

The Agricultural Experiment Stations
of Tartu University, Estonia

in 1928.



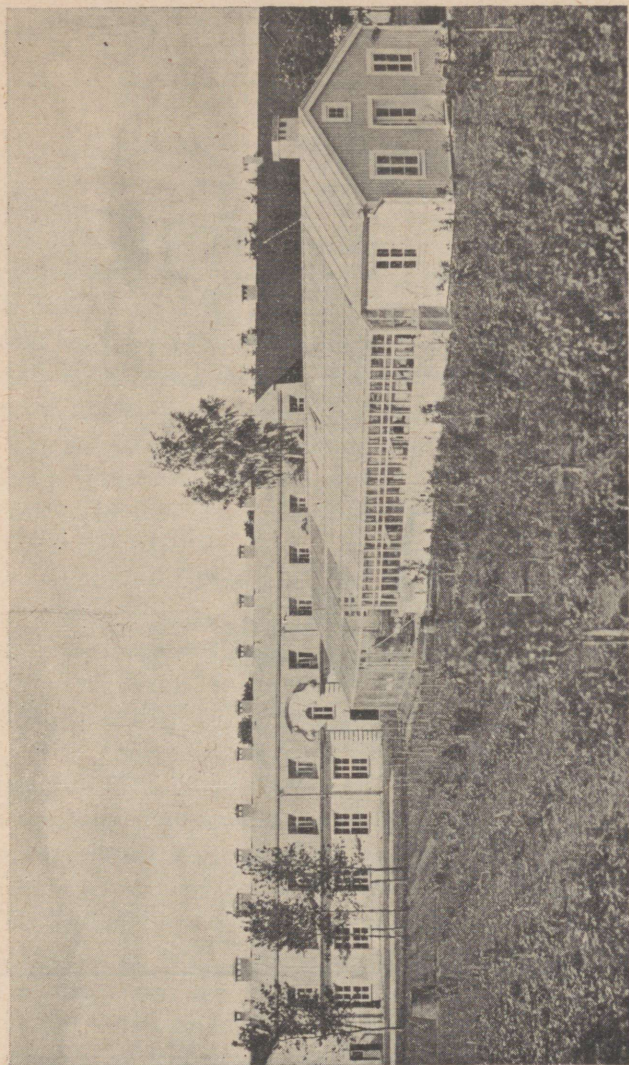
Tartu 1928.

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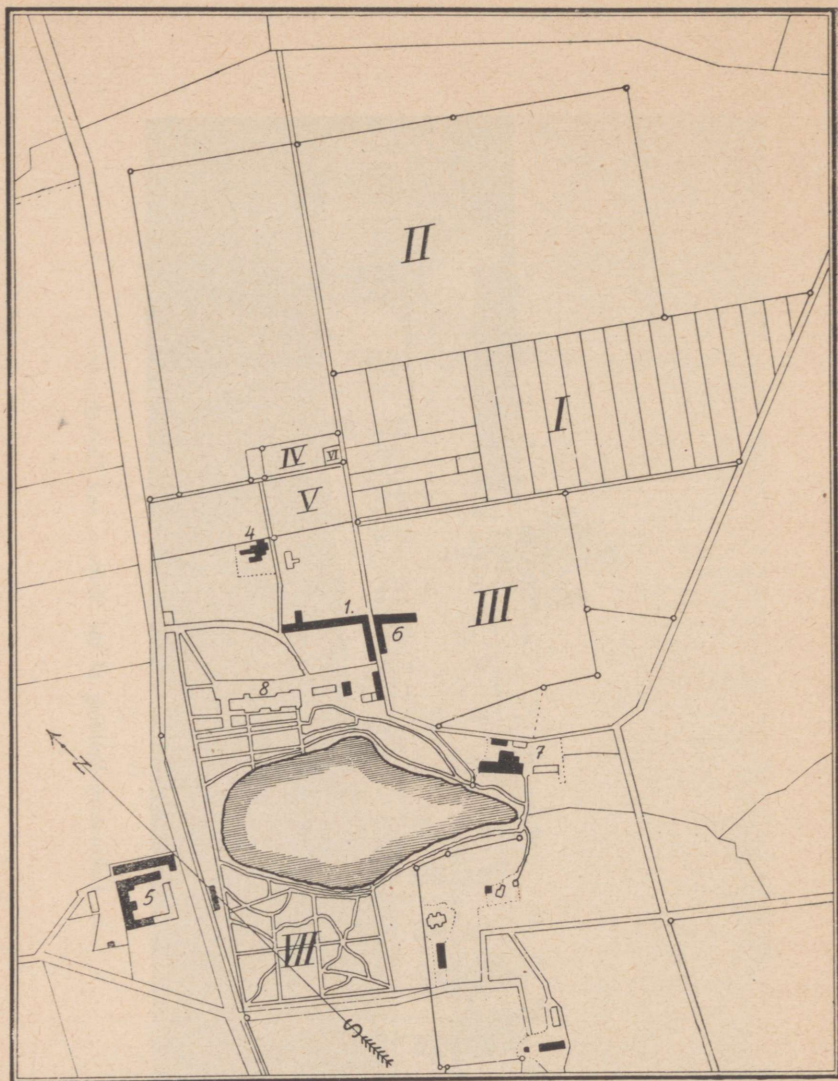
**The Agricultural Experiment Stations
of Tartu University, Estonia
in 1928.**



Tartu 1928.



1. Laboratory Building of the Stations and Greenhouse.



2. The Experiment Stations.

I. Plant Biology. II. Agricultural Chemistry. III. Horticulture. IV. Phytopathology. V. Entomology. VI. Meteorological Station. VII. Park and Dendrological Orchard.

