REPORT OF THE PRESIDENT

OF THE UNIVERSITY OF BRITISH COLUMBIA

FOR THE ACADEMIC YEAR ENDED

AUGUST 31st, 1941.

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REPORT OF THE PRESIDENT

I GENERAL:

To the Board of Governors and
the Senate of
The University of British Columbia.

Gentlemen

I have the honour to submit the following report on the work of the University for the academic year ended August 31st, 1941:

Teaching Staff

The numbers of members on the teaching staff for the academic year 1940-41, were as follows:

Deans of Faculties	3
Professors	37
Associate Professors	24
Assistant Professors	29
Lecturers	7
Instructors	14
Honorary Lecturers	9
Part-time Lecturers	33
Assistants	80
	236

New Appointments:

Thomas Greenshields Henderson, M.A.(McGill), Ph.D.(Harvard), Associate Professor of Philosophy.
Louis A. MacKay, M.A.(Toronto), B.A.(Oxon.), Associate Professor of Classics.
Ian McTaggart Cowan, B.A.(Brit.Col.), Ph.D.(California), Assistant Professor in the Department of Zoology.
Stephen A. Jennings, M.A., Ph.D.(Toronto), Lecturer in the Department of Mathematics.
Joseph M. Keller, B.Sc.(Harvard), Lecturer in the Department of Physics.
Vernon C. Brink, M.S.A.(Brit.Col.), Ph.D.(Wisconsin), Instructor in the Department of Agronomy.
Miss Mary Elizabeth Henderson, R.N., B.A.Sc.(Brit.Col.), Cert.P.H.N.(School of Nursing, Toronto), Instructor in the Department of Nursing and Health.
John Duncan Leslie, B.A., M.A.Sc.(Brit.Col.), Instructor in the Department of Chemistry.

D. Gordon B. Mathias, M.A.(Brit.Col.), Instructor in the Department of Bacteriology and Preventive Medicine.
Daniel W. Thomson, B.A.Sc.(Brit.Col.), M.A.Sc.(Illinois), Instructor in the Department of Mechanical and Electrical Engineering.
William Kaye Lamb, M.A.(Brit.Col.), Ph.D.(London), Librarian
Miss Mary Winifred Johnston, B.A.(Brit.Col.), Secretary to the President.

Promotions:

John Allan Irving, M.A.(Toronto), M.A.(Cambridge), from Professor and Acting Head to Professor and Head of the Department of Philosophy and Psychology.
Charles Bruce Wood, B.A.(Toronto), A.M.(Columbia), from Assistant Registrar to Registrar.

Leaves of Absence:

Dr. A. M. Crooker, Assistant Professor in the Department of Physics, from April 1st, 1941, to August 31st, 1942.
Dr. Thomas G. Henderson, Associate Professor of Philosophy, for a period of one year as from July 1st, 1941.

Retirements under the Annuity Plan:

Lemuel Fergus Robertson

Through the retirement of Professor Robertson at the close of the academic year, the University of British Columbia lost from its teaching staff one of the pioneer members to whom it had long been deeply indebted. Prior to his appointment to the professorial staff of the University, Professor Robertson had been associated with Vancouver College which later became McGill University College of Vancouver. During the many years of his connection with the University, Professor Robertson served the institution most acceptably in many capacities — as Professor and Head of the Department of Classics, as a member of the Senate, as Director of the Summer Session, and as a member of many of the more important committees. The Board of Governors, the Senate, and the Faculty of Arts and Science spread upon their minutes their appreciation of Professor Robertson's more than forty years of devoted service to the cause of education in the Province of British Columbia, and expressed the hope that he would long be spared to continue his interest in the work of the University.

Stanley Wade Mathews.

For twenty-two years the scholastic records of all students in the University of British Columbia, as well as the minutes of the deliberations of the Senate and of the Faculties, were the special responsibility of the Registrar of the University, Mr. Stanley W. Mathews, who reached the age of retirement on March 31st, 1941. Eminently qualified for this important position by reason of his natural gifts and his wide experience in the High Schools in this Province, Mr. Mathews brought to the Registrarship a knowledge of educational practice and procedure which was of the greatest assistance to his colleagues during the formative years of the University's existence. The accuracy of his official records and his unfailing courtesy soon became proverbial. These qualifications and accomplishments, in conjunction with his sterling personal qualities which were often all but obscured by a self-effacing modesty, constitute a record of achievement which leaves little to be desired — a record in which his many associates will ever take a deep personal pride.

Resignations:

Miss Mary L. Bollert, M.A.(Toronto), A.M.(Columbia), Dean of Women.
Miss Mabel F. Gray, R.N., Cert.P.H.N.(Simmons College), Assistant Professor of Nursing.
Miss Elizabeth B. Abernethy, B.A.(Brit.Col.), Secretary to the President.

Miss Mary Louise Bollert.

In the summer of 1941 Miss Mary L. Bollert, who for nearly twenty years had been the capable Dean of Women, tendered her resignation to take effect at the end of the academic year. During her long tenure of office, Dean Bollert endeared herself to many hundreds of young women who had come to know her personally as a woman of wide cultural interests, keen insight, and sympathetic understanding. While fully alive to the needs of all classes of women students, Dean Bollert was particularly interested in those young women of ability who, because of lack of funds or for any other untoward reason, were unable to avail themselves of the intellectual and social opportunities available to those women students who were more fortunately circumstanced. The results of her early efforts on behalf of these women were so gratifying that they quickly stimulated the generosity of many individuals and organizations who later made annual contributions to this project. This may be regarded as perhaps the most far-reaching of the many forward-looking policies which Miss Bollert initiated during her long period of service as first Dean of Women in the University of British Columbia.

Re-appointment Following Attainment of Retirement Age:

Mr. Stanley W. Mathews was re-appointed Registrar from the date of his retirement on March 31st, 1941, to July 31st, 1941.

Re-appointments to the Board of Governors:

Mr. Percy R. Bengough and Mr. George T. Cunningham were re-appointed by the Lieutenant-Governor-in-Council as members of the Board of Governors for a period of six years as from August 27th, 1941.

Appointment to the Board of Governors:

In July, 1941, Mr. Edward Harris Barton was appointed as a member of the Board of Governors to complete the term for which Mr. S. H. Shannon had been appointed, namely, until August 27th, 1943.

Election of Representatives of Senate on the Board of Governors:

On August 29th, 1941, Mr. Arthur E. Lord and Mr. Harry T. Logan were elected as representatives of the Senate on the Board of Governors to succeed the two representatives whose terms of office would expire on September 13th, 1941.

II THE YEAR WITHIN THE UNIVERSITY:

Registration and Accommodation:

Contrary to expectations, the registration for the second year of the war showed a marked increase over that of any previous session. Accommodation, on the other hand, remained stationary and hence was even more inadequate than ever before. The enrollment is now rapidly approaching twice the number for which the present buildings were erected.

Regulations Governing Limitation of Attendance Waived:

For the session 1941-42, the regulations governing limitation of attendance, as passed by the Board of Governors on January 28th, 1938, were again waived.

Administration of the Brock Memorial Building

For effective administration, the Board of Governors decided to exercise the same measure of control over the administration of the Brock Memorial Building as it exercises over buildings on the campus devoted to academic uses.

Committee of Senate to Take Charge of the Acknowledgment of War Decorations and Distinctions:

A Senate committee, composed of representatives of the governing bodies of the University and of the student body, was appointed to take charge of the acknowledgment of decorations and distinctions which University students and graduates had received and might receive during the war.

Superannuation Plan for Members of the University Endowment Lands Fire Department:

By an Act cited as the "University Endowment Lands Administration and Fire Department Superannuation Act", provision was made for the superannuation of all members of the University Endowment Lands Fire Department effective as from January 1st, 1941. In conformity with this legislation, the Board of Governors made this scheme operative for those members of the Fire Department whose salaries are paid by the University.

Statement Respecting the Acknowledgment of Gifts and Grants:

Under the heading of "Endowments and Donations", reference is made in the Calendar to the principal gifts received by the various departments in the University during the year. All gifts to departments are acknowledged by the Head of the Department receiving the donation. Medals, Scholarships, Prizes, Bursaries and Loan Funds made available by private individuals, or by organizations, are announced in the Calendar. In the case of the more important gifts and grants, a letter of thanks is sent to the donor by the Honorary Secretary of the Board of Governors or by the President.

As a result of financial assistance given by individuals, corporations, or by the Dominion or Provincial Government, researches were conducted in each of the Faculties. In the reports of the Deans, specific reference is made to these gifts and grants and to the results of the investigations obtained to date.

Because of the increasing number of gifts received by the University each year, it may be necessary in the near future to issue, annually, a separate publication containing a list of these, together with the names of the donors.

Dominion-Provincial Youth Training Plan Bursaries:

When these Bursaries were established in 1939, it was the intention of the co-operating governments that the grants for this purpose would be available for a period of three years and that an increased amount would be placed at the disposal of the University for each succeeding year in order to continue assistance to students already helped and to make possible the attendance of new students. Owing to conditions arising from the war, the regulations were changed in the spring of 1940 so as to give preference to those students who had received assistance the previous year, provided their academic standing was satisfactory and their need for financial assistance was evident. Other students, more particularly those in the upper years in science courses, pure or applied, were also eligible.

Previous recipients who were recommended for assistance received sums ranging from $75.00 to $185.00. Of these, six had an academic standing of eighty per cent. or better, and sixteen had over seventy per cent. Eleven new applicants were recommended for sums ranging from $75.00 to $150.00. In each of the Faculties there were students in the upper years who received assistance from this fund. With one exception, all had a mark of seventy per cent. or better.

These bursaries have enabled a considerable number of students with insufficient means, but with good scholastic standing, to continue their studies. The amount disbursed by the University for this purpose during the year was $4,500.00.

Research Projects Financed by the University or made Possible through Assistance from Outside Sources:

During recent years the basis for the prosecution of research and investigational work has been considerably broadened. Certain of the researches now being conducted are financed wholly by the University, while the expense incurred in the carrying out of others is provided by individuals, companies, or governments. All three faculties devote a considerable part of their time to this fundamental division of University work.

The mere listing of the titles of the projects which are financed wholly by the University, as they appear on page 7 of this report, suggests something of the nature and range of the work being undertaken. When to the list are added those investigations which are made possible by financial assistance obtained from private, corporate or government sources, some idea can be had of the number and variety of the projects which are being conducted by the regular staff, every member of which carries, in addition, a full teaching or administrative load.

The results of a number of these investigations, many of which have extended over a period of years, appear in this report. Those in Arts and Science will be found on pages 22-30 those in Applied Science on pages 33-35 and those in Agriculture on pages 37 -59.

Researches for which Specific Grants were not made by the University or by Outside Organizations:

On pages 83-90 of this report is recorded a list of the publications which have been written by members of the professorial staff during the past year. As the statement indicates, these publications have appeared in book form, in literary or scientific journals, or in the transactions of learned societies. Many of these publications, which have done so much to enhance the reputation of the University, were not "assisted researches" but were the direct result of independent effort on the part of the authors.

Projects Under the Special Grant for Research:

At a meeting of the President and the Deans the following research projects were unanimously agreed upon for the fiscal year 1941-42. As in previous years, the grants for these investigations were not made, as a rule, to individual Departments nor yet to single Faculties, but were voted for projects which, in a number of instances, involved work in two or more Faculties:

Undulant Fever; Control of Fish Furunculosis; Genetics of Economic Plants; Effect of Hormones and of Radiant Energy on Growth; Lignin Investigation; Magnesium Carbonate; Superactive Charcoal; Surface Reactions of Minerals in Flotation; Preservation of Fishing Nets; Use of Coal Gas for Reducing Native Minerals; Anhydrous Bromides; Organo-Metallic Compounds; Gold Research; Petrographic Investigations; Wall-rock Investigation; Spectroscopic Analysis; Application of Raman Effect to Problems of the Oil Industry; Electron Diffraction of Minerals; Parasites and Diseases of the Columbian Blacktailed Deer; Foods and Feeding of Trout in Hatcheries; Relation of Pituitary Gland to Growth and Early Maturity of Trout; Natural Foods of Trout; Selective Flotation of Nonsulphide Minerals; Causes of Raspberry Failure; B.C.Fish Oils; Activators for Enzymes; Fowl Paralysis; Surface Taint in Butter; An Economic Study of Standards of Living on Some Subsistence Farms; Calfhood Vaccination for Bang's Disease; Problems Associated with Meat Quality.

Plans for a New Traffic Artery Resulting from the Diversion of the Marine Drive:

In placing the Point Grey battery on the University Campus, the Department of National Defence closed that part of Marine Drive adjacent to this fortified area. The Department then obtained permission from the Board of Governors of the University to divert traffic from the closed portion of Marine Drive to the Main Mall on the campus, on the understanding that the Department would keep this road in a good state of repair so long as it was subjected to heavy traffic as the result of a part of Marine Drive being closed.

Later, the Department of National Defence obtained permission from the Board of Governors to construct a new road through the University grounds to take care of the traffic formerly carried by the closed portion of Marine Drive. For this purpose the Board granted a right-of-way one hundred feet in width to permit of the construction of a dual paved roadway with a boulevarded strip which would be seeded and planted in conformity with the plans for the other main traffic arteries on the campus. This right-of-way was made available without cost to the Dominion Government.

The construction of this roadway was the joint responsibility of the Department of National Defence and of the Provincial Government. When plans for the road were submitted by the Provincial Department of Public Works, they showed that provision had not been made for a boulevarded roadway in keeping with the other main traffic arteries on the campus as the Board of Governors had indicated, but only for a single road twenty feet in width.

The Board were not in favour of this proposal. Such a road, they believed, would constitute a bottle-neck in traffic since it would have to carry two streams of traffic, that of Marine Drive and also that of Chancellor Boulevard which has two roadways and is one hundred feet in width. Further, they were of opinion that a road such as the one contemplated would not, by reason of its location, divert the main stream of public traffic from the Central Mall. So strongly did the Board of Governors feel that nothing less than a finished boulevarded roadway should be constructed at this time, that they repeatedly refused to approve of the plans submitted for a single road.

In granting the request of the Government for the right-of-way through University property, the Board of Governors sacrificed landscaping and building plans which had been worked out in considerable detail by the best obtainable authorities. The projected road, they maintained, would destroy the unity of the original plan, not only at the main entrance, but also across the entire front of the University grounds. The Board, therefore, were rightly insistent that this loss should not be further emphasized by the construction of anything less than they had in mind when negotiations were opened, namely, a double roadway with a properly seeded and planted boulevard.

When the guarantee sought by the Board of Governors for present or future construction of the desired roadway could not be obtained, the Board consented to the construction of a twenty-foot road; the hundred-foot right-of-way was cleared to a width of eighty feet; and the grading of the twenty-foot road was begun.

Meanwhile the Department of National Defence will continue to maintain the Main Mall and the Farm Road until such time as the projected road in the rear of the Point Grey battery is completed.

III THE UNIVERSITY IN WARTIME:

Attitude of the Government Towards Undergraduates Continuing their Courses:

The early and forthright pronouncement of government policy with respect to the desirability of university students continuing their studies was generally approved and appreciated. Since the country's need for technical men was so great, the Government did not hesitate to advise students in science, whether pure or applied, to continue their university courses rather than enlist for active service before graduating.

This decision greatly simplified matters in that it enabled university administrators to give authoritative information with respect to the official attitude on the question of students enlisting in the armed forces. With the definite lead given by the Government, it remained with the students, individually, to decide the course they should take as indicated by their conception of duty.

Changes in Curriculum and Organization of Non-Academic Courses:

A number of the courses listed in the Calendar were modified to meet the new conditions created by the war, and new credit courses were authorized by the Senate. These changes and additions are set out in the 1941-42 Calendar.

Many new courses were offered for which University credits were not given. As these courses do not count towards a degree, they do not appear in the Calendar. Among the new non-credit courses authorized were:

Courses in First Aid leading to the St.John's Ambulance Certificate, for men and women.

A course for women in Home Nursing leading to the Canadian Red Cross Certificate.

A course in Motor Mechanics for women students given by the Ford Motor Company at its plant.

A course for instrument-makers given in the Physics Work Shop under the auspices of the Dominion-Provincial Youth Training Plan.

A course for Radio Technicians in the Royal Canadian Air Force.

An eight weeks' course in Fire Protection in Relation to Air Raids, given to a group of members of the Fire and Police Departments of Vancouver and vicinity.

A special course for experienced cheese-makers under the Faculty of Agriculture.

A wide range of courses under the Department of University Extension. (For particulars see pages 68-71 of this report)

Credit Allowed Undergraduate Students who Enlisted before Completing their Year:

A limited amount of credit was allowed to a few undergraduate students who enlisted before completing their year's work. In the interests of the students themselves, however, fewer concessions are being made in this war than were granted in the war of 1914-1918. As to the wisdom of the present policy, none submit more convincing evidence than those veterans of the last war who suffered as a result of such mistaken kindness.

War Researches Conducted on the Campus:

A number of Departments undertook highly specialized war work of a confidential nature, the details of which cannot be divulged. Investigations were conducted with explosives, munitions, gases, war minerals and metals, also in electrical and short-wave detection devices and in radio. The Faculty of Agriculture, as a part of its task, co-operated in the war effort with the Dominion and Provincial Departments of Agriculture.

Radio Technicians' Course:

In co-operation with the Department of National Defence, the University undertook the training of 150 Radio Technicians for a three-month period. An allowance of

not more than $150.00 per man was provided by the Department of National Defence to defray the cost of instruction and equipment for the course. Later, this allowance was increased to $200.00.

At the conclusion of the three months' period, a class of 75 was organized for a course of sixteen weeks' duration. To meet the cost of these classes the Government agreed to provide $200.00 per student for the sixteen-week period, this grant to cover the cost of tuition, equipment, supplies and necessary alterations to buildings. It was from this source that funds were obtained for the modest addition made to the Science Building.

Compulsory Military Training:

Just preceding the period covered by this report, the Senate approved of the principle of compulsory Military Training for all physically-fit male students for the duration of the war, and, shortly afterwards, the following resolution was passed by the Board of Governors:

> Whereas the Board of Governors of the University of British Columbia is in agreement with the resolution of Senate requiring Military Training of all physically-fit male students in the University, the Board goes on record as being prepared to co-operate with the Department of National Defence to give effect to such policy.

