Environment and Disease in Plants.

Writing in the *American Journal of Botany, December 1924* on "The relation of environment to Disease in Plants" L. R. Jones observes :—

For a generation past, pathologists have concentrated attention upon the parasite. Has not the germ theory of disease in its simplest conception—"germs" synonymous with disease—so filled the mind and satisfied the imagination of public and practitioner that it has been natural for even the investigator, who should see more deeply into his problem, to be influenced by the popular measure of his responsibilities? Has it not often been temptingly easier to find and name a new fungus than to probe patiently into the behaviour of one long known? When the potatoes show scab or scurf and the grower asks "why", have we not been too prone to ease our mind, and perhaps mislead his, by pronouncing some of our modern mystic words "Actinomyces" "Rhizoctonia"? When we so frequently must face the fact, with these and many other diseases, that, comparing field, and season with season, the lors following like initial infection may vary widely—perhaps even from nothing to total—then we must agree that naming the parasite is only a first step in explaining disease-occurrence.

* * * *

Evidently, as basic for right thinking, we should accept the idea that soil environment— temperature, moisture and composition—has a controlling influence upon all soilborne parasites, whether of the obligate or of the facultative type ; and further, that these environmental factors are the ultimate determinants, in the broader geographical distribution as well as in the local occurrence and seasonal severity of these diseases.

G. N. R.

Bacteria and Butyl Alcohol. One of Professor Edwin E. Slosson's stories in his admirable keeping up with Science (Cape London, 1924) has to do with Bacteria and Indian Corn. When the foreign supply of acetone, a substance of well-known importance in making cordite explosives, was cut off during the war, the fortune discovery was made that a certain kind of Bacterium could produce acetone out of the starch of Indian corn, just as yeast produces alcohol. In a short time acetone was being turned out in large quantities in distilleries in Toronto and Terre Haute. But after the war the market for acetone slumped and the distillers were in a quandary. As has happened

so often, however, a way out has been found by utilising a by-product called butyl aclohol. This is similar to the "fusel oil" which is much used as a solvent in the manufacture of varnishes and lacquers. But "fusel oil" is a mixture and variable, whereas butyl alcohol is a pure substance with definite properties. Therefore it can be used in various industrial processes for which fusel oil is less suitable or not suitable at all. Thus it has come about that Bacteria are now being used to turn a million of bushels of Indian corn every year into butyl alcohol.

(From the Scottish Journal of Agriculture Vol. VIII No 1 of Jan. 25)

Arsenical Insecticides. Faure (Jean C). Sur L'importance croissante de L'arsenic dans la lutte contre les ennemis des plantes.—Prog. Agric Vitic, LXXXII No. 48 pp. 524-526. Montpellier, 30th Nov. 24.

Of a total world production of 10,000 tons of pure arsenic, France produces about half, but she could easily increase this amount and, by transforming the arsenic that is frequently considered a useless by-product of her metal industries into arsenical insecticides, could ensure an appreciable increase of revenue. Calcium arsenate is the preferred form. Statistics are quoted showing that, for insecticidal purposes, America has decidedly insufficient for her needs and must leave large tracta, such as the cotton-growing regions of the south, undefended. The loss in the United States in 1919 from insect depredations has been estimated at $ 1,261,291,000.

(The Review of Applied Entomology. Vol. xiii. Ser. A. Pt 1. p. 40.)

Agriculture and the Laboratory. The agriculture of whole sections of our country, upon which the livelihood of many thousands of people depends, may be entirely changed by experiments in an attic laboratory, or by the work of a single man in his own back garden. The miles and miles of Marquis wheat-fields that one travels through when going west on the Canadian Pacific all owe their existence to a single head of cold and drought resisting wheat that Dr. Saunders, of Ottawa, discovered after years of patient, perisistent work among hundreds of hybrids which he had made.

(Marian H. Bell Fairchild, in the Journal of Heredity)

The Function of Agricultural Science. The nineteenth century took the view that agricultural science was justified only in so far as it was useful. That view we now believe to be too narrow. The practical purpose is, of course, essential ; the station must help the farmer in his daily difficulties--which necessitates co-operation between the practical grower and the scientific worker. But history has

shown that institutions and investigators that tie themselves down to purely practical problems do not get very far ; all experience proves that the safest way of making advances, even for purely practical purposes, is to leave the investigator unfettered. Our declared aim at Rothamsted is "to discover the principles underlying the great facts of agriculture and to put the knowledge thus gained into a form in which it can be used by teachers, experts, and farmers for the upraising of country life and the improvement of the standard of farming."

(Sir John Ressell, Director of Rothamsted Experiment Station, in a recent address at Toronto, Canada.)