In order to facilitate the prosecution of scientific research and experiments and the holding of practical courses for students the University of Tartu, in 1921, established experiment stations for plant biology, agricultural chemistry, entomology, phytopathology and animal husbandry in the estate of Raadi, which had been presented by the government for that purpose.

The Ministry of Agriculture being also interested in the solution of practical problems arising in agriculture, an agreement was concluded between the university and the ministry to the effect that the latter is allowed to present problems for solution to the experiment stations of the University while bearing the expenses arising in connection therewith.

For the organisation of experimental work throughout Estonia there is in existence an advisory central institution, attached to the Ministry of Agriculture, a so-called *Council of Experimental Work*. The experiment stations of the university are represented in this Council by their directors and through them their work is correlated with that of other experiment stations in Estonia. Each of the experiment stations of the university is in possession of a sufficient area of land, a number of rooms, appropriate equipment etc. To the buildings of the estate of Raadi an insectary was added in 1926, and, in 1928, a new green-house for pot experiments. The University and the Ministry of Agriculture every year in their budgets set apart sums for research and experimental work. Each experiment station is attached to the respective chair of the agricultural faculty of the university, and the occupant of the chair is at the same time director of the experiment station. More detailed information on the work of the various experiment stations is given below.

The Plant Biology Experiment Station.

The experiment station is under the direction of the professor of plant-cultivation and its work falls into the following divisions :

1) The investigation of the value of agricultural plants and

the most expedient cultivation of their varieties 2) The organisation of research work in plant-cultivation by members of the teaching staff and advanced students. 3) The training of students in the methods of experimental work in plant breeding and instruction in allied subjects. For the performance of these duties the experiment station is provided with the following equipment:

1) The staff, consisting of the director, 2 assistants, 1 permanent attendant and a number of temporary paid helpers.

2) The laboratory, containing 3 rooms in the main building of the experiment stations and one half of the greenhouse.

3) 10 hectares of agricultural land.

Up to the present date the experiment station has organised the following field work: 1) Comparisons of plant varieties for the purpose of selecting objects for the main experiments. Subject to these experiments have been varieties bred abroad and in Estonia,



3. Root Systems of *Medicago foliata* and *Trifolium pratense*.

and specially the lines of the Jõgeva plant breeding station. The aim of this work has been the determination of the quantity and quality of the crop yields.

2) Experiments with fallows. These have the object of demonstrating the importance of green fallows sown with vetch and clover, and of promoting their adoption in practical agriculture. In these experiments the best results in regard to yield and favourable residual effect on rye have been obtained from green fallows with a preponderance of legumes.

3) As on warmer soils the cultivation of alfalfa may also deserve attention, experiments on the methods of cultivation of alfalfa of various origin were arranged.

4) As silage crops sunflower and maize have been under experiment; the method of cultivation and the behaviour of different varieties being specially attended to.

5) The cultivation of legumes formed the subject of experiments in which mixed crops were compared with unmixed ones.

6) To demonstrate the importance of the period of sowing under Estonian conditions, experiments were arranged with summer and winter crops. The above-mentioned experiments are being continued. In the present year the following lines have been added:

7) Experiments in regard to shallow ploughing.

8) Experiments on rotation of crops, intended to investigate the employment of various forms of fallows and the importance of flax in rotation.



4. Vetch. No. 80 in dry soil, no. 82 in moist soil, and No. 83 in very moist soil.

In pot experiments the influence of soil moisture and fertilizers on the yield of tops and roots of several varieties of oats and barley have been studied. The quantity of root remains of cultivated plants has been studied also in the field :

Up to the present date the following publications of experiments and investigations carried on in the experiment station have appeared in print :



5. Oats. No. 11 in dry soil, no. 14 in moist soil, and no. 17 in very moist soil.

of the Department of Agriculture, 1927.

5) Prof. Dr. N. Roots, „On the root remains of cultivated Plants“, 1928.

1) Professor Dr. K. Teräsvuori, “Mitturi järjestelman käyttämisestä kentäkoeissa” (Finnish ; in translation: The employment of a system of standard plots in field experiments), 1922.

2) Prof. Dr. N. Roots, “The Fallow Question in Estonia”, in the journal “Agronomia” 1925.

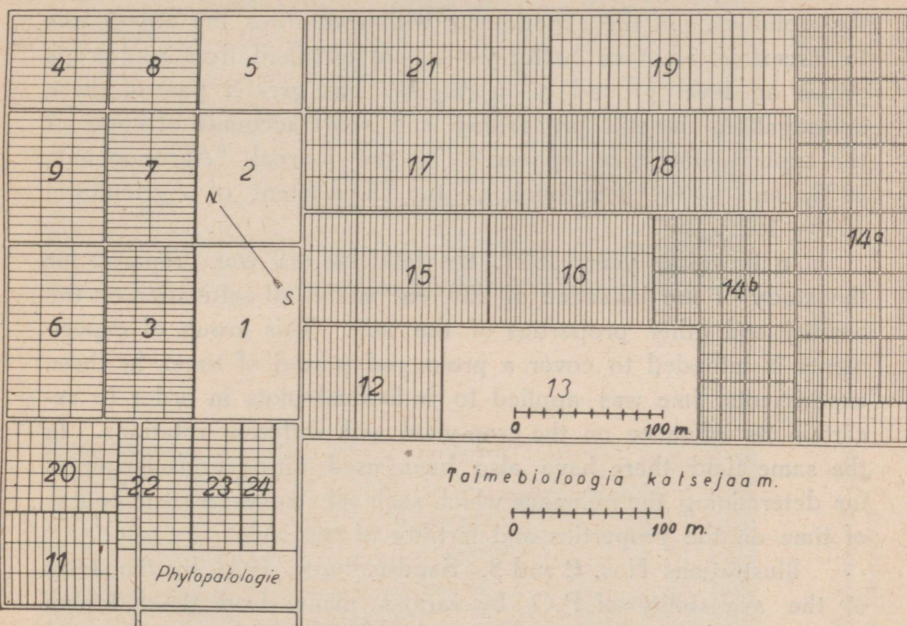
3) Prof. Dr. N. Roots, “On the Question of the Cultivation of the Sunflower in Estonia”, “Agronomia” 1926.