The report of the Officer Commanding, U.B.C.Contingent, C.O.T.C., which appears on pages 79-82 of this report, shows in detail how this aim is being realized.

Intercollegiate Athletics:

By resolution of the University Council on Athletics and Physical Education, all intercollegiate athletics were discontinued for the session. It was also agreed that no University teams should be entered in extra-mural league games which would interfere with Military Training.

Air Raid Precautions:

Following the submission of a detailed report by the Superintendent of Buildings and Grounds on the air raid shelter accommodation on the campus, the Air Raid Precautions officials assured the Board of Governors that every precaution had been taken to provide adequate protection for life and property should an air raid or gas attack occur on University grounds.

Plans for the Construction of an Armoury:

Through the initiative of the members of the Canadian Officers' Training Corps in waiving their training pay allowance, annually, since 1928, the sum of approximately $48,000.00 was made available for the erection and equipment of an Armoury. After the plans for the building had been approved, the Provincial Government voted the sum of $7,500.00 to defray the cost of installing the services. Construction was begun early in the summer.

The forward-looking policy of the C.O.T.C. in making this Armoury possible is deeply appreciated by the Board of Governors.

The Function of the University in Wartime:

During the past two years the University of British Columbia has attempted on the one hand to carry on its normal teaching and research, while on the other hand it has been called upon to render an increasing amount of assistance to industry, to research under the National Research Council, and to government services both civil and military. This has made it increasingly difficult to balance the instructional needs of the students and the intra-mural duties of the professorial staff against the extra-mural demands for the time of both.

The prime functions of the University in normal times are teaching and research. But times such as the present demand a pronounced change in emphasis. The University's first duty now is to satisfy the country's need of professionally-trained men; its second, to continue its ordinary teaching as best it can.

These adjustments the University proceeded to make as expeditiously as possible following the declaration of war. Many courses were modified as the requirements of the hour necessitated, and new ones, designed to meet the changed situation, were organized. Research in relation to war problems was greatly expanded; compulsory Military Training for all physically-fit male students was adopted; and the Dominion Government was assured of the University's desire to co-operate whole-heartedly in all matters affecting the nation's war effort.

In the University's endeavour to discharge the two fundamental responsibilities indicated, experience has shown that there are some things the University should not do. The practice which became common among Universities during the first world war of encouraging all young men to enlist, irrespective of their aptitudes and educational attainments, has long since been recognized as a grievous mistake — a short-sighted policy which should not be repeated.

Conclusion:

The war has called many members of the faculty away from the campus. All the University can do under the circumstances is to find substitutes wherever possible, and, where this cannot be done, to place extra burdens on the remaining members of the faculty in order that the quality of instruction may not suffer too seriously. Those who remain have volunteered, as far as in them lies, to close up the ranks and do the best they can to maintain academic standards while giving every possible assistance to other forms of war effort.

From the day of the declaration of war, the University has been prepared to put at the disposal of the Government all possible assistance by way of laboratories, equipment and trained personnel, in so far as such action is consistent with the maintenance of reasonably efficient instructional standards. To do less would be unthinkable.

Respectfully submitted,

LEONARD S. KLINCK,
President.

Vancouver, British Columbia,
May 30th, 1942.

REPORT OF THE REGISTRAR

Registration

Faculty of Arts and Science	Women	Men	Total	
First Year	207	340	547	
Second Year	207	282	489	
Third Year	115	165	280	
Fourth Year	116	159	275	
Graduates	24	105	129	
Social Work	22	4	26	
Teacher Training Course	46	25	71	
*Directed Reading Courses	21	109	130	
*Extra-Sessional Class	9	13	22	
*Double Registrations	-6	-16	-22	
Faculty of Applied Science				
Second Year	1	166	167	
Third Year	-	101	101	
Fourth Year	-	102	102	
Fifth Year	-	82	82	
Graduates	-	14	14	
Faculty of Applied Science(Nursing)				
Second Year	10	-	10	
Third Year	13	-	13	
Fourth Year	18	-	18	
Fifth Year	11	-	11	
Sixth Year	8	-	8	
Public Health Nursing	12	-	12	
Faculty of Agriculture				
First Year	4	49	53	
Second Year	4	41	45	
Third Year	5	21	26	
Fourth Year	3	19	22	
Graduates	3	17	20	
Occupational Course	-	7	7	173
TOTAL				2658
Evening Class in Botany	12	23	35	
Summer Session (1941) (Faculty of Arts and Science)	146	311	457	

Nationalities of Students (exclusive of those taking the Teacher Training Course, Social Work, Extra-Sessional Class, Directed Reading Courses and Public Health Nursing Course):

British 1994; American 85; Japanese 63; Icelandic 54; Chinese 34; Swedish 20; Hebrew 17; Norwegian 14; Italian 9; Russian 7; Greek 6; Ukranian 6; others 88. TOTAL 2397

Geographical Distribution of Students:

From Vancouver and vicinity	1585
From Victoria	121
From New Westminster	132
From other Provincial points	702
From other Provinces	100
From other Countries	18
TOTAL	2658

Occupations of Parents (exclusive of those taking the Teacher Training Course, Social Work, Extra-Sessional Class, Directed Reading Courses and Public Health Nursing Course):

Accountant 54; Army 21; B.C.E.Ry.Employee 20; Bank Manager 17; Barrister 55; Broker 22; Carpenter 32; Civil Servant 28; Clergyman 40; Clerk 24; Contractor 30; Dentist 22; Doctor 66; Druggist 14; Engineer 132; Farmer 82; Grocer 16; Insurance 24; Lumberman 30; Machinist 23; Manager 46; Manufacturer 25; Merchant 73; Miner 12; Professor 20; R.R.Employee 54; Real Estate 15; Salesman 67; Storekeeper 12; Superintendent 16; Teacher 50.

Location of Graduates:

Number in,-

Vancouver	2839
Other parts of British Columbia	1549
Other parts of Canada	386
British Isles	43
Other parts of British Empire	20
United States of America	233
Other countries	54
Number deceased	108
Number whose address is unknown	508
TOTAL	5740

Comparative Statement of Attendance
Sessions 1931-32 to 1940-41

Session	Arts and Science	Applied Science	Nursing	Agriculture	Teacher Training Course	Total Winter Session	Summer Session	Short Courses	Grand Total
1931-32	1477	284	44	75	109	1989	441	342	2772
1932-33	1269	288	47	71	64	1739	404	181	2324
1933-34	1147	287	48	63	61	1606	370	124	2100
1934-35	1238	320	57	71	66	1652	377	165	2294
1935-36	1337	336	68	80	62	1883	464	278	2625
1936-37	1499	366	47	95	42	2049	566	306	2921
1937-38	1590	416	50	100	67	2223	650	279	3152
1938-39	1634	419	59	117	57	2286	659	290	3235
1939-40	1664	434	65	139	69	2371	715	253	3339
1940-41	1724	466	60	166	71	2487	587	206	3280

Comparative Statement of Degrees Conferred
Sessions 1931-32 to 1940-41

Year	M.A.	B.A.	B.Com.	M.Sc.or M.A.Sc.	B.Sc.or B.A.Sc.	B.A.Sc. Nursing	M.S.A.	B.S.A.	Total	Grand Total
1931	20	211	14	2	39	7	2	13	308	2500
	4	31	1	-	5	-	-	-	41	2541
1932	17	201	15	2	37	4	9	6	291	2832
	6	36	1	-	6	-	-	-	49	2881
1933	19	215	22	8	44	7	4	12	331	3212
	4	46	5	3	5	-	-	1	64	3276
1934	11	204	31	3	37	5	4	12	307	3583
	6	36	5	1	5	-	1	3	57	3640
1935	14	196	23	8	57	13	2	19	332	3972
	12	45	5	-	5	-	-	1	68	4040
1936	15	175	21	6	50	7	5	16	295	4335
	10	38	1	2	3	-	3	2	59	4394
1937	21	190	28	4	48	2	7	14	314	4708
	9	54	8	-	6	1	1	1	80	4788
1938	20	204	31	6	56	7	3	19	346	5134
	10	53	3	2	4	-	-	5	77	5211
1939	19	217	22	7	71	8	4	22	370	5581
	5	63	6	-	9	-	1	2	86	5667
1940	30	212	37	4	71	13	3	18	388	6055
	6	62	1	-	1 B.S.F.	-	1	3	74	6129
1941	21	189	26	7	81 1	8	2	19	354	6483

Comparative Statement of Diplomas Issued
Sessions 1931-32 to 1940-41

Year	Teacher Training	Public Health Nursing	Social Service	Occupational Course in Agriculture	Totals
1931	58	11	-	3	72
1932	85	8	2	7	102
	12	1	11	-	24
1933	58	13	4	-	75
	-	1	5	-	6
1934	61	10	-	-	71
	3	-	3	-	6
1935	65	15	3	3	86
	1	-	7	-	8
1936	60	15	-	-	75
	-	-	12	-	12
1937	39	16	-	4	59
	1	5	19	-	25
1938	65	18	1	3	87
	-	2	15	-	17
1939	54	14	2	4	74
	1	1	24	-	26
1940	66	12	3	5	86
	2	-	23	-	25
1941	68	9	Social Work 1	2	80

Scholarships, Fellowships and Bursaries Awarded to Graduates

During the year many scholarships, fellowships and bursaries have been won by graduates of the University. The following list does not include awards which have been made in The University of British Columbia.

Name	Award	Value	Subject	Where Tenable
Ashford, Walter R.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill
Bailey, Albert E.	Teaching Fellowship	-	Education	University of Washington
Baker, Donald C. B.	Studentship	-	French	University of Chicago
Brewer, Charles P.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill
Brown, James B.	*Rhodes Scholarship (3 years)	per yr. £400		Oxford University
Davenport, Charles F.	Teaching Fellowship	$1,500	Chemical Eng.	Massachusetts Institute of Technology
Davis, Jack	National Research Council Studentship	$650	Chemistry	McGill University
Downes, Gwladys	Scholarship	-	French	University of Toronto
Eastham, Arthur M.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill
Fisher, Herbert E.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill
Fitch, Fred T.	Teaching Fellowship	$400	Chemistry	Purdue University
Godson, Warren L.	Teaching Fellowship	$750	Chemistry	University of Toronto
Grant, W. Leonard	Reuben Wells Leonard Fellowship	$500	Classics	University of Toronto
Herd, Harold H.	Teaching Fellowship	$650	Chemistry	California Institute of Technology
Hipkin, George	Rockefeller Institute Travelling Fellowship	$1,800	Chemistry	University of Michigan
Lynott, William J.	Instructorship	$625	Geology	Princeton University
Mead, Bruce R.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill

(*suspended for duration)
(rate of exchange:4.50)

Name	Award	Value	Subject	Where Tenable
Moyls, Benjamin N.	Fellowship	$800	Mathematics	Harvard University
McCarter, J. Alexander	Teaching Fellowship	$1,200	Biochemistry	University of Toronto
Patterson, Ralph F.	National Research Council Fellowship	$750	Chemistry	Cellulose Research Laboratories, McGill
Pepper, James M.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill
Robinson, H. Basil	Research Fellowship in Arts	$300	French and German	Queen's University
Rothstein, Samuel	Tuitional Scholarship	-	French	University of California, Berkeley
Sibley, William M.	Teaching Fellowship	$1,200	Philosophy	Brown University
Stuart, Frank A.	Teaching Fellowship	$400	Chemistry	Ohio State University
Weeks, Harold L.	Scholarship	$500	Education	Harvard University
Welch, Maurice F.	National Research Council Fellowship	$750	Biology and Botany	University of Toronto
West, Kenneth A.	National Research Council Studentship	$650	Chemistry	Cellulose Research Laboratories, McGill

NOTE: In many cases these scholarships and fellowships carry with them free tuition or exemption from fees (or travelling expenses) in addition to their monetary value.

Value of scholarships, fellowships, and bursaries won by our graduates in other Universities and in Institutes in 1941.....$ 19,525.00

Total value of scholarships, fellowships and bursaries won by our graduates in other Universities and in Institutes since the first awards were made in 1917.....$696,294.00

Respectfully submitted,

CHARLES B. WOOD,
Registrar.

REPORT OF THE DEAN OF THE FACULTY OF ARTS AND SCIENCE

Military Training and Academic Credits.

With the inauguration of compulsory Military Training for all physically-fit male students, a change was made in the policy adopted in 1939-40 in respect of academic credits granted on the basis of the C.O.T.C. examinations. In the year 1939-40, students taking the C.O.T.C. were allowed to drop one subject of three units, which they would normally be taking, provided that subject was not a prerequisite for their subsequent work. No credit, however, was granted unless and until the student passed the C.O.T.C. examinations. As a matter of fact comparatively few students sought academic credit for their C.O.T.C. work, and still fewer were granted any. When Military Training became compulsory in 1940-41 no academic credits were allowed. While this training did demand a considerable amount of a student's time and energy, a deterioration in his academic achievement was not marked if, indeed, any occurred.

During the session, many of the students, particularly in the upper years, joined the various branches of His Majesty's Forces. In a few cases certain of these students were "called up" just before the spring examinations and they were granted standing in the work of the year, provided their work during the session had been satisfactory. During the summer of 1941 when it was learned that certain students, about half a dozen in number, were "called up" before they could write their supplementals, it was decided to grant such students their degrees provided they had completed all the work but three units.

Retiring Professors.

The year marked the termination of the active association with the University of two men who had been connected with the institution for a very long time. No better statements of the appreciation of their services can be made than those recorded in the following minutes of the Faculty of Arts and Science under date of May 12th, 1941:

Professor Lemuel F. Robertson.

"More than forty of Professor Robertson's years have been devoted to teaching in this province, and he has long been a legend as well as a personal force in its history. He planned the foundations upon which a University structure could rise, as it did, almost overnight. Through all the adjustments and changes that followed, he has brought to Faculty councils the ripened wisdom of an elder statesman. But his fellows will continue to regard him even more gratefully for his friendliness, his wit, his inexhaustible store of illustration; and college

students of nine quadriennia gladly recall a persuasive and provocative instruction of his own unique devising. A title might well be given to him from a tradition that he reveres - Professor Emeritus of the Humanities."

Mr. Stanley W. Mathews.

"In 1919, after seventeen years of able service in the provincial schools, Mr. Mathews took over the office of Registrar equipped with full knowledge of his immediate duties and of University history. The Faculty of Arts and Science has abundant cause to thank him for the accurate completeness of his records and, what is even more memorable, the unfailing patience and courtesy with which he made them accessible. But it is not enough merely to say that he has been a faithful recorder, for he is seized of warm pride in the University's growth and in being a preserver of landmarks which the founders have set."

Extra-Sessional Class and Directed Reading Courses.

Below are listed the Extra-Sessional Class and the Directed Reading Courses together with their instructors and the registration.

Class	Instructor	Registration
Extra-Sessional Class		
History 12	Professor F.H.Soward	22
Directed Reading Courses		
Education 10	Dr. F. T. Tyler	70
Geography 3	Dr. G. Davis	52

We are pleased to report the continuance of the high standard attained in these classes.

Professors Visiting other Universities.

During the summer of 1941 the following members of the staff were Visiting Professors at the institutions named:

Professor	University
Dean D. Buchanan	University of California,Los Angeles, California.
Professor J.A.Irving	University of Washington, Seattle,Wash.
Dr. W. L. MacDonald	University of Texas, Houston, Texas.
Dr. D. H. Russell	Teachers' College, Columbia University, New York, N.Y.
Dr. C. W. Topping	Queen's University, Kingston, Ont.
Dr. F. T. Tyler	University of Manitoba, Winnipeg,Man.

Professors engaged in Outside Activities.

At the request of the Research Enterprises Limited of Toronto, Dr. A. M. Crooker of the Department of Physics was granted leave of absence from April 1st, 1941, to August 31st, 1942, to undertake computations in connection with the design of service optical instruments.

In June, 1941, the services of Professor H. F. Angus were sought by the Dominion Government. He was, therefore, granted a year's leave to undertake work in the Department of External Affairs as Special Assistant to the Under Secretary of State. Professor Angus entered upon his new duties early in July.

The National Research Council of Canada made use of the services of Dr. H. D. Smith and Dr. K. C. Mann. At the time of writing (October, 1941) the Council has requested Dr. Mann's services for a longer period and arrangements are being made for his release.

Dr. J. E. Morsh and Dr. F. T. Tyler were appointed by the Department of National Defence, on the recommendation of the Executive of the Canadian Psychological Association, to be in charge of Military Testing for British Columbia. They spent a considerable amount of time in April and May, 1941, administering a psychological test to the armed forces, the nature and the results of which are at present military secrets.

During the year a series of lectures was given to a selected group of thirty firemen taking special Air Raid Precautions training. The subjects covered were: Elementary Principles of Chemistry, Chemistry of Explosives and Poisonous Bombs, Mechanics, Heat, Electricity, Meteorology, X-ray and Ballistics. The courses were given chiefly by certain members of the Departments of Chemistry and Physics.

Those who were selected to take the course were later required to pass on to the members of their various units the information which had been obtained for use in A. R. P. work.

Mr. C. B. Wood had general supervision over the course and in addition conducted group discussions on the question of organization and presentation of material.

Special Researches.

Following the custom of the previous years, the Board of Governors made available for the three Faculties an item of $10,000.00 for Special Researches having a bearing upon the development of the industries of the Province. The selection of the researches to be undertaken from the list submitted by the various science professors and the allotment of the funds were made by a committee consisting

of the President and the three Deans of the Faculties. The titles of the researches under the supervision of the Dean of the Faculty of Arts and Science, the names of the professors undertaking the research, and a brief summary of the report on each research, are as follows:

Undulant Fever. Dr. C. E. Dolman

Work was carried out by Mr. D. G. B. Mathias under Dr. Dolman's direction. During the period of investigation a purely synthetic carbo-hydrate-free medium was developed on which occurred a satisfactory growth of Brucella abortus. After growing the organisms for many weeks on this medium, several filtrates were prepared and attempts were made to determine their brucellin content. While a satisfactory method for standardization of brucellin has not been elaborated, preliminary work seems to indicate that a precipitin test may be developed to permit a precise assay of the material's potency. Several samples of brucellin preparations were supplied to local doctors for use in the treatment of undulant fever patients and the results in many instances were encouraging. The research is being continued in the direction of attempting to standardize brucellin grown on the synthetic medium developed and to check the potency of the material thus determined against its clinical efficacy.

