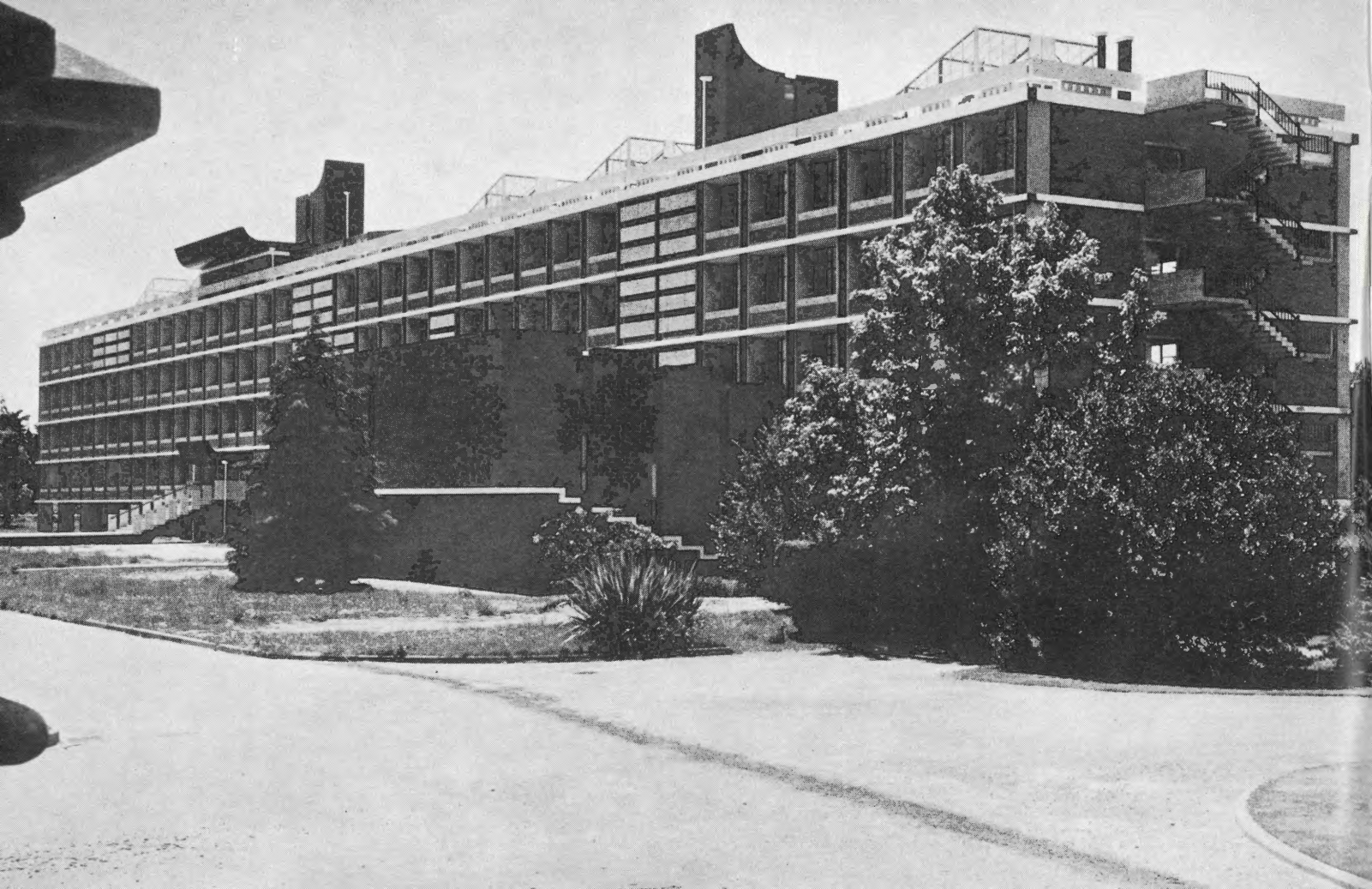
The Hilgendorf Wing of the Teaching Block

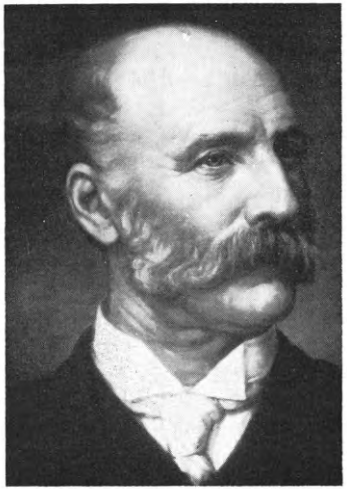
LINCOLN COLLEGE



A BRIEF HISTORY OF THE COLLEGE

With the establishment of the Royal Agricultural College, Cirencester, in 1846, agricultural instruction received a considerable stimulus and it was not therefore unnatural that the settlers of the province of Canterbury, New Zealand, a province in a country which would derive its wealth from agricultural production, should be anxious to assure the security of the settlement by the founding of educational establishments including the setting up of a course in agricultural education at university level.

