PROVINCE OF BRITISH COLUMBIA
DEPARTMENT OF EDUCATION

PROVINCIAL MUSEUM
of NATURAL HISTORY
and ANTHROPOLOGY

REPORT FOR THE YEAR 1956

VICTORIA, B.C.
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1957

To His Honour FRANK MACKENZIE ROSS, C.M.G., M.C., LL.D.,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Provincial Museum of Natural History and Anthropology for the year 1956.

L. R. PETERSON,
Minister of Education.

Office of the Minister of Education,
June, 1957.

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY,
VICTORIA, B.C., June 12th, 1957.

The Honourable L. R. Peterson,
Minister of Education, Victoria, B.C.

SIR,—The undersigned respectfully submits herewith a report of the activities of the Provincial Museum of Natural History and Anthropology for the calendar year 1956.

I have the honour to be,
Sir,
Your obedient servant,

G. CLIFFORD CARL,
Director.

DEPARTMENT OF EDUCATION

The Honourable LESLIE RAYMOND PETERSON, *Minister.*
H. L. CAMPBELL, B.A., M.Ed., LL.D., *Deputy Minister and Superintendent.*

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY

Staff

G. CLIFFORD CARL, Ph.D., *Director.*
CHARLES J. GUIGUET, M.A., *Curator of Birds and Mammals.*
WILSON DUFF, M.A., *Curator of Anthropology.*
ADAM F. SZCZAWINSKI, Ph.D., *Curator of Botany.*
J. E. MICHAEL KEW, B.A., *Assistant in Anthropology.*
FRANK L. BEEBE, *Illustrator and Museum Technician.*
MARGARET CRUMMY, B.A., *Senior Stenographer.*
BETTY C. NEWTON, *Museum Technician.*
SHEILA Y. NEWNHAM, *Assistant in Museum Technique.*
ELEANORE MCGAVIN, *Clerk.*
GEORGE A. HARDY, *Curator of Entomology* (part time).
E. J. MAXWELL, *Attendant.*

Totem-pole Restoration Programme

MUNGO MARTIN, *Chief Carver.*
DAVID MARTIN, *Assistant Carver.*
HENRY HUNT, *Assistant Carver.*

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY

Objects

(*a*) To secure and preserve specimens illustrating the natural history of the Province.

(*b*) To collect anthropological material relating to the aboriginal races of the Province.

(*c*) To obtain information respecting the natural sciences, relating particularly to the natural history of the Province, and to increase and diffuse knowledge regarding the same.

(Section 4, " Provincial Museum Act," chapter 273, R.S.B.C. 1948.)

Admission

The Provincial Museum is open to the public, free, on week-days, 9 a.m. to 5 p.m., and on Sunday afternoons, 1 p.m. to 5 p.m.

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REPORT OF THE PROVINCIAL MUSEUM

FOR THE YEAR 1956

REPORT OF THE DIRECTOR

NEW DISPLAYS AND SPECIAL EXHIBITS

Several minor additions to the exhibition material were made in 1956. A newly completed habitat case featuring the fisher was added to the mammal department and a display forming an introduction to the Indians was installed. The latter was designed and prepared by Mr. J. E. M. Kew, a new member of our staff.

A display-case containing an exhibit of sponges and corals and another enclosing models of Pleistocene elephants were redecorated and rearranged with the help of Miss Betty Newton.

Several new exhibits, mostly of a temporary nature, were prepared and installed in the botanical section through the joint efforts of Dr. Szczawinski and Mrs. Newnham. One of these featured spring wild flowers as depicted by various outstanding artists and illustrators in this field. A second display, called "Mushroomorama," was featured during International Museums Week (October 7th to 13th), culminating in "open house" held on October 12th to which the general public was invited. Other exhibits on this occasion included posters prepared by local school-children for a national contest, special botanical displays, a demonstration of the use of airbrush in illustration, and Indian canoe-carvers at work. Awards in connection with the poster competition were presented to Marilyn Strouts, Central Junior High School; Michael Cullin, Willows School; Edith Boon, Strawberry Vale School; and Vicky Vigar, Oaklands School.

Enlarged models of developing seeds and roots were prepared by Miss Newton for use in a teaching display also arranged by the herbarium staff.

A curved background and other accessories suitable for a habitat display of the fisher were prepared by Mr. Frank Beebe, to complete another unit in the small-mammal hall. The taxidermy for this exhibit is by Mr. A. J. Braun, of Oliver, B.C.

A number of other small mammals, including pikas and mantled groundsquirrels, were mounted by Mr. C. J. Guiguet for an additional display unit to be prepared in 1957.

FIELD WORK AND OUT-OF-PROVINCE TRAVEL

In co-operation with the University of British Columbia, the Museum sponsored a field party to the northern portion of the Province for the purpose of making an extensive plant and small-mammal collection. Representing the Museum were C. J. Guiguet and Adam F. Szczawinski, who were joined by T. M. C. Taylor and Marc Bell, of the Department of Biology and Botany from the University. Leaving by Museum truck on June 4th, the party drove northward via the John Hart Highway and the Alaska Highway to the Cassiar area and then to the area adjacent to the Haines Cut-off, returning to Victoria by July 30th. Details are given in following sections of this Report.

Sponsored jointly by the University of British Columbia and the Provincial Museum, Mr. Michael Kew, of the Museum staff, travelled to Rivers Inlet and to Hope Island, where he prepared several totem-poles and other carvings for shipment. For part of the time he was assisted by David Martin, an Indian carver from the Thunderbird Park programme.

With the generous assistance of the Royal Canadian Navy through the kindness of Rear-Admiral Hugh F. Pullen, Flag Officer, Pacific Coast, four staff members visited Anthony Island in the Queen Charlotte Islands group as reported in further detail later.

In March the Director made a short lecture tour under the auspices of the National Audubon Society, during which he was able to visit the following institutions: Montana State College (Bozeman, Mont.); Saskatchewan Museum of Natural History (Regina, Sask.); University of Saskatchewan (Saskatoon, Sask.); and University of Alberta Museum (Edmonton, Alta.).

EDUCATION

Museum Film Programmes

The annual Saturday morning series of programmes started in 1942 for school-children of the Greater Victoria area was continued this year, as follows:—

Date	Topic	Attendance
February 25th	" Nature's Half Acre "	587
March 3rd	" Water Birds "	436
March 10th	" Beaver Valley "	468
March 17th	" Olympic Elk "	485
March 24th	" Seal Island "	492

As on many occasions in the past years, we are indebted to the Audio-Visual Education Branch of the Greater Victoria School Board for distributing the free tickets to the various schools, and to the British Columbia Electric Company for granting special travel privileges to school-children attending the lectures.

A similar series of films was presented to the general public on Sunday afternoons during the same period of time. The attendance was about 2,000 persons. We are again indebted to the British Columbia Electric Company for loan of certain films used on these programmes.

Other Lectures

During the year the Director gave lectures and film shows to more than seventy-five organizations; four of the programmes were under the auspices of the Canadian Club Council and eighteen were sponsored by the National Audubon Society. Several short instructional courses were also given to Cubs.

A course entitled " Natural History of British Columbia " was given to teachers at Victoria Summer School during the period July 4th to August 7th. The course consisted of fifteen lectures and nine field-trips.

In the field of radio and television, various members of the staff have contributed to several programmes. Except for two months when away on field work, Mr. Guiguet has continued his series of five-minute talks, " Sport Outdoors," three times a week (CKDA, Monday, Wednesday, and Friday), and Dr. Carl has appeared regularly with Inspector George Stevenson, formerly of the British Columbia Game Commission, in a weekly broadcast, " Outdoors with the Experts " (CJVI, Thursday).

In connection with International Museums Week in early October, Messrs. Carl, Duff, Guiguet, and Szczawinski were featured in "Almanac " over CBUT (television), and in November the Museum's trip to Anthony Island in co-operation with the Royal Canadian Navy formed part of " News Round-up " over the national television network.

The Junior Natural History group, sponsored by the Victoria Natural History Society, continued to meet weekly during the school-year under the direction of Miss Betty Newton. We are again indebted to several persons who have contributed to the programme in various ways.

PUBLICATIONS

Publications continue to be an important contribution of the Museum. Sales of popular types, particularly of the handbook series, have increased in 1956, especially with the appearance of Handbook No. 11, " The Mammals of British Columbia," by I. McT. Cowan and C. J. Guiguet, and Handbook No. 12, " The Ferns and Fern-allies of British Columbia," by T. M. C. Taylor. Reprints of " Fifty Edible Plants " (Handbook No. 1) were obtained, and a start has been made in revising " The Fresh-water Fishes of British Columbia," which has been out of print but in considerable demand.

The manuscript and illustrations for a handbook, " The Common Bivalve Molluscs of British Columbia," by D. B. Quayle, were almost completed, and a start has been made on one featuring introduced animals of the Province and one on the gulls, terns, and jaegers, which are planned for publication in 1957.

In the anthropological series a combined Memoir (Nos. 2 and 3) was published containing " Katzie Ethnographic Notes," by Wayne Suttles, and " Faith of a Coast Salish Indian," by Diamond Jenness, and an intensive study, " Prehistoric Stone Sculpture of the Fraser River and Gulf of Georgia," by Wilson Duff, was prepared for publication in Anthropology in British Columbia, No. 5, to appear early in 1957.

The following publications by Museum staff members have appeared during the year:—

By Frank L. Beebe—

" Our Merlins." Victoria Naturalist, Vol. 13, No. 3, pp. 34–36.

By G. Clifford Carl—

" By-the-wind Sailors." Victoria Naturalist, Vol. 13, No. 6, pp. 66–67.

By G. Clifford Carl and C. J. Guiguet—

" Notes on the Flora and Fauna of Bunsby Islands, B.C." Report of the Provincial Museum for 1955, pp. 31–44.

By Wilson Duff—

Three maps in British Columbia Atlas of Resources. Maps 12, 13A, 13B.

Native Indians: Distribution of Ethnic Groups 1850, Population and Economic Life 1835, Population Trends 1835–1954.

" An Unusual Burial at the Whalen Site." Research Studies of the State College of Washington, Vol. 24, No. 1, March, 1956, pp. 67–72. Pullman.

" Thunderbird Park " (revised edition). British Columbia Government Travel Bureau.

By Wilson Duff and Michael Kew—

Selected List of Publications pertaining to the Indians of British Columbia. Provincial Museum.

By Herbert C. Taylor, Jr., and Wilson Duff—

" A Post-contact Southward Movement of the Kwakiutl." Research Studies of the State College of Washington, Vol. 24, No. 1, March, 1956, pp. 56–66. Pullman.