Factors in the Potency of Thymus Extracts. Dr. J. Allardyce.

"Thymus extracts prepared from calves 2 to 4 and 6 to 10 months old showed no difference in their average content of iodine-reducing material although considerable difference existed from animal to animal.

Calves 2 to 6 weeks old yielded extracts approximately 8 per cent. higher than the 2 to 10 months calves.

Fetal calves yielded extracts with the lowest value.

Iodine-reducing values of thymus extracts, considered by themselves, were no indication of the potency of such extracts as judged by their effect on rates of growth and development.

Thymus-injected rats maintained their weight-curves while controls showed lower curves with succeeding generations.

The state of health of the rat may be a factor in the degree of response to thymus-extract injections.

Histological examination of endocrine tissues of control and injected rats failed to show any difference in structure or manner of staining."

(From the summary of the paper by Dr. J. Allardyce, U. Dale, D. Smith and P. Griffin, Endocrinology, Vol. 27, No. 6, December, 1940, pp. 994-996.)

The Effects of Irradiation on Growth and Development.
Dr. J. Allardyce

Preliminary findings indicate that irradiation in different parts of the spectrum affect rate of growth and development, size and care of litters, and general activity of the experimental animals.

The Effects of Unbalancing a Diet with Excess of Carbohydrate, Fat or Protein. Dr. J. Allardyce.

Apparatus is nearly completed for determining basal metabolic rates of the experimental animals. Equicalorigenic diets containing all essential ingredients but definite excesses of certain carbohydrates, fats or proteins have been prepared and the feeding of the experimental animals will be continued.

Genetics of Economic Plants.

Seed Development in Medicago (Alfalfa) Hybrids.
Dr. A. H. Hutchinson

Dr. Hutchinson was assisted in this research by Miss Helen M. Farley. They investigated the seed production in Medicago (Alfalfa) hybrids. They found it related to many factors, primarily to the cytological disturbance due to hybridization and the establishment of balances resulting in new strains which may occupy different habitats.

Preservation of Fishing Nets. Dr. R. H. Clark.

In a search for an adequate preservative for gill-nets, many attempts were made to synthesize a plastic in the fibres of the twine. While this could be effected, the resulting strands lacked such requisite properties as sufficient flexibility and wearing qualities. After several years' investigation it was found that the strands could be greatly improved when treated with a solution of chlorinated pale crepe rubber, to which a definite concentration of a plasticiser, dibutylphthalate, and a bactericide were added.

Tests made by commercial fishermen on sections of net, treated according to the formula, have confirmed laboratory and sea-immersion experiments showing increased tensile strength of the treated fibres. Further experimental work is going on in co-operation with the Drummondville Cotton Company, Limited, Montreal, the largest manufacturers of netting in Canada. The formula found by Dr. Clark and his assistant, Mr. G.Cave-Brown-Cave, does not have the repellent effect upon the fish that past experience showed other preservatives to possess.

Solvent Extraction of B.C.Coal and Shale. Dr. W. F. Seyer.

Considerable preliminary work has been done in extracting with selected solvents a number of oil shales from different parts of Canada and of various geological ages in order to determine the

most effective solvents. It was found that, by using solvents of a fatty acid nature, much simpler types of extraction equipment could be used, and also that a considerably larger amount of hydrocarbon material could be extracted than had hitherto been possible.

Superactive Charcoal. Dr. M. J. Marshall

The object of this investigation was to obtain superactive charcoal by chlorination and to establish the nature of the adsorption bonds holding chlorine to the carbon surface. From the experiments conducted it was possible to estimate how much chlorine was physically adsorbed by the charcoal and how much chemisorbed. The results indicated that, while the chemical bonds holding the chlorine are not all of the same magnitude, a large part of the chemisorbed chlorine is held with considerable tenacity. These results are being used in an effort to produce carbon tetrachloride by direct combination.

Studies were made on the retentivity of various activated charcoals to determine their efficiency to remove war gases in a gas mask.

Investigations were also carried out to obtain information regarding the mode of combustion of carbon, a very controversial matter at the present time.

Surface Reaction of Minerals. Dr. W. Ure.

Study of the flotation of sphalerite was continued. Pretreatment of ore with the collector, potassium ethyl xanthate, produced high recoveries of the order of those obtained by using the collector in the flotation cell. The investigations seem to indicate that the chief function of the collector is one of cleaning the surface by removal of oxidized material.

Researches on Rare Earths. Dr. J. A. Harris.

The following researches were undertaken:

An Improved Method for the Preparation of Rare Earth Bromates. A preliminary paper on this topic was presented to the Royal Society of Canada in May, 1941.

The Use of Coal Gas to Reduce Native Minerals Encouraging results were obtained.

The Preparation of Anhydrous Bromides.

The Preparation of Organo-Metallic Compounds.

The Detection of Beryllium and Aluminium.

These two metals are of the utmost importance in the war industries. Methods are being determined to separate beryllium from aluminium as the two substances usually occur together.

The Volumetric Determination of Cerium in Acid Solution.

The rare metal cerium has assumed considerable importance owing to its use in tracer bullets, incendiaries, and

incandescent gas mantles. Its determination has always been difficult, but a method developed here a year ago has been checked and found to be rapid and reliable.

The Quantitative Determination of Tin.

Exceedingly accurate methods, other than spectroscopic, have been found for the determination of tin when in the presence of other metals.

Refractive Indices in Minerals. Dr. C. O. Swanson.

Two problems were carried on. One was the petrography of the Kamloops batholith which is of interest in connection with the occurrence of magnetite deposits in that area. The other problem was the petrography of certain basic dikes in the Coast Range batholith.

Gold Research. Dr. H. V. Warren.

Investigations made on the tailings of several mines, notably Chelan, Britannia, Cariboo Gold Quartz, Bralorne and Island Mountain, indicate that considerable values in gold are being lost.

A study of the ores at Hedley showed the existence of valuable quantities of cobalt.

The fluorescent lamp has enabled the University to be of much assistance to those engaged in the search for scheelite. Several British Columbia companies have either made use of the University's lamp or have purchased one of their own. There are several enquiries from both Alberta and Ontario regarding the efficiency of this lamp in prospecting. Probably this is one of the best possible examples of how initiative on the part of the University has resulted in a new tool being brought before the mining industry.

Work on the minor elements carried on jointly with Dr. A. M. Crooker and Mr. F. A. Forward has already shown itself to be justified by the finding of tin, cadmium and bismuth in several mines.

Spectroscopic Analysis. Dr. A. M. Crooker.

Almost the entire amount voted for this investigation was used to purchase a fine Spekker Absorption Spectrophotometer. This has been used in co-operation with the Department of Mining and Metallurgy and the Department of Geology and Geography in the identification of trace elements, such as geranium, titanium, cadmium, etc., in ore samples from different localities in British Columbia.

Application of Raman Effect to Problems of the Oil Industry. Dr. H. D. Smith.

A new phase of work is the Raman analysis of samples of oil from the Peace River District. In many instances in the study of hydrocarbons, such as are encountered in the petroleum industry, the Raman spectrum resolves the components of the mixture when other methods of analysis give doubtful results or fail entirely.

Electron Refraction of Minerals. Dr. K. C. Mann

The construction of an electron diffraction camera has almost been completed. It will be used in the investigation of problems of lubrication by the study of the molecular structure of lubricants under various conditions. It will also be of considerable value in determining the crystal structure of very small crystallites sometimes found isolated in ore bodies whose detailed investigation by other means is exceedingly difficult. Another possible use is in the examination of particular forms of virus.

Other Researches.

In addition to the Special Researches listed above, other researches were carried on by various Departments. A brief summary of certain of these follow:

Department of Bacteriology and Preventive Medicine:

Dr. C. E. Dolman continued researches into the toxins of staphylococci under a special grant from the National Research Council.

Dr. D. C. B. Duff continued with the general problem of control of fish furunculosis. He also continued to act as Consulting Pathologist to the Fisheries Research Board of Canada. His experiments on the protection of game fish against infection with Bacterium salmonicida, through oral administration of vaccine, have yielded promising results. Mention of these results was made in the section on fish diseases in the Annual Report for 1940 of the Fisheries Research Board of Canada.

Dr. L. E. Ranta, in collaboration with Dr. Dolman, conducted investigations on the survival of typhoid bacilli in Cheddar cheese. It was shown that typhoid bacilli could survive in Cheddar cheese, under appropriate conditions, for periods of many months - far longer than the usual storage time between the manufacture and the consumption of the cheese.

Another problem which, like the foregoing, has a very significant bearing on war conditions, is one dealing with the survival rates, the antigenicity and factors determining the virulence of cholera bacillus. Dr. Dolman and Dr. Ranta, largely under the auspices of the Connaught Laboratories, have launched an extensive investigation into this problem.

Department of Biology and Botany:

For about fifteen years the Department has been developing a North American Arboretum as a part of the Botanical Gardens. Most of the native plants of British Columbia have been secured mainly by Associate Professor John Davidson. Additional species are collected each year. The Dendrology collection, assembled and raised mostly from seed, numbers well over one hundred species of trees and shrubs of Eastern Canada and the United States. For climatic reasons, British Columbia is the only Province in Canada where such a collection can be established. Through lack of funds it has not been possible to transplant the seedlings as they developed in the nursery. But seedlings do not wait for funds and they (the seedlings) have grown to such proportions that care and eventual transplanting are becoming increasingly difficult. As the cost is comparatively small, it is sincerely hoped that provision can soon be made for the transplanting of these seedlings from the nursery to their permanent positions. Such a collection would be a valuable educational feature on the University site.

In addition to his work in connection with the Arboretum, Mr. Davidson is arousing interest in the topic of British Columbia as a source of medicinal plants. At the request of the Minister of Agriculture, Victoria, Mr. Davidson was appointed to the Committee on Drug Plants. A bulletin prepared by this committee on "Propagation of the Cascara Tree" was circulated to all the schools of the Province for educational use in connection with Arbor Day exercises.

Other Researches in the Department are:

A Study of the Life Histories of certain Wood-destroying and Parasitic Fungi.

A Systematic Survey of the Genus Astragalus, including Fodder and Poisonous Species.

Department of Chemistry:

The investigations have been mainly on war problems suggested by the Advisory committee on War Research of the National Research Council. They included:

The Preparation of Four New Explosives

A New Peroxide for Incendiary Purposes

The Electrolytic Production of one of the Lightest Metals.

The Production of Synthetic Wool

The Superactivation of Charcoal for Use in Special Gas Masks.

Production of Epsom Salts.

A commercial deposit of magnesium sulphate (Epsom Salts) near Ashcroft has attracted attention for several years. A considerable deposit of doubtful purity was extracted during World War No. 1 when the prices were very high. Post-war attempts were made to develop the deposit but failed on account of the difficulty of freeing the magnesium sulphate from mud and from other salts.

Recently a laboratory process was worked out for purifying the magnesium sulphate as it occurred. A plant was constructed last summer and put into operation. Already a carload of the purified product has been shipped to the eastern market where it is utilized in the leather, textile and special chemical industries. It is anticipated that the output will soon be such as to make the whole of Canada independent of outside sources - much to the gratification of the Foreign Exchange Board of Canada.

Department of Geology and Geography:

Dr. M. Y. Williams was engaged throughout the summer as consultant for the Department of Mines, Victoria, on the Oil Development in the Peace River.

Dr. C. O. Swanson was Consulting Geologist for the Consolidated Mining and Smelting Company.

Dr. H. C. Gunning did consulting work in the Zeballos Camp.

Dr. H. V. Warren visited several of the British Columbia mines collecting minerals. The specimens which he collects each spring are of considerable monetary value. They are used for laboratory material and also for exchanges with other universities for material not readily available in this Province.

Department of Mathematics:

Investigations were carried on in the following fields:

Periodic Orbits.

Criteria for the Equivalence of Pairs of Quadratic Forms.

Algebraic Equations with Prescribed Galois Groups, and Related Topics.

Gyroscopic Precession.

Generalized Arithmetical Identities.

Group Rings over a Modular Field.

Department of Physics:

Theoretical Investigations on "Tensor Forces and Heavy Nuclei".

Determination of Vitamin A Content of British Columbia Fish Oils.

A Study of Cosmic Rays at Various Altitudes by the Direct Photographic Method.

An Investigation in the Spectra of Iodine.

On the Ultraviolet Spectrum of the Hydrogen-Denterium Molecule.

The Dependence of the Energy Distribution - Field Emission upon the Geometry of the Collecting Surface.

Characteristics of Geiger-Mueller Counters filled with Argon and Alcohol.

Department of Zoology.

Dr. W. A. Clemens was engaged in the study of sockeye salmon data collected by the Provincial Department in 1940 and a review of record data for the past twenty-five years.

Professor G. J. Spencer has under preparation a detailed report on the results of nine years' investigation of grasshoppers in the Kamloops area. In addition he continued his studies of the ectoparasites of birds and mammals, and insects affecting stored products. Considerable attention was given to four new household and garden insect pests which have appeared in the Vancouver area.

Dr. Ian McTaggart-Cowan carried out an extensive investigation of the life history of the Columbian Black-tailed Deer with special reference to its diseases and parasites and to its food habits in relation to the forests of British Columbia. Other studies included a research into the results of insular isolation upon the mammals of the coastal islands of British Columbia and an investigation of the food-habits of the barn owl.

A Distinguished Graduate.

While it is not possible to record all the noted achievements of our graduates, nevertheless I feel that reference should be made to the appointment of Mr. Norman Robertson as Under-Secretary of State for the Department of External Affairs to succeed the late Dr. O. D. Skelton.

Accommodation

As usual the report must be closed with a reference to accommodation. The large sections both for instruction and for laboratories present a problem which is exceedingly acute. But at this time, when the efforts of the remaining "free peoples" of the earth are concentrated upon the gigantic task of maintaining and restoring freedom, a crowded condition within a university seems to shrink into a very small problem indeed. Consequently the Faculty of Arts and Science, and of course the University as a whole, will carry on as best they can, urgent though the need may be. And in this connection the Dean wishes to record his appreciation of the loyal and whole-hearted way in which the members of the Faculty and Staff carried out their duties under circumstances far from ideal.

Respectfully submitted,

D. BUCHANAN,

Dean.

REPORT OF THE DEAN OF THE FACULTY OF APPLIED SCIENCE

The enrolment in the academic year 1940-41 was the largest in the history of the Faculty, the increase over that of the preceding year being approximately ten per cent. There is a corresponding increase in the demand for graduate engineers to fill important positions in both civil and military establishments. In general, it may be said that demand exceeds supply, so much so that the Wartime Bureau of Technical Personnel has issued appeals to the universities urging them to encourage properly qualified students to enter courses that have a definite bearing on the war effort, such as engineering, medicine and dentistry, and to proceed towards the obtaining of their degrees with the greatest possible expedition. The increased enrolment imposed additional burdens on the members of the teaching staff, many of whom were already giving direct voluntary service to the war departments as consultants or directors of important researches. There likewise has been increased congestion in the laboratory classes, notwithstanding the division of many classes into sections compatible with staff and timetable limitations. More than one department reports that substantial additions of space and equipment must be provided if the increasing needs of industry and war departments are to be supplied by the University. It is because of the contributions of these departments to the war effort that I venture to call attention to existing conditions.

Mention was made in my report last year of the increasing importance attached to the study of metallurgical problems. Some additional space for experimental work in this field was obtained by converting a former store room in the Mining Building into a metallographic laboratory which has already proved to be of definite value to our students and to the industries. We were able to arrange for the purchase of some essential equipment for this laboratory. Steady additions to this equipment and the expansion of other facilities will enhance the value of the laboratory to the students and to the community. It is noteworthy that many of our recent graduates are employed with companies directly engaged in the production of war materials, their work being mainly technical, associated with physical metallurgy and metallography.

Another department that requires additional space and equipment is that of Chemical Engineering. The enrolment in this department is larger than that of any other department in the Faculty, and there is a steady demand for Chemical Engineering graduates. Since 1925 the number of students has increased fourfold, yet no additional space has been provided and the congestion is acute. It is not necessary to stress the important services rendered by Chemical Engineering graduates in modern warfare.

Similar statements can be made in support of the need of additional laboratory and drafting room space for the departments of Civil, Electrical, Mechanical and Mining Engineering. It is not exaggerative to state that without some increase of space it will be impossible to train a single additional student in certain departments.

The Committee on Curriculum submitted a carefully considered report recommending a limited amount of specialization in the third year. The report was referred to a committee of Senate for further study. A few changes were made in the curriculum of the Department of Mechanical Engineering. Metallurgy 1 was substituted for Physical Treatment of Metals, and increased emphasis was placed on the subjects of Heating, Ventilation, Air Conditioning, and Refrigeration. Students in Fourth Year Mechanical Engineering and Metallurgical Engineering were given a laboratory course in Metallography. In the case of the Metallurgical Engineering students this course replaced Fourth Year Mapping. Advanced courses in Physical Metallurgy and Metallography were introduced for students in the Fifth Year in Metallurgical Engineering. Additional field work facilities were added for the benefit of students in Nursing and Health.

The Kelowna Exploration Company donated approximately five hundred dollars to the Department of Mining and Metallurgy for equipment and assays in connection with researches on cobalt-gold recovery which were commenced last year. A simple and effective solution of the problem has been worked out by Associate Professor F. A. Forward. Application has been made for a patent on a method of treating sulphide minerals such as ores and concentrates. Two graduate students under Mr. Forward's direction have been investigating methods of recovering cobalt and gold from ores and concentrates from other British Columbia mines. Undergraduate students have been engaged on such problems as the separation of nickel from copper in copper-nickel matte and the metallurgy of complex gold-lead-zinc-arsenic ores.

During the session a request was received from the Dominion Bridge Company to have annealed in the metallurgical laboratory 1300 tube-ends urgently needed for the construction of a war industry plant. No other equipment for work of this nature was available in the city, so the task was undertaken. The laboratory heat-treating furnace was converted for the purpose and the work was successfully carried out in four days.