4) Prof. Dr. N. Roots, „Survey of the Work of the Plant Biology Experiment Station 1921 — 1926“. Yearbook

The Experiment Station of Agricultural Chemistry.

The total area of the land belonging to the Experiment Station of Agricultural Chemistry is 20 hectares. Since the time of its foundation the station has enjoyed the financial support of the

University and the Ministry of Agriculture. The work of the experiment station consists in the investigation of the question of fertilizers in South Estonia in general and of the fertilizing value of Estonian rock phosphate in particular. The first experiment plots were arranged for the investigation of the latter question and at the same time experiments were also conducted on private farms. In accordance with the programme of the experiment station the influence of fertilizers on the yield of crops grown has



6. Map of the experimental fields of the station in 1928.

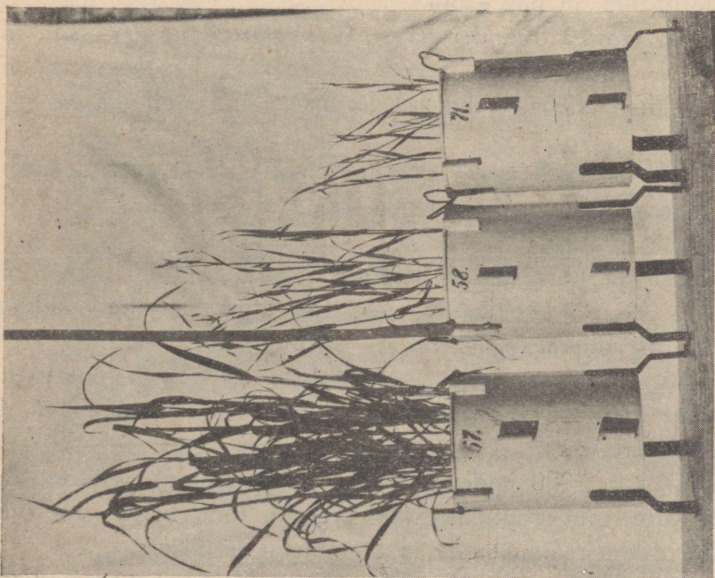
been studied. There are under investigation: grain-crops, root-crops, potatoes and hay. The influence of stable-manure as well as mineral fertilizers has been examined from the above-named point of view. Fertilizers, especially of a mineral nature, have been applied in various proportions, with the object of ascertaining the optimum amounts of various fertilizers for different kinds of crops. At the same time the various nitrogenous and phosphoreous fertilizers have been compared among themselves. The investigation of mineral fertilizers is accompanied by that of stable-manure in

various modes of apply. Thus manure used on fallows has either been ploughed under at once or left on the field for a certain time, and ploughed under at the time of second ploughing. In some cases the manure was ploughed under in spring, the field sown with vetch and after the removal of the vetch the field sown with rye. In experiments with root crops the manure used was ploughed under either in autumn or in spring. In experiments with potatoes the manure was ploughed under in spring and autumn and also deposited in the furrows at the time of the planting of the potatoes. In the experiments with root-crops the object was to ascertain whether better yields are obtained from root-crops grown on level ground or in ridges. The greater part of these investigations is still proceeding and short accounts of some of the experiments have appeared in the journal "Agronomia", 1923, and in the Year-book of the Department of Agriculture, 1918—1926.

In the past year, 1927, the field No. 19 was prepared for the study of the influence of different modes of cultivation on the fertility and other properties of the soil. This group of experiments is intended to cover a prolonged period of time. In these experiments lime was applied to individual plots in order to ascertain its influence on the crop-yield with different rotations. In the same field there have also been used nitrogenous fertilizers for determining the influence which such substances exert in course of time on the properties and fertility of the soil.

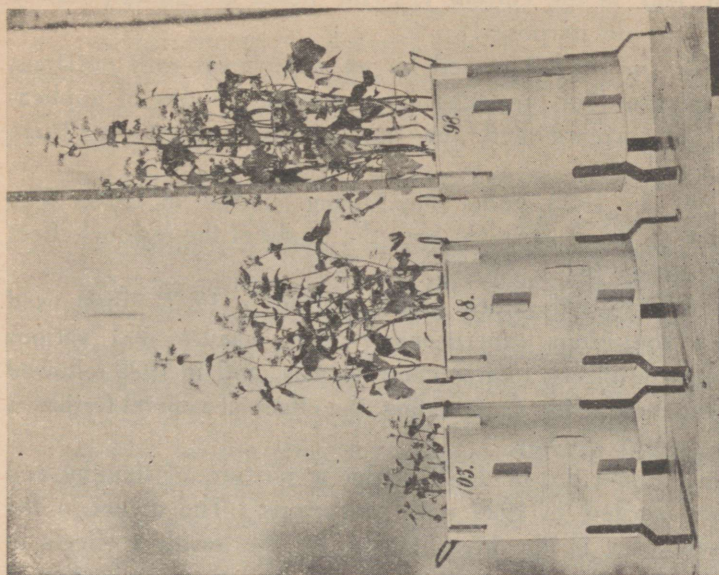
Illustrations Nos. 2 and 3. Sand-cultures, 1924, for the study of the availability of P_2O_5 by various plants from the Estonian rock phosphate (Obulus sandstone). As in previous years the greater part of the experiments was devoted to the investigation of Estonian phosphate, and as the effect on plants takes some time to make itself fully felt, part of the fields (Nos. 6, 9 and 11) are still under hay-mixtures, although these experiment fields were started already in 1923—24. In the present year the fields enumerated below are under investigation in the experiment station. The problems to the study of which each of them is devoted are described in the respective places.