In 1865 a reserve of agricultural land was set aside for the support of educational establishments and this led to the founding of Canterbury College (now the University of Canterbury) in 1873. In the same year a reserve of 101,000 acres of pastoral land was set aside as an endowment for a School of Agriculture. It was originally intended that this School should be administered by a separate body but it was found more convenient to place it under the control of the Board of Governors of Canterbury College. Initially part of the money available from the endowment was used to pay the salary of a Professor of Chemistry who delivered lectures on agricultural chemistry weekly in Christchurch and on occasion in other centres throughout the province. This arrange-



W. E. Ivey

J. Bayne

Opposite: The Hilgendorf Wing from Ivey Hall.

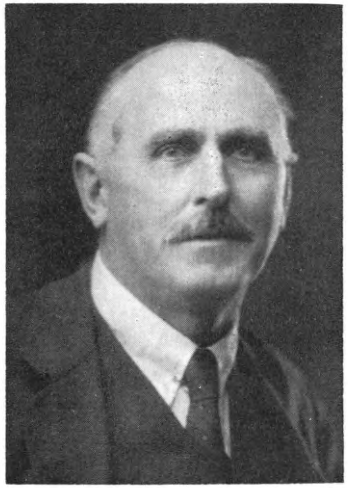
ment ceased in 1875 and in 1876 steps were taken to procure a farm near Christchurch and to establish on it a School of Agriculture which would provide for residential as well as day pupils. In 1877 402 acres at Lincoln were bought and in January 1878 a tender was accepted for the erection of a homestead building to accommodate the manager and his family, 20 students and a lecture room to seat 70, while in March of the same year Mr W. E. Ivey, after whom the first College building was subsequently named, was appointed 'Manager' and Principal of the Lincoln School of Agriculture.

Classes began in July 1880 with 13 enrolments, eleven of whom were in residence. The original College building soon proved inadequate and a further wing was added in 1881 to provide accommodation for an additional 30 students. After this good start, however the roll declined from an average of 65 for the years 1882-1885 to 35 in 1886 and 17 in 1887. This decline was attributed to the economic depression of the 1880's and to the maladministration of the School's endowment funds by the Canterbury College Board of Governors who had applied some of the revenue from endowments towards the costs of buildings at Canterbury College. Attempts to improve the School's administration culminated with the passing of the Canterbury College and Canterbury Agricultural College Act in 1896 which provided for a 'Canterbury Agricultural College' separate from Canterbury College with its own elected Board of Governors, which was to receive the original reserves for the School of Agriculture and all proceeds from them.

Ivey had died in 1893 and was succeeded as Principal by J. Bayne who remained in office until 1901 when he resigned to take up an appointment as Professor of Agriculture at the Harris Institute, Preston, England. He was succeeded by W. Lowrie and he in turn by R. E. Alexander who was Principal from 1909 to 1935.

The original School of Agriculture had offered a course leading only to a Diploma in Agriculture but under Lowrie's direction the

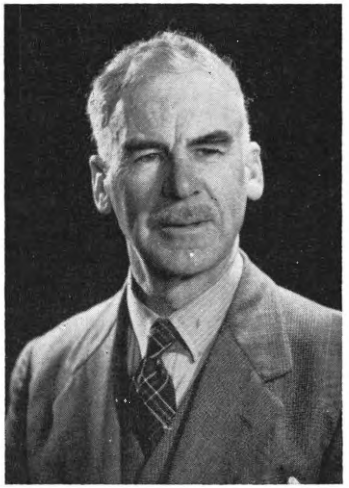
W. Lowrie



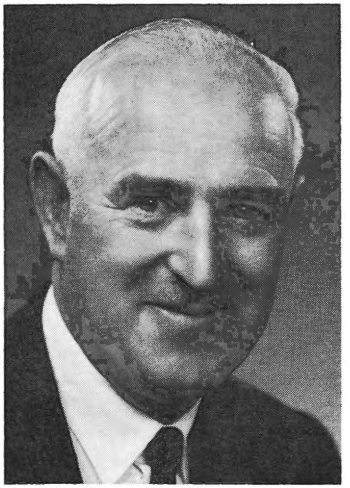
R. E. Alexander

new College broadened its educational objectives. It had become a teaching institution of the University of New Zealand and when the Senate of that body instituted a degree of Bachelor of Science in Agriculture in 1896 the College became recognised as a special school of the University. With the widening scope of scientific agriculture the degree was renamed Bachelor of Agricultural Science and subsequently a degree of Master of Agricultural Science was introduced.