Chemical and metallographic tests were made on rivets that had failed in a marine boiler, bronze governor gear on a marine Diesel engine, aeroplane valve parts, springs for automobiles, tractors and railroad cars, piano wire, manganese steel casting. and on bearing metal. Analyses were made of specimens for spectrographic work and the determination of cadmium, bismuth and tellurium content of minerals. Investigational work was done on a cobalt arsenide ore from an Ontario mine from which it was found that a very high recovery of cobalt could be obtained by roasting and leaching. Encouraging results were obtained from a series of tests on Pacific Nickel ore involving roasting, leaching and flotation. Roasting and concentration tests were made on a tungsten concentrate. In this connection a simple and satisfactory procedure was worked out and the necessary recommendations were forwarded to the operators. In all this work, Mr. Forward received faithful and valuable assistance from Mr. Alfred G. Lyle, B.A.Sc., Assistant in the Department of Mining and Metallurgy.

Professor G. A. Gillies continued his researches on the selective flotation of non-metallic ores. Results obtained have been embodied in a paper entitled "A Graphical Method for Evaluating Selective Flotation Tests", which has been accepted for publication. Two graduate students assisted Professor Gillies in these researches.

Senior undergraduate students taking the course in Ore Dressing conducted by Professor Gillies investigated important milling problems listed below:

> Investigations for the purpose of obtaining a commercial concentrate from the gold ore of the Windfall Mine near Taseko Lake, B.C. A satisfactory concentrate was provided.
>
> Investigations for the purpose of obtaining a commercial barite concentrate from ore sent in by the Kamloops Homestake Mine. A satisfactory concentrate was produced assaying 86 per cent. $BaSO_4$ with an 89.86 per cent. recovery.
>
> Investigations for the purpose of obtaining a commercial concentrate of scheelite from amalgamation tailings of the Bralorne Mine, Bridge River, B.C. These investigations were undertaken as a war measure, scheelite being one source of tungsten. The ore was found to contain only small quantities of scheelite, which, moreover, had been "deadened" by the reagents used to extract the gold.
>
> Investigations for the purpose of obtaining a commercial concentrate of zircon from placer sands of the Shuswap River near Enderby, B.C. Technical information was obtained which will be of value in future investigations of zircon ores.

In three of the above-mentioned investigations the method for evaluating selective flotation tests was applied. In assaying the preliminary products obtained from the tests for scheelite and zircon, ultra-violet-ray lamps were used, the amount of scheelite and zircon present in a concentrate being determined by the character of the fluorescence. The final assays were made by the wet method, a laborious and somewhat expensive process.

In the Department of Mechanical and Electrical Engineering, Assistant Professor W. O. Richmond continued his researches on the rate of growth of fatigue cracks in metals. Nearly all the members of the staff were engaged in important work during the summer vacation; some assisted in the special course given in Radio Mechanics. Two recent graduates are doing radio research work with the National Research Council at Ottawa.

Important investigations were continued by the members of the staff and student body in Forest Engineering. A sample plot in the University forest laid out in 1936 was remeasured at the end of the first five-year period and some significant results were tabulated. The plot is in an under-stocked stand of fir, cedar and hemlock. A new half-acre sample plot in a forty-year old Douglas fir second-growth stand in the University farm wood lot was laid out for the purpose of studying the effects of thinning. The results obtained will be compared with those from similar studies on a plot laid out in 1939. A comparison of the relative accuracy in a one hundred per cent. cruise and a twenty-five per cent. cruise on four or five acres in the University farm wood lot was undertaken by Mr. T. G. Wright and the class in Mensuration. The results indicated that the twenty-five per cent. cruise is sufficiently accurate for our purpose. The first pruning in any of our plantations was commenced. Dr. B. G. Griffith continued his experiments on the determination of the effect of temperature in storage on the viability of Douglas fir seed.

At the request of the Greater Vancouver Water District Board, two fifth year students in Civil Engineering under the direction of Assistant Professor E. S. Pretious investigated methods of computing the discharge of water through screens placed in hydraulic channels. Equations were obtained from which discharges from submerged and free discharge screens can be computed.

The Board of Governors approved the offer made by members of the Department of Nursing and Health of repeating the two courses in Home Nursing and First Aid which had been given on a voluntary basis in the preceding year. A few special lectures in Compulsory Nursing were given to the Rural Leadership Training School, held early in the year.

The close of the academic year marked the retirement of Miss Mabel F. Gray, who since 1925 had been Assistant Professor of Nursing and Health. During her period of service in the University Miss Gray gave unsparingly of her time and energy in the interests of her students, by whom she was respected and beloved. The good wishes of the University follow her in her retirement.

Miss Mary E. Henderson was appointed Instructor in the Department of Nursing and Health as from July 1st, 1941, with a special assignment as Supervisor of University students during their years of training at the Vancouver General Hospital. For some time it has been felt that students registered for the degree course had too little contact with the University during the two and one-half years of the hospital part of their training. Moreover, as a result of the preoccupation with acquiring hospital discipline and techniques, it has been felt that students were prone to lose sight of the preventive or public health aspects of their profession; and since the majority of students complete their degree in Nursing by taking public health nursing in their final year, this tendency seemed to require remedying. The appointment by the University of an Instructor who will spend part

of her time at the hospital supervising the activities of the degree course students, should serve to remedy both these defects in training.

Miss Henderson will, incidentally, take the course of lectures on Community Health and Social Needs, previously given by Miss Margaret E. Kerr to the whole nursing student body at the hospital. This should further tend to infiltrate the hospital training with the public health implications of nursing. Finally, Miss Henderson will make it her especial interest to interview applicants for the Nursing course, and to follow through their records during the first two years of their course at the University This arrangement should also serve to strengthen the ties between the Department and the students registered in it during the earlier years of their training.

It is a pleasure to give expression to my sense of gratitude to the members of the Faculty for their co-operation and assistance during a very busy session.

Respectfully submitted,

JOHN N. FINLAYSON,
Dean.

REPORT OF THE DEAN OF THE FACULTY OF AGRICULTURE

No outstanding changes were made in the Faculty of Agriculture during the year. The teaching was carried on according to Calendar, and some progress was made on all researches for which members of the Faculty were responsible.

The total student registration in all grades was 173, which was 27 higher than in any previous year. This larger enrolment only accentuated the difficulties that for a number of years have been common with us because of overcrowding of classrooms, more particularly overcrowding of laboratories. It is not my wish to magnify these difficulties in any way at this time, but rather simply to make reference to them.

The reports of the various Departments are quite complete, and as requested, the research and co-operative projects have been made a special feature of this report. These projects are recorded in some detail in the body of the report under the following major headings,-

Departmental Researches.

Department of Agricultural Economics.

Economic Study of Standards of Living on Some Subsistence Farms. The results of this study are reported under the heading: "University of British Columbia Researches".

Department of Agronomy.

1. Pigments Produced by Enzymes.

Mr. Eugene Lopatecki, a graduate student, continued his studies on "Pigments Produced by Actinomyces". Unfortunately, before this work was completed, Mr. Lopatecki accepted a position elsewhere.

2. Rhizome Development in Plants.

Mr. Bernard Rogers, a graduate student, completed a preliminary study of "Rhizome Development in Plants".

3. Control of Weeds by Chemicals.

Mr. Herbert Falls, a graduate student, organized the research for his Master's thesis around the problem of "Control of Weeds by Chemicals".

Department of Animal Husbandry.

1. Hemorrhagic Septicemia.

The policy of annual immunization of the herd for the prevention of this disease has come under review during the year. One case of hemorrhagic septicemia developed in a three-month-old calf. This was of the peracute type and rapidly fatal. All animals in the herd were at once vaccinated as a preventive to spread of the infection. This action disclosed a hypersensitivity of the herd to the bacterins, 27 animals showing shock reaction in varying degrees of intensity, with fatal termination in two calves. A careful investigation was made at the time, and samples of the bacterin used were tested for purity, foreign proteins, and against shock reactions in experimental animals. Our investigations indicated that the bacterin was of standard quality and harmless in itself, but that through annual vaccination the herd of cattle had become highly sensitized to the bacterin so that further use of the product was fraught with danger. For the present we have discontinued the practice of annual vaccination, and will deal with the disease in future according to the requirements of the situation if and when an outbreak of the disease occurs.

2. Mastitis.

This disease, the control of which continues as a major problem with dairymen, has been only of minor importance in the University herd during the year, two relatively mild cases having been treated during that period. The Department has undertaken a long-time study of the incidence of the disease, its clinical and non-clinical forms, and its economic importance in a herd which is the source of the entire milk supply of a distributing dairy. This study will provide the basis for essay and thesis material for one or more senior students over a period of years.

3. Laboratory Technical Work.

Mr. Anson McKim, Assistant in the Department, carried out some special technical work with pathological organisms for Animal Pathology during the year, and assisted with the poultry testing work by growing and preparing the antigens used for the blood test. Investigations of vaccine and abortions are being carried on, using experimental animals in connection with the Bang's disease prevention programme.

4. Swine Work.

While the work with swine during the year was not on an experimental basis, phenomenal results in gains in weight obtained by Mr. Bert McKinnon, the feeder working under Mr. Young's direction, have focussed the attention of Canadian swine producers on our Yorkshire herd. The five sows produced 50 feeder pigs which reached a market weight in excess of 200 pounds at approximately five months of age. Most, but not all, of the lots were sold subject to official grade, and they all graded high.

Department of Dairying.

Riboflavin Content of Poultry Feeding Materials.

In co-operation with the Department of Poultry Husbandry the riboflavin content of poultry feeding materials has been determined by a microbiological assay method employing Lactobacillus casei ξ (Thermobacterium Helveticum) - a Lactic Acid Bacterium. (For further details of this research see "Co-operative Work, Department of Poultry Husbandry", pages 58-59.)

Department of Horticulture.

1. Hydroponics (Tank Gardens).

A series of five automatically controlled tanks was set up in the greenhouse, using gravel as a growing medium. The system operated all summer with little or no attention. Five different solution formulae were used to determine a 'best'. In each tank tomatoes were grown interplanted with cucumbers. One tank had tomatoes, lettuce, cucumbers, peas, beans and onions all growing together. Each grew well to maturity, although such a 'jungle' combination is not recommended. Of the five standard solution formulae used, two produced very healthy growth, one fair growth, and the two others very poor growth. That all formulae recommended have not the same merit was demonstrated. This apparatus will prove valuable in mineral nutrition studies.

2. Student Researches.

(a) The Effect of Potassium on the Transpiration of Plants. Richmond LeGallais, B.S.A.

A series of carefully conducted experiments was carried out, mainly with tomato plants, to note the various responses in plant metabolism to a potash deficiency. Plants which did not receive adequate potash had a much greater water requirement than those which did receive adequate potash. In dry seasons a liberal potash supply is a good insurance against plants suffering from drought.

Mineral Balance and Plant Growth.
Bruce Dickson, B.S.A.

Raspberry plants and carrots have been grown by using various combinations and nutrient levels of nitrogen, phosphorus and potash. The harvested material is now being analysed, but to date analyses are not completed.

Effect of Vitamin B_1 on the Growth and Metabolism of the Carrot. John B. Teir, B.S.A.

No significant difference was observed between carrots treated with vitamin B_1 and those not so treated. It would appear that the carrot is able to synthesize its own vitamin B_1 and hence does not respond to a treatment of it. A thesis has not yet been handed in by this student.

(d) The Effect of Colchicine on the Iris.
Thomas Anstey.

There was some indication that colchicine is capable of changing the characteristics of the Dutch iris. Whether this change is of any material benefit to horticulturists was not established.

The Effect of Chemicals as Specific Weed Killers in Gardens. Douglas Christie.

Different weeds responded to different chemicals, but general control for all weeds was not obtained.

The Effect of Potash Deficiency on the Raspberry Plant. Arthur Sakamoto.

Raspberry plants which received an inadequate potash supply looked as healthy as the controls (those which received a normal supply) under the conditions of the experiment. However, when the plants were analysed chemically, the low potash series had a lowered dry weight and a lowered carbo-hydrate supply. The C/N ratio was abnormal in contrast to that of the controls, which agreed closely with that established by Hornby (U.B.C. 1939).

Department of Poultry Husbandry.

1. Breeding.

(a) Dual-Purpose Poultry.

The improvement made in the meat type of the Barred Rocks and the Rhode Island Reds has been cumulative. Records kept this year of grade, weight and rates of feathering of all young stock at two-week intervals from four weeks onward to maturity, have indicated a steadily decreasing percentage of B grade stock. The percentage of C's, which used to be considerable, has now become almost negligible.

The feathering in both breeds, while not yet pure for 'Earliness', is much earlier than it was three years ago, when selection and breeding for this characteristic were undertaken in earnest. Up to that time it had been done in a general way. The style of feathering has been found to differ materially in the Barred Rocks and the Reds. The gene for early fast feathering as shown by long tail feathers at 10 to 14 days in most Leghorns, and in about 30 to 35 per cent. of the Reds, has been found to occur but rarely in the Rocks. At the same time, the Rocks feather out more evenly and fully at 10 to 12 weeks than the Reds. Accordingly it would seem as if feathering were controlled or affected by several different factors, and that the rate of growth should be studied in its broader aspect to include fullness and uniformity.

The demand for stock of dual-purpose type in Barred Rocks and Reds has been considerable, shipments having gone forward in the past year to several hatcheries in the United States, besides an increasing number to local and prairie breeders.

The cross-bred Barred Rock X Rhode Island Red stock has shown better and fuller feathering than either of the parent stocks. For that reason alone, the crossing of these particular strains of the two breeds would be justified in specialized broiler production. The vigour of the crosses has been outstanding, with mortality running steadily lower than that in the pure breeds.

While the production of the White Leghorn pullets in R.O.P. has been worthy of note, throughout all the fall and winter and now into the second fall, the performance of the Rock X Red and Rock X Cambar pullets has been exceptionally high. The most remarkable feature of this performance of these crosses is their exceptional persistence. They give promise of a long biological year, with corresponding high profit. The size and quality of eggs laid are above the average. Results obtained to date suggest the suitability of the Rock X Red cross for commercial farmers, and the excellence of the Rock X Cambar cross for general purpose use, with emphasis on broiler production. The early and full feathering of the Cambar imparts an advantage to this cross that makes the resulting chickens ready for market at any time from six weeks on. Inasmuch as that crossing and back-crossing are utilized in any case in the improvement of the auto-sexing breed, the Cambar, the procedure is an economical one.

(b) Auto-Sexing Breeds.

(1) The Cambar.

Some improvement in size of bird, meat type and egg production was attained in the new generation of Cambars. One pullet reached the 250-egg mark, equalling the 1920 record for the U.B.C. Leghorns. Six other pullets reached or exceeded 200 eggs in twelve months. Considerable variation still exists in the breed, ranging from slow-maturing pullets requiring nine months to reach the laying stage, down to others that begin to lay at six months. The pullets raised this last summer have been maturing earlier than in any previous year, thus giving promise of higher production. Sufficient

good stock is now available to permit of line breeding and inbreeding of the best to fix production. Meanwhile the use of Barred Rock blood from some of the best family lines is being more freely employed to improve body size and egg production.

So long as crossing and back-crossing must continue, extreme care must always be exercised to prevent the creeping in of impure colour patterns; otherwise the advantage of auto-sexing is lost in the identification of the sex of the baby chick. Accordingly, a considerable proportion of the young stock of doubtful colour pattern has to be kept out of the breeding pens. These birds, when good layers, are very useful in the production of broilers.

Encouragement has been offered by some well-known authorities, such as Mr. George Robertson, Dominion Poultry Husbandman, to make application to have the breed accepted by the American Poultry Association as a Standard breed. Mr. Robertson, as one of the members of the Standard Revision Committee, is prepared to assist in presenting the petition.

As reported last year, the Cambars have special merit in crossing for broiler production, and have been so utilized this year. Material is now being assembled to permit of a more exhaustive study of various crosses for the production of a more profitable type of broiler and streamlined meat chicken of around 2½ to 3½ pounds in weight, such a weight, in fact, as appeals to the average small household. Birds of this weight will be in demand for export, too, after the war as they were prior to it. No such type of bird exists at present on this continent.

(2) <u>The Redbar</u>.

The two leading general-purpose breeds in Canada are the Barred Plymouth Rocks and the Rhode Island Reds. Each possesses characteristic merit. The former, with its high meat quality, is preferred to every other breed by the packers and butchers. The latter, however, is outstanding in vigour and hatchability. If the better qualities of each could be combined in one breed, and that were auto-sexing, the result would be a boon to the industry. The beginning of the project was announced last year, and fortunately, as hoped, some success can be reported this year, in the occurrence of a trio of Redbar chicks - one cockerel and two pullets - in this year's generation from the back-cross. The first cross was Barred Rock male to Red females, the second (a back-cross) was a cross-bred male (which was barred) back to Red females. This is particularly gratifying in that Cambridge, while recommending the cross, was not confident of the results, and also because no others have reported success to date in a similar attempt. When these barred birds are bred together, one-half of the offspring ought to be pure Redbars and breed true. From that point selection may be proceeded with in the regular way.

In such an auto-sexing breed as the Redbar there should be greater uniformity in production than in the Cambar, since the foundation strain in both the Rock and Red has been line-bred for egg production for many years, and ranks well amongst high-producing strains of all breeds.

An interesting and profitable by-product as incidental to the development of the Redbar has been the cross-bred pullets which are not used in breeding in the back-cross. These birds have proved themselves, as would be expected, to be outstanding layers. Not only have they laid well over a long biological first year, but they seem to require less time to moult than ordinary stock, and in fact have not gone below 25 per cent. production in the regular moulting period. Such a performance suggests the wider use of this particular cross for commercial poultrymen at large.

2. Study of Egg Quality.

The inherent quality of eggs has always been a factor of fundamental importance in the marketing of eggs as a food product. In the last year it has taken on almost critical importance as Canada seeks to ship maximum supplies of eggs to Britain. Since British Columbia is the most remote of the provinces from the market, the eggs shipped from here must be of the highest possible quality to stand up under the vicissitudes of the long haul and war conditions. Under these circumstances, encouragement of an extension of the studies already undertaken by Mr. Wilson Henderson seemed justifiable. In his investigation he broke and examined 1,248 eggs from the three breeds - White Leghorns, Rhode Island Reds and Barred Plymouth Rocks - measuring thickness of shell, height of albumen and yolk, and calculating their relative indices and correlations. Relationship between quality of eggs from different breeds, strains and individuals confirmed the previous findings of Narod and again showed a superiority in quality of eggs of the Barred Rocks of this strain. Henderson found further evidence to indicate that egg quality was a characteristic of the individual hen, and that studies of more individuals are justified. He also found a tendency towards better interior quality in eggs of a rounder shape than in longer, thin eggs. It appeared too, from the data obtained, that the eggs of the Barred Rocks were affected more quickly by changes in feed and environment than those from other breeds.