By C. J. Guiguet—

" Enigma of the Pacific " (The Marbled Murrelet). Audubon Magazine, July-August, 1956, pp. 164–167.

" Some Recent Bird Notes from the Provincial Museum." Victoria Naturalist, Vol. 12, No. 7, pp. 79–81.

By I. McT. Cowan and C. J. Guiguet—

" The Mammals of British Columbia." Provincial Museum Handbook No. 11, pp. 1–413.

By G. A. Hardy—

" The Frog and the Centipede." Victoria Naturalist, Vol. 12, No. 9, p. 101.

By Adam F. Szczawinski—

"Mushrooms for Beginners." Victoria Naturalist, Vol. 12, No. 7, pp. 74–76.

"Dogwood, the Floral Emblem of British Columbia." Victoria Naturalist, Vol. 13, No. 1, pp. 8–11.

"Lichens within Your Reach." Canadian Alpine Journal, 1956, pp. 102–107.

ATTENDANCE

The number of visitors to the Museum in 1956 is summarized as follows:—

	Registered	Estimated
January	976	1,410
February	1,130	1,507
March	1,032	1,376
April	2,068	2,757
May	2,918	3,890
June	6,017	8,019
July	12,634	16,858
August	12,509	16,675
September	4,827	6,436
October	1,684	2,245
November	857	1,145
December	685	923
Totals	47,337	63,241

To the estimated total there should be added 6,278 persons attending the spring film programmes and 1,506 persons attending as school classes or organized groups, making a grand estimated total of 71,025.

The attendance record for the month of July has been broken down by Mr. Maxwell as follows:—

Residence	Registration	Residence	Registration
British Columbia	2,502	Washington	2,033
Alberta	605	Oregon	1,063
Saskatchewan	359	California	2,599
Manitoba	212	Other States	2,270
Ontario	539	Alaska	4
Quebec	130	Great Britain	80
New Brunswick	23	Other countries	180
Nova Scotia	29		
Prince Edward Island	4	Total	8,229
Newfoundland	2	Grand total	12,634
Total	4,405		

The sum of $441.49 collected by the Solarium donation-box during the year was turned over to the Queen Alexandra Fund for Crippled Children.

STAFF CHANGES

As an assistant in anthropology, Mr. Michael Kew joined our staff on August 1st. With postgraduate training in anthropology taken at the University of British Columbia and having completed several seasons' field work for the Fisheries Research Board of Canada, he brings with him both theoretical and practical experience. He will be assisting in the setting-up of displays, in instructing visiting school classes, in carrying on anthropological work in the field, and in other activities.

As student assistants in the botanical office, we were pleased to have the help of Miss Martha Ann Todd and Mr. Fen Lansdowne, who mounted, labelled, and catalogued many plant specimens during July and August.

REPORT OF THE CURATOR OF BOTANY

HERBARIUM

Recorded accessions for the year 1956 amounted to 2,337 sheets of specimens, bringing the total to 27,208.

A great amount of time was spent in mounting, labelling, and checking material collected in previous years. Among these were important British Columbia plants from the earliest collections, from the late 1800's and the early 1900's. These were partly checked, labelled, and mounted. We were very fortunate to be able to incorporate into our herbarium the extensive collections of J. R. Anderson, W. B. Anderson, I. McT. Cowan, W. J. Eyerdam, J. Fletcher, G. A. Hardy, J. K. Henry, C. F. Newcombe, C. Tice, and many others.

In 1956 the herbarium obtained plant material from the following collectors: J. G. N. Davidson (62 lichens), L. B. Davies (90), Keith Illingworth (420), N. Putnam (150), L. G. Sugden (158), and W. A. Weber (134). The above-mentioned collections were donated to the herbarium. We acknowledge them with thanks. They are a valuable addition.

The herbarium offers to the volunteers detailed instructions and material needed for field work. So far we have been very fortunate in lining up an extensive programme for the coming year, and we expect to achieve quite a lot by using this scheme.

Considering the ever-increasing demand for British Columbia flora, it would seem to be of great importance and urgency to collect more, particularly in those parts of the Province previously not botanized or only fragmentarily covered, and to encourage botanists and other interested parties to help in this regard. In this way we can increase our collection and also obtain new locality records and can learn more of the distribution of species.

The herbarium has provided services for the general public and also for various government offices, including the Forest Pathology Laboratory, and Experimental Farm at Saanichton for the Federal Government, and Agriculture, Horticulture, Plant Pathology, Field Crops, Forest Research, and Parks Branch for the Provincial Government. Since these departments have no botanists on their staffs and have no herbaria, they have used the facilities of the Provincial Museum herbarium for their botanical needs.

In collaboration with the Parks Division of the Forest Service, it has been planned to make a botanical survey of the Provincial parks. The herbarium has offered to identify the material collected, so that, in time, a list of all the vegetation in these parks will be made. The collection thus obtained will be a valuable addition to our herbarium. This, of course, is a large-scale project but is of great importance and will be a beginning of botanical research in the Provincial parks.

During the summer the herbarium was able to obtain the help of two students—Mr. Fen Lansdowne, from June 18th to August 31st, and Miss Martha Ann Todd, from June 25th to August 24th.

These two students were a great help in mounting, labelling, and shelving plants, which were moved to new storage-cases. It is planned to continue this work next summer.

Supervision of the technical work in the herbarium was very efficiently attended to by Mrs. S. Newnham.

PLANT EXCHANGE

For the first time it was possible to establish a more extensive exchange of duplicates. Approximately 1,000 British Columbia plants were exchanged with various universities, government botanical institutions, and private collectors.

Most of the material was sent to the University of British Columbia; Science Service, Ottawa; and to Dr. P. O. Schallert, Florida.

(Photo by Cecil Clark.)

Preparation of one section of "Plants in Action."

CHANGING EXHIBITS

As in the previous year, an effort was made to present changing exhibits of educational value and special note.

"British Columbia Flora in Drawings and Paintings" was opened in December, 1955, and remained till March of 1956. Artists for this exhibit are mentioned in the 1955 Annual Report.

The second exhibit was "British Columbia Orchids in Drawing and Paintings" and included the work of I. Abercrombie, T. C. Brayshaw, and G. Weber. This exhibit was then replaced by "British Columbia Spring Flora in Drawings and Paintings," which

showed the work of I. Abercrombie, T. C. Brayshaw, M. Heathfield, G. Kuthan, S. Stoker, and Museum artists F. L. Beebe and B. Newton. This exhibit closed the series of artistic and scientific drawings of our native plants.

"Plants in Action" was the Museum's first attempt at presenting, in a popular way, complicated life processes in plants. This exhibit was composed of three sections:—

(1) "From Seed to Plant," showing the anatomy of seeds and processes of germination of two plants—corn and bean—representing monocotyledon and dicotyledon plants. Enlarged models of seeds and their germination stages were done accurately and successfully by Miss B. Newton.

(2) "Photosynthesis and Respiration." The physiological changes and chemical reactions were illustrated by simple diagrams.

(3) "Roots in the Soil," showing various stages of root development and their behaviour in the soil.

In connection with Museum Week sponsored by UNESCO, as an international campaign for museums, a special large exhibit "Mushroomorama" was arranged. About 120 species of mushrooms were represented. These authentic models were displayed in their natural habitat. This exhibit was a great success and aroused a great deal of interest. We were very fortunate to obtain this valuable display material from the following sources: University of British Columbia (Leon Koerner collection of wooden models); Mrs. L. O. Madison, Port Angeles (ceramic models); and the Federal Forest Pathology Laboratory (forest diseases). Also included in the display were wax models made by former Museum artist Mrs. L. Sweeney.

Mr. J. Lort, Director of the Victoria Public Library, kindly allowed us sidewalk display-space to show some mushroom models, with reference to Museum Week. Another exhibit in connection with this was arranged in the Provincial Library through the courtesy of Mr. W. E. Ireland, Provincial Librarian and Archivist. This consisted of twenty-four airbrush paintings by F. L. Beebe, ceramic models by Mrs. L. O. Madison of Port Angeles, and popular and scientific literature dealing with fungi.

A display of "British Columbia Coniferous Trees and Cones" with accompanying maps showing their distributions was the last changing exhibit in the botanical section.

In view of the educational value, it is planned to enlarge in the future the display of "Plants in Action" by adding several additional sections, presenting other life processes.

At the same time as the programme of changing exhibits was under way, wide permanent improvements of the exhibits were started. It is intended to build up the exhibit "From Seed to Plant" to cover the entire plant kingdom. This kind of permanent exhibit will give a comprehensive review and will no doubt have an educational value.

EXTENSION WORK

An effort was made to start a series of illustrated lectures to popularize botanical knowledge concerning our Province. Having this in mind, illustrated lectures were given, discussion groups attended, and several demonstrations using living specimens were presented to Scout and Guide groups.

The main lecture topic was "Flora of Northern British Columbia," illustrated by a series of coloured slides taken during a biological survey to Northern British Columbia in the summer of 1956. This service was at the disposal of the Victoria Natural History Society, P.-T.A. and church groups, garden clubs, agricultural and horticultural associations, and other professional and social clubs.

OTHER ACTIVITIES

The exhibit of native plants was maintained as usual, with the emphasis on distribution and necessity of conservation.

Other duties were the identification of many large collections of mosses, lichens, and other plants, either sent to or brought into the Museum. It should also be mentioned that in the fall, mushrooms are arousing greater interest and consequently take up a considerable amount of the botanist's time, dealing with their identification and giving instructions concerning their edibility. It is planned next fall to arrange in the Museum a series of lectures and demonstrations entitled "How to Know and Collect Your Mushrooms."

ACKNOWLEDGMENTS

Space does not permit a listing of the numerous volunteers, contributors, and helpers who made it possible for the botanical section to accomplish the extensive work of many changing exhibits in 1956 and to add considerably to the herbarium collection. Nevertheless, the following should be mentioned in appreciation of their work and enthusiasm: Dr. T. C. Brayshaw, Professor L. J. Clark, Mr. J. G. N. Davidson, Mr. L. B. Davies, Mr. K. Illingworth, Mr. W. E. Ireland, Mr. J. Lort, Mrs. L. O. Madison, Miss M. C. Melburn, Dr. H. A. Senn, Mr. L. G. Sugden, Dr. T. M. C. Taylor, Dr. W. Ziller. Also special thanks are due to the Museum Director and to the staff artists, Mr. F. L. Beebe and Miss B. Newton.