In June 1930 the University of New Zealand established two Chairs of Agriculture at Lincoln to which Alexander and Dr F. W. Hilgendorf were appointed. Alexander was succeeded as Principal



E. R. Hudson



M. M. Burns

and Professor of Agriculture in 1936 by E. R. Hudson who held office until 1952 when he was succeeded by Dr M. M. Burns.

During Hudson's time as Principal his enthusiasm and vigour led to a great expansion of activities, an expansion which has extended and continued under the present administration. A course leading to a Diploma in Valuation and Farm Management was introduced in 1938 to be followed by courses in Horticulture — a diploma course being established in 1945 and a degree course in 1948.

The students taking the Diploma course in Agriculture originally spent their whole time at the College where they carried out the practical work on the College farms. With decreased demand for labour following on an increase in the number of students enrolled for the Diploma course and increased mechanization on the College farms, in 1954 it was decided to remodel the courses so that students spend the first two terms only of two consecutive years at the College and the rest of the course is spent in practical farm work away from the College.

Short one term courses leading to a Certificate in Woolclassing were introduced in 1944 and to a Certificate in Meat Inspection, available only to Assistant Meat Inspectors employed by the Department of Agriculture, in 1965.

To allow graduates in various fields other than agriculture to receive an introduction to aspects of agriculture, postgraduate diplomas in Agricultural Science, Horticultural Science and Agricultural Engineering have been introduced. The close academic link the College has had with Canterbury College, now the University of Canterbury, has led to the introduction of two degree courses in collaboration with the University; the first a five-year course leading to a degree of Bachelor of Science with Honours in Biochemistry being established in 1963, and the second a four-year course leading to an agricultural option for the degree of Bachelor of Engineering being introduced in 1966.

In 1961 with the disestablishment of the University of New Zealand the link with the University of Canterbury became strengthened for with the passing of the Lincoln College Act 1961 Canterbury Agricultural College became Lincoln College, a constituent college of the University of Canterbury. Under the Act, however, the College retains control over its staff and buildings and over its farms and has its own elected Council and its own Professorial Board.

In 1880, the year in which classes opened, there were 13 students at the College: in 1968 there are 890 in full-time classes. The projected total enrolments for degree and diploma classes

are 1000 by 1969 and 2000 by 1980. To these figures must be added those who enrol for the one term certificate courses amounting to approximately 200 in 1968. In common with all university institutions the College has, over the past six or seven years, gone through a period of rapid growth, but whereas with the other universities the percentage of school leavers who enrol for classes has remained more or less constant the percentage of school leavers who enrol at the College has been rising steadily. With the increase in enrolments the College roll has doubled over the last five years. The roll is added to by students from overseas many of whom are supported by such agencies as the Colombo Plan or SCAAP. There are approximately 80 overseas students enrolled in 1968, from 17 different countries ranging from Africa, through Australia to Malaysia, Thailand, Vietnam and Korea.

Notwithstanding its rapid growth and the wide diversity of the courses it now offers, the College has kept unchanged its principal functions — education, research and extension in the rural community.

F. W. HILGENDORF, M.A., D.Sc.(N.Z.), F.R.S.N.Z.

(An appreciation by one of his students — I. D. Blair)

F. W. Hilgendorf

Frederick William Hilgendorf, who was born and educated in Otago, joined the staff of the Canterbury Agricultural College in 1899, at a salary of £180 plus free accommodation. For three years he taught botany and entomology but in 1902 resigned to take a position at Southland Boys' High School. Lincoln drew him back in 1904, initially as biologist; and from then on his career of service and accomplishment appears to have few parallels in College history. During 36 years as member of the staff he was acting-director for three periods and in 1930 was appointed Professor of Agriculture. After his retirement in 1936 he served seven years as member of the College Board until he died in September 1943. He was predeceased 13 years by his wife (Frances Murray) and their sons are Charles Hilgendorf, M.A., farmer, Lyndhurst, Mid-Canterbury, former member of the College Board, Deputy Chairman New Zealand Meat Board, member University Grants Committee and Murray Hilgendorf, B.E., executive and engineer, Department of Civil Aviation, Melbourne.