The measurements of indices which Mr. Henderson secured on quality of eggs laid by U. B. C. birds were favourable as compared with any heretofore reported on eggs from other sources. For his thesis on "Studies in Egg Quality", Mr. Henderson was granted credit towards his Master's Degree. A paper integrating the work of Cook, Narod and Henderson was written by E. A. Lloyd and read by J. Biely at the Poultry Science Meeting at Stillwater, Oklahoma, in August, 1941.

Researches Financed by Funds Provided by the Board of Governors of the University of British Columbia.

Under this heading the emphasis is placed on the research project rather than on the department or departments doing the work. The grants which made these investigations possible were voted by the Board of Governors for the prosecution of research on projects which have a direct bearing on industry in the Province. These grants are administered by the Dean of the Faculty of Agriculture. In some cases the findings are those of a single department; in others they are the results of collaboration between departments within the same faculty, or between departments in more than one faculty.

1 Activators for Enzymes.

Department of Agronomy.

Researches under this heading have been carried on during the year in the Department of Agronomy by Miss Odetta Hicks and Mr. Todd Tremblay.

Miss Hicks continued the study of "The Influence of Iron on the Actinomyces". This was reported in 1940 under date of March 12th. It is now apparent that Actinomyces, after being carried on synthetic media for an extended period, do not have the proteolytic power which they had when first isolated from the soil. These cultures can, however, be rejuvenated through transferring them to a soil medium and carrying them thereon. Thus there appears to be a stimulatory factor in soil which is lacking in the synthetic medium used. It has been demonstrated, in addition, that iron stimulates the production of proteolytic enzymes, and work was conducted to ascertain whether or not the iron has any influence on the vegetative growth.

Mr. Todd Tremblay carried out some phases of the "Peat/Fish Meal Study". His attention was largely directed to the absorptive power of peat for soluble nitrogen compounds, notably ammonia. Some samples of ammoniated peat were prepared, and Mr. Tremblay determined the amount of ammonia so fixed. The groups of bacterial species which may in association increase the rate of peat fermentation have been enlarged and are being studied.

The financial assistance rendered by the Board of Governors has been much appreciated and has enabled the carrying on of work which would otherwise have been impossible.

Department of Dairying.

Work on the phenomena of microbic dissociation and bacteriophage among lactic acid streptococci of cheese starters has been actively pursued throughout the year. A new departure in the method of approach to the problem of starter failure has been the employment of the Thunberg and Barcroft-Warburg techniques for the study of the dehydrogenase enzyme systems of these microorganisms. This feature of the work gives promise of providing a more direct attack on the problem.

The difficulties associated with starter failure in the cheese industry are becoming more manifest in Canada as the effort to produce greater quantities of high-quality cheese for export to Great Britain increases.

It is worthy of note that on the occasion of the visit of Mr. T. J. Hicks, Senior Dominion Dairy Produce Grader, in his capacity as Chief Instructor at the Cheese-making Short Course held at the University, he was most interested in the methods that we employed in the carrying of starters. These procedures have emerged largely as the result of the intensive fundamental work that has been carried out under the grant for researches on Activators for Enzymes.

Particular attention has been paid to the question of the desirability of using 'single' strains for cheese-making in the Province. Results obtained to date indicate that the use of single-strain starters is not to be recommended.

2. B. C. Fish Oils.

The past five years have witnessed a remarkable development in the fish oil industry of this province. In this connection it might be stated that whereas previous to this period local manufacturers had difficulty in meeting the competition of Eastern producers of standardized and fortified oils which were, for the most part, manufactured in the United States, now the situation is completely changed, with British Columbia manufacturers having captured the British Columbia and the Western Canada markets and the greater part of the Eastern Canada market as well. The service rendered to the oil producers by the Poultry Nutrition Laboratory during this time has been of vital importance, since it has included the securing of information regarding the suitability of different British Columbia fish oils for poultry feeding, and their standardization for vitamin A and D content. The scope of the work in the past year is indicated by the fact that a biological test involving 600 to 700 birds was conducted during each of the past twelve months.

In addition to the contribution made to the development of the British Columbia fish oil industry, the Poultry Nutrition Laboratory has actively co-operated during the past year with the Vitamin Assay Laboratory of the Department of Agriculture, Ottawa. A very extensive biological assay was carried out on three samples of fish oil supplied by the Ottawa investigators. These samples were tested by three other laboratories in Canada, and results of the assay submitted to Ottawa for interpretation. Individual ash analyses were carried out on over 600 chicks, and the duplicate bones were prepared for ashing and submitted for analysis to the Ottawa Laboratory. Comparative tests were also made between the B. S. I. Standard and the U.S.Pharmacopoeia Standard Reference Cod Liver Oil. The former proved to be about 25 per cent. more potent than the latter. At the request of the Dominion Department of Agriculture, Mr. Biely participated in a conference held at Ottawa under the auspices of the Vitamin Assay Laboratory, in September, 1940.

In co-operation with the Department of Physics, a spectrophotometric analysis was made of the vitamin A content of Reference Cod Liver Oil (3000 A) and British Columbia produced Dog Fish Liver Oil (30,000 A). The latter oil was saponified and a biological assay carried out to determine the relative effectiveness of vitamin A in the saponified oil and vitamin A in the untreated oil. Two series of biological tests with Leghorn chicks were carried out, each extending over a period of six weeks. The oils were saponified by Dr. William Chalmers, of Western Chemical Industries Ltd., and standardized for vitamin A content by Dr. A. M. Crooker and Dr. Chalmers. A paper summarizing the results of the above experiments was prepared for the annual meeting of the Poultry Science Association, and the abstract of the paper was published in Poultry Science, Vol.XX, No. 5, 456, September, 1941, under the title: "Vitamin A Requirements of Growing Chicks: III. Effectiveness of Ester and Free Forms of Vitamin A in Dog Fish Liver Oil", by J. Biely, Jean Pratt and William Chalmers.

As a member of the Animal Vitamin Research Council working under the auspices of the Association of Official Agricultural Chemists, Mr. Biely participated in collaborative studies of the A.O.A.C Chick Method for Vitamin D.

All the above activities were made possible by the grant from the Board of Governors for the B.C.Fish Oils Research. The action of the Board in this connection is very much appreciated.

3. Calfhood Vaccination for Bang's Disease.

A brief summary of the calfhood vaccination work since commencing the policy on May 1st, 1940, indicates that vaccination of calves between 4 and 8 months of age offers a positive protection against Bang's disease. Out of 14 animals so vaccinated, 12 are negative and 2 suspicious; 1 has calved normally, 2 are carrying calves, and the remainder have just attained breeding age.

Vaccination of calves over 8 months and up to 17 months of age, but not bred, has given encouraging results. Six so vaccinated have all calved normally, though 3 of these animals were positively infected at time of vaccination.

Vaccination of mature cattle has not given any apparent protection against the disease in our herd. Among 14 animals so vaccinated, 9 have produced normal calves and 5 have aborted.

The most encouraging fact is that since commencing vaccination no abortions have occurred in any animals dropping their first calves, and that several of these have already produced their second calves normally.

4. Causes of Raspberry Failure.

The raspberry research problem was continued in 1941. Several interesting points were brought to light:

Winter Injury

The canes in the University of British Columbia plots all came through the winter of 1940-41 in good condition. During March, 1941, extremely heavy, cold, drying winds were prevalent. These winds did considerable damage, especially to the cover crop plots. A check-up on plantings through the Fraser Valley showed a similar condition. The initial buds were completely killed, and while in many cases what otherwise would have been dormant buds came into shoot at a later date, the set-back was great.

The yield from the University of British Columbia cover crop plot, which comprises two-thirds of the planting, was almost negligible.

The fertilized, clean-cultivated plots came through with slight or no damage. The degree of injury depended on the treatment.

Soil analyses revealed that in the cover crop plots, which were badly infested with couch grass, the nutrients were materially lower than in the clean-cultivated plots.

Chemical analyses of canes showed that their constituents were generally lower in the cover crop plots. The plot which received ammonium phosphate, 16-20-0, plus potassium chloride for the third season outyielded canes from all other treatments. This would indicate that the combination as ammonium phosphate penetrates the plant better than a similar amount of nitrogen and phosphorus in other combinations, and suggests that we may more profitably use fertilizers of higher analysis than we are using now in practice.

Another outstanding feature was the potash deficient plot. This plot, which until this year had shown little real deterioration, went down so badly that its recovery is doubtful. It clearly looks as if higher levels of nitrogen, phosphorus and potash than we have been accustomed to think of must be maintained for successful raspberry growing, even if we have to cut down the total area to increase fertility in what remains.

Leaf symptoms as a means of detecting mineral deficiencies have proved their value. Field trips and demonstrations are having effects on growers. They are now looking for these symptoms, and applying remedies before it is too late.

Plantings have not responded to boron as much as was anticipated. However, recent work (see "Vegetable Food Values Research - Safeway", pages 56-58) shows that boron depresses phosphorus intake, so until we "step up" our phosphorus levels any effect of boron could be masked.

Food Value of Raspberries.

Plots fertilized with ammonium phosphate and potassium chloride (the high-yielding plots) also consistently have yielded highest vitamin C-containing fruit.

Raspberries are of the best quality as regards food value when they are given a liberal supply of nitrogen, phosphorus and potash. The sugar content and vitamin C content especially are increased. Seasonal variation in food value is wide, and a yearly general check should be made.

Recommendations.

The field plots, at least the clean-cultivated ones, should be continued as should also the analysis of the fruit grown thereon. The effect of boron after phosphoris has been built up should be studied on the University of British Columbia plots, and particularly in areas in different localities and soil types.

Field trips should be continued to familiarize growers with leaf symptoms and to take soil, leaf and fruit samples from time to time for analysis. Raspberry growers are now looking after their plantings with renewed hope for the industry and should be encouraged. The value of the British Columbia raspberries as a source of vitamin C should be made better known.

5. Economic Study of Standards of Living on Some Subsistence Farms.

Under the grant for this research a study was made of ninety-five farms or small holdings. All the farms in the section selected are in the Rosedale area. The following are some of the findings:

Part-time farmers are an integral part of the socio-economic structure of this area.

Twenty-seven of the families had no children living at home. Twenty-three of the families had one child living at home. In the remaining forty-five families there were from two to seven children living at home. The average number of children living at home is less than two per family.

The average age of the commercial farm operators is 52.8 years.

The average net income per family was $970.11 for the year.

Fifty per cent. of the families receive 79.6 per cent. of the total receipts in the area from the sale of farm products. The remaining 50 per cent. of the families receive 20.4 per cent. of the total receipts.

The average value of the family living received from the farm was $220.08 per family.

These points are given simply to illustrate the type of work undertaken.

6. Fowl Paralysis.

In previous reports on fowl paralysis, emphasis was laid on the fact that the nature of the disease is such that it does not lend itself easily to laboratory experimentation. Since the incubation period of the disease is long and extremely variable, it is therefore difficult to classify birds into susceptible and resistant lines. Thus birds which appear to be free from the paralysis complex at the end of the first egg-laying year, and thus tentatively classifiable as resistant, may develop one of the several forms of the fowl paralysis complex in the course of the second or even the third year. A considerable amount of data on this important phase of the problem has been gathered from our investigation.

As regards the practical control of the disease, the results indicate that:

(1) The various manifestations of fowl paralysis can be substantially reduced in a flock through breeding from yearling hens, but more effective control could be gained by breeding from two-year-old or three-year-old birds exclusively.

(2) Poultrymen should refrain from changing their stock from year to year, as is the case with most buyers of baby chicks. The introduction of new stock to infected premises generally results in heavy losses. Less risk is involved in purchasing chicks from a flock which has been exposed to an attack of fowl paralysis than in purchasing chicks from flocks which have not been exposed to the disease.

From the laboratory point of view our work differs significantly from that of the Iowa group of investigators, in that we have never had any cases of myeloid leucosis or erthroleucosis amongst our birds. The three types of disease which have been encountered may be described as the ocular, the neural, and the visceral types. Whether this condition is due to differences in the virus present, or to differences in the susceptibility of the fowl used by the Iowa investigators and by us, could not be stated definitely unless an exchange of birds and viruses were made.

7. Surface Taint in Butter.

Considerable progress has been made on this problem during the past year. A method for the more ready detection of the microorganisms responsible for this defect has been evolved, and attention has been paid to the sources of contamination with the object of minimizing their presence in butter. Use is being made of the Barcroft-Warburg apparatus as a possible means of determining the nature of the substance or substances responsible for the odour characteristic of the defect. The importance of aeration as a factor in the occurrence of Surface Taint has been demonstrated.

We have continued to enjoy the active co-operation of Mr. Mason, of the Dominion Grading Service, and of the industry itself, in work on the problem.

Co-operative Researches with the Dominion Department of Agriculture, the Provincial Department of Agriculture, Industries, Associations, and Private Companies.

Department of Agronomy

Development of the Co-operative Projects.

In the autumn of 1932 the Department of Agronomy was left without a budget. The laboratory and the Agronomy Barn were available for use, but the Department was without funds for the purchase of laboratory supplies and for the heating and care of the Agronomy Barn. The immediate problem of the Department became the provision of funds for the purchase of the necessary laboratory supplies and the growing of plant materials for class-room purposes. It was essential also that the Agronomy Department should maintain its contacts with the agronomical problems of the Province, as no department, particularly one like Agronomy, could maintain its vitality and teach effectively without these contacts. In the solution of these problems the Department received the most

sympathetic support of the University Administration. As far as it has been possible to do so, the Administration in subsequent years has provided the necessary funds for laboratory supplies and for the growing of plant materials in the field. These plant materials have been supplemented from the various projects subsequently developed in the Department.

It should be stated that unless active research projects are being maintained in the Department it is impossible to provide suitable subjects for student research. For the two years immediately following the reduction to zero of the Agronomy budget, the only theses written in the Department were of the library type- merely reviews of research and experimental work done by others. Fortunately a small research grant to the Department and the starting of the co-operative experiments overcame this lack both in Soils and Field Crops.

The Department of Agronomy was fortunate at that time in having a number of research projects under way of sufficient importance to draw assistance apart from the University. The Wheat Studies that had been carried on for some years received financial assistance from the Dominion Experimental Farms beginning in 1933. The Alfalfa Studies were given support by the Dominion Experimental Farms in 1936. The Pure Seed Work, which had been carried on prior to 1932 with assistance from the Provincial Department, was re-established in 1938. Since then two new projects have been added, both during the last year -- the Flax Investigations, with assistance from the Provincial Department of Agriculture, and the Potato Tuber Index Studies, financed by the Co-operative Potato Growers' organizations.

1. Wheat Studies.

The field work with these studies was completed in 1937. Since that time the results of these experiments have been under study. The duration of this experiment, which extended over nine years, and the large amount of experimental material and data to be examined, have delayed the completion of the final report. At this time one can say with confidence that the results will justify the long study which has been devoted to this project. The report will be available during the coming winter. These studies could not have been completed without the financial support received from the Dominion Experimental Farms.

2. Alfalfa Studies.

From the summer of 1931 to 1935 the alfalfa project was in abeyance, the plants maintaining themselves in the field in competition with grasses and weeds. A small sum of money was available in 1934 from the Departmental grant to clean the weeds and grasses out of the foundation stock. In 1935 a grant of $500.00 was received from the Forage Crop Division of the Dominion Experimental Farms, and this grant was continued during the years 1936-37-38 and 1939. In 1940, when, owing to the war, the Dominion grant had to be discontinued, the project was assisted by a grant of $500.00 from an anonymous private donor, and a grant of $500.00

from the Provincial Minister of Agriculture, Dr. K. C. MacDonald. Unfortunately, these last two grants were not received in time to be used during the season of 1940, but were held for the present year.

The object of this alfalfa breeding experiment is the creation of a variety of alfalfa having the ability to spread. The possibilities of this cross were first recognized by Professor P. A. Boving in 1917, when he was successful in securing six natural crosses between the Grimm variety and a variety of the spreading type first brought to the University by President L. S. Klinck. The Dominion Experimental Farms at first became interested in this alfalfa because of its possibilities for pasture purposes. At the present time it would appear to be equally suitable for either pasture or hay. This new variety has been tested widely by the Dominion Experimental Farms, and they recommend that it be licensed as a new variety. This alfalfa will be multiplied in 1942 and 1943, and the first seed will be available for sale in the winter of 1943-44.

The Department of Agronomy has been favoured by the warm co-operation of the Department of Biology and Botany in basic cytological studies designed to establish the chromosome numbers of this alfalfa and the causes of sterility in certain strains. These latter studies have been made possible by the research grant of the University.

3. Pure Seed Project.

Prior to the stoppage of field experimental work in 1931 and 1932, the Department of Agronomy had carried on the production of pure seed in co-operation with the Provincial Department of Agriculture. This arrangement was not resumed until the summer of 1938. During the years that intervened, the stocks had been held by the Department of Agronomy and had been renewed by re-planting in 1937. The maintenance of these stocks permitted the Department of Agronomy to enter an agreement whereby the University grew seeds of cereals and roots at a price previously agreed upon and turned these over to the Provincial Department of Agriculture. The Provincial Department of Agriculture then placed these seeds with farmers who were interested in multiplying the seed and re-selling it to their neighbours. This co-operative arrangement is based on an agreement as between the Department of Agriculture and the University. The seed produced is of the highest quality and is given the highest grade according to the regulations of the Canadian Seed Growers' Association.