FIELD WORK AND RESEARCH

During the summer of 1956 the Provincial Museum and the Department of Biology and Botany, University of British Columbia, carried out a biological survey of chosen areas in Northern British Columbia. The party consisted of C. J. Guiguet and the Curator of Botany, from the Museum; T. M. C. Taylor, head of the Department of Biology and Botany at the University; and M. Bell, a forestry student.

Realizing the vast area of Northern British Columbia and the limited time at our disposal, we decided to choose three districts for collecting and for a biological survey. These were: (1) Summit Pass, Mile 392, Alaska Highway, the highest elevation being 4,134 feet (from June 9th to June 13th, 1956); (2) Cassiar district (June 16th to July 1st, 1956); and (3) Haines Road (July 4th to July 21st, 1956).

From each camp, excursions were made by truck or on foot to many points of particular interest. Fragmentary collections, observations, and notes were also made on the road in between the main areas of study, and it is intended to include them as well in the final report.

The botanical survey dealt mainly with vascular plants, particularly the distribution and ecology of the most significant types of vegetation along the Alaska Highway, in the Cassiar Mountains, and in the Haines Cut-off country. The botanical collection totalled over 1,700 numbers, with sufficient material for four complete sets.

The party assembled at Vancouver on June 4th and travelled north by Provincial Museum truck through Prince George to Dawson Creek, where it arrived June 7th; from Dawson Creek we moved along the Alaska Highway to Summit Pass, where the first area of study was established.

The route from Summit Pass took us to Liard River (Mile 496), where two days were spent in studying the interesting area surrounding the hot springs. After passing Watson Lake, the party branched off the Alaska Highway en route to Cassiar, some 82 miles southwards. From Cassiar our next destination was Haines Road, the road which connects the Alaska Highway with Haines, Alaska. The road turns south at the point of Haines Junction, Mile 1,016 on the Alaska Highway.

The return journey covered the same route.

A detailed account covering the biological survey and research results of this field work and including complete lists of plants collected, ecological observations, and conclusions will be given in a future publication.

REPORT OF THE CURATOR OF BIRDS AND MAMMALS

Field work in 1956 included small-mammal investigations along the northern boundary of the Province. The results of this expedition will be published at a later date, when more field work has been completed. In October the curator accompanied the Museum Director and the anthropologists on a short expedition to Anthony Island in the Queen Charlotte group. The Museum had a biological as well as an anthropological interest, in that Anthony Island had never been worked for small mammals. Twenty-two white-footed mice were collected. From superficial examination it appears that these rodents are not the Sitka white-footed mouse (*Peromyscus sitkensis*) which one would expect to find in that area, but that they resemble the distinctive red-bellied mice (*P.m. rubiventor*) found in the Bardswell Island group. Detailed examination and comparisons will be made and results published when the slow process of skull preparation is completed.

In December, series of mice were collected from four islands in the Oak Bay area. The populations from which these series were taken were established on the mouse-free islands in previous years by the Provincial Museum. It is planned to take additional series at about four-year intervals for examination and storage in the Museum collections, with a view to eventually gaining some knowledge on the length of time involved in the speciation of this plastic species. Field-trips on Vancouver Island were curtailed again this year due to the pressure of other commitments.

An additional twenty-eight illustrated articles on British Columbia birds were prepared for newspaper publication and eventual use in the handbook series, making a total of 158 articles so far completed in this project. " Gulls of British Columbia " was also completed in final draft, and six additional bird handbooks were prepared in rough draft. Unfortunately we were unable to publish these in the current year due to unforeseen expenses in publications. Handbook No. 11, " Mammals of British Columbia," was completed and published this year.

In 1956, 150 five-minute radio programmes were produced for a local station featuring hunting and fishing reports as well as natural history of birds, mammals, and fishes in general. Guest speakers again this year included Dr. I. McTaggart Cowan, Dr. G. Clifford Carl, Dr. David B. Turner, Dr. James Hatter, Dominion Wildlife Research Officer R. H. Mackay, Game Biologists Patrick Martin and Don Robinson, Museum technician Frank L. Beebe, Mr. Dave Gray, and several other specialists in the field of outdoor sports.

Routine curatorial activities dealing with nearly 16,000 scientific study skins of birds and mammals, specimen preparation, preparation and rearrangement of exhibits, cataloguing and indexing of material, specimen identification, lecturing, research, writing (*see* Director's report), and the host of minor activities associated with Museum work, combined with the field activities, completely utilized the biologist's time during the year 1956.

Reorganization of the bird and mammal collections was begun this year and is progressing satisfactorily with the aid of Mrs. E. McGavin.

For new exhibits and reorganization of exhibits in this department *see* the Director's report.

We wish to acknowledge the continued voluntary co-operation of the many citizens of this Province who contribute annually to our biological collections and knowledge, especially members of the Canada Department of Fisheries—Mr. A. J. Whitmore and Mr. H. E. Palmer (and Captain C. W. Earnshaw and the crew of the " Howay "); members of the Game Commission—Commissioner Frank R. Butler, Inspector George Stevenson, Game Warden R. Sinclair, Mr. Don Kiers, and Game Warden W. Webb;

Mr. Bruce Irving, of Saltspring Island; Messrs. George Hillier and Vince Maden, of Ucluelet; Mr. Bert Robson, of Atnarko; Mr. Len Newbigging, of Victoria; Mr. Don Robinson, of the British Columbia Game Commission at Nanaimo; Game Warden Charles Estlin, of Courtenay (now Inspector at Nelson); Mr. R. H. Mackay, of the Canadian Wildlife Service; Mr. Gordon Pike, of the Pacific Biological Station, Nanaimo; and Lieutenant-Commander Ernest Cassels and crew of H.M.C.S. "Brockville"; and many others whom we may have failed to mention here.

REPORT OF THE CURATOR OF ENTOMOLOGY

Curatorial duties occupy a certain proportion of the entomologist's time, necessitating a close examination of the various cabinets, table cases, and store boxes, and including such procedures as fumigation and the addition of pest deterrents to each receptacle.

Identification of a miscellaneous assortment of insects is another routine activity, along with inquiries made by the public. Many of these queries relate to household pests, biting or stinging insects, or the naming of small collections from an educational point of view.

Occasional requests by specialists for the loan of material are acceded to whenever possible.

The arrangement of the lepidoptera in classified sequence is proceeding, at intervals, between other activities.

Some time has been spent in the preparation of notes on the life-histories of certain butterflies and moths for presentation as a paper to the annual meeting of the Entomological Society of British Columbia. An article on the fauna and flora of Blenkinsop Lake area just north of Victoria has been completed for inclusion in this Report.

Work in gathering material for a handbook on the butterflies of British Columbia has been started and continued as time permits.

Accessions include several species of coleoptera presented by Mr. W. Downes, of Victoria, and by the writer, adding to our series or replacing damaged material.

I am indebted to Mr. D. Evans, of the Forest Biology Laboratory, for the identification and revision of certain Buprestidæ, and to Dr. T. N. Freeman and Dr. Munroe, of the Science Service at Ottawa, for identification kindly undertaken for me from time to time.

REPORT OF THE CURATOR OF ANTHROPOLOGY

ACTIVITIES

Field Work

As in past years the main field-trips were totem-pole survey and salvage operations. This year the main salvage project was under the direction of Mr. Kew, who joined the staff as assistant anthropologist on August 1st, while in the field. The project, undertaken in co-operation with the University and financed by Dr. H. R. MacMillan, involved the purchase, crating, and shipping of fourteen poles from Kwakiutl villages visited during the previous year's survey. Eight of the poles (houseposts from two houses) were from Gilford Island, five (houseposts of two houses) were from Hope Island, and the other, a house frontal pole, was from Rivers Inlet. Four of the Gilford Island houseposts are now stored here; the others are in storage at the University. The transportation of the poles was provided by British Columbia Packers Limited.

In October, thanks to the Royal Canadian Navy, we were able to visit the deserted Haida village of Ninstints on Anthony Island, near Cape St. James. This is the last village on the Queen Charlotte Islands that still contains any sizeable number of totem-

poles. Three dozen poles of various types still exist on the site. Most of these are very badly weathered and decayed, but parts of about a dozen are still sound enough to be salvaged. As complete a record as possible was made in the note-book and on film, although only one afternoon was spent ashore. Negotiations are now under way for the purchase and removal of the poles. We are very greatly indebted to Rear-Admiral Hugh F. Pullen, Flag Officer, Pacific Coast, for making this trip possible, and to Lieutenant-Commander E. S. Cassels and the crew of H.M.C.S. " Brockville " for their hospitality aboard ship and their assistance in carrying out our mission. The trip received considerable publicity across Canada on radio and television.

On our return, we recommended to the Parks Branch of the Forest Service that Anthony Island be given legal protection comparable to other village-sites which were made Indian reserves. The island has since been designated as a Class "A" Provincial park.

Education

Educational services inside the Museum continued to increase. Forty school classes from the Greater Victoria area, totalling about 1,250 students, made supervised visits and were given talks and demonstrations of Indian material. Four more organized groups (123 persons) were also given talks in the Museum or Thunderbird Park. The usual large number of casual visitors, including visiting colleagues, were given individual attention.

Outside the Museum, the curator gave ten lectures and film shows on Indian subjects to various groups, including, for example, The Overseas League, Esquimalt Lions Club, Nanaimo University Women's Club, and B.C. Indian Arts and Welfare Society. The curator also took part in six radio broadcasts, including a fifteen-minute CBC talk, and with other members of the staff appeared on the "Almanac" television show from Vancouver.

Exhibits

Considerable work was done on the anthropological exhibits throughout the year. A number of old cases were discarded and the windows in the exhibition rooms were covered to cut down reflections and make the best use of the new lighting. New displays were installed in a large number of the cases. From mid-March until the end of May a number of displays were in disarray because much of the material was on loan to the Vancouver Art Gallery, but this provided an opportunity for displaying much material formerly in storage.

Plans for the construction of new cases and a major reorganization of the Indian exhibits were completed and blueprinted. As planned, construction was to begin on October 1st, but because of delays beyond our control no start had been made by the end of the year. As an experiment, the large wall-case in the entrance-way to the Indian rooms was converted by the installation of a large fluorescent fixture to give inside lighting. Mr. Kew installed a display entitled " Indians of To-day." The results are striking, and it is unfortunate that we are unable to alter the other cases in this way.

An outstanding exhibit in preparation is a scale model of a section of the Haida village of Skedans as it was in 1870. Mr. John Smyly, of Victoria, has made models of three houses, several totem-poles, canoes, and human figures, working from old photographs and measurements made by the curator in 1953. A special case will be constructed for this exhibit.