Dr Hilgendorf was a progressive scientist, a dedicated teacher and an incomparable exponent of extension instruction to farmers. This triple capacity is no longer fashionable and anyone presuming to try and incorporate these interests tends to be suspect as an academic. But this was the kind of person that the College and the agricultural community needed in the formative years of development.

As a teacher he had to develop his own methods and he decided that for some subjects he would have to write his own textbooks. Some of these are the best yet written and continue to be regularly re-printed.

As biologist his sphere of interest was clearly defined but at all times extrovert, he was also called on to instruct students in surveying, bookkeeping and feat incomparable — to instruct in the use and maintenance of the College steam traction engine. He liked to teach; this exercise was never burdensome; he liked stud-

ents, observed them as personalities, counselled and helped them and countless men now in all works of life would testify that 'Hilgy' was the teacher never to be forgotten. His occasional discursiveness was delightful.

His early zoological researches resulted in the conferment in 1905 of the Doctorate of Science and his work was published in several papers of the Transactions New Zealand Institute — later Royal Society of New Zealand of which he was elected a Fellow. In 1909 R. E. Alexander, who had been impressed in Northern Ireland with the success of early plant improvement techniques, persuaded Hilgendorf that he should attempt plant improvement in Canterbury. Initially, through selection procedures, he was able to release into farming yield improved selections of wheat (College Hunters), oats (College Algerians), grasses (C.23 cocksfoot), this work being aided by some of his students, notably J. W. Calder. He made his first wheat crosses in 1920 and after several more years Cross 7 appeared as the first release of a crossbred variety incorporating several characters associated with yield and baking quality. By this time he had become a New Zealand pioneer in the study and application of Mendelism and also, through the necessity to prove the merit of his cereal selections, on the use of replicated experiments. This subject, under his authorship, was published as an early bulletin of the Department of Scientific and Industrial Research. He was instrumental in forming a Pure Seeds Association among merchants and farmers. This was the first form of seed certification in New Zealand and later he encouraged J. W. Hadfield to widen this programme in the Department of Agriculture.

His relaxation was generally sought in the open spaces of the South Island. He loved the environment of river, lake and mountain and introduced so many students there to opportunity for observation, later translated in their prominence as this country's first conservationists and ecologists. For many years he went on trips by bicycle and the expeditions were adventurous and hilarious. Indeed for 15 years, as enthusiastic supporter of the Canterbury Philosophical Institute, he rode his bike from Lincoln to Christchurch and back to attend the meetings. His field observations encompassed all things — zoology, geomorphology, geology, botany and he published authoritative papers ranging from pollination by bees to water levels on the Plains. One of his most well expounded series of observations arising from critical interest in the phenomena of natural history was incorporated in his publication on the 'Grasslands of the South Island', (Department of Scientific and Industrial Research Bulletin No. 64). This has been a foundation to much subsequent work especially relating to tussock grassland.

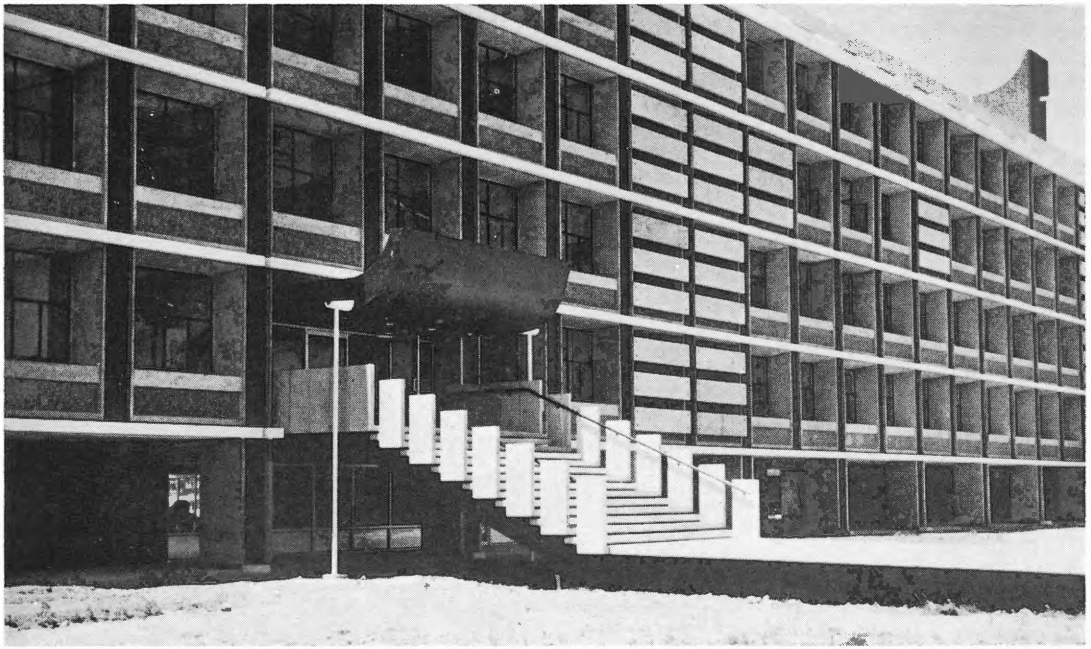
By 1928 his wheat improvement work had enabled him to find Government, grower and miller support for the establishment of the Wheat Research Institute. Until 1936 he was Director of the Institute, additional to his College work, but after he retired from Lincoln this position was his full-time interest.