Fields Nos. 1, 2, and 5 were used for study in 1921 and served chiefly for the investigation of the influence of floats and other P-fertilizers. At present these fields are out of experi-



8. Oats.

Pot No. 71 — without P_2O_5 .
 " " 58 — 0,71 gr. P_2O_5 per pot in Estonian rock phosph.
 " " 67 — 0,71 gr. P_2O_5 per pot in basic slag.



7. Buckwheat.

Pot No. 103 — without P_2O_5 .
 " " 88 — 0,71 gr. P_2O_5 in Estonian rock phosphate.
 " " 98 — 0,71 gr. P_2O_5 in basic slag.

ment and in the current year the fields are under potatoes for economic purposes.

Field No. 3. In 1918 it served for an experiment with potatoes, the question for investigation being the modes of application of manure and the amounts of mineral fertilizers required.

Field No. 4. In 1928 under hay, being started in 1926. The object of the experiment was the study of the residual-effect of floats on hay.

Field No. 6. In 1928 under grass, started in 1923. First used for a root-crop, experimenting with manure and various mineral fertilizers. Later came cereals, and in 1928 followed an experiment for ascertaining the effect of mineral fertilizers and manure on hay.

Fields Nos. 7 and 8. In 1928 under a mixture of timothy and clover started in 1924 with root crops. The object in the present year is the investigation of the residual effects of previous methods of cultivation and modes of application of manure.

Field No. 9. In 1928 under hay; started in 1924 with root-crops. In the present year investigation of residual effect of mineral fertilizers on hay crop.

Field No. 11. In 1928 under hay. Was started in 1924 and in 1925 was under rye. Serves at present for the study of the residual effect of mineral fertilizers and methods of cultivation.

Field No. 12. In 1928 under oats and had a grass mixture sown into these. The subject is the same as No. 6.

Field No. 13. Fallow.

Field No. 15. In 1928 under barley. Started in 1926 with root crops. At present serving for the study of the residual effects of mineral fertilizers.

Field No. 16. In 1928 barley. Started in 1926 with potatoes. Present purpose the investigation of the residual effect of mineral fertilizers.

Field No. 17. In 1928 under summer wheat (Rubin). Started in 1927 with root-crop. At the present time serves for the study of the residual effects of mineral fertilizers.

Field No. 18. 1928 summer wheat (Extra Kolben). Started in

1927 with potatoes. Present purpose the investigation of residual effects of mineral fertilizers.

Field No. 19. In 1928 under rye, having in part a young grass crop sown into it. Aim of the experiment: the study of the influence of different rotations and of various fertilizers on the properties and fertility of the soil (for particulars cf. above).

Field No. 20. In 1928 under clover. Was taken in hand for experiments in 1927, when grass seed was sown into oats. The first series of plots of this field received an application of some mineral fertilizer late in the autumn of 1926, prior to the freezing of the soil. The second series of plots was similarly treated in the early spring of 1927, after the drying of the land and the third series was fertilized in the middle of May of the present year, when the field was already green with the young grass crop. As fertilizers served muriate of potash and phosphatic fertilizers pure or mixed. The phosphatic fertilizers employed were basic slag, superphosphate and Estonian floats the latter alone or mixed with superphosphate.

Field No. 21. In 1928 under root crop, the investigations being identical with that pursued in fields Nos. 15 and 17, viz.:

- a) methods of cultivation of land for root-crops,
- b) amounts of fertilizers (nitrogen, potash and phosphoric acid),
- c) crops: fodder beets and turnips.

Field No. 22. In 1928 under a grass mixture. The start of the field is identical with that of No. 20, but all fertilizers were applied in the spring of 1928. This field serves for ascertaining the proper amount of potash fertilizers for a mixture of clover and timothy. The field contains also limed and unlimed plots.

Field No. 23. At present (1928) under grass mixture. Start of field identical with No. 22. Purpose of the field: the determination of proper amounts of P_2O_5 for clover and timothy mixture.

Field No. 24. In 1928 under a grass mixture. The field was started exactly as field No. 22, the aim being the investigation of the value of nitrogenous fertilizers in a first year's crop of a mixture of clover and timothy. As nitrogenous fertilizers Chilean nitrate of soda and ammonium sulphate were used.

Field No. 14_a and 14_b. In 1928 under a root crop and serving for the practical work of students.

* * *

In addition to field experiments, the experiment station has arranged pot experiments, investigating the availability of the P_2O_5 from Estonian floats by the various plants in sand- as well as soil cultures. (Illustrations No. 2. and 3.)

As regards the laboratory work mention must be made of some of the more important investigations, such as the accumu-



9. Taking of soil samples for determination of nitrate, 1924.

lation of nitrate in the fallow and under various crops, conducted chiefly in the years 1923 and 1924. At present the question of the acidity of the various Estonian soil types is under investigation.

* * *

The experiment station has also arranged numerous experiments on private farms, principally in the vicinity of Tartu. The aim of these is again the determination of the effect of mineral fertilizers on the various crops. University students also attend the station every summer for practical work. In the present summer 50 university students and 39 students of the courses for the preparation of teachers are working on the station.

List of publications.