Loans

In the spring a large amount of our Indian material was sent on loan to the Vancouver Art Gallery, where it formed part of a large and important exhibition of Coast Indian arts and crafts. The exhibition was called " People of the Potlatch " and was spon-

sored jointly by the University and the Art Gallery. Our contribution consisted of more than 250 specimens. Many of these had first to be photographed, and thirty-six of these were used as plates in the illustrated handbook describing the exhibition. In addition, the curator spent the period from March 31st to April 9th in Vancouver assisting with the installation of the exhibition (and gaining experience in display techniques). The satisfaction derived from seeing our material effectively displayed in new and modern surroundings more than compensated for the time and effort taken and the temporary disruption of our own exhibits.

Two additional loans were made during the year, of small amounts of material. One was made to the Victoria Public Library and the other to the Victoria Folk Festival.

Publications

Within the year *Anthropology in British Columbia, Memoirs No. 2 and 3,* were edited, published, and distributed. *Anthropology in B.C., No. 5,* containing the curator's study of prehistoric stone sculpture, was also completed and sent to press. The *British Columbia Atlas of Resources,* published during the year, contained three maps, compiled by the curator, on the distribution, population trends, and economic life of the Indians of the Province. Two other short articles were published elsewhere. An annotated list of publications on the Indians of British Columbia was prepared and made available.

Miscellaneous

Other routine work in the Museum was carried on as usual. Correspondence, the reception of visitors, the care and accessioning of collections, and the care of the photographic file are duties which demand considerable time. Soon after joining the staff, Mr. Kew undertook a thorough reorganization of the storage collections, which are now in his hands. The curator made several business trips to Vancouver, and every effort was made to maintain close relations with other institutions.

TOTEM-POLE RESTORATION PROGRAMME

From January to mid-April, Mungo Martin, David Martin, and Henry Hunt were engaged in carving the world's tallest totem-pole in Thunderbird Park. This project was sponsored by the Victoria Daily Times and financed by donations from individuals and companies. We contributed the use of our facilities and the direction of the carving. The pole is an original and authentic design by Mungo Martin illustrating the origin myth of one of the Kwakiutl clans from which he is descended. It bears more than 127 feet of carving. Upon completion, the pole was given to the City of Victoria and erected in Beacon Hill Park, where it was formally dedicated on July 2nd.

Beginning on April 16th, the carvers were employed again in our programme. They worked steadily throughout the rest of the year, except that Henry Hunt spent the period from May 3rd to June 21st in Vancouver repainting the totem-poles at the University. A fourth carver, William Reid, was added to the carving staff for a short period (June 11th to 23rd). Mr. Reid is a well-known artist and silver-worker of Haida descent, and the purpose of his brief appointment was to give him training in wood-carving techniques. David Martin made two short trips away, at outside expense. In August he spent a week at Hope Island assisting Mr. Kew in the totem salvage project there. In September he spent four days in Seattle as a guest of the American Institute of Park Executives at their annual conference.

The first carving project of the year was the copying of a large Haida house-front pole collected from the deserted village of Skedans in 1954. This is a superb example of Haida sculpture, and great care was taken to make the replica as exact as possible. Another project was the carving of a dugout canoe of the northern coastal type by Henry

Hunt. This canoe, 21 feet long, was copied from an old example in the collection. It will be displayed in Thunderbird Park. In addition, two copies were made of a Grizzly Bear housepost from Comox, to be used in remaking the Thunderbird Park arch. A new Thunderbird for the arch was also started. During cold weather the carvers made a number of masks for the Museum collection, and Mungo Martin completed eight in a series of water-colour paintings of mythical beings from Kwakiutl traditions. In December, work was started on a pair of 18-foot Kwakiutl totems for the City of Courtenay, to replace the pair at the entrance to Riley Park, which are badly decayed. This project is being done under a special financial arrangement.

This year, for the first time, we have been able to provide totem-poles for display in places other than Thunderbird Park. In doing so our main aim is to place them in appropriate places where they will be seen by the greatest number of people. Arrangements have been made to place two, both replicas of very fine large Haida house-front poles collected in 1954. One, the Tanoo Beaver pole, is to stand in front of the British Columbia Building at Exhibition Park in Vancouver. The other, the Skedans Grizzly Bear pole, will be placed beside the Tourist Bureau office, north of the Customs Building, at Peace Arch Park. Title to the poles is being retained by us to ensure their proper display and maintenance. We hope that this programme of putting excellent poles on display in various parts of the Province will increase the public appreciation of native art and counteract the effects of the atrocious totems so frequently seen.

A notable event during the year was a brief visit to Thunderbird Park on July 21st by His Excellency the Governor-General of Canada, the Right Honourable Vincent Massey. His Excellency took time late in the afternoon of a busy day for the unscheduled visit, and seemed delighted to meet the carvers and see their work. Mungo Martin presented him with a mask as a personal gift.

DEFICIENCIES IN OUR SERVICE

To provide a more balanced view of the adequacy of our services to the Province, we must mention several tasks in our field which we are not able to perform adequately or at all. These represent major deficiencies in Museum service.

Archæology

Industrial development and urban expansion are proceeding in the Province without any organized provision for the study of our archæological resources. Important sites are being destroyed and large areas are being flooded before they have been investigated by qualified archæologists. If industrial developments which are planned for the Rocky Mountain Trench, the Fraser River, the Chilcotin River, the Lewes River, and other parts of the Province are carried through without provision being made for archæological work, a major part of our archæological resources will be destroyed. This problem is being met in other countries by well-organized programmes of salvage archæology. At the present time we are failing in our obligation as a civilized society to study and preserve the records of man's past in our area.

We believe two measures are necessary to solve this problem. First, a qualified archæological staff should be added to the government service to survey threatened areas, discover and evaluate the sites which face destruction, and conduct the necessary excavations. Second, legislation should be passed to provide for the designation, protection, and study of important sites. One provision, for example, could make it the responsibility of private companies undertaking industrial developments to finance the salvage of a representative sample of the archæological resources which their activities threaten to destroy. Our forest and fish resources receive this sort of protection, and we strongly believe that our achæological resources should as well.

Ethnography

The older generation of Indians in the Province are taking to their graves the last large fund of knowledge of the life, customs, traditions, and arts of the native tribes. While a certain amount of this knowledge has been and is being recorded, we are keenly aware of the amount that is being lost.

Educational Services

We are also well aware of the deficiencies in our exhibits, school service, and publication programmes. We would like, for example, to be able to begin a programme of travelling exhibits so that we could serve other areas of the Province. These deficiencies are the result of present limitations of space (in a museum declared overcrowded as long ago as 1919), facilities, and staff. Any improvement in these conditions would result in greatly improved service.

ZOOLOGICAL ACCESSIONS

Mammals

By gift—

I. E. Cornwall, Victoria, specimen of ambergris.
Mrs. H. N. Sandall, Victoria, one mounted young seal.

By the staff, 327.

Birds

By gift—

David Boag, Turner Valley, Alta., one blue grouse.
A. Byatt, Victoria, one skylark.
British Columbia Game Office, one glaucous-winged gull.
Mrs. O. Eaton, 3801 Epsom Drive, one double birds' nest and eggs.
Lorne Johnson, Victoria, one pine siskin.
Mrs. Eleanore McGavin, Victoria, one horned lark.
N. L. Maynard, Victoria, collection of British Columbia birds' eggs.
Miss M. C. Melburn, Victoria, one tree-creeper.
L. P. Mores, Victoria, one cock pheasant.
J. Palmer, Sooke, one cedar waxwing.
Miss Helen Simmons, Victoria, one sparrow.

By the staff, 18.

Amphibians and Reptiles

By gift—

Mr. and Mrs. R. K. Banning, Victoria, one garter snake.
Mike Campbell, Victoria, two salamanders.
Pat Chinney, Penticton, one painted turtle.
Ed Hicks, Victoria, one lizard.
Mrs. R. P. James, Victoria, one albino snake.
Kenny Simpson, Victoria, one garter snake.
W. R. Webb, Victoria, one turtle.

Fish

By gift—

Tom Hosie, Victoria, one sculpin.
Mr. McIndoe, per Provincial Department of Fisheries, one pomfret.
S. L. Neave, Kyuquot, one quill-fish.
John Youson, Victoria, one grunt-fish.

Invertebrates

By gift—

Mrs. W. A. R. Alsdorf, Victoria, one starfish.
Mrs. W. C. Cryer, Victoria, one parasitized caterpillar.
Gerald Dent, Victoria, eggs of a marine snail, and egg case of moon snail.
Mrs. R. I. Dron, Victoria, one funnel-web spider.
Mrs. H. W. McAllister, Victoria, two cockroaches.
Eddie Powell, Victoria, two sea-urchins.
D. R. D. Ritson, Victoria, one orb-weaver spider.
Mrs. Betty Watson, Victoria, one sexton beetle.

Palæontology

By gift—

T. Butler, Victoria, one fragment of elephant bone.
Mrs. J. McTavish, Victoria, collection of fossils.
Arthur Peake, Haney, one specimen of fossil coral.

ANTHROPOLOGICAL ACCESSIONS

Haida

Argillite carvings, two. E. F. Green, Victoria. (Purchase.)
Argillite figure, beaver. Mrs. Hammond, Victoria. (Purchase.)
Argillite figure, sea-wolf. Mrs. Hammond, Victoria. (Purchase.)

Kwakiutl

Copper bracelets, five. Mrs. F. D. Howgarth, Vanderhoof.
Wooden canoe-bailer. A. F. Flucke, Victoria.
Stone sinker. Staff.
Stone hammer. Staff.
Iron fish-hook, old style. Staff.
Bows, two. E. K. DeBeck, Victoria.
Wooden box, carved and painted. E. K. DeBeck, Victoria.
Wooden masks, three. Henry Hunt, employee.
Wooden mask. David Martin, employee.

Nootka

Skeleton with fragments of matting. R.C.M.P., Ucluelet.
Skull, deformed. W. H. Forrest, Victoria.
Chipped obsidian blade. P. E. Malon, Tofino.

Coast Salish

Whale-bone club. Frederick A. Moulton, Sidney.
Bone awls, two. Mrs. J. McTavish, Victoria.
Antler wedge, fragment. Mrs. J. McTavish, Victoria.
Antler implement. Mrs. J. McTavish, Victoria.
Bone implement. Mrs. J. McTavish, Victoria.
Ground slate point. Mrs. J. McTavish, Victoria.
Ground slate blade. Mrs. J. McTavish, Victoria.
Chipped stone blades, two. Melvin G. Briggs, Victoria.
Ground slate blade. F. L. Beebe, Saanich.
Elk-antler wedge. William Herod, Victoria.