He was a man of sterling character, of irrepressible geniality, a pillar of support to community institutions — ranging from his participation in the formation of the Ellesmere Rugby Sub-Union in 1905 to the needs of the Village Church.

For most of his time at Lincoln it was conceded to him to develop and nurture the rather slender structure of the College in academic matters. He was evidently appreciative of the need to maintain a balance between the interests of farm husbandry and agricultural science. In the absence of other help, and for years, he conducted the routine servicing of the small, inadequate library but he seemed to know that so long as the library could be preserved, it could only grow into something of the order as it is today. In the time of crisis in the mid 1920's when the future of Lincoln as a University institution was in the balance in the estimation of bureaucrats and politicians in Wellington, Hilgendorf was the member of staff, allied to a few Board members who

ultimately prevailed in their advocacy of justification for public support to this College. From that time, and supported increasingly by Government, Lincoln College has steadily grown into the great public institution, a centre of agricultural learning, as it now is. It seems entirely appropriate and just, that this fine, new building, to house the College facilities for teaching and research, should commemorate the name, the attainments and the service of F. W. Hilgendorf.

'What if another sit beneath the shade of the
broad elm I planted by the way —
'Have I not done my task and served my kind?'
Oliver Wendell Holmes



The west wall of the Hilgendorf Wing showing the main entrance.

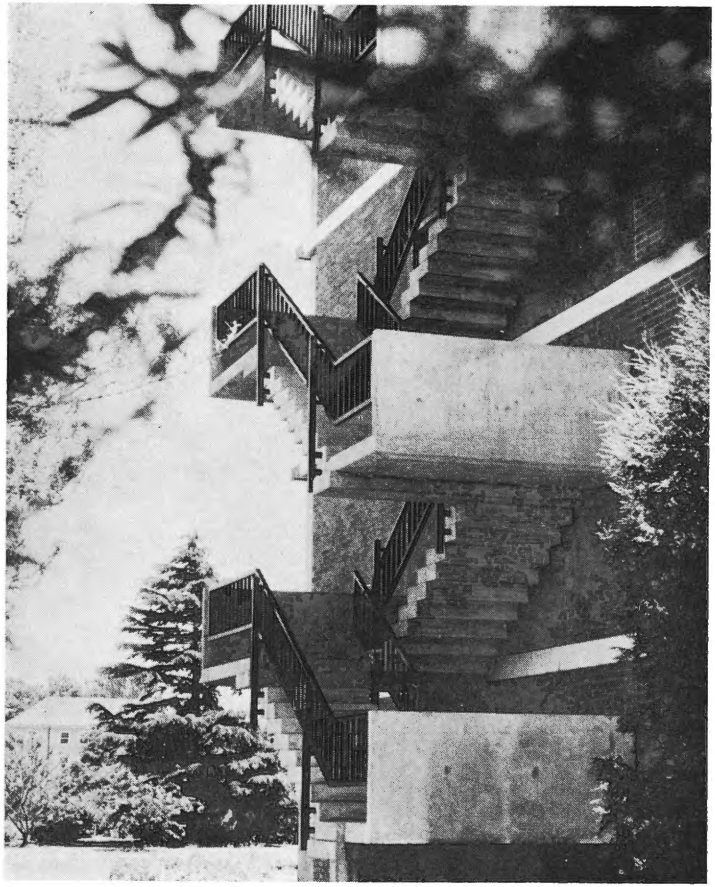
THE HILGENDORF WING

ARCHITECTS: W. H. TRENGROVE, TRENGROVE & MARSHALL.

CONTRACTOR: M. L. PAYNTER LTD.

CONSULTING, STRUCTURAL & MECHANICAL ENGINEERS: POWELL, FENWICK & PARTNERS.

QUANTITY SURVEYORS: TOMLINSON, DICKSON & PARTNERS.



