Science, Biology, Chemistry, Physics, General Science and Additional General Science.

The examination shall consist of three papers all of which should be taken.

PAPER 1

2 – hour theory paper divided into three sections.

Section I: General Agriculture (5 questions).

Section II: Agricultural Economics (3 questions).

Candidates shall be required to answer four questions including at least two from Section I and at least one from Section II.

PAPER 2

3 – hour theory paper divided into three sections.

Section I: Soil Science (4 questions).

Section II: Crop Science (4 questions).

Section III: Animal Science (4 questions).

Candidates shall be required to answer two questions from each section.

PAPER 3 (Practicals)

A Farm Project to be assessed in the second term of the year of exami-

please continue overleaf

nation; and carrying 1/3 of the maximum marks for the practicals.

PLUS a 3–hour practical paper.

Note: (1) The content of the syllabus for the Practicals could be examined in the theory papers and vice-versa.

(2) Paper 2 alone may be offered as a Subsidiary Paper for H.S.C.

(3) Farm Project

The Farm Project would be assessed by an examiner of the Council. The Project Work would be inspected in the 1st term of the 2nd year or when the Project is at its peak. Schools will therefore be required to inform the Council of the Project Work being carried out by the students at the end of their first year.

DETAILED SYLLABUS

A. General Agriculture

1. Introduction

(a) Meaning and importance of Agriculture.

(b) Factors that determine the pattern of agriculture-ecological and sociological basis: ecological distribution of crops, animals and forests.

(c) Agricultural systems: principles and practice of cultivation nomadism, shifting cultivation, mixed cropping, crop rotation and mixed farming.

(d) The contributions of Agriculture to the national economy.

2. Development of Agriculture

(a) Problems of subsistence agriculture-land tenure, education, health services, communications, soil erosion, transportation, attitudes, poor tools, government agricultural policies.

(b) General World Survey of the development of Agriculture with special reference to West Africa.

(c) Role of Science and Technology in the development of Agriculture.

(d) Administration of agricultural production and the role of government-agricultural policy, research, extension education and services,

education and services, financial assistance to farmers, veterinary services and quarantine services.

3. Land Tenure System and the Principles of Land use for Agriculture, Forestry and Wild Life Conservation.

Factors affecting land use-topography, economic and social factors, population, situation of land for commercialisation, farm settlement schemes, development, management and conservation of forests and soils.

4. Fisheries

Distant sea, coastal and

Distant sea, coastal and inland water fishing, fish ponds curing, handling and distribution of fish. Marine products other than fish.

Note: Fish species to be mentioned Fishing equipment to be discussed.

5. Agricultural Engineering and Surveying

(a) Problems and prospects of mechanization of agriculture in West Africa.

(b) Tools, implements and machineries-uses, care and maintenance.

(c) Sources of power on the farm-wind, water, electricity, heat engine and animals.

Brief discussion on the working of the internal combustion engine.

(d) Farm surveying farm buildings and constructions (simply treated).

(e) Mechanization peasant agriculture.

8. Soil Science

1. Genesis and Classification of Soil

(a) Rocks and minerals-their characteristics and simple classification.

(b) Weathering Processes

(i) Expansion and abrasion agents, water, wind and temperature.

(ii) Chemical Processes

Hydrolysis, hydration, oxidation-solution and reduction.

(iii) Biological Processes: Effects of organisms.

(c) Soil Formation

(i) Factors of soil formation-climate and vegetation, relief and drainage, parent material, living organisms, time.

(ii) Soil profile-soil horizon, soil profile defined. Genetic horizons of ideal profile specific to the area. Importance to Agriculture.

(d) (i) Principles of soil classification.

(ii) Kinds of soils in the local area and their existing classification.

2. Composition of the Soil

(a) (i) Physical composition of the soil: soil components, soil structure, soil texture, soil air, soil water and soil temperature.

(ii) Mineral composition of the soil, Quartz, feldspars, micas, clay minerals, montmorillonite etc.), colloids and collodal systems, collids defined, properties state of colloidal system sol, gel.

(iii) Organic componets of soil-organic material, substance and matter, humus.

B. Effect of Soil composition on properties of the soil.

3. Soil Fertility

(a) Plant Nutrient Elements

(i) Classification
Macro-N,P,K,Ca, Mg,S
Micro-B,Cu,Zn,Mo, Co,Fe,Mn.

(ii) Factors leading to loss of these nutrients: Leaching, erosion, crop removal, etc.

(iii) Replenishment of lost nutrients: Soil organisms: Micro-Marco-, effect of soil organisms on the soil. Nitrogen cycle, and carbon cycle, rock weathering, fertilizers.

(iv) Soil management as an attempt to strike a balance between loss and gains in soil nutrients.

4. Soil Conservation

(a) Types of irrigation and drainage.

(b) Soil erosion: Types, effects and control.

(c) Methods of soil conservation: terracing, contour farming, strip cropping, cover crops, mulching, etc.

(d) Water pollution and recovery (where it applied).

C. CROP SCIENCE

Candidates should be familiar with agricultural and botanical methods of classification of crops

methods of classification of crops as well as the identification, morphology and reproduction of important crop plants.

1. INTRODUCTION

Origin and geographical distribution of some important tropical crops including forage crops. Nomenclature and classification of crop

ture and classification of crop plants. Examples should be drawn from the major classes of locally cultivated crops.

2. FACTORS AFFECTING CROP PRODUCTION

Ecological physiology of crop plants: the primary effects of light, radiation, temperature, water and inorganic elements on crop growth, development and yield.