Chipped stone scraper. Jane Burrough, Victoria.
Skull. Gerald Knight, Victoria.
Chipped stone point. J. L. Geddes, Victoria.
Stone hammer, unfinished. A. F. Flucke, Victoria.
New dancer's costume. Doreen Olsen, Brentwood Bay.
Net sinker. A. L. Farley, Victoria.
Stone object. Ernest M. Allen, Vancouver.
Bone harpoon point, fragment. Lady R. Lake, Victoria.
Bone awls, three. Lady R. Lake, Victoria.
Bone object, fragment. Lady R. Lake, Victoria.
Soapstone object. Lady R. Lake, Victoria.
Ground slate projectile points, three. Lady R. Lake, Victoria.
Chipped blade. Lady R. Lake, Victoria.:
Stone sinker, unfinished. Lady R. Lake, Victoria.
Skull. W. R. Dunkley, Victoria.
Bone object, fragment. Staff.
Bone tube. Staff.
Elk-antler wedge. B. R. Lemon, Fulford Harbour.
Barbed bone point. Gerald R. Dunn, Victoria.
Stone hammer. A. C. Niehaus, Chemainus.

Interior Salish

Bird-bone drinking-tube. T. W. S. Parsons, Victoria.
Human skeletons, two. R.C.M.P., Kelowna.

Kootenay

Stone hammer. John L. Hammonds, Sirdar.

Athapaskan

Embroidered buckskin gloves. T. W. S. Parsons, Victoria.
Beaded moccasin tongue. T. W. S. Parsons, Victoria.
Beaded hat-band. T. W. S. Parsons, Victoria.
Porcupine-quill belt. T. W. S. Parsons, Victoria.
Beaded moccasins. T. W. S. Parsons, Victoria.

Miscellaneous

Snowshoes, three pairs. J. R. Unsworth, Victoria.
Eskimo adze. William Hooson, Victoria.
Eskimo pipe. D. Hurst, Victoria.
Beaded bags, three. D. Hurst, Victoria.
Beaded cloth bands, one pair. D. Hurst, Victoria.
Beaded paint-bag. D. Hurst, Victoria.
Beaded knife-scabbard. D. Hurst, Victoria.
Cup and stick game. D. Hurst, Victoria.
Snowshoes, one pair. D. Hurst, Victoria.
One photo of totem-pole. S. O. Sharcott, Kyuquot.

NOTES ON THE FLORA AND FAUNA OF THE BLENKINSOP LAKE AREA ON SOUTHERN VANCOUVER ISLAND, BRITISH COLUMBIA

By George A. Hardy, Provincial Museum, Victoria, B.C.

INTRODUCTION

In a time when rapid changes are taking place in native wildlife as a result of encroaching urbanization, it is important to place on permanent record some account of the original fauna and flora of any area before it is destroyed. An opportunity to make a small contribution along this line was afforded the writer during a series of more or less regular visits to the Blenkinsop Lake area near Victoria, B.C.

The period covered is chiefly the five years 1945 to 1950. Since the latter date considerable changes have come over the area, due to the encroachment of settlements, and especially to the construction of a power transmission-line, whereby much of the surrounding area has been drained, logged off, or otherwise devastated. With these changes much of the primeval plant cover has either disappeared or has been greatly reduced.

It is thought that a record of the flora and fauna of this period might be of some interest to future naturalists, particularly in view of the fact that the area surrounding the lake will eventually be completely built over.

GENERAL ASPECT

Blenkinsop Lake lies some 4 miles north of the City of Victoria at an elevation of 83 feet above sea-level. A reference to the map shows that the outline of the lake is roughly in the form of a narrow shoe, with the toe pointing to the south-east and the heel to the north-west. It is about one-half mile in length by one-quarter mile at its widest part, but averages much less, and covers an area of approximately 8 acres.

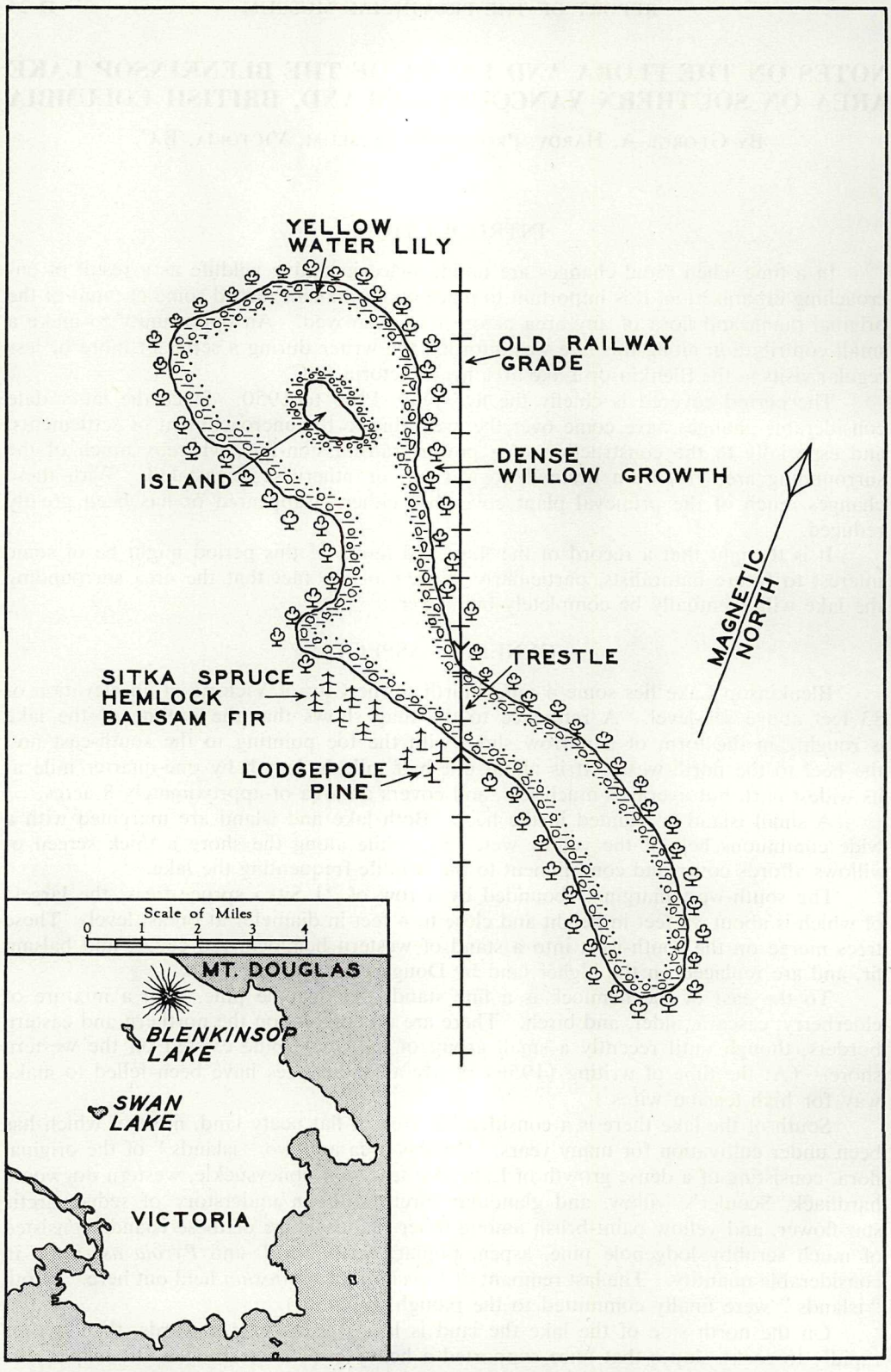
A small island is situated in the heel. Both lake and island are margined with a wide continuous belt of the yellow water-lily, while along the shore a thick screen of willows affords cover and concealment to the wildlife frequenting the lake.

The south-west margin is bounded by a row of 21 Sitka spruce-trees, the largest of which is about 80 feet in height and close to 4 feet in diameter at breast level. These trees merge on the south-west into a stand of western hemlock, red cedar, and balsam fir, and are replaced on the higher land by Douglas fir and Garry oak.

To the east of the hemlock is a fine stand of lodgepole pine, with a mixture of elderberry, cascara, alder, and birch. There are no conifers on the northern and eastern borders, though until recently a small group of lodgepole pine existed on the western shore. (At the time of writing (1956) nearly all these trees have been felled to make way for high-tension wires.)

South of the lake there is a considerable area of flat peaty land, most of which has been under cultivation for many years. On this area are two " islands " of the original flora, consisting of a dense growth of Labrador tea, twin honeysuckle, western dogwood, hardhack, Scouler's willow, and glandular birch, with an understory of sedge, arctic star-flower, and yellow paint-brush among other plants. One of these islands consisted of much scrubby lodgepole pine, aspen, poplar, cottonwood, and *Pyrola asarifolia* in considerable quantity. The last remnant of *Vaccinium cæspitosum* held out here. (Both " islands " were finally committed to the plough by 1956.)

On the north side of the lake the land is level for about 100 yards, then it rises rapidly to rocky slopes that once supported a heavy growth of Douglas fir, maple, and associated trees and shrubs.



BLENKINSOP LAKE, SAANICH, BRITISH COLUMBIA

Scale of Yards

0 50 100 400 800

At one point the remains of a railroad trestle exist where the Victoria to Sidney Railway used to cross the lake. A shallow valley connects with the north-east end of the lake, along which the grade continues. This valley is flooded in the winter, forming a chain of shallow flooded ponds, much frequented by waterfowl. (*See* Fig. 3.)

The chief biological interest in the Blenkinsop Lake area lies in the fact that it contains much peaty subsoil, a relic of the colder climate that once was prevalent over most of the Province. Associated with the peat are certain types of plants that thrive under such conditions, notably sphagnum moss, which in turn forms a basis for sundew, swamp-laurel, Labrador tea, and arctic star-flower to mention a few. The presence of Sitka spruce is particularly notable as this is the only stand so near Victoria.

Another feature of the area surrounding the lake, particularly on the southern end, is the wealth of marine shells to be found in the subsoil, to which reference is made in the section on geology.

CLIMATE

Blenkinsop Lake lies within the Gulf Islands Biotic Area. According to Chapman (1952), the area experiences a cool summer Mediterranean type of climate, characterized by a " summer deficiency of moisture, lower annual precipitation and, particularly in the Victoria-Saanich peninsula area, high totals of sunshine." The average annual precipitation is around 30 inches, falling chiefly in the fall and spring months. The mean yearly temperature for sixty-five years is 50° F.