The Hilgendorf Wing, the first building in a development scheme which is designed to provide, for the College, facilities for the 2000 students expected to enrol by 1980, houses all the departments of the College except the Departments of Agricultural Engineering, Soil Science and Wool Science.

Features of the Building

The building which was designed to accommodate a student population equivalent to 550 full-time students, is 400ft long by 50ft wide and five storeys high. The total gross area is 109,000 sq. ft.

The aim of the architects was to provide for a given sum a fixed nett area and every device to achieve a balanced economical solution was used. To keep costs to a minimum, maximum off-the-site fabrication and finishing was aimed for, together with repetitive units to gain the advantage of factory production. For example the entire east and west walls are made up of identical window units each weighing $3\frac{1}{4}$ tons which were constructed off the site and brought to the College only when required for lifting into position.

The floors are of flat slab reinforced concrete construction with post tensioning; partitions of concrete blocks allow internal reorganization if this should prove necessary. The north and south walls and the lower panels on the east and west walls and the walls of the lecture rooms are of brick to harmonize with existing buildings while the upward curve of the roof features links the building architecturally to the downward curve of the gables on Ivey Hall. The use of precast window units for the two long walls has allowed a rapid construction of the exterior. At the peak 16 units were erected on a normal working day.

The student entry to the building is on the ground floor at the south end. Opening off a student concourse and foyer are five of the eleven lecture rooms in the building. These five rooms have tiered seating and are heated by water heating coils embedded in the floor supplemented, in winter, with warmed filtered air.

On the first floor and again in the south end are the remaining six lecture rooms while the main student laboratories are on floors above.

Access to the staff and research area is at first floor level and all occupied rooms are raised to this upper level to prevent nuisance at pedestrian level. The ground floor is then utilised for housing service rooms and cloak room and toilet facilities for students. The walls of the ground floor are set back to provide a covered access around the building. A pass through at ground floor level between the student entry and the rest of the ground floor prevents the building being a complete visual barrier on the site.

The services to the building are housed in ducts between window units and under each window sill. Access to the interior is through an opening in the window units and this permits easy change in room usage. The prefabricated concept is continued in the laboratories and all benching, under bench cupboards and wall units such as shelving, draining racks, and cabinets are easily removable and are interchangeable. The laboratories are designed on the 'finger' principle throughout the building. The 'fingers' are the laboratory benches springing from the service ducts within the external wall.

Provision has been made for specialized facilities. In the Plant Science Department are fourteen plant growth cabinets to provide the artificial climatic conditions necessary for satisfactory research in this Department. On the roof are five conditioned glasshouses in which plant, microbiological and entomological material for classroom teaching can be housed and in which research projects in Plant Science and Horticulture, Microbiology and Zoology, can be carried out.

Staff offices all have the same dimensions and it has thus been possible to ensure that all fittings are standardized and completely interchangeable.

Laboratories and offices are heated by hot water convector type heaters. The water in the heating system is heated with steam carried in a service duct from the College Boiler House.

COLLEGE ACTIVITIES

The Governors of the Lincoln School of Agriculture when they established a course of practical and theoretical instruction for students, at the same time established an experimental farm on which Field Days for visiting farmers were held. The three elements for effective development of a University institution, education, research and extension have thus been a feature of Lincoln College's life since its very early days. As the range of educational activities conducted by the College has been extended so has the research and extension activities. The value of research of the College is shown in the improvements in farming practice and by the widespread utilization of improved strains of plant and animals which owe their origin to research carried out at the College.

Research at the College receives a stimulus from research and allied institutions attached to the College and from independent organizations situated immediately adjacent to it. The Botany, Crop Research and Grasslands divisions of the Department of Scientific and Industrial Research and the Wool Research Organization and Wool Industries Research Institute are housed on sites contiguous with the College site. Based at the College are the Agricultural Economics Research Unit, the Agricultural Engineering Institute and the Tussock Grasslands and Mountain Lands Institute. The first named is housed in the Hilgendorf Wing.

Extension activities, which cover both agriculture and horticulture include the holding of field days and conferences, the publication of bulletins, broadcasting, lectures, publication of press and other articles, instruction of the pupils of secondary schools and correspondence with farmers and horticulturalists and others.

The research activities of the Departments housed in the Hilgendorf Wing are:—

AGRICULTURAL ECONOMICS

A long-term programme of economic research is being carried out by the Agricultural Economics Research Unit and the Department of Agricultural Economics, along the following lines:—

Production Economics

Long run trends in productivity in N.Z. Agriculture.

Future Capital and Labour requirements for agricultural development and rate of return.

Economics of North Island Hill Country development.