The following amounts of pure seed have been grown by the Department of Agronomy and distributed by the Provincial Department of Agriculture:

1938 Crop.

Victory Oats	995 lbs

1939 Crop

Prolific Rye	357 "
Chancellor Peas	535½ "
Victory Oats	1,021 "
Olli Barley	384 "
Marquis Wheat	1,508 "
Alaska Oats	455 "
Ridit	330 "

1940 Crop.

Marquis No. 137	1,802.5	lbs.
Olli No. 137	869.0	"
Prolific Rye	923.5	"
Alaska No. 137	996.5	"
Chancellor Peas	698.0	"
Victory No. 137	1,510.0	"
Kharkov No. 137	239.0	"
Dawson's Golden Chaff No. 137	368.5	"
Jones' Fife No. 137	414.0	"
Storm Rye	257.5	"

4. Flax Investigations.

The Department of Agronomy undertook to grow three acres of flax for the Provincial Department of Agriculture so as to assist in the establishment of seed in sufficient quantity to meet the probable demands of the fibre flax growers of the Province. Seed was the primary purpose in growing the flax during last summer, but, at the suggestion of the Minister, a small plot of fiber flax was put in for fibre purposes so as to serve as a demonstration plot at the time of the Field Day in mid-summer. The seed yields from the flax were most satisfactory. Mr. Hutchinson, Fibre Flax Expert for the Dominion Experimental Farms, visited the plots in August and asked that 200 pounds of fibre be shipped to Ottawa immediately for treatment and that later 100 pounds be sent after it had been retted in British Columbia. The Department shipped this material at his request, and reports on quality of fibre are awaited with considerable interest. It is proposed that the Department of Agronomy should undertake the multiplication of a new strain of flax which is now recommended in preference to any other variety. It is proposed that we should grow three acres of this flax during the coming year and supervise its multiplication in the year following, so that this seed may replace completely the present strain of fibre flax grown in the Province.

5. Potato Tuber Index Studies.

During the past year a co-operative undertaking with the representatives of the Potato Growers' Associations has been carried on at the University. There is every possibility of an

export demand for British Columbia seed potatoes being created in California, provided that the Province can supply seed of a definite quality - which means largely freedom from disease.

The tuber index system as a basis for the propagation of foundation stock is recognized as the only satisfactory system for the propagation of disease-free seed. Without going into details, it is sufficient to say that in this method individual hills of healthy-appearing potatoes are selected at harvest time from the best stock available. Each of these hills is bagged separately and is held in cold storage. One tuber is taken from each of these hills and a portion of it is planted in a small container under greenhouse conditions. The presence of disease can be noted when the young plants are approximately 5" to 6" high. If a unit is diseased, the hill of potatoes from which it came is discarded. If the unit appears to be free from disease, the tuber from which it came is planted, and likewise the remaining tubers in the hill from which that tuber came are planted as a hill unit. Later these various units are rogued in the field for disease, and on the appearance of disease in any one hill of the units, the entire unit is discarded. In this way it is possible to eliminate most of the disease at the very beginning. The potatoes thus grown are put out the following year in an isolated multiplying block, and the year following are used for general seed production purposes. This practice goes on year after year, new disease-free stock being available annually to the growers.

That a very definite market may be established for our potatoes in Southern California is shown by the enquiries received this summer from the United States for cars of seed potatoes. It should be noted that it will not be until the fall of 1943 that stocks of seed potatoes can be shipped from seed produced during the past summer on the University farm.

Value of Co-operative Projects.

It may well be asked: What is the value of these co-operative projects to the University, particularly in relation to the training of students? In reply it may be said that these projects have contributed to the training of students in a number of ways. Beginning in 1935 we were able to give students in Agronomy summer employment. While in the employ of the Department they were working with varieties and types of crops, and were taking part in the elementary work of alfalfa breeding, root breeding and the production of pure seed. In addition, these projects supplied thesis material for the senior students., In particular they were familiarizing themselves with the growth-habits and types of the various crops in a way that was impossible in the classroom.

The indirect value of this work to the University and to the Department of Agronomy is considerable. These projects serve to keep the Department actively in touch with the farm problems of the Province, and provide a point of contact as between the farmers and the University. The field days which have been held by the Department of Agronomy in each of the last three summers have brought to the University approximately one hundred and twenty-five visitors on each occasion.

These projects have attracted the interest and support not only of the Provincial Field Crops Commissioner, Mr. Tice, but also of the Deputy Minister of Agriculture, Mr. Munro, and the Minister of Agriculture, Dr. K. C. MacDonald. This increased interest on the part of the Provincial Department of Agriculture has resulted, at their request, in the establishment of the Flax Project as well as a general agreement on the future procedure of testing potato stocks. Of even greater importance is the opportunity that these co-operative projects have provided during the last year for discussions with the Honourable the Minister of Agriculture for a further extension of the co-operative plans to include fundamental research problems basic to the development of agriculture in the Province.

Department of Animal Husbandry.

1. Steer Feeding.

The steer-feeding trials were carried on again during the year, and were under the sponsorship of Swift Canadian Company Limited. The primary object of the investigations this year was the relationship between economic factors in fattening cattle and the initial weight, age, and condition of the experimental animals.

The Brackman-Ker Milling Company, New Westminster, in addition to providing the feeds, was of considerable assistance to us in consultation work in connection with the compilation of rations.

Included in the work this year at the request of Shanahan's Limited, Vancouver, was a trial of iodized salt partially and heavily impregnated with anice seed, as against ordinary iodized salt and ordinary stock salt. This work has been of value to the Interior ranchers because of some difficulty experienced in getting cattle to eat iodized salt when the iodine content has been increased beyond the usual limits.

We are indebted to Canada Packers for their co-operation in providing facilities for killing and for student demonstrations on dressed carcasses. The officials of the Federal and Provincial Governments assisted in the grading and demonstrations on the carcass work.

This work constitutes excellent material for judging studies for undergraduate students and for the actual carrying on of experimental steer-feeding under the guidance and direction of graduate students.

2. Lamb Feeding.

The flock of Rambouillet sheep was disposed of, and a policy of lamb-feeding trials established. The work this year was sponsored by the Brackman-Ker Milling Company, New Westminster, which, through co-operation with Swift Canadian Company Limited, provided the sheep and the feed.

The object of this year's work with the lambs was to obtain information on the values of rations with and without molasses. The work provided the basis for essays and theses for students in Animal Husbandry, and at the same time provided excellent sheep-judging material and practice material for the students in the courses dealing with feeds and feeding.

Department of Horticulture.

1. Vegetable Seed Trials.

For the fifth consecutive year the Department of Horticulture has conducted a series of vegetable seed trials. This work was instituted in 1937 as a co-operative project between the Plant Products Division, Production Service of the Dominion Department of Agriculture and the University of British Columbia. In this year's trials there were some 370 samples of seeds on test, each sample was grown in duplicate and the total area occupied was about two acres. The eventual purpose of these tests is to insure for Canadian users of vegetable seeds a dependable supply of high-quality seed. The quality is demonstrated in these trials.

The Department of Horticulture provided the necessary land, the labour for fitting the area, and all materials used, including manure and commercial fertilizer, spray chemicals and stakes. The labour costs were cared for by a special grant from the Dominion Department of Agriculture ($600.00 in 1941) supplemented by contributions of $265.00 from other sources as follows:

British Columbia Seed Growers' Ass'n.....	$100.00
Provincial Department of Agriculture.....	100.00
Wm. Rennie Seeds Ltd.....	25.00
Brackman-Ker Milling Co.Ltd., New Westminster.....	25.00
Brown Bros. Co.Ltd.....	10.00
Angus Seeds Ltd.....	5.00

Professor Buck was again placed in charge of the field work, using student labour entirely. A comprehensive report is to be forwarded to Ottawa, as is done every year. A "Field Day", held in August, was well attended, especially by the seedsmen themselves. The value of this work is such that it is hoped the University may be continued as an "Official Testing Station" for vegetable seeds. A block of land has been prepared ready to care for this project for next season.

2. Elite Vegetable Seed Work.

During the previous season a start had been made to re-establish the Elite seed work which had been under way for several years, but which had of necessity been dropped for a time. Financial assistance provided by the Agricultural Marketing Bureau, Vancouver, made it possible to start on Foundation Stock of a variety of five different vegetables last season.

Although separate funds to support this work were not available during the season just closing, the selection work already started was continued in a modified way with the use of student labour for the actual work involved.

3. Vegetable Food Values Research (Safeway)

During the year experiments were conducted to determine the effect of locality (soil type) and fertilizer treatments on the food value of carrots and turnips. This research was underwritten by Safeway Stores Limited.

Registered carrot and turnip seed, Chantenay half long and U.B.C. Banghorn respectively, were obtained from the B.C. Seed Growers' Exchange. The seed was planted in five localities in the Lower Fraser Valley of British Columbia, each locality being selected for a different soil type. The localities were as follows:

Locality	Soil Type
West Point Grey (Univ. of B.C.)	Sandy Loam
Ladner	Peaty Clay
Cloverdale	Peat
Milner	Light Clay Loam
Agassiz (Expt. Farm)	Heavy Clay Loam

The fertilizer treatments used in each locality were:

1. Low nitrogen and high potash.
2. High nitrogen and low potash.
3. Commonly used complete fertilizer, 5-10-5.
4. Check, no fertilizer used.
5. Complete fertilizer, 5-10-5 plus boron.

Phosphorus was not varied, as all are phosphorus-deficient areas, and it was felt that for this experiment an ample supply should be provided in all cases other than the check.

The quality of the crops in the main was excellent. All plots produced carrots of pleasing appearance and a good marketable product. Turnips grown in the peat showed the greatest variation in uniformity.

A general synopsis of the completed results of the experiments conducted with carrots is given below:

Results with Carrots.

Data were obtained on the effect of locality on the one hand and of fertilizer treatment on the other, with respect to the following: Weight top; Weight root; Top: Root ratio. Chemical analyses of roots were made for: Dry weight; acidity; total mineral; protein; phosphorus; potash; calcium; magnesium; and iron content, as well as for vitamins A, B and C.

The effects of locality showed that the largest tops as well as roots were produced in the peat, whereas the smallest were produced in the sandy loam. The peaty clay produced the greatest root in relation to top, while the peat gave the smallest. The peat produced the most acid roots and sandy loam the least acid. The sandy loam and light clay loam produced the roots with the highest sugar content and highest vitamin C, while the heavy clay and peat yielded those with the lowest content. The sandy loam and clay also produced roots of the highest dry weight, while peat yielded the lowest in this regard. The clays, both light and heavy, produced slightly higher vitamin A content than the other soil types. The light clay loam was responsible for roots with the highest mineral content and the sandy loam those with the lowest. The peaty clay yielded roots with the highest phosphorus and magnesium, the peat the highest nitrogen and potash, and the clays the highest calcium and iron contents. The sandy loam was low in all minerals.

The effects of fertilizer treatments showed that the complete fertilizer, 5-10-5, produced the largest tops, but the largest roots were produced by the high potash, and 5-10-5 plus boron. The high nitrogen produced the largest top in relation to root. The high potash, besides giving largest roots, gave highest sugar content, highest vitamin A and vitamin C. All treatments yielded good mineral content except the high nitrogen treatment. The high nitrogen treatment also produced the lowest vitamin C content. Noteworthy is the fact that the application of boron materially lowered the phosphorus content of the roots.

Conclusions.

While an attempt was made to record the effect of treatments on such factors as core-size, etc., in carrots, there were no significant differences found.

An outstanding result of the experiment so far is the correlation obtained between sugar content, vitamin C and high potash fertilizer treatments.

That a high nitrogen treatment cut down the entrance of other minerals, thereby making a mineral deficit in the product, is significant.

It is natural to assume that the greater the dry weight, the greater the value of the product. This does not seem to hold. A medium dry weight is associated with quality in carrots. Where the dry weight is high, as in the check plots, the product is woody; on the other hand, where the dry weight is low, the product is tender and juicy but lacks constituents. A desirable dry weight was produced on the light clay loam. Rather than dry weight (specific gravity) a better test of quality for carrots is sugar-content or vitamin C. A high potash fertilizer ensures high sugar and high vitamin C content.

The above has dealt only with general trends. Details of each plot will be dealt with in the final report.

Data with respect to carrot storage and turnips will be completed during the winter.

Recommendations.

This work warrants its continuance both from an academic and from a commercial standpoint, in that it is bringing to light certain relationships which one mineral has on the utilization of another.

It is the only work of its kind being done, certainly in the Pacific Northwest, and is much needed.

It shows how a good grower can take any soil type, and by using such information as outlined above, produce high quality produce. A poor grower would produce better quality carrots on light clay loams than he would on heavy clay, peat or sandy loams.

That such an increase in quality can be obtained by stepping up our potash level is not generally recognized.

Finally, this type of work should be of vital interest in our war effort as well as in planning settlement schemes and crop planning in the post-war period.

For the coming year more valuable data could be secured by repeating work on the same two crops, although it might be more progressive to work on such crops as lettuce and canning peas.

Department of Poultry Husbandry.

1. B.C.Fish Oils.

The Nutrition Laboratory co-operated with the British Columbia fish oil industry, the Vitamin Assay Laboratory of the Department of Agriculture at Ottawa, the Animal Vitamin Research Council, and the Department of Physics at the University of British Columbia, in studies on fish oils. (For details of these researches see pages 45-46.)

2. Riboflavin Content of Fish Products.

A study of the riboflavin content of fish products was begun at the request and with the co-operation of the Canadian Fishing Company. Biological assays with chicks were carried out to determine the vitamin G effectiveness of various fish products prepared by different methods. In the autumn of last year the biological assays were supplemented with microbiological assays. The latter tests were conducted in co-operation with the Department of Dairying in the University. During the past year a study was made of the riboflavin content of different poultry feeds, and particularly of animal protein concentrates.

Through the co-operation of the Canadian Fishing Company, livers were secured from thirteen species of fish. These, together with other fish products, 37 samples in all, were tested for riboflavin content. The results of these tests were summarized in a paper which was published in the Journal of Nutrition, V.22, No. 4, October 1941, under the title: "The Riboflavin Content of Fish Products", by F. L. Billings, Jacob Biely, Herbert Fisher and Carl Hedreen. This paper draws attention to the high riboflavin content of fish livers, and will undoubtedly prompt other investigators to study the same question with other species of fish. The information presented in that paper is of interest not only to poultrymen but to students of human nutrition as well.

Through collaboration with Dr. R. H. Clark of the Department of Chemistry of the University, an application was made to the National Research Council for a grant to enable us to extend our present programme of research on riboflavin. It is very gratifying to report that the sum of $650.00 was made available for this investigation. We feel greatly indebted to Dr. Clark for his interest in this problem.

Poultry Blood Testing.

The laboratory was opened on September 4, 1940, and kept open daily up to January 14, 1941, when all regular bleeding work was completed. Some retesting of flocks having over four per cent. reactors was requested, and the laboratory was opened for one week, January 28 to February 3, 1941. On February 14 we again opened on request to do one large flock, and remained open with only one assistant for a further period of eleven days, making in all a total of 146 days of operation. During that period, 218,727 individual blood specimens were tested, taken from a total of 211,644 birds. The 7,097 additional tests represented flock and individual retests made at the owner's request. This work was done by Dr. S. N. Wood of the Department of Animal Husbandry.

Record of Performance Work.

Department of Animal Husbandry.

The Ayrshire herd was again continued in the Record of Performance under the Federal Government plan. All the normal milking cows were tested for production and some very creditable records were made throughout the year. There is some noticeable progress being made in raising the butterfat test of the herd. Owing to the emphasis being placed today by dairymen on long-time records, an effort is being made to test all the cows throughout their full lifetime.

Department of Poultry Husbandry.

Records of egg production secured in the past year have been rather mixed in character. They have been outstandingly good in the case of the WhiteLeghorns, good with the Cambars (that

is, in view of the "newness" of the breed), but unsatisfactory in some important respects in the cases of the Barred Rocks and the Rhode Island Reds. The Leghorns illustrate not only what may be accomplished from good matings but also the importance of favourable environment. By more careful selection and the judicious use of some new blood lines in recent years, a steady improvement has been effected and is bringing the U.B.C. strain closer to the very high standards of former years. The White Leghorn R.O.P. sheets now look more like those of the famous 1925-26 years, when the U.B.C. strain made the highest production in the Dominion. According to present indications, 8 to 10 birds in the entry of 100 will reach the 300-egg mark in twelve months, while as many more, or a total of about 20 pullets, will pass the mark in their laying year of fifty-five weeks. The excellence of such a performance may be better appreciated when it is realized that no cases have been previously reported where more than 20 per cent. of the birds in a 100-bird unit laid 300 eggs or over in a biological year. Neither has any case been reported of a higher mean weight for White Leghorns, which in this case was 5.2 pounds per bird in June. The maintenance of such good body condition through a long period of heavy production provides proof of efficient care and management. In other important respects, such as egg-size and shell-texture, production was also satisfactory. The low mortality in this unit, less than 10 per cent. could reasonably be attributed, in part at least, to good care of the birds.

The Reds gave satisfactory production with respect to number of eggs laid in the winter months. However, the egg-size was small and eggs were broken in too many cases, indicating that very drastic selection will be necessary for the matings next season. Egg production, moreover, was not maintained at a satisfactory rate by the Red pullets through the summer and fall months.

Size and shell-texture of Barred Rock eggs were considerably better than those of the Reds, whereas in some previous years the reverse was true.

Service Work.

Department of Agronomy.

1. Soil Testing.

No effort is being made to build up this service, but during the past year about 150 samples were examined in some detail and reports were sent out covering the same. A graduate student was employed to do the testing, but the reports in every case were sent out by Dr. Laird.

2. Outside Activities.

Members of the Department of Agronomy served in various capacities on the following:

Lime Committee
B.C.Fertilizers and Agricultural Poisons Board
B.C.Fertilizer Council
Dominion Plant Breeders' Committee on Forage Crops.

Dr. Moe and Dr. Laird appeared together before the Agricultural Committee of the Provincial Legislature to give evidence relative to soil and crop problems.

Department of Animal Husbandry.

1. Veterinary Clinical Work.

During the year Dr. S. N. Wood has done much valuable work, not only for the herds and flocks maintained by the University, but also for those of many farmers and ranchers throughout the Province. Naturally, most of the material submitted comes from the Fraser Valley. However, a number of shipments have been sent in from upper-country points, and considerable work has been done for ranchers interested in fur-bearing animals.

2. Animal Breeding Short Course.

In January, 1941, a three-evening short course was given at Langley Prairie on problems in animal breeding, with Dr. J. C. Berry as the chief lecturer. Dr. Wood assisted at one meeting. This course was attended by approximately 23 farmers, practically all of whom own pure-bred dairy herds between Langley and Chilliwack. The course has been of material assistance in helping these farmers to outline their breeding plans for the production of high-quality dairy cattle.

3. Outside Activities.

Members of the Department of Animal Husbandry served in various capacities in connection with the following:

Provincial Feeds Standards Board
Canadian Jersey Herd Classification
Boys' and Girls' Club Work (Vancouver Exhibition)
B. C. Veterinary Association
Vancouver Local, Canadian Society of Technical Agriculturists
Vancouver Exhibition Association.