Temperature would be the only factor affecting the lake-side plants, as moisture is permanently available in this environment, but on the slopes surrounding the lake the water content of the soil is probably the critical factor in determining the flora of the region.

GEOLOGY

Blenkinsop Lake is shallow, but it has a soft peaty bottom, extending at least to 100 feet in depth at the site of the trestle bridge, according to Newcombe (1914).

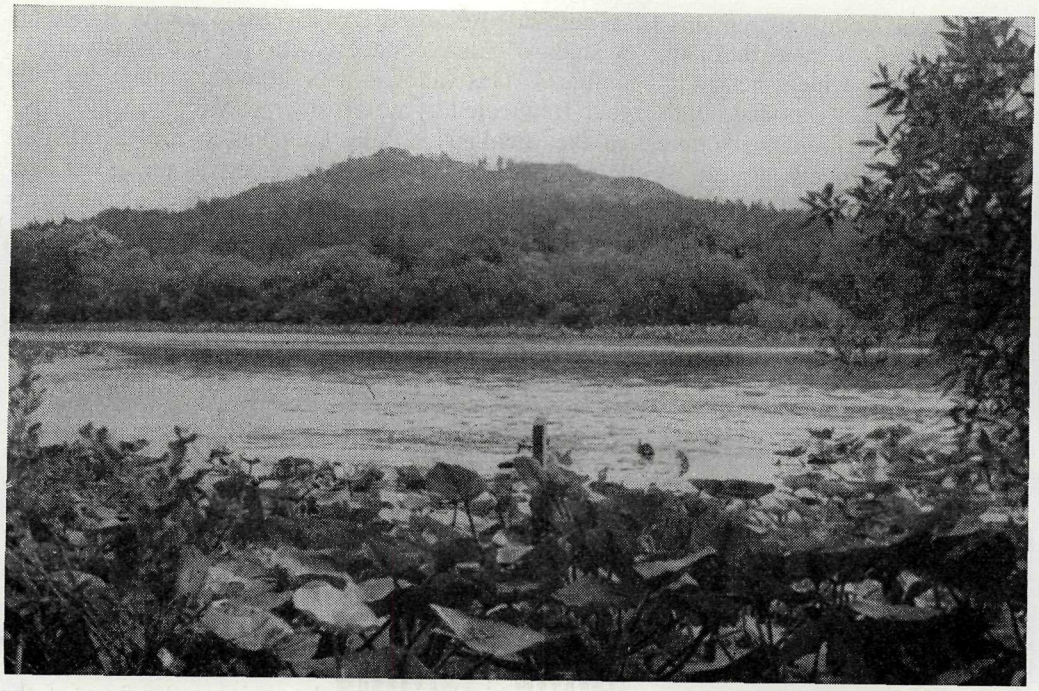
At the present time the lake is but a remnant of its former size. It is, in fact, a catch-basin, complete drainage being prevented by a rim of volcanic rock to the south. The lake and the surrounding area form part of a raised beach, in which large numbers of marine shells are embedded in a clayey matrix; above this is a layer of peat containing fresh-water shells, and finally the present-day layer of imperfectly formed peat and humus of the last phase of conversion from a marine to a dry-land habitat. This latest transformation is being materially hastened by drainage and clearing.

HISTORY

I am greatly indebted to Miss Madge Wolfenden, formerly of the Provincial Archives (now Mrs. J. H. Hamilton), and to Mr. Archie Flucke, also formerly of the Provincial Archives, for information and access to maps relating to Blenkinsop Lake and for data on the railroad.

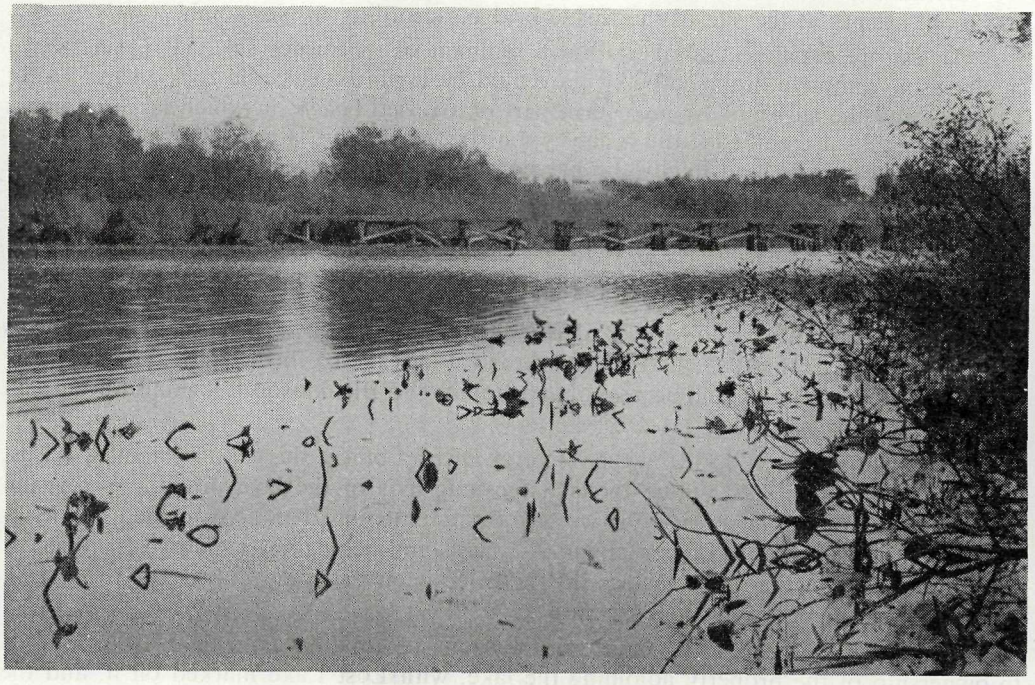
In a map issued in 1858 by the Victoria District office, this lake is labelled " Lost Lake." It shows a line running through the long axis of the lake, to form a division between two separate territories, the western tract containing 125 acres owned by Henry Von Allman, the eastern side containing 258 acres and belonging to George Blenkinsop. On earlier maps of the south-eastern district of Vancouver Island, dated 1853, by J. D. Pemberton, no name is indicated for the lake.

Another map dated 1880 has much the same information as in that dated 1858 as to ownership of the property adjoining the lake, with Lost Lake marked on it, and the same division west and east, with the numbers 66 and 51 allocated to each parcel respectively.



(Photo by G. A. Hardy.)

Fig. 2. Blenkinsop Lake looking north-east toward Mount Douglas. Pond lilies form a continuous belt around the lake.



(Photo by G. A. Hardy.)

Fig. 3. The old railroad trestle crossing the south end of Blenkinsop Lake.

In addition, a line drawn through the summit of Mount Douglas to " Kinghorn Hill " indicated the boundary between the Victoria and Lake Districts.

More recently the name Blenkinsop, originally spelled Blinkinsop, has been substituted for Lost Lake, but judging from the old maps and the originally shared ownership, Lost Lake would seem to have priority.

George Blinkinsop (1822–1904), as spelled in an original account, was a native of Cornwall. He was Hudson's Bay factor at Fort Vancouver, from which place he moved to Fort Stikine (Fort Wrangel). Later he officiated at Fort Rupert in 1850 and in 1857 travelled to Fort Coville on the Kettle River, then back again to Fort Rupert. He was appointed Indian Agent for West Vancouver Island in 1881. He died at Fort Rupert.

From this brief account of his life, there does not appear to be any record of his residence on or near the property, although it is understood that he personally chose the site of the farm residence and building on the east side of Blenkinsop Road not far from the foot of Mount Douglas.

An easy access to the Lake has for some years been by way of the Victoria to Sidney Railway grade which crosses the lake by means of a trestle bridge.

This railway had its inception in 1892, when it was promoted by a group of citizens.

In 1903 the Great Northern Pacific Railroad took over until 1919, when a further change of ownership took place. It was finally operated by the Canadian Northern Railroad, but traffic ceased about 1934, so far as crossing Blenkinsop Lake is concerned.

C. F. Newcombe (op. cit.) mentions the fact that the railroad company was trying to find solid footings for the piers, but I have not been able to ascertain the exact date of the erection of the recent trestle. (At this date, 1956, the trestle has been dismantled.)

BIOLOGY

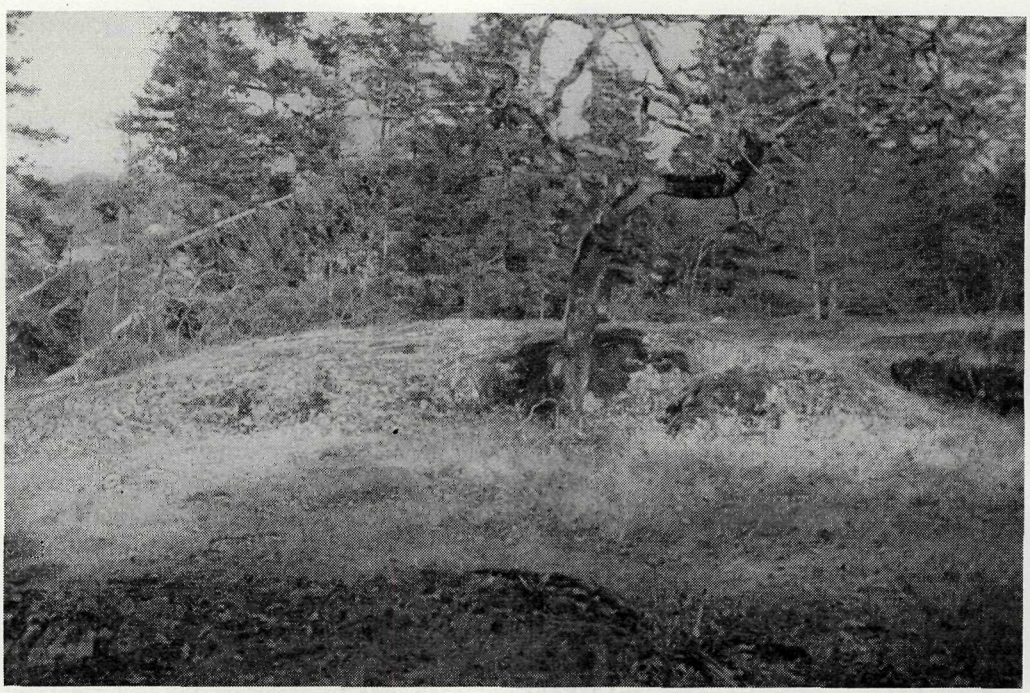
The following notes grew out of frequent visits to the lake area for the purpose of studying wild-flower succession and in order to gather living material for a wild-flower exhibit in the Provincial Museum. Visits were roughly at weekly intervals during most of the five-year period commencing in 1945, and each visit usually occupied a half-day. Examples of most of the plant and insect species were collected for identification, but no vertebrates were taken. The latter are therefore represented by sight records.