Economic evaluation of the proposed Rakaia irrigation scheme.

Economic evaluation of conservation.

Economics of fertiliser use in Southland.

Economics of beef production in beef-sheep areas of North Island.
Economics of Land Prices.
Economic Study of Lamb Supply in N.Z.
Economics of Pasture Insect Pests.

Marketing Economics
Analysis of fluctuations and trends in wool prices.
Long term market projections for meat in U.K. and E.E.C. markets and implications of alternative trading policies.
Economics of Wool Marketing Schemes.
Long term market projections for dairy products.
Retail demand elasticities for meat and dairy products in Great Britain.
Simulation of alternative wool marketing schemes.
Analysis of Wholesale Price Fluctuations for Meat in U.K.
Economics of Scouring Wool in New Zealand.
Analysis of Short Term Fluctuations in Wool Prices.
Economics of Private Wool Selling.
Demand for Pig meat in New Zealand.

Relations between Agriculture and General Economy
Interindustry policy model for New Zealand economic planning.
Real Capital employed by sectors of New Zealand economy.
Detailed interindustry accounts for New Zealand Agricultural industry.
Indirect labour requirements attributable to increased agricultural production.
Economic and Social Aspects of Farm Labour Problem.

Studies in Regional Economic Development
Agricultural and Economic Development of Northland.

AGRICULTURAL MICROBIOLOGY

Wool Microbiology

The fleece of the sheep has been shown to be the habitat of a wide range of organisms which may give rise to discolourations or to attack of the fibres — weakening them and lessening their value. Various aspects of the multiplication and survival of the microbial population have been studied, as well as the ecology of a number of pigment-producing organisms. This work of both practical and theoretical interest is supported financially by the New Zealand Wool Research Organization.

Diseases of the skin of sheep are closely bound up with the microbiology of the fleece and the predisposing factors associated with mycotic dermatitis are being studied, with particular reference to dipping, sheep breed, climatic factors.

Microbiology of Grain

The problem of ill-thrift in chickens is the basis of a project which is financed by the New Zealand Poultry Board. Investigations are being made into aspects of the microbiology of poultry foods to establish the types of organisms present and to examine the significance of toxin-producing fungi or salmonellae.

Soil Microbiology

The breakdown of organic matter in soil is important in relation to forest-lands. The New Zealand Forest Service is supporting two projects associated with decomposition of woody tissue. One is a study of the feasibility of growing edible fungi on wood wastes such as sawdust and slash. Another project entails an examination of the microbiology of the breakdown of tree roots in soil and the consequent release of energy for successive crops of forest trees. A third project in this field is a study of the breakdown of the herbicide 'Tordon' (picloram) in the soil by micro-organisms.

Substantial progress has been made by research students of the Department in the past five years, who have provided an understanding of some of the microbial processes occurring in some of our tussock-grassland and mountain soils.

Studies are being made on the activity of nitrogen-fixing Rhizobium bacteria on clover and lucerne roots, growing under acid soil conditions. This work is financed by the College Research Fund and also supported by the New Zealand Tussock Grasslands and Mountain Lands Institute.

Plant Pathology

Over many years, research contributions have been made by students and staff on aspects of disease in crop plants and this sphere of interest is being maintained.

A research contract has been arranged with the Department of Scientific and Industrial Research, initially for two years, and to cover a study of factors contributing to deterioration or running-out of lucerne. During the first summer crops were examined in all South Island districts and the nature of the problem was defined.

AGRICULTURAL ZOOLOGY

Taxonomy of Diptera.
Population dynamics of cabbage aphid.
Population dynamics of pasture insects.
Biology and ecology of sub-alpine scrub insects.
Decomposition of animal carcases.
Population ecology and food of magpies.
Toxicity of miticides to resistant fruit tree mites.
Genetics of insecticide resistance.
Survey of insects associated with lucerne.
The effect of selected soil animals on the mineralization of organically bound plant nutrients.
Population dynamics of brassica insects.
Taxonomy of mites.
Insect attractants.

ANIMAL SCIENCE

Photoperiodic and temperature effects in sheep.
Transplantation of endocrine glands in sheep.
Influence of post-mating nutrition on lambing percentage.
Influence of post-natal nutrition on lamb growth rates.
The determination of growth gradients in lambs.
Synchronisation of mating.
Development of the Border Romney breed of sheep.
Winter nutrition of hoggets in the high country.
Beef production, especially dairy-beef.