- 1) A. Nõmmik. — The foundation of the Experiment Station of Agricultural Chemistry and its work 1921—22, and some results obtained in comparative experiments with manures. Journal "Agronomia" Nos. 4, 5 and 6, 1923.
- 2) A. Nõmmik. — On the Manuring of Root Crops. Journal "Agronomia" No. 5, 1924.
- 3) A. Nõmmik. — The Soils of Estonia. Journal "Agronomia" Nos. 6 and 12, 1924; Nos. 1, 2, 3, 5 and 6, 1925.
- 4) A. Nõmmik. — Short Survey of the Soils of Estonia. Year-book of the Department of Agriculture 1918—26 (Short report in the journal "Die Ernährung der Pflanze", No. 10, 1928.)
- 5) A. Nõmmik. — Short Survey of the Work of the Experiment Station of Agricultural Chemistry. Year-book of the Department of Agriculture, 1918—1928.
- 6) A. Nõmmik. — The Reaction of the Soil, its Causes and the Methods for its Determination. Partly published in the journal "Agronomia", Nos. 10/11 and 12, 1927.

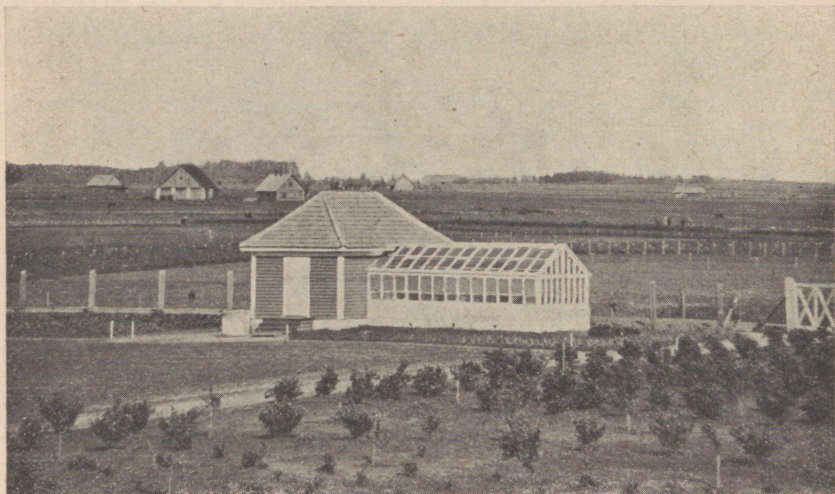
The Entomological Experiment Station.

The work of the experiment station falls into the following divisions: 1) The biology of noxious insects and animals and the investigation of methods for combating them, 2) the giving of advice to cultivators and gardeners, 3) the collecting of statistics in regard to the occurrence of noxious insects and animals and to the ravages caused by them, 4) propagation of knowledge about such pests and about the modes of combating them, 5) the arrangement of practical work in these subject for university students.

The experiment station is provided with a properly equipped laboratory (3 rooms) in the main building of the experiment stations and with an experiment field, one half of which is under farm cultures, while the other forms an orchard. In the experiment field is located the insectary (illustrations a, b) and the vivary, where the development of the pests in question is investigated and the modes of combating them are subjected to preliminary tests.

The staff of the experiment station consists of a director and an assistant.

Of work done in past years may be mentioned the investigation of the life-history of the mustard beetle (*Phaedon cochleariae* Fbr.) and of the modes of fighting it. As a result of these a successful beginning has been made throughout Estonia with the dusting of cattle-turnips and cabbage plants with calcium arseniate for the destruction of this pest. Secondly the life-history of the wireworms (*Agriotes* sp. and *Corybites* sp.) and the modes of fighting them have formed the subject of prolonged



10. Insectary.

investigation. The best means of combating this pest has been found to be the cultivation of the soil at the end of June or in the first days of July. Further the pea moth (*Grapholitha nigricana* Steph. and *dorsana* Fabr.) has been studied for a considerable time, and the methods for its extermination in conjunction with later sowing have produced relatively good results. In a series of investigations of poor seed yield in red clover a great mass of statistics has been accumulated in regard to the humble bee fauna and its relation to red clover and other vegetation. At the same time the influence of the clover boll-weevil (*Apion* sp. sp.) on the diminution of the seed-yield has been investigated.

The barley leaf fly (*Hydrellia griseola* Fall.), from the ravages of which the barley fields in the North-West of Estonia suffered severely in 1923, has received special attention and for its destruction quickly acting fertilizers have been employed which assist the plants in overcoming the critical moment.

At present the experiment station is busy on the investigation of the life-history of the cut worm (*Agrotis segetum* Schiff.) and the methods of fighting it. For the first of these objects the



11. Part of interior of insectary.

station has sent out observers to certain places, in order to ascertain the period of flight of butterflies and to determine the proper time for future preventive measures in accordance with this phenomenon. For the purpose of obtaining a survey of the ravages due to the cutworm in the autumn of 1927, the station organized an inquiry which resulted in over 2500 valuable replies concerning the occurrence of the noxious insects, the amount of the damage caused by them and the measures for combating them hitherto adopted. From the inquiry it appears that only such rye crops suffer from the ravages of the cutworm as are grown on weed-

covered fallows, whereas rye sown on bare fallows and in particular on green fallows is not affected by the pest.

In addition to the investigation of the cut worm the station is at present engaged in perfecting the means for the extermination of the mustard beetle, adopting for this purpose combinations of various substances.

Since 1922 the station has been collecting information, by the aid of a network of correspondents specially created for that purpose, about the occurrence of pests and the extent of the ravages due to them. This kind of work possesses great importance



12. Spraying of bushes by motor spray.

for the following reasons: Firstly, the station is thereby enabled to follow and study all changes in regard to insects, and in particular to render timely assistance to farmers in case of appearance of dangerous pests. Secondly the possibility is thereby offered of developing out of these correspondents a body of experts throughout the country who are able to furnish their neighbours with explanations and advice in regard to pests. This latter object has been given special attention by the experiment station, which distributes gratis literature on the subject and is always ready to send out any desired information to these correspondents. The number of the latter has risen in the present

year to 678 persons, the majority of them being practical agriculturists.