Essentials of Good Milking. The essentials of good milking (points out a publication of the English Ministry of Agriculture) are that it should be performed quietly (that is, with no discomfort to the cow), quickly (rapid milking appearing to increase the flow), and thoroughly—the last milk, being the richest, should always be withdrawn.

In the milker's contest held at the London Dairy Show, in which no competitor is allowed to milk his own or his employer's cows, the following are the points upon which competitors are judged:—(1) the manner of approaching the animal, and style of work, 20 points; (2) cleanliness, 10 points; (3) clean stripping, 10 points; total, 40 points.

Rat Control in Hawaii. Some years ago rats began to manifest themselves in something approaching plague numbers in Hawaiian cane fields and-protected as they were by the forest of cane stems-they multiplied and rapidly and began to destory considerable quantities of the cane itself and of certain fruits. With the failure of the mongoose, mechanical means of control have had to be resorted to on a large scale, while poison is often freely used. A method advocated is the use of barium carbonate baits, the procedure being first to set unpoisoned wheat (in five places to the acre) for a period of about two weeks until every rat and mouse knows where it is, and then to substitute poisoned baits. This is done three times a year with such success that the 1924 crop of cane harvested at Honokaa (an important plantation) showed practically no rat-bitten cane and the plantation got fully sixty thousand dollars worth of sugar which had hitherto gone to feed the rats. The total cost of the work here has been about five thousand dollars annually.

Another method of using the poison is to prepare a dough with one part barium carbonate to three of flour, rolling this thin, stamping it into tiny biscuits, and finally drying these and coating them with paraffin.

How Denmark become Prosperous. The Danes were once a seafaring, war-making, poverty-stricken people. Now they are agricultural peace-keeping, and prosperous. How did they do it?

During the Napoleonic wars they sided with the French. The English and Germans beat them. Their navy was sunk; they lost most of their colonies. Germany took all of the southern part of their country, which was by far the best part of it. By the latter part of the nineteenth centruy these defeated, poverty-stricken people were thrown back to make a living out of the poorest land in Europe.

Then what did they do? They did not emigrate to other lands; they did not submit themselves to be ruled by their aristocracy; they did not appeal to their government to help them. They did a very unusual thing-they helped themselves. They formed an association of neighbours to do things together; they pooled their intellectual power so that everybody in the pool should get the advantage of the best brains; and they settled down to work out their problems on the spot. (Southern Planter).

Dehorning of Dairy Cattle. The dehorning of calves is best accomplished by the application of caustic to the horn "buttons," the two small protuberances which can be felt when the animal is a few days old on either side of the poll where the horns emerge. The skin immediately surrounding each button should first be protected by smearing it with vaseline, and the button itself and then carefully rubbed with the caustic pencil. Should the caustic touch the skin severe burning will occur and areas of skin will slough off. For the same reason, the caustic must not be handled with the fingers, but slipped for use into some metal holder, such as an ordinary pencil-holder. Four applications are usually sufficient, when the buttons will peel off, this marking the completion of the treatment.

The operation is thus performed without any pain to the animal and the method is quite the most effective and humane. Adult cattle are sometimes dehorned by use of a special instrument, several kinds of which are on the market, but it is not a painful operation and is not recommended.

If cattle prove troublesome in the yard by horning others, much damage can be prevented by sawing off the ends of their horns, leaving them quite blunt. Care should be taken not to remove too much of the horn, and the sawn ends should be filed round.

Max Henry, Chief Veterinary Surgeon.

(Extract from the Agricultural Gazette of N. S. W. January 1. 1925).

Cotton Boll Weevil :—Several small lots of cotton seed of special varieties were admitted recently. Only four ounces of a kind were released and the seeds, after fumigation, were examined one by one to make sure no insect escaped detection. In one lot from America, covered by an official oversea inspection certificate and treated twice for the destruction of insect life before reaching South Africa, the picking over of the four ounces disclosed a specimen of the notorious Mexican boll weevil. The insect was dead, but its presence is significant of what might easily reach the country were drastic precautions not exercised. A little lot of cotton seed smuggled into the country might lead to the establishment of a new and formidable pest.

(Journal, Deptt. of Agri. United. S. Africa, Vol IX, No. 5 of Nov, 24).

Farm—Workers' Budget. Mr. A. W. Ashby, University College of Wales, Aberystwyth gives an account of his enquiries, on Farm Workers' Budget in Oxford. ("Journal of the Ministry of Agriculture. February 1925.") Particulars were collected from 83 families and are below :—

	Size.	Per family.
Adults over 14 years ...	199	2.397
Children ...	279	3 361
Total ...	478	5.758

5.758 persons were considered equal to 3.85 "men" for dietary purposes.