They also assisted as judges, demonstrators or lecturers at exhibitions, agricultural association meetings and conferences. In response to a request from Mr. Sweeney, Deputy Minister of Agriculture of the Province of Alberta, for Professor H. M. King to attend the Farm and Home Week at Olds, arrangements were made for Dr. J. C. Berry to act in his stead. Dr. Berry gave one lecture on animal breeding, one lecture on animal nutrition, and conducted a judging demonstration on Ayrshire cattle. He was the featured outside speaker.

Department of Dairying.

1. Short Course in Cheddar Cheese-Making.

Under the Department of University Extension a two-weeks' Short Course in Cheddar Cheese-Making was held by the Department of Dairying from March 4th to 14th inclusive. The course was arranged at the request of the British Columbia Branch of the Canada Produce Association and had as its object the improvement of the quality of Cheddar cheese made in the Province of British Columbia. The course was given in co-operation with the Dominion and Provincial Departments of Agriculture and was part of the Dominion-wide effort to improve and maintain the quality of Canadian Cheddar cheese. As cheese is not only a highly nourishing foodstuff, but a concentrated food lending itself to easy shipment, Canada is called upon to supply in large measure Great Britain's needs for this product, and it is essential that increased production of cheese of high quality be encouraged throughout the Dominion.

Mr. T. J. Hicks, Senior Dairy Produce Grader of the Marketing Service, Dominion Department of Agriculture, acted as Chief Instructor. He was assisted by Mr. H. A. Mason, Dairy Produce Grader for the Province of British Columbia, and by the staff of the Dairy Branch of the Provincial Department of Agriculture under Mr. Henry Rive. Fifteen experienced cheese-makers from various parts of the Province registered for the course. In addition, approximately twenty others, drawn principally from the trade and from students in Dairying at the University, attended on one or more occasions.

The work of Mr. Hicks was particularly appreciated, and all students agreed that the holding of the course will lead to a marked improvement in the quality of cheese produced in British Columbia Already a request has been received that another course be held next year, with Mr. Hicks acting as Chief Instructor.

2. Milk Display.

An exhibit of the materials to be found in milk has been prepared for the Department of University Extension, which has made arrangements for its use as a Travelling Exhibit for teaching purposes in Science, Health and Agriculture classes in schools throughout the Province.

The Department has again prepared an exhibit for display at the Vancouver Exhibition in co-operation with the Canadian Produce Association.

3. Field Work.

During the past year the number of requests for assistance received by the Department from individuals faced with difficulties in special fields of endeavour has increased markedly. The requests are not by any means limited strictly to the field of Dairying, but cover a host of topics in allied fields. The major difficulty in attacking problems such as these is the lack of sufficient laboratory assistance.

Department of Horticulture.

1. Night Class.

For the seventh consecutive year a night class in Amateur Gardening was conducted during the fall and winter. The course was again held in the Provincial Normal School in Vancouver. There was a good registration and keen interest was shown throughout the course.

2. Outside Activities and Field Work.

Frequent requests came to the staff members, both from individuals and from firms or organizations, seeking advice on horticultural problems or asking that certain tests be made. These were attended to as promptly as possible.

Lectures, radio addresses and demonstrations were given for various agricultural associations, and many annual meetings and conventions were attended. Members of the Department served in various capacities in connection with the following:

Provincial Vegetable Seed Board
Dominion Civil Service Commission Board of Examiners
Architectural Institute of British Columbia
Town Planning Commission of Vancouver
Special Housing Committee, Vancouver
Provincial Raspberry Committee
Business Men's Garden Club Organization Committee
Vancouver Exhibition, Agricultural Committee
Vancouver Institute
Committee on Educational Policies, Coordinating Council.

Department of Poultry Husbandry.

1. Poultry Pathology.

The number of requests for post-mortem examination of birds increased. Owing to pressure of teaching and research work it has not been possible to give as much thought and study to these examinations as would appear to be justified. In the post-mortem examinations the following diseases showed the greatest incidence: coccidiosis, internal laying, fowl pox, and worm infestation. In co-operation with a student specializing in Poultry Husbandry, examination was made of all birds that died during the year on the University poultry farm. The number of requests from poultrymen to visit their flocks also increased, but on only a few occasions was it found possible to meet this demand. It is felt that the task of making post-mortem examinations, giving personal interviews re poultry, etc., is such as would justifiably occupy the full time of a specialist.

2. Night Class.

The Night Class, as organized by the Department of University Extension, was conducted again in both Fall and Spring sessions of eight weeks each. Lectures were given at the Normal School, and most of the laboratory periods were held at the University.

3. Vocational Correspondence Course in Poultry-Keeping.

A Vocational Correspondence Course in Poultry-Keeping, as presented by the Provincial Department of Education, and consisting of ten lessons, was completed by Mr. Biely during the past year.

4. Outside Activities.

Members of the Department served in various capacities in connection with the following:

Vancouver Exhibition (Judging Utility Classes)
Producers and Research Committee, B.C.Branch,
Canada Produce Association
Pacific Coast Poultry Producers' Association.

Special lectures were given in such poultry centres as Ladner, Cloverdale and Strawberry Hill during the year. Illustrated lectures were given at meetings of the Vancouver Poultry Association.

Assistance was rendered by the Head of the Department in the presentation by G. G. McGeer, K.C., on behalf of the Surrey Farmers' Co-operative, of the case for reduced freight rates on eggs, before the Board of Transport Commissioners at Vancouver, in June. The case is reported in the July/August number of "Canada Poultryman".

Numerous enquiries with regard to specific problems in the various branches of agriculture were attended to by all members of the Faculty through correspondence. More than 6,000 individual letters and parcels have been sent out by the Faculty during the year.

Respectfully submitted,

F. M. CLEMENT,

Dean.

REPORT OF THE DIRECTOR OF THE SUMMER SESSION

The twenty-second Summer Session opened on July 7th and closed on August 22nd, 1941.

The enrolment for the Session classified by college years follows, along with a comparison with the corresponding figures for the previous three years:

	1941	1940	1939	
Partial	4	11	11	5
First Year	40	62	65	74
Second Year	173	186	211	231
Third Year	62	83	100	80
Fourth Year	59	75	92	90
Graduates	118	159	209	179
Auditors	4	11	25	41
Total	460	587	713	700

The numbers of courses covered in each of the last three Sessions are as follows:

	1941	1940	
Full courses (three units)	37	44	40
Reading courses (three units)	2	--	--
Half courses (one and one-half units) (or one and one-quarter units)	3	1	2

The three half-courses given counted towards the Academic Certificate only.

In addition to the above, the usual courses in Social Work, namely, Social Work 5, Case Work Methods, (two units), and Social Work 6, Child Welfare Case Studies, (one unit), were given. Eighteen students registered for these courses.

The staff consisted of thirty-four full-time instructors and two part-time instructors. Of these, one full-time instructor (School Organization and Administration) and one full-time assistant (Physical Education) were employed to give courses not for University credit but to meet the wishes of the Department of Education.

As in previous years lecturers were brought in from all parts of Canada and the United States. The institutions whose staffs were drawn upon were: Alberta, Queen's, Saskatchewan and Toronto in the Dominion of Canada; California at Los Angeles, Columbia, Indiana, New Mexico, Southern California at Los Angeles, Stanford, Texas and Washington.

I cannot conclude this report without recording my appreciation of the kindness that gave me the privilege of directing the Summer Session for so many years and also my gratitude to the colleagues and associates who made my labours as Director a constant and ever-renewed joy.

Respectfully submitted,

LEMUEL ROBERTSON,

Director, Summer Session.

REPORT OF THE DIRECTOR OF UNIVERSITY EXTENSION

General.

The work of the Department of University Extension has developed very satisfactorily during the past year. The problems of a war period have inevitably affected the nature and variety of the demands made on the Department and have, of course, necessitated certain modifications in policy. However, the fundamental aim of the Department, as in previous years, has been to provide a general adult education programme which will make the facilities of the University available, in some measure at least, to every section of the Province. The response to this programme continues to be very gratifying.

A number of new developments in the work of the Department relate to the war situation. Close co-operation has been maintained with the Canadian Legion War Services and other auxiliary services, particularly in providing visual instruction material for use in educational work and recreational programmes for the armed forces. In the Youth Training Programme, increased emphasis has been placed on first aid, citizenship, physical training and war-time nutrition. In providing new material for the use of study groups and individual readers, emphasis has been placed on literature dealing with the war and the problems of post-war reconstruction.

To meet the growing interest in good music, a phonograph record service was established in January, 1941, by the Department of University Extension in co-operation with the Faculty Committee in charge of the Carnegie Music Set. Through this service, music appreciation groups in all parts of the Province may borrow from the collection of records which forms part of the Carnegie Music Set. As far as is known, this service is the only one of its kind in Canada.

Another new development has been the establishment of a pamphlet library. It is intended to serve as a clearing house for the vast amount of useful information which is now appearing in pamphlet form. In assembling approximately one thousand titles, particular stress has been placed on literature dealing with agriculture, handicrafts, home economics, and current affairs. Numerous requests for advice and assistance from all parts of the Province have been answered by the use of material from this collection.

An increasing number of organizations has approached the Department of University Extension for assistance in planning lecture and study courses. A series of lectures was arranged for each of the following groups: the Grandview Y.W.C.A., the West End Community Centre, the B.C. Penitentiary, and the Victoria

Extension Association. Special courses were arranged at the request of the Canadian Credit Men's Association, and the Pacific Coast Fishermen's Union. In co-operation with the Vancouver Health League, the Department sponsored ten courses in wartime nutrition held in various parts of the city. Assistance was given to the Registered Nurses' Association and to the Parent-Teacher Federation in preparing series of discussion-group outlines for their members. A great many other organizations have also made use of Extension services in planning their educational programmes.

Evening Classes and Extension Lectures.

Evening classes given by members of the University staff continued to be a popular feature of the Extension programme in the Vancouver area. The following courses were offered: Business English, Contemporary Literature, Current History, Amateur Gardening, Poultry Husbandry, Business Management, and General Botany. As part of the educational programme for British Columbia fishermen, an evening class in Navigation was offered. It met with a very enthusiastic response from the fishermen of Vancouver and district.

Summer Courses.

Several non-credit courses open to the general public and without educational pre-requisites were again offered at the University this summer. In response to frequent requests for instruction in short story and radio writing, a new course in Radio Script Writing was offered, with Dr. Robert Allen of the University of Indiana as instructor. Splendid co-operation was received from the Canadian Broadcasting Corporation, which made a generous loan of equipment to supplement the resources of the University Radio Studio. Several scripts written in the course were accepted by the Director of School Broadcasts of radio station CBR.

Two other courses which have been very popular in previous years were again offered. The Summer School of the Theatre was held for the fourth consecutive summer, this year under the direction of Mrs. Burton James of Seattle. The students enrolled for the course included representatives from four provinces in the Dominion. The Canadian Association for Adult Education provided a number of bursaries to assist students from more distant parts of the Province to attend the School. For the third successive year, Mrs. Mary Meigs Atwater of Montana was brought to the University to give a course in Hand-weaving. As in the past, the class included students from many parts of the Province and the northwest States.

During the summer the Department again offered a series of short courses in Homemaking at a number of centres throughout the Province. Two instructresses, one specializing in handicrafts and the other in home economics, visited the communities to offer courses of from one to three days' duration. Subjects taught included handicrafts, sewing, weaving, rug-making, nutrition, dietetics, and certain types of cooking.

Dramatics.

The Department has continued its policy of emphasizing service to out-of-town dramatic groups. The pressure of war activity in many communities has led to a slight falling off in the number of drama groups enrolled with the Department, but the interest of those who registered has been very well maintained. The Play Lending Library, which now includes some 2,000 plays, provides a particularly valuable opportunity for these groups to familiarize themselves with the best dramatic material available. The circulation of this library during the past year was 5442. Short courses in Drama of five days' duration were offered by the Assistant in Dramatics at the following centres: Penticton, Summerland, Kelowna, and Lumby. A new study-group course in acting and a correspondence course in playwriting were among other services offered to those interested in dramatics. In general, satisfactory progress may be noted in all branches of the work.

Visual Instruction Services.

During the past year, films and film slides were shown in 223 towns and communities throughout British Columbia. It has been possible to reach a large number of these isolated centres through the Dominion-Provincial Youth Training Schools and also through organizations such as the Columbia Coast Mission. Over one six-week period alone, the Mission boat reported the showing of Extension films at 85 fishing villages and logging camps along the British Columbia coast.

The number of reels of motion-picture film circulated has increased more than two and one-half times over that of the previous year. Films have been used widely for war purposes in recruiting campaigns, in the Victory Loan Drive, in Air Raid Precaution work, in campaigns for the Canadian Red Cross, in military stations for men of the three services, and in many war-fund drives. In addition, schools, boards of trade, churches, Farmers' Institutes, Women's Institutes, Parent-Teacher Associations, Youth Training Clubs and many other groups have made extensive use of the service.

The Department receives all new releases of the National Film Board, and circulates films from a depository for the National Film Society. Such new additions have assisted in increasing the facilities of the Department, so that more than 250 motion-picture films, 650 film slides and 100 sets of lantern slides are available for loan.

A complete photographic service has been maintained for the benefit of departments within the University.

Study Groups.

During the year every assistance has been given to study groups requesting aid from the Department. Several new study-group outlines were prepared which proved particularly popular. Primarily for use in the Educational Programme for British Columbia

Fishermen, two new courses were prepared on co-operatives and credit unions. These courses have been used extensively throughout British Columbia, and have also attracted a good deal of attention outside the Province. St. Francis Xavier University, probably the leading centre of co-operative education on the continent, has requested permission to use the outlines as the basis for its educational programme this winter. The Extension Departments of the Universities of Alberta and Saskatchewan are also using these courses in their study-group programmes. The Provincial Inspector of Credit Unions has recommended the credit-union course to all credit unions in the Province.

A new course in Child Psychology was prepared at the request of the Parent-Teacher Association, and assistance was given to the Registered Nurses' Association in preparing discussion outlines and in organizing a study-group programme amongst its members in all parts of the Province.

As in the previous year, courses in British Columbian History, Practical Psychology, Modern Literature, International Relations, and the History of the Theatre were again offered.

The Department is convinced that in assisting voluntarily-organized study groups it is sponsoring one of the most effective forms of adult education.

Educational Programme for British Columbia Fishermen.

The task in the past year's work under this programme has been to carry over the enthusiasm aroused by the first year's preliminary work into a year of thorough study and educational preparation for co-operative action. It is encouraging to be able to report that despite the distractions of a war period this has been accomplished. Throughout the year there has been much evidence of a willingness on the part of the fishermen to follow a regular study programme. Assistance has been given to existing fishermen's organizations in extending their membership, a number of new credit unions has been organized, and the groundwork has been laid for credit union and co-operative organization in many other communities.

With a staff of three men this year, it was possible to extend the work in several ways. New study-group outlines in co-operatives and credit unions were prepared, and they proved to be of invaluable assistance to the numerous study groups organized under this educational programme. The maritime area of the Province was divided into three sections -- Prince Rupert area and Queen Charlotte Islands, Vancouver Island, Lower Mainland and Gulf area-- and each field worker spent most of his time in one assigned area. This permitted more frequent visits to the various communities within each area.

Results of the programme can be judged only in part from the number of communities in which work has been carried on and the number of study groups organized. More important, perhaps, is the new community spirit which has been developed in many areas, due in

large part to the constructive educational work which has been carried on under this programme.

Dominion-Provincial Youth Training Programme, Schedule "E"

The main features of the work carried on under this programme were similar to those of the previous year. A number of Rural Occupational Schools of two or three weeks' duration were conducted by two travelling staffs of instructors in communities throughout the Province. The more promising students were again brought to the Forestry Camp near the University, where an eight weeks' course was held. The aim of both parts of the programme is to build citizenship and morale and to provide a practical training for rural young people which will make rural life more worthwhile and attractive.

Since so many of the young people have left the rural areas, it was not possible to hold as many schools this year, and the average attendance per school was considerably smaller. In organizing the curriculum of the schools, increased stress was placed on those subjects which would be useful to young people in a war period. Whenever possible, the problems of agriculture and homemaking were considered in relation to war requirements.

Even in its present curtailed form, the programme continues to receive enthusiastic support from farm organizations and community leaders in all parts of the Province. After a very successful series of schools in the Peace River area, Mr. Glen E. Braden, M.L.A., wrote that in his opinion, "The Dominion-Provincial Youth Training Programme..... is the greatest benefit our young people of the Peace River have received since the formation of this constituency". It is the hope of the Department of University Extension that the programme can be maintained, if even on a reduced scale, for the duration of the war, in order that it may be in a position to play a vital role in the period of demobilization and reconstruction.

Public Relations.

At a time when the work of every organization and institution which is not wholly engaged in national defense projects is being examined in relation to the national war effort, it is important that the public should be kept informed regarding the contribution of the University towards the strength and morale of the nation. The Department has sent to the newspapers of the Province not only the results of the sessional examinations but other items of interest concerning the work of the University. A similar service is also provided to many of the radio stations in British Columbia. This is a very effective means of building up good-will between the University and the constituency it serves. Much more could be done if time could be devoted to collecting and preparing the releases.

Acknowledgements.

The Director acknowledges his indebtedness to the President of the University for his valuable advice and assistance; to the members of the Board of Governors for their appreciation of the value and importance of adult education; to members of the Faculty for their co-operation; and finally to the members of the staff of the Department, who by their loyalty and devotion to duty have contributed so largely towards any success which has been achieved.

Respectfully submitted,

GORDON M. SHRUM,

Director of University Extension.

REPORT OF THE DIRECTOR OF THE UNIVERSITY HEALTH SERVICE

At the close of another academic year, it is necessary to review the activities of the Session and to present certain data which in some measure justify the work of the University Health Service. The value of this report is limited by its inability to present the many everyday happenings of the Service, but it is of definite assistance in evaluating progress and also in serving as a basis upon which to plan future programmes.