While the whole area was kept under observation as far as changes in the plant life were concerned, a few rather typical habitats were given special attention. One of these, designated a " woodland knoll," was selected for detailed study because it represented a type of habitat common to the district and was conveniently located. An account of its ecology follows, after which will be found annotated lists of the flora and fauna of the whole area.

WOODLAND KNOLL

This particular and typical rock outcrop is quite close to the south end of the lake. It is of small extent, about one-eighth of an acre, and is surrounded by a forest of mixed Douglas fir, balsam, and a few Garry oak trees. The higher surface of the rock is covered with a carpet of several species of mosses and lichens, while a sward of grasses, chiefly *Aira præcox,* carpets the hollows and seams. (*See* Fig. 4.)

In one or two places there are shallow pools of water during the winter, but these dry out in the summer, leaving a caked mud bottom. On all sides the rock slopes rapidly and merges into the general wooded area. To the south and east this slope is gradual, leaving a belt of open park-like country, which is ideal for those plants requiring light, shade, and good soil. On the north and west sides the slopes are steep and abrupt. The highest part of the knoll is about 15 feet above the lake-level.



(Photo by G. A. Hardy.)

Fig. 4. The " woodland knoll," with Garry oak and associated flora.

(Photo by G. A. Hardy.)

Fig. 5. Sitka spruce and paper birch at the south end of Blenkinsop Lake.

During the winter months the general appearance of the knoll is of a green-mantled outcrop of rock, the colour being due to the mosses and lichens which thrive at this season of the year. On the north slopes, the grey-green rosettes of stonecrop (*Sedum spathulifolium*) make a pleasing contrast with the emerald green of the mosses, while a curtain of polypody ferns drapes other sections of the rock. The dark-green rosettes of the small-leaved miner's lettuce (*Montia parvifolia*) are intermixed with those of the stonecrop, indicating a promise of a colourful flower display later on in the year.

One or two dwarfed and distorted Garry oaks accent the general barrenness of the knoll surface. In addition to the shallow depressions, there are a number of seams or cracks that break up the general surface of the rock; these are indicated by a line or row of the sheep-sorrel (*Rumex acetosella*) and hair-grass (*Aira præcox*), which find a trifle more soil here than on the adjoining rock surfaces.

As the season advances, the different species of flowers appear in succession and give character to the otherwise unpromising outlook. In turn the Easter lily, peacock, buttercup, seablush, miner's lettuce, and camas give a colourful succession of white, mauve, yellow, rose, and blue, each blending into the other as the season advances.

In the small and rapidly drying pools the tiny mousetail (*Myosurus minimus*) is associated with *Plagiobothrys medius,* while the drainage from the pool is covered with a moss-like sponge of blinks (*Montia fontana*) and the narrow-leaved miner's lettuce (*Montia linearis*). Later the yarrow and wild onion (*Allium acuminatum*) replace the early spring flowers, but these are never so noticeable. At this time also, Michael's rein orchid (*Habenaria unalascensis* var. *elata*) and the coral roots (*Corallorhiza maculata* and *C. striata*) display their colourful spikes among the bordering trees together with a patch of *Aster curtus.* When the wild onion blooms, the mosses and lichens begin to dry up in the intense heat, leaving only a drab, cracked area where all was once so green, relieved in the fall by the small pink flowers of the fall knotweed (*Polygonum spergulariæforme*) sprawling over the rocks, the last of the season's wild flowers to appear.

For a period prior to the fall rains, the parched look persists, but close examination shows the ripening pods of the lily, camas, shooting star, and others of the spring flowers, whose seeds are shed gradually during the summer as chance in the form of wind or animal disturbance shakes out the ripe seed. With the advent of the rains in September or October, the mosses and lichens revive, again covering the rocks with a mantle of greens and greys, while the seeds of the herbaceous plants sprout and in due course give rise to new plants for another generation of flowers; thus the yearly cycle of plant growth on this woodland knoll is completed.

ANNOTATED LIST OF VASCULAR PLANTS

OPHIOGLOSSACEÆ (ADDER'S TONGUE FAMILY)

Botrychium multifidum (Gmel.) Rupr. Grape Fern.

One plant was found growing near the Sitka spruce belt; others were occasionally found in the dense shade bordering the old railroad-bed.

POLYPODIACEÆ (FERN FAMILY)

Adiantum pedatum aleuticum Rupr. Northern Maidenhair.

One specimen only in the bushy growth bordering the Sitka spruce. Evidently a straggler, though at one time possibly established in the perennially moist soil.

Athyrium filix-femina (L.) Roth. Lady-fern.

Common in the alder swamp at south end of lake.

Polystichum munitum (Kaulf.) Presl. Western Sword-fern.

Common on the higher ground in the coniferous forest.

Polypodium vulgare L. Polypody.

Common on the rock-faces just south of the lake.

Pteridium aquilinum var. *pubescens* Underw. Bracken.

Common on the higher ground, and at one place at the southern end of the lodge-pole pine group at southern end of lake.

Equisetaceæ (Horsetail Family)

Equisetum hiemale L. Scouring-rush.

Occasionally along the ditches, but due to recent deepening it has now disappeared.

Selaginellaceæ (Selaginella Family)

Selaginella wallacei Hieron. Wallace's Selaginella.

Common on the rocks near south border of lake.

Taxaceæ (Yew Family)

Taxus brevifolia Nutt. Yew.

Woods near lake-shore, associated with balsam fir.

Coniferæ (Pine Family)

Abies grandis (Dougl.) Lindl. White or Balsam Fir.

Well represented in the wood bordering the south end of the lake. This is associated with hemlock, on the lower ground, and with Douglas fir higher up.

Picea sitchensis (Bong.) Carr. Sitka Spruce.

About twenty very fine trees form a row along the south border of the lake. One or two reach an estimated height of 100 feet and measure 42 inches in diameter 3 feet from the ground. This is quite a unique stand and the only one of its kind near Victoria. (Since writing the above, all but two of the trees have been cut down. Examination of the butts showed an average of sixty-five to seventy annual rings; most of them are one-quarter inch wide, indicating rapid growth. It is presumed that the trees from which these originated may have been more widely spaced over adjacent land, long since cleared off.)

Pinus contorta Dougl. Lodgepole Pine.

A very fine pine stand exists at the southern end of the lake. The trees are very well developed up to 60 feet or more in height and with full rounded crowns. Their roots are practically in the water throughout the year. A thick growth of salal forms the ground cover.

Pseudotsuga menziesii (Mirb.) Franco. Douglas Fir.

The prevailing tree on the drier slopes.

Thuja plicata Donn. Red Cedar.

One or two near the spruces.

Tsuga heterophylla (Raf.) Sarg. Western Hemlock.

A small and very restricted group occurs adjacent to, but not mixed with, the lodge-pole pine. Some of these trees are large and well proportioned.

TYPHACEÆ (CAT TAIL FAMILY)

Typha latifolia L. Cat-tail.

A small patch persists here and there at the edge of the lake.

GRAMINEÆ (GRASS FAMILY)

Aira præcox L. Little Hair-grass.

Common on rock-outcrops.

Alopecurus geniculatus L. Water Foxtail.

Damp meadow near lake. In runnels that contain running drainage-water in the winter, but which are dry in the summer and fall.

CYPERACEÆ (SEDGE FAMILY)

Carex sitchensis Prescott.

In wet places, lake border.

Scirpus validus Vahl. Bulrush.

One or two places, but generally scarce.

ARACEÆ (ARUM FAMILY)

Lysichitum americanum Hulten & St. John. Skunk Cabbage.

In the alder swamp at south end near trestle.

LEMNACEÆ (DUCKWEED FAMILY)

Lemna minor L.

Common on the backwaters of the lake and drainage-ditches. In some years the plant almost completely covers the surface of the lake in the late summer.

JUNCACEÆ (RUSH FAMILY)

Juncus bolanderi Englm.

In wet places, south end of lake.

Juncus ensifolius Wiks.

Becomes common if low-lying land is not ploughed up too frequently; it is then associated with *Mimulus guttatus, Veronica americana,* and *Myosotis laxa,* together making a bright display of contrasting colour.

LILIACEÆ (LILY FAMILY)

Allium acuminatum Hook.

On the knoll in cracks and crevices in the driest places.

Brodiæa grandiflora Smith. Wild Hyacinth.

On the knoll, in late June and July.

Camassia leichtlinii (Baker) Wats. Late Camas.

On the woodland knoll.

Camassia quamash (Pursh.) Greene. Early Camas.

Common on the woodland knoll.

Erythronium oregonum Appleg. Easter Lily.

At one time abundant in the open woods adjoining the lake; becoming scarcer every year.

Fritillaria lanceolata Pursh. Rice Root.

It used to be locally abundant in open oak woods, but, like many other wild plants, it is fast becoming scarce to absent altogether, due primarily to grazing.

Lilium columbianum Hanson. Wild Tiger Lily.

Rare; among the brush at edge of woods. (It has probably disappeared altogether now.)

Maianthemum dilatatum (Wood) Nels. & Macbr. Wild Lily-of-the-valley.

This species forms dense carpets of leaves in the shade of the spruces and lodgepole pines, where the ground is cool and moist. The leaves first show up as little green squills that pierce the soil; these soon unfurl and expand into the broad green leaves. The inflorescence resembles a tiny white candle; the many small flowers finally give way to berries, first grey then bright red.

Smilacina stellata (L.) Desf. False Solomon's Seal.

Woodland borders.

Zigadenus venenosus S. Wats. Poison Camas.

On the rocky outcrop, referred to as the " woodland knoll."

Iridaceæ (Iris Family)

Sisyrinchium angustifolium Miller. Blue-eyed Grass.

At one time the plant could be found in the meadow adjoining the Sitka spruce belt of trees, but this area has recently been ploughed up, seeded to cultivated grasses, and is now grazed by horses and cattle.

Sisyrinchium douglasii Dietr. Satin Flower.

Usually abundant on the woodland knoll and similar rocky outcrops in the woods surrounding the lake, early in the spring.