BIOCHEMISTRY

Rumen micro-organisms

The unusual microbe known as 'Quin's Oval', which becomes the predominant organism in the sheep rumen when the diet is supplemented with molasses, continues to be the subject of biochemical study. Its fermentation products, including the glycogen-like storage polysaccharide, are under investigation, and its sub-cellular structure and organelles are being examined in collaboration with Dr A. D. Thomson of the DSIR, Plant Diseases Division, Lincoln.

The capsular polysaccharide of another common rumen bacterium, Steptococcus bovis, is also under study. This substance may be of importance in relations between this organism and other rumen microbes.

The survey of bacteria present in the rumen of sheep feeding on Canterbury pastures continues.

Thermophilic bacteria

Previous work on the biochemical aspects of thermophily has been extended to include study of bacteriophages and some thermophilic anaerobes.

Plant biochemistry

The metabolic route by which plants synthesize the amino acid asparagine, the most abundant nitrogen compound in many plants, is being investigated, using the blue lupin as source material.

FARM MANAGEMENT AND RURAL VALUATION SERVICE

An Advisory Service available to farmers and other persons or organizations asociated with agriculture, is maintained by the College. Its activities cover:

Continuous supervision of farm properties. Farms are managed in accordance with an approved budget aiming at maximum net returns, together with improvement of the property. The entire management, buying and selling, is controlled by the Service.

Co-operation with owners or occupiers. Advice is given on all phases of the farm management. The executive responsibility rests with the owner or manager, but the Service directs a certain part of the management, such as pasture establishment, cropping policy.

Preparation of complete financial and management reports on farm properties, outlining a constructive policy for improvement of the net returns and the property.

Valuations of farm properties for prospective purchasers, mortgage or rental purposes. Associated with the service is a detailed study of farm management problems. Attention is given to the application of the results of scientific investigation to practical farming. Wherever desired productive values are prepared.

Current research covers the following fields:

Development of a computerised budgetary and financial control system.

Cost/Benefit analysis (High country runs. Soil conservation projects. Irrigation in Mid-Canterbury. Hill country development. Light plains development).

Linear programming analysis (Town supply dairying. Mixed arable farming.

Economics and management of intensive pig farming in Canterbury.

Beef production on the Canterbury Plains.

HORTICULTURE

A 35 acre research area has been established on which a range of applied and fundamental research projects have been initiated.

Detail costing of establishment and maintenance of berry, stone and pip fruits.

Spacing, direct seeding and management studies of a variety of vegetables.

Micrometeorological studies.

Mineral absorption, movement and loss in horticultural plants.

PLANT SCIENCE

Plant Physiology

Physiological basis of yield in wheat.

Effects of moisture, temperature and nitrogen stress on grain production in wheat.

Nitrogen nutrition of Pinus.

Transportation of minerals in tree xylem.

Agronomy

Introduction of lucerne in tussock grasslands.

Material and methods in legume seed pelleting.

Evaluation of grasses under dry-land conditions.

Introduction of grasses in hill country.

Evaluation of subterranean clover strains and annual medics.

Seed production in tetraploid ryegrass.

Growth and yield of soya beans.

Genetics and Plant Breeding

Cytogenetics of lucerne.

Factors affecting tripping and seed setting in lucerne.

Testing of improved Glutinosa lucerne.

Production of Rambler X Glutinosa lucerne cross.

Morphogenesis of the wheat inflorescence.

Ecology

Tussock grassland ecology.

Ecology of matagouri (Discaria toumatou).

Plant succession and soil development on sequences of selected shingle fans and glacial moraines.

Ordination of native grassland and related communities.

Distribution and ecology of weeds.

Soil/vegetation history.

Application of ecological methods and principles to joint projects on soil fertility, grazing management and pest control.

VETERINARY SCIENCE

Plant/Animal Relationships

Sheep production and health on pure-species pastures; involving a study of the effects of five different pasture species on:

live-weight gain, carcase conformation and composition;

wool growth (in association with the Wool Department);

rumen structure and function, and food intake;

rumen microflora and fauna (in association with Biochemistry); also a study of

Assay of plant oestrogens; the effects of synthetic oestrogens on growth rate and carcase composition;

fat composition, mutton flavour and palatability (in association with the Fats Research Laboratory, D.S.I.R.);

thyroid, adrenal and pancreas inter-relationships;

chemical composition of pastures.

Control and eradication of brucella ovis infection and other infections causing orchitis in rams (in association with the Department of Agriculture).

Control of bovine brucellosis and bovine mastitis.

The effect of mastitis on the non-fatty solids of milk. Testing of the Christchurch milk supply for the presence of antibiotics.

Investigation of mineral deficiencies in sheep, cattle and pigs.

Thyroid function in the wether, pregnant ewe, lactating ewe, pregnant cow and lactating cow.

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