It has been a very busy year and the resources of the Health Service have often been taxed to capacity. There were 16 per cent. more student visits this year than in 1939-40. New conditions have had to be met, and epidemic disease has been present though, fortunately, not of a serious character. There was nearly a fourfold increase in student absenteeism, largely due to the increased incidence of respiratory diseases which accounted for roughly 50 per cent. of all absenteeism. The Health Service has worked throughout the year in close co-operation with the Canadian Officers' Training Corps and the various Departments having to do with the war effort. Medical examinations of men for the C.O.T.C. and Basic Military Training were held in conjunction with the examination of new students early in the fall term. Two medical members of the staff of the Metropolitan Health Committee acted as Medical Examiners with the C.O.T.C. and in this way the University examination requirements, as well as the necessary military requirements, were met without duplication of examinations. Five hundred and fifty-six men were given the combined examination. The quarters set aside for University examinations, as well as office equipment and supplies, were shared by the Military Examiners.

During the year, students who were unable to attend compulsory physical and military training because of illness or physical defect were seen in our Office, and the Office of the C.O.T.C. was notified daily of all cases in which absence was justified. Recommendations regarding follow-up were made whenever necessary. Recommendations regarding certain students with serious defects were relayed specifically to the Medical Officer of the C.O.T.C. This close working agreement was instrumental in maintaining the health of the students, and, at the same time aided the programme with respect to Military Training.

Altogether 8,756 student visits were made to the Office, an increase of 16 per cent. over last year. The number of physical examinations during the fall term totalled 869, an increase of four per cent.

The records indicate that 80.5 per cent. of the students examined were in Class 1, i.e. they were able to participate in strenuous and competitive games; 14.9 per cent. were in Class 2, indicating their ability to engage in moderate exercise only; while 3.9 per cent. were advised to do no exercise other than walking. Remedial exercises were recommended for 1.1 per cent. of those examined. It is noted that 45.6 per cent. of the students had defects which required correction or further investigation.

During the winter months the Lower Mainland Area suffered from an epidemic of mild Influenza. There were 346 University students diagnosed as suffering from this infection, approximately 13.5 per cent. of the total student body. There were 907 others reported as having other infections of the upper respiratory tract, namely colds and sore throats. Three students developed pneumonia and 12 others developed severe streptococcal throat conditions. Minor illnesses, of less than three days' duration were in many cases unreported, but owing to the regulation requiring students absent for more than three days to report to the Medical Office, it was possible to classify many of these respiratory infections and, at the same time, check on their spread throughout the student body. It was noted that many of the students suffering from Influenza had a protracted convalescence, accompanied with prostration and inertia, and particular care was exercised in closely following the convalescence of these students.

A mild epidemic of Rubella also made its appearance and 199 notifications of cases of this disease were received. This outbreak reached its height in February, but fortunately no serious sequelae followed, and apart from its nuisance value in keeping students home during the isolation period, it had little serious effect upon the general health of the student body. It was noted, however, that a certain number of students developed visual defects following Rubella. Students were warned of the presence of this disease and instructions were issued regarding premonitory signs and symptoms. In this way many cases were seen and diagnosed before those affected mixed with the students generally. It was noted that 17 students developed Simple Measles.

In a closed community such as the University, the control of Communicable Diseases is a necessary precaution. We were indeed fortunate that major epidemic diseases, such as Scarlet Fever, Diphtheria, Smallpox and Epidemic Meningitis, were absent during the year in spite of the fact that Meningitis was present in the Lower Mainland Area and Vancouver.

The programme of physical examination supplemented by Tuberculin Testing has been invaluable in the control of Tuberculosis.

Two new cases of Tuberculosis were discovered and five others showed evidence of arrested disease. There was one suspect and twelve cases were classified for further observation, of which four were later discharged. Our programme is to follow closely all cases, including suspects, and to recommend exclusion only of those students requiring special treatment and whose continuance at University would be detrimental to the health of the students generally. One student was absent from December 1940 to the end of the academic year.

As a routine, Chest X-rays are performed on all students showing a positive reaction to the Tuberculin Test. Of students tested this year, 40.3 per cent. showed positive reactions. This test indicates previous infection with the germ of Tuberculosis but in only a few cases is actual disease found.

The programme of Mental Hygiene had a satisfactory beginning, but in March, 1941 Dr. C. H. Gundry, Director of Mental Hygiene, Metropolitan Health Committee, who had built the framework

of a successful programme, was given leave of absence to join His Majesty's Armed Forces. However, 118 student visits were made regarding diseases of the Nervous System during the year and 21 students consulted the Director of Mental Hygiene because of personality problems, an increase of threefold over last year. It was observed that 73, or 8.1 per cent. of new students were found to have personality and emotional problems according to the physician's notes at the time of examination. Brief discussion was responsible in many cases for helping the student to gain a proper insight into his own particular problem and assisting him along the road of mental stability.

Of interest was the students' attitude toward health. Part of the physical examination card was devoted to a questionnaire dealing with health problems, answered by the students before coming for examination. Altogether about 30 questions were asked one-third of which dealt with personality problems. The purpose of this questionnaire was not only to estimate the students' attitudes toward health, but also to serve as a rough screen for finding those students whose adjustments were likely to be poor.

Altogether, 890 students answered the questions and 23.4 per cent., by their answers, admitted personality defects; defects which are largely of a minor degree and common to the majority, but the presence of which served as an opening for discussion of the defects noted. These findings are informative and suggestive, and point to the necessity for a more intensive exploration of this field.

Prophylactic vaccinations and inoculations against Smallpox, Diphtheria, Scarlet Fever and Typhoid Fever were available. Many students availed themselves of the opportunity of becoming protected against these diseases. The Health Service co-operated with the Hospital Boards and the Department of Nursing and Health in giving immunizations to students entering upon a Nursing career. Liver Extract and Insulin injections were given to certain students at the request of family physicians. Haemoglobin estimations and Urinalysis were performed in our quarters, and other Tests, including examination of blood, stools, nose and throat swabs, were performed by the Division of Laboratories, Provincial Board of Health.

The Health Service has through the years accumulated a valuable pamphlet library on Health Topics. Of interest is the fact that 2000 pamphlets were voluntarily taken from the racks by students.

Opportunity is taken to express appreciation of the interest which the President, Deans, Staff and Faculty Members displayed toward the Health Service. The recognition of the services performed is a source of continual satisfaction and it is our policy to co-operate in furthering the democratic ideals of education, so that students may be better equipped to assume professional and community responsibilities in later life.

Our appreciation is also extended to the Divisions of Laboratories and Tuberculosis Control of the Provincial Board of Health for diagnostic aid in the control of communicable disease.

Respectfully submitted,

J.S.Kitching, B.A.,M.D.,D.P.H.,
Director University Health Service.

REPORT OF THE INSTRUCTOR IN

PHYSICAL EDUCATION FOR MEN

Required and Voluntary Programme.

During the Session 1940-41 the gymnasium facilities were made available to the Canadian Officers' Training Corps for the purpose of augmenting the basic military programme. Each of the nine hundred men registered was required to take one hour's physical education a week. These classes were conducted by the University Instructor in Physical Education with the help of one student assistant who was assigned four of the seventeen hours a week.

In addition to the military classes, a limited voluntary programme was scheduled which included such activities as badminton, tumbling, basketball, and boxing.

Intramurals.

With military lectures being scheduled at the noon hours, the intramural committee decided to suspend the intramural programme for the year with the hope of continuing when sufficient time could be made available.

Programme Revision.

The forthcoming transfer of many of the military physical-education classes to the new Armoury will make possible a reorganization of the gymnasium time-table. The new arrangement will afford a broader programme of activities for those interested in special phases of physical education. Time will be available for advanced classes, recreational periods, and special individual instruction.

Increased Facilities

Those interested in cricket will find it possible to practice indoors during the term with nets being set up in the new Armoury.

Small fibre mats are being obtained for indoor golf practice, and two indoor driving ranges are being constructed in the stadium, a feature which can be enjoyed by both faculty and students.

Future Plans

The new Session 1941-42 holds real promise for Physical Education in general. All the military classes will be handled by student instructors, with the Physical Education Director giving a special course for instructors and supervising the work of the student assistants. Intramurals will be resumed with the cancellation of military noon hour lectures. In addition, a golf programme is being introduced which will include free instruction, special outside lectures, indoor practice equipment, and a low rate on the golf course

Respectfully submitted

M. L. VAN VLIET

Instructor in Physical Education
for Men.

REPORT OF THE INSTRUCTOR IN PHYSICAL EDUCATION FOR WOMEN

Registration.

The women continued their enthusiastic support of the Physical Education activities throughout the Session 1940-41.

Registration of formal class work was as follows:

Gymnasium Classes	75
Badminton Classes	108
Archery Classes	165
Dancing Classes	65
Recreation Leadership Classes	52

Women also registered in large numbers for informal activities such as riding, golf, ping-pong, tennekoit, archery, badminton, as well as for intramural games. One hundred and fifty women registered for a course in sports education which could not be fitted into the programme. The total registration for the session was just over 550.

Programme.

The morning periods were devoted to class instruction, and the afternoon periods to informal activities such as student meetings, interviews and general organization.

(a) Classes

Gymnasium class instruction was modified to meet the increased need for women students to keep fit at a time when wartime duties make extra demands upon their time and strength.

Dancing class instruction included fundamental rhythms, folk, national and tap dancing.

Elementary Folk Dancing classes were conducted for prospective teachers and for the women in the Teacher Training Course. The course included rhythms, folk, character, and tap dances suitable for use in schools and playgrounds, correlation of dancing with other subjects, dancing for boys, and method and programme planning.

Folk Dancing classes were given for the women in attendance at the Rural School Course under the Department of University Extension.

Classes in badminton, archery, and group and team games were conducted

A class in Play and Playgrounds was given for teachers and women entering social and recreational work. This course included the theory of play,- its nature and function, adaptation of activities to various age groups, programme making, management and supervision of playgrounds, and playground activities.

(b) Sports.

An intramural programme of games was carried out during the fall and winter term. Classes which entered teams for competition were First, Second, Third and Fourth Year Arts and Science, Teacher Training Course, Agriculture, Commerce and Nursing and Health. There were also mixed teams of men and women, and teams consisting of members of the sororities. The series included tournaments in volley ball, badminton, archery, ping-pong, tennekoit, and basket ball free-throw competition.

Weather conditions prevented the University team from entering the intercollegiate Archery Tournament this year. A member of our team, who was able to shoot the round between showers, made the highest individual score of the tournament. It was, therefore, an added disappointment that our team was unable to enter and have the advantage of her fine score.

Western Washington College signified its desire to continue the "Guest Days" which had been held with such success the previous year. As national defence regulations made it difficult for the University teams to go to Bellingham, the Western Washington College teams visited our campus. The following activities constituted the programme for the day: luncheon in the Brock Memorial Building, volley ball, badminton and archery tournaments, and tea in the gymnasium.

The Instructor in Physical Education for Women assisted in:-

The Women's Athletic Directorate.

The training of coaches and the organization of intramurals.

The giving of co-operation and counsel in all actions of the Women's Athletic Association.

The training for recreational leadership which was given in the Rural School Course under the Department of University Extension.

The charting of women students for posture, with suggestions for corrections.

The giving of counsel in matters concerning professional standards and opportunities in Physical Education and Recreation.

Respectfully submitted,

GERTRUDE E. MOORE,

Instructor in Physical Education for Women.

REPORT OF THE OFFICER COMMANDING CANADIAN OFFICERS' TRAINING CORPS UNIVERSITY OF BRITISH COLUMBIA CONTINGENT

1. General.

Because the date of commencement of the Contingent's training year coincides very closely with that of Canada's entry into the war, this report covers the main military activities at the University during the second year of the war

During this period the two outstanding events for the Contingent were the inauguration of compulsory military training for all physically-fit male students of the University and the commencement of construction of the Armoury.

The gravity of the international situation and the resulting need for an ever increasing number of technically trained young men in the armed forces, both overseas and at home, and in the war industries of the nation were reflected in the increased earnestness of the students not only in their University studies but also in their military training. Whereas it had been expected that the transition from a voluntary to a compulsory training programme would create a number of administrative problems some of which might require disciplinary action, it is gratifying to note that such was not the case and, with a few minor exceptions, the students taking the compulsory training showed the same keenness in their military studies and the same willingness to co-operate as those who had formerly taken the training on a voluntary basis. This is even more remarkable when it is considered that approximately half the men in the Unit were not equipped with boots or uniforms, that the Unit as a whole suffered from the lack of text-books and training equipment, and that throughout the winter all the practical work had to be carried on out of doors, often at night, under instructors who had had no special training for this work and who, in many cases, had not even had previous military training. That no protest was made by the men is, in itself, an indication of the high standard of discipline and morale which has always been a characteristic of the Contingent.

During the year 218 members left the Unit to go on active service. Of these, 34 enlisted in the Navy, 69 in the Army, and 115 in the Air Force. That the latter service received by far the largest number of men is not explained wholly by the fact that students wish to become pilots or observers but probably also because the air service offers more opportunity for advancement to students with University training.

2. Compulsory Military Training.

After the Dominion Government had adopted a policy of compulsory military training for young men over twenty-one years of age, representatives of the Inter-Universities Conference and of the Departments of National Resources Mobilization and National Defence met in Ottawa to consider how this policy would affect the work of the Universities and, more particularly, the supply of trained young men for war industries and the various technical branches of the armed forces. After very

careful consideration it was agreed that if the Universities would establish a programme of compulsory military training for all physically-fit male students, the government would postpone the calling up of students who might be eligible under the Mobilization Act until the completion of their University courses. The Senate and the Board of Governors of the University of British Columbia accepted the recommendations of the Inter-Universities Conference and made military training compulsory for all physically-fit male students of the University. In order that the regulation might not bring undue hardships upon any student, a special committee of the University Committee on Military Education was named to consider applications for exemption from military training. A relatively small number of applications was received by the Committee and in a few instances exemptions were granted, but in no case to students who were eligible for training under the National Resources Mobilization Act.

In the course of the year four hundred and forty students were called for either "Thirty Day" or "Four Month" Training. In all cases postponements were granted and the students were thus enabled to continue their University courses.

3. Training.

The establishment of compulsory military training caused an unprecedented increase in the number of men enrolled in the Corps. In 1938-39 the total strength was 98; in 1939-40 it jumped to 219; and in 1940-41 it reached 1738. The problem of training this number of men was made more difficult by the fact that a large percentage of the officers, N.C.O's, and trained personnel of the preceding year had left the Unit to join the armed forces.

For purposes of administration and training, the men were divided into two groups. Basic Training was given to men in the junior years who had had no previous military instruction, and Officer Training to seniors and those who had been in the Corps the preceding year or who had training with some other unit. Both groups attained a degree of efficiency, not only in the theoretical subjects, but also in the practical work, which was most gratifying when one considers the handicaps under which they worked.

Through the co-operation of the University Council on Athletics and Physical Education and the Men's Athletic Directorate, Saturday afternoons were kept free for military training. This made it possible for most of the students to do three hours of their practical work without interfering with their academic studies. Those who were unable to attend on Saturday afternoons came in the evenings and took their drill outside under floodlights. The Stadium and Gymnasium Committee assisted very greatly by placing at the disposal of the Corps the facilities of the playing fields and the Gymnasium. The latter was used seventeen periods per week for physical training, which formed an integral part of the Basic Training syllabus.

4. Camps.

Students who received a postponement of their National Resources Mobilization Act Training were required to attend a two weeks' camp at the end of the University term. Camp training was also provided for students who had written the theoretical examinations for 2nd Lieutenant.

Two camp periods were arranged, May 1st to 15th and May 16th to 30th. Artillery Training was given at Steveston and all other branches at Nanaimo. In all 830 men took two weeks' camp training.

5. Staff.

The full-time training and administrative staff was authorized by National Defence Headquarters and was supplied by Headquarters, Pacific Command. The men who were assigned to these duties were carefully selected with due regard to their character, ability, and general efficiency. The high standard of service given by this personnel contributed in a very notable way towards the success of the year's work.

6. Addition to Quarters.

Owing to the greatly increased administrative and training staff, further additions were required to the stores and offices. Through the co-operation of the President of the University, additional space was made available in the basement of the Arts Building. Two additional rooms were added. In one of these, book cases were constructed so as to provide accommodation for the United Services Institute Library.

7. Armoury.

Although the number of men trained during 1940-41 far exceeded that of any previous year, this was the first time that the Corps had not had the part-time use of one of the Vancouver Armouries. The result was that throughout the winter months all practical training for over seventeen hundred men had to be carried on out of doors. The Corps was fortunate in having uniformly good weather for the Saturday afternoon parades but was not so fortunate in regard to some of the evening periods. The pressing need for a covered drill floor and additional accommodation for officers and stores was obvious to all members of the Unit. When the C.O.T.C. was reorganized in 1927-28 a precedent was set that all officers and cadets should contribute their local headquarter training pay to Corps Funds to be used for the benefit of the Unit. It had always been accepted that an Armoury was needed and should be the first objective for the Corps funds. If by good fortune the Department of National Defence, the University, or some other organization should provide an Armoury, then it was expected that the accumulated funds would be used to provide dress uniforms for the Unit.

The accumulation of the Funds was retarded by the necessity for providing temporary accommodation. Approximately seven thousand dollars was spent on the stores, offices, and rifle range in the basement of the Arts building.

In April of this year the Fund had reached a total of approximately forty-eight thousand dollars, and it was decided to proceed with the construction of an Armoury. Consultations with the President, the Board of Governors and the University Architects took place in regard to the selection of the site, the provisions

of the services, and the appointment of the holding trustees. The District Engineer Officer offered to prepare the plans and specifications. On July 31st, Armstrong and Monteith Construction Company were awarded the contract for the building at a cost of $45,676.00. Previously the Provincial Government had made a grant of $7,500.00 to take the University power, heat, water and telephone services to the building.

The provision of this very much-needed accommodation should add greatly not only to the efficiency of the training but also to the interest of the student body in military science.

8. Acknowledgement.

The Commanding Officer wishes to record his thanks and appreciation for the assistance and co-operation afforded him by the Chancellor, the General Officer Commanding Pacific Command, the President, the Board of Governors, the Committee on Military Education, the Faculty Council, the General Staff Pacific Command, the Officer Commanding Vancouver Defences, the District Engineer Officer, the attached Administrative and Training Staff, members of the University Staff and, finally, all officers and cadets of the Unit.

Respectfully submitted,

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Lieutenant-Colonel,
Commanding U.B.C. Contingent, C.O.T.C.

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