3. PRINCIPLES OF CROP PRODUCTION

Land preparation.

Methods of propagation: seed selection and testing, vegetative propagation. Nursery practises: time of planting and planting distances.

4. PRINCIPLES OF PLANT BREEDING AND CROP IMPROVEMENT

(a) Aims of crop improvement;

(b) Basic genetic principles of crop improvement;

(c) Methods of crop improvement:
Introduction and mass selection; hybridisation; multiplication; vegetative propagation.

5. PRINCIPLES OF PLANT PROTECTION

(a) Diseases of crop plants: Causal agents, symptoms, methods of transmission and eradication of diseases associated with the crops studied.

(b) CROP PESTS

(i) Classification of field and storage pests; extent of damages: e.g. insect pests, nematodes, rodents, birds and human beings.

(ii) Principles of pests control: mechanical, biological, cultural and chemical.

(c) WEEDS AND THEIR CONTROL

(i) Identification of common weeds and modes of dispersal; study of selected weeds with particular reference to locality.

(ii) Control: mechanical biological, cultural and chemical methods.

6. STUDY OF SELECTED CROPS

Origin, geographical distribution; climatic and soil requirements: cultural practices, harvesting, processing marketing and storage of West African arable crops, cash crops and vegetative crops.

please turn over

The study should include at least one cereal from group 1, one legume from group 2, and four plants chosen from at least three of groups 3,4,5 and 6 below:-

GROUP 1

C E R E A L S

Maize-Zea mays.

Millets-Pennisetum typhoideus, Seteria italica, Elestine corocana

Rice-Cryza sativa

Guinea Corn-Sorghum bicolor (S. vulgare)

Wheat-Triticum vulgare

Tamba

Acha

G R O U P I I

Beans-Phaseolus spp

Cow peas-Vigna unguiculata

Groundnut-Arachis hypogea

Soya Beans-Gycine soja

Bambara groundnut-Voandzeia geocarpa (V.Subterranea)

Yam bean-Sphenostylists steno-carpa

Pigeon pea-Cajanus cajan

G R O U P I I I

Cassava-Manihot esculenta

Yams-Doscorea Spp

Cocoyams-Araceae (Colocasia or Xanthosoma)

Potatoes (European P)-Solanum tuberosum (Hausa P.)-Plectranthus esculentus

Sweet Potatoes-Ipomoea batatas

Onions-Allium cepa

Shallot-Allium ascalonicum

Pumpkins-Cucurbita maxima
Tomatoes-Lycopersicum esculentum

Pumpkins-Cucurbita maxima

Tomatoes-Lycopersicum esculentum

Carrots-Daucus carota

Cabbage-Brassica oleracea

Cauliflower-Brassica oleracea, var, botrytis.

Graden egg-Solanum melogena

G R O U P I V

Avocado pear-Persa gratissima

Bananas-Musa Spp

Citrus-Citrus Spp.

Guava-Psidium guajava

Mango-Mangifera indica

Pawpaw-Carica Papaya

Pine-apple-Ananas sativus

Cashew-Anacardium occidentale

Water melon-Colocynthis citullus

G R O U P V

Cocoa-Theobroma cacao

Coffee-Coffea Spp.

Colanut-Cola Spp.

Benniseed-Same as Sesame

Ginger-Zingiber officinale

Sugar cane-Saccharum officinarum

Peppers-Piper nigrum•

G R O U P V I

Coconut-Cocos nucifera

Oil Palm -Elaeis guineense

Cotton-Gossypium Spp

Shea-butter-Butyrospermum park ii

Sunflower-Helianthus annuus

Sesame-Sesamum orientale

Rubber-Hevea brasibensis

Sisal hemp.-Agave Spp.

Kapok-Ceiba pentandra

Kenaf.

Urena lobata.

7. PASTURES AND FORAGE

Pasture agronomy, grasses, legumes, their distribution, improvement, quality and assessment, establishment and conservation.

D. ANIMAL SCIENCE

1. Introduction

Role of livestock and livestock products in West African countries.

2 **FARM ANIMALS**

Types and classification of locally available breeds of cattle, sheep, goats, swine, poultry.

3. ANATOMY AND PHYSIOLOG

(a) Brief gross anatomy of m domstic animals: cattle, goa horses, pigs, sheep, rabb poultry and fish.

(b) Physiology of digestion, re duction, lactation, milt let do egg formation and laying, cu latory, and endocrine syste

(c) Environmental physiology: direct and indirect effects climate (tropical) on farm a mals with due regard to th effects on grazing habit growth, reproduction, mil production, egg production, gro yield and quality of food suppl

4. ANIMAL NUTRITION

(a) The main nutrients–carbohydr tes, proteins, fats, mineral vitamins, water–their chemic composition and their role a animal nutrition. Malnutrition farm animals.

(b) Feeds and feeding-me preparation of foodstuff animals-cooking, cutt ding, pelleting etc.

Note: Emphasis should be la upon the reason for feedi these forms of feeds the different types animals.

(c) Principles of ration formulation balanced maintenance, production starter rations.

Note: Mathematical and technic details of ration form.la tion will not be required.

5. ANIMAL HEALTH

(a) DISEASE

Causes and prevention; pest and parasite control; insects and ticks as carriers of diseases in farm animals. Life history of one endoparasite of farm animal (e.g. liverfluke, roundworm, tape worm, trypanosomes); and one ectoparasite (e.g. ticks and lice).

(b) Diseases as the limiting factor in the development of animal

continue on p.20