The experiment station, being the only institution of its kind in Estonia, is not in a position to restrict its activity entirely to scientific teaching work, but is obliged to meet the requirements of farmers and gardeners in regard to the solution of practical questions. As the information concerning the pests themselves and the ravages caused by them is still scanty, the staff of the station has laid great stress on the education of public opinion, e. g. by organizing displays at shows and exhibitions and giving demonstrations illustrative of pests and their destructive effects.

Publications of the Experiment Station.

1. K. Zolk. The Leaf-louse of the Carrot (*Trioza viridula* Zett.) 1922, Tartu
2. " " The Flax-worm (*Plusia gamma* L.). 1922, Tartu.
3. " " The Species of *Phyllotreta* which ravage our grain crops. Tartu 1923.
4. " " *Lophyrus rufus* Latr. as Destroyer of the Young Fir Plantations of Lake Ülemiste 1923, Tartu.
5. " " *Paracodrus apterogynus* Halid., a new Parasite of the Family of *Agriotes obscurus* L.
6. " " Some New Facts regarding the Life-history of *Agriotes obscurus* L. 1924, Tartu.
7. " " On the Life-history of *Paracodrus apterogynus* Halid. 1924, Tartu.
8. " " On the Life-history of the Mustard Beetle (*Phaedon Cochleariae* Fbr.). 1925, Tartu.
9. " " The Mustard Beetle and the Methods of Combating it. 1927, Tallinn.
10. " " Cabbage Pests and the Methods of Combating them. 1927, Tartu.
11. " " Survey of the Work of the Entomological Experiment Station 1921-1926, Tallinn.
12. A. Käsebier, N. Roosa and K. Zolk: Plant Protection. 1926, Tartu.
13. K. Zolk: The Noxious Insects of Estonia (*Insectes nuisibles en Estonie*). 1923, Tallinn.
14. " " The Combating of the Principal Plant Pests. 1927, Tallinn.
15. " " Noxious Insects in Orchards and the Methods of Combating them. 1920, Tartu.

Review of the Experimental Work of the Phytopathology Experiment Station in 1928.

The Experiment Station of Phytopathology was initiated in 1922 by Professor Dr. Buchholtz, who was also its first director. The work of the station embraces the following lines of scientific research and practical experiments: a) The investigation of

all bacterial diseases of cultivated plants, the study of the effects of bacteria and weeds, the discovering of new methods of combating these and the control of the application of such methods, b) the rendering of advice and practical aid to farmers in regard to plant protection, c) the instruction and training of university students and others in the results and methods of phytopathology and plant protection, b) the organisation of lectures and practical experimental work for undergraduates and post-graduates specializing in phytopathology.

The present director of the experimental station is Professor Dr. N. Roots, whose assistants are Mr. A. Käsebie, for scientific work, and Mr. A. Luhakooder, for practical experimental work. The last mentioned gentlemen are appointed and paid by the Ministry of Agriculture. For expenses in connection with the work of the station the grant from the University for the present year is 1300 Estonian crowns; the Ministry of Agriculture allows for this purpose a sum of 3400 Est. cr., this making a total of 4700 Est. cr. available for experimental and practical work.

Experiments and Scientific Publications.

Among the questions engaging the attention of the experiment station at the present moment the following may be mentioned.

1. Investigations of methods for preventing bacteriosis of beet-root seedlings and damping off of beet-root seedlings (*Phytium de Baryanum*) (experiment plots Nos. 1—105.)

2. The question of preventive measures against potato leaf disease (*Phytophthora infestans*) (experiment plots Nos. 106—153).

3. Experiments with infection of loose smut of oats (*Ustilago avenae*) and the covered smut of barley (*Ustilago hordei*) (experiment plots Nos. 154—320).

4. Experiments with preventive measures against the loose smut of wheat (*Ustilago tritici*) (experiment plots Nos. 321—330).

5. The phenolate obtained from Estonian oil-shale as a medium for cauterizing, spraying and impregnation.

6. Statistics of plant protection.

The results hitherto obtained have been partly summarized in the following works:

- Bucholtz, Prof. dr. F. Potato Black Scab and our Potato Export. (Agronomia 1922, p. 27.)
- Käsebier, A. The Principal Blights (Ustilagineae and Fusarium) of our Grain Crops (Agronomia 1922, p. 129).
- „ Experiments in Combating the Loose Smut of Wheat (*Ustilago tritici*) (Agronomia 1925, p. 403).
- „ Experiments in Cauterizing Tomato-seeds. (Publications of the Tartu University Phytopathology Experiment Station I.)
- „ Plant Diseases and Organisms Causing them, 1923. (2-nd Estonian Agricultural Statistical Album p. 39.)
- „ Plant Diseases in Estonia in 1924 (Reports of the Tartu University Phytop. Exper. Station. No. 11).
- „ The Plant Diseases Occurring in Estonia I: *Mycothica Estonica*.
- „ Survey of the Work of the Phytopathology Experiment Station 1921—25 (Year-book of the Department of Agriculture I, p. 134).
- Lepik, E. mag. bot. Phytopathological notes I (Reports of the Phytop. Exper. Station I).
- „ The Fungous Growths occurring in our Cellars (Reports of the Phytop. Exper. Station III).

In addition to the publications just enumerated the experiment station has been issuing a series of popular pamphlets of which Nos. 1—5 have hitherto appeared.