Weekly expenditure per family averaged, Rent S.2-2, Foodstuffs 20-9. Cleaning materials 1-1, Insurance club etc., 1-4, Fuel and light 4-10, Miscellaneous 0-9, and the average expenditure on food was thus 3-7¼d., per head or a little over S,5-4¼d. per "man."

These budgets were divided into two groups for analysis Group A related to families with more than three children and group B dealt with families with three or less than three children and the results arrived at are.—

Group A, families 40		Per family.
Adults over 14 years ...	100	2.50
Children ...	197	4.925
Total ...	297	7.425

Average weekly expenditure was rent s.0-10d, foodstuffs 22-4¾, cleaning materials 1-0½, insurance 1-3½, fuel and light 4-0¾, Miscellaneous 0-8½. Thus foodstuffs averaged 3s-0¼d per head or about 5s-1d per "man."

Group B Families 43.			Per family.
Adults over 14 years	...	99	2.3
Children	...	82	1.91
Total	...	181	4.21

Average weekly expenditure was rent 2s-5¼d, foodstuffs 19-3, cleaning materials 1-1¾, insurance 1-5½, fuel and light 5sh. Miscellaneous 0-9d. Expenditure on food averaged 4s-7d per head or 6sh., 4½d. per "man"

Thus it is seen that families with more than three children suffered in the matter of diet to the extent of above 50 percent per head over families with three or less than three children.

We would invite our readers attention to a study of family budgets of workers families in Bombay, vide this Journal Volume No. A study of the family budgets amongst the several strata of workers in this country would be educative and reveal interesting facts.

A. N. I.

Ear-tick. The Spinose Ear-tick (Ornithodorous Megnini Duges). The ticks remain attached in the ear of animals. chiefly cattle, sheep and goats. They puncture the tender skins and suck the blood at the same time injecting an irritating fluid. The wounds thus caused often ulcerate, nervous and digestive disturbances arise resulting in low vitality of the animals which consequently fall off in condition. These sticks can be controlled by pouring or injecting a mixture at regular intervals for a few days. The mixture recommended should be such as contains ingredients which mix well together and flow freely. A mixture suggested in Natal and Transval (Journal of the Union of South Africa) is made of four parts by volume of thin tar, four parts of cotton seed oil and one of terpentine. Tar destroys ticks and prevents reinfestations. Cotton seed oil is a good solvent for ear wax and terpentine increases the destructive effect of tar. In India cotton seed oil can be replaced by goundnut, gingelly or safflower oil.

Height of Cotton plants and length of fibre. Working with the Pima variety of American Egyptian cotton, determinations were made of the length of fibre from bolls borne on fruiting branches at successive groups of nodes on the main stalk. The length of fibre was found to increase steadily from the lower to the next higher group of fruiting branches. On the other hand, no close correlation was found to exist between the length of fibre in a boll and date of anthesis of the flower from which the boll had developed—T. H. Kearney and Harrison in Journal of Agricultural Research.

G. N. R.

Freeing Animals from Ticks. Di Sangiustino, I describes a simple, cheap and speedy method adopted by the Arabs to free an animal from ticks. For 5 consecutive days, they give the tick-infested cattle pills made of barley pounded in a mortar, kitchen salt being added in the proportion of 200 grams per 2 Kilograms barley. The animals readily take the salted barley. In the treatment for adult cattle (1 Kg) 200 gm. per day are necessary, while 500 gm. (100 gm. per day) are enough for calves. From the first day, the dead or dying ticks begin to fall off, and on the fifth day the animal is quite free from the parasites. The sodium choloride is directly absorbed and passes into the blood, and poisons the ticks as they suck the blood.

(Inter. Rev. of the Sc. and Prac. of Agri. New series Vol. II. No. 4 October to Dec. 1924 p. 931-932).

B. V. N.

REVIEW.

Lt. Col. W. C. Ross and Dr. K. N. Bagchi of Bihar and Orissa in an article in recent number of the Journal of Indian Medical Research estimate that as a result of their observations at Patna in 1921 8.76 lbs. of nitric acid equivalent to 1.95 lbs. of nitrogen per acre is annually added to the soil. This figure appears to be too low. Dr. Leather investigated this problem as early as 1906 and as a result of 2 years' observations at Dehra Dun and Cawnpore estimated that about 3.5 lbs. of nitrogen are annually added to the soil. The disparity in the two figures is apparently due to the fact that Messrs. Ross and Bagchi based their estimate on the nitrogen present as nitrates only; while Dr. Leather estimated the ammoniacal nitrogen as well.