Organisation of Plant Protection in Practical Economic Life.

Among the organisatory schemes undertaken by the experiment station the most important is the inspection of potatoes for export. A further enterprise of importance is the organisation of experiments on private farms throughout Estonia with methods and media for preventing plant diseases which have been tried and found efficient in preliminary tests at the station. This work has been undertaken with the object of introducing the new points of view in regard to plant protection into the practical life of the nation.

The Zootechnical Experiment Station.

The duties of the Zootechnical Experiment Station consist in the investigation of questions having reference to the breeding and keeping of cattle, and in the providing of facilities for students to study the methods of zootechnical experimental work. In addition to its work in the university the experiment station also undertakes the investigation of special problems for the Ministry of Agriculture, the expenses for which are borne by this ministry.

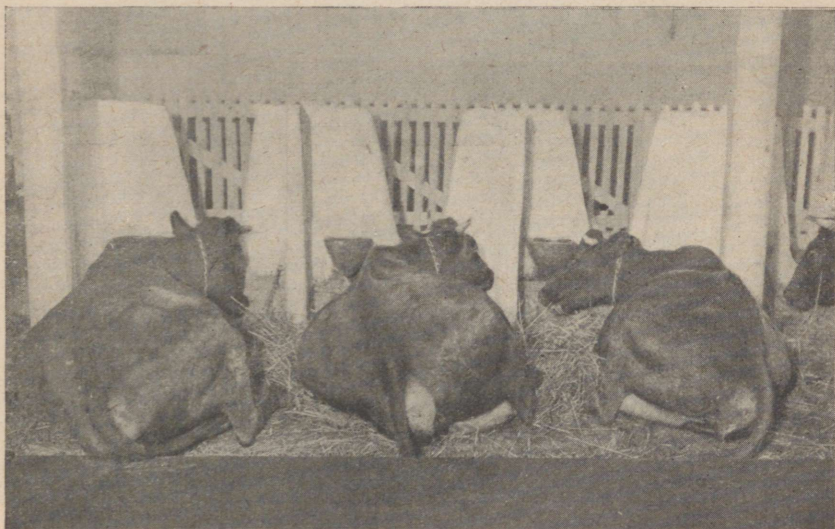


13. Experiment Stable of the Zootechnical Experiment Station.

The zootechnical experiment station possesses an experimental stable and a laboratory of its own, the latter serving for the analysis of animal fodder and of the milk and the excrements of the animals under investigation. The experimental stable has accommodation for experimenting with 21 full-grown cows, which are selected from the herd of about 100 milch-cows belonging to the Raadi estate. The breeds represented among this herd are the following: 1) Estonian red cattle (Angler), 2) Estonian black and white spotted (Dutch Frisian) and 3) Ayrshire cattle.

In past years the work of the experiment station has been concerned chiefly with experiments on the feeding of milch-cows. Among these experiments the following are to be mentioned as possessing special importance for Estonian cattle raising: 1) Experiments with Lake Peipsi smelt (*Osmerus eperlanus* var. *spirinchus*), 2) experiments with sunflower and maize ensilage and 3) experiments with raw potatoes. These experiments are being continued.

In addition to the line of research just described the experiment station has undertaken the investigation of the physical de-



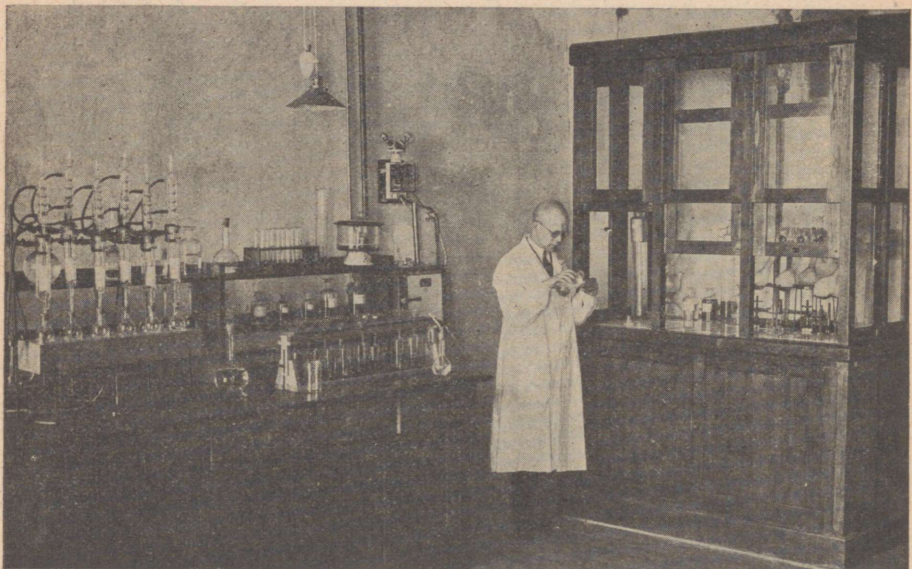
13^a. Zootechnical Station. Interior of experiment stable.

velopment of young cattle, in regard to which observations are still in progress.

For the proper conduct the feeding experiments which have to be carried out on the experiment station an investigation of the composition of the food-stuffs employed became a matter of urgent necessity. This research has been accomplished in regard to a number of feeding substances of native origin and their composition determined. The experiment station cherishes the project of gradually extending the investigation of animal fodder of

every kind grown or manufactured in Estonia in regard to its chemical composition, its digestibility and its feeding value.

The staff of the zootechnical experiment station has hitherto consisted of the following persons: the director, who is at the same time professor in the university, and two assistants, one of these being an agronomist, who superintends the practical execution of the experiments, and the other a chemist, who does the analytical work.



14. Laboratory of the Zootechnical Experiment Station (department of fodder analysis).

Accounts and descriptions of the work of the zootechnical experiment station and of the experimental results obtained have appeared in a number of publications. The following may be mentioned here:

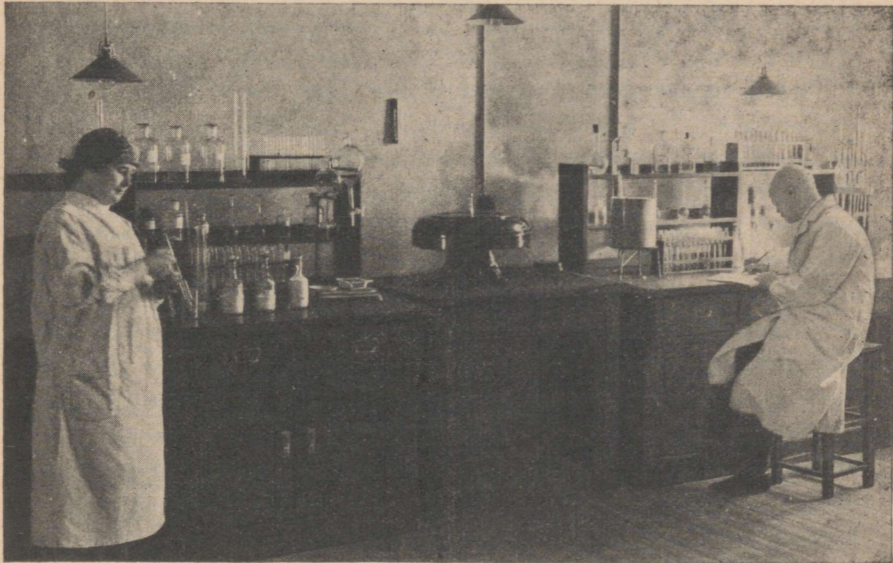
1) In the Year-book of the Estonian Republican Department of Agriculture 1918—26 an article entitled: „Review of the Work of the Zootechnical Experimental Station“ by Professor J. Mägi.

2) In the journal „The Stockbreeder“, 1927, No. 2: „Smelt as a Feeding Material for Milch-cows (Prof. J. Mägi).

3) Zeitschrift für Fleisch- und Milchhygiene, 1927. H. S. (Stuttgart): „Fischfutter für Kühe“ (review by Prof. Stang).

4) In the journal „Agronomia“, 1918, No. 3: On Zootechnical Experiments, with particular reference to their Methods“ (Prof. J. Mägi).

The address of the Zootechnical Experimental Station is: Tartu, Estonia, Raadi mõisa.



15. Laboratory of the Zootechnical Experiment Station (department of milk analysis).

The Tartu University Horticultural Experiment Station.

The Horticultural Experiment Station is at present still in process of organisation. Until recently its place was occupied by a gardening school and practice garden, which has not yet been raised officially to the full rank of an experiment station. The total land area embraces 6.95 hectares. At the time of publication the collecting of the requisite objects and specimens for horticultural study is still continuing.

In the programme of work provision is made for the study of the more urgent problems concerning Estonian horticulture,

such as the possibility of growing dwarf-trees, the determination of suitable species, the study of the fertilization of fruit-trees (the question of individual sterility or fertility), the problems of land cultivation and of manuring. A subject receiving special attention is the study of different varieties of fruit-trees, and for this reason it was decided to adopt the establishment of a pomological orchard as the first item of the programme. This project is at present approaching its realisation and on the Raadi estate a collection of fruit-trees has already been formed consisting of about 50 apple-trees, 12 pear-trees, some 15 plum-trees, a like number of cherry- and sweet-cherry trees, 50 sorts of gooseberries, 25 kinds of currants, 20 varieties of strawberries, etc., which, however, will have to be supplemented considerably. The principle in collecting various sorts has been in the first instance to choose such as may be supposed to possess the properties qualifying them for profitable cultivation under our climatic and other conditions, as it is a well known fact that the number of different sorts among our fruit-trees and berry-bushes is exceedingly large and the study of them all a most difficult task presupposing a long period of time. In the programme of the station this question is followed immediately by the question of ascertaining the sorts of apple-trees native to our country, many of which are still practically unknown, and of their systematic study. Among them there will doubtless be discovered numerous marketable varieties of excellent quality which would be very much more suitable for our conditions of soil and climate than the sorts of foreign importation which are being cultivated at present.

In the field of fruit-tree breeding the first project is that of the improvement of our well known and generally popular native Livonian winter Borsdorf apple (the so-called "onion-apple"). Experiments in regard to manuring and land cultivation cannot be undertaken for the present, as suitable objects are lacking, these having first to be planted and grown. Preliminary work in this direction is, however, proceeding.

Experiments are at present being carried out with wild stock in the case of apple-trees, pear-trees and cherry-trees. The results of these experiments will, however, become visible only in a few years' time. At the same time experiments are in progress

with about 300 dwarf-trees, the aim of which is to decide whether in our country a commercially profitable growing of dwarf-trees is conceivable, what sorts should be employed for that purpose and on what wild stock each sort ought to be grown. In this field of research results will probably begin to appear after a period of about 4—5 years.

There are also proceeding experiments which are intended to settle the question of the pruning of trees at the time of planting them. At present two diametrically opposed views in regard to this question sharply divide the body of our gardeners. Light may be expected to be thrown on this problem after 2—3 years.

In the department of berry-bushes observations are being made in regard to sorts. It has already been rendered fairly clear that a number of first-class sorts of West-European origin are not adapted to our conditions and that their propagation is not to be encouraged in future. But no quite definite and final results can as yet be established. A good deal of work will have to be done and some time will have to elapse before this stage is attained.