Orchidaceæ (Coral Root Family)

Calypso bulbosa (L.) Oakes. Lady's Slipper.

Once quite common before the woods were logged off, now very rarely seen. Its last stronghold was among the loose piles of tree limbs that prevented too close a trampling by cattle and other stock, but these have been re-piled and burned, and most of the sheltering trees cut down.

Corallorhiza maculata Raf. Spotted Coral Root.

At one time frequently in the near-by woods, where small groups could be found close to the base of the Douglas and balsam firs. The succulent red shafts of the flowering stems appear early in the spring.

Corallorhiza striata Lindl. Striped Coral Root.

In the same habitat as the spotted coral root. Occasionally in clumps of eighteen or more individual stems.

*Goodyera oblongifoli*a Raf. Rattlesnake Plantain.

Common in the coniferous woods, but, like all plants in that habitat, fast disappearing with the felling of the trees.

Habenaria unalascensis (Spreng.) S. Wats. Alaska Rein Orchid.

Dry banks and slopes in the vicinity of the lake.

Habenaria unalascensis var. *elata* (Jepson) Correll. Michael's Rein Orchid.

Associated with the Garry oak. The presence of this orchid is heralded by two or three broad green leaves early in the year; later they wither and die and are replaced by the single stem bearing many small white flowers.

Spiranthes romanzoffiana Cham. Ladies' Tresses.

A few specimens could be seen in the old meadow near the Sitka spruce belt before it was ploughed under.

Salicaceæ (Willow Family)

Populus tremuloides Michx. Aspen.

One or two clumps of small trees existed along the railway bank and in the most southern of the two patches of bushland that stand out like islands in the cultivated area. Periodically the white downy seed-hairs drift conspicuously in the air.

Populus trichocarpa T. & G. Black Cottonwood.

Several large trees grow along the bank of the railroad grade.

Salix alba L. Golden Willow.

Occasionally in the drainage-ditches in the lake area, where it has escaped from gardens. A native of Europe.

Salix geyeriana var. *meleina* Henry. Geyer Willow.

Used to be common along the ditches and unspoiled patches of brush in the peat land to the south of the lake, but disappearing with drainage and clearing for cultivation.

Salix hookeriana Benth. Hooker Willow.

Occasional; the thick flannel-like leaves proclaim the species from afar, for it stands out conspicuously from the other shrubs among which it grows.

Salix lasiandra Benth. Red Willow, Black Willow.

Abundant along the margin of the lake and ditches leading from it, and flanking the old railroad grade.

Salix mackenziana var. *macrogemma* Ball. Mackenzie's Willow.

Several fine bushes of this willow occur along the ditches and in the last remnant of the original bush cover of the flat marginal lands adjacent to the lake.

Salix scouleriana Barratt. Scouler Willow.

Abundant on the slightly higher ground surrounding the lake. The first to bloom, often in January.

Salix sitchensis Sans. Sitka Willow.

The chief species composing the dense growth of willow around the lake. It seems to thrive best with the roots in permanent moisture.

Betulaceæ (Birch Family)

Alnus rubra Bong. Red Alder.

One of the commonest trees in the moist black soil areas bordering the lake.

Betula glandulosa Michx. Scrub Birch.

In similar places to the preceding species, but notably in the brush islands to the south of the lake; now (1955) no more.

Betula papyrifera var. *commutata* (Reg.) Fern. Western Birch.

Some fine trees are to be found among the dense shrubbery at the base of the Sitka spruces, and on the southern border of the lodgepole pine stand. Some also are found in the thickets on the western border of the lake.

FAGACEÆ (BEECH FAMILY)

Quercus garryana Dougl. Garry Oak.

The native oak grows in the higher rocky places, where it seems to thrive in the most unlikely habitats even on the bare rock surface, where it becomes dwarfed and scrubby. It is the only tree that can survive the long drought periods of late summer in such places.

URTICACEÆ (NETTLE FAMILY)

Urtica lyallii Wats. Western Nettle.

In the waste places and on the old right-of-way.

POLYGONACEÆ (BUCKWHEAT FAMILY)

Polygonum amphibium L. Water Knotweed.

Wet places in the open swampy parts south of the lake.

Polygonum convolvulus L. Bindweed.

A pest of the cultivated land, replacing the native plants.

Polygonum lapathifolium L. Dock-leaved Knotweed.

In the moist pastures and fields near lake-borders.

Polygonum persicaria L. Lady's Thumb.

Occasionally in the cultivated fields.

Polygonum spergulariæforme Meisn. Fall Knotweed.

Occurs on the knoll and other rock-outcrops. It blooms in the fall, hence the common name.

Rumex acetosella L. Sheep-sorrel.

Abundant on the rock-outcrops and in sour soil that has been undisturbed for some time. One of the first plants to colonize new land scars.

Rumex crispus L. Curled Dock.

In the old cultivated land; its withered brown spikes remain upright throughout the winter and form a convenient perch and source of food for small passerine birds when the snow covers the ground about them.

CHENOPODIACEÆ (GOOSEFOOT FAMILY)

Chenopodium album L. Lamb's Quarters.

One of the most persistent weeds in the cultivated areas. This, with other plants of similar habitat, has for the most part replaced the native flora, which cannot hold its own against constant disturbance by plough and live stock.

AMARANTHACEÆ (AMARANTH FAMILY)

Amaranthus retroflexus L. Green Amaranth Pigweed.

Common in the fields; one of the most aggressive weeds, for the shiny black seeds are produced in prodigious quantities.

CARYOPHYLLACEÆ (PINK FAMILY)

Arenaria macrophylla Hook. Large-leaved Sandwort.

In dry coniferous wood, where it often forms small colonies at the base of the trees, where the soil is well drained and undisturbed by tramping stock.

Cerastium arvense L. Field Chickweed.

A few on the woodland knoll where they grow in rock crevices, on the dry slope at the base of the knoll among the Garry oaks.

Cerastium viscosum L. Mouse-ear Chickweed.

In cultivated ground, especially near the margins of fields where there is less disturbance.

Sagina occidentalis S. Wats. Pearl-wort.

In the damp cultivated fields.

Spergula arvensis L. Corn Spurry.

Abundant in the old cultivated fields where the soil is rich; often flooded in the winter season.

Spergularia rubra (L.) J. & C. Presl. Sand Spurry.

In dry places, such as the woodland knoll, where it has gained a foothold in the small pockets of soil, which, though full of water during the winter, dry out early in the spring.

Stellaria crispa C. & S. Crisped Starwort.

Only noted in the lodgepole pine wood near the south end. This plant needs shade and moisture, both of which are found here.

PORTULACACEÆ (PURSLANE FAMILY)

Montia fontana L. Blinks.

Moist crevices and hollows in rock-outcrop. Very variable in size and luxuriance, depending on soil and moisture.

Montia linearis (Dougl.) Greene. Narrow-leaved Montia.

Abundant on the knoll and in the cultivated fields, where it grows luxuriantly in the damp soil. One of our few native plants that can become a troublesome weed, in gardens, tulip-beds, and so forth, early in the year.

Montia parviflora (Moc.) Greene. Small-flowered Miner's Lettuce.

On rock-outcrop; flowering in March and April.

Montia parvifolia (Moc.) Greene. Small-leaved Miner's Lettuce.

Abundant on the north slope of the knoll and other outcrops. The small rosettes form during the winter. From long trailing stems several small flowers of a faint pastel pink or bluish hue are produced. Masses of this plant in flower give a festive air to the otherwise barren rocky slopes.

Montia perfoliata (Don.) Howell. Miner's Lettuce.

About as common as the previous one and in similar places; flowering early in the spring. Frequent on north slopes of rock-outcrop.

Montia sibirica (L.) Howell. Western Spring Beauty, Miner's Lettuce.

Common in the woods bordering the lake, where it may be found in flower throughout the year.

Montia spathulata (Dougl.) Howell. Pale Montia.

Same time and places as *M. parviflora* but scarce.

NYMPHÆACEÆ (WATER-LILY FAMILY)

Nuphar polysepala (Englelm.) Greene. Yellow Pond Lily.

Abundant on the margin of the lake, where it forms a continuous band up to about 40 feet wide around the shore of the lake and also of the island. (*See* Fig. 2.)

It affords fine cover for waterfowl, as the leaves stand well up out of the water, unlike those growing in deep water, where they float level with the surface. Since 1952 the lake has been extensively used for irrigation, with a consequent abnormal drop in the level of the water, up to 3 or 4 feet in one measured case.

As a result, the root-stocks are subject to prolonged exposure to the sun and air, causing the leaves to wither and die. Up to date (1956) the leaves have reappeared each spring, only to die out again as the season advances. How long this plant can stand such extreme treatment remains to be seen.

In the fall of 1952 the leaves were severely attacked by a species of aphid, which in turn attracted vast numbers of ladybird beetles (*Hippodamia* sp.), affording them a rich harvest of food.

CERATOPHYLLACEÆ (HORNWORT FAMILY)

Ceratophyllum demersum L. Hornwort.

Very abundant in the lake, often forming solid mats just below the surface in shallow places.

RANUNCULACEÆ (BUTTERCUP FAMILY)

Anemone lyallii Britt. Lyall's Anemone.

Once to be found sparingly in the shady woods, but it seems to be nearing extermination by the removal of the trees and undershrubs.

Myosurus minimus var. *lepturus* (Gray) Howell. Mousetail.

One of the small winter-pool plant groups that occur here and there in hollows on the rock surface. A scarce plant throughout the district and one of few habitats remaining. Associated with *Plagiobothrys medius.*

Ranunculus acris L. Tall Buttercup.

A patch of it grew along a pasture trail, at the foot of the woodland knoll; no doubt introduced in cattle-fodder.

Ranunculus bongardii Greene. Bongard's Buttercup.

This small-flower species occurs in moist shady places on margin of woods.

Ranunculus flammula var. *strigulosus* Freyn. Small Creeping Buttercup.

Wet places near lake-margin.

Ranunculus occidentalis Nutt. Western Buttercup.

Common on the higher ground and in the meadows surrounding the lake.

Ranunculus repens L. Creeping Buttercup.

Quite common along ditch-banks in meadows, where it occasionally forms a dense and continuous carpet.

BERBERIDACEÆ (BARBERRY FAMILY)

Achlys triphylla (Smith) DC. May Leaves, Sweet-after-death.

Occasionally in rich woodland soil, but now becoming scarce.

Mahonia aquifolium (Pursh.) Nutt. Mahonia.

Equally as abundant as *M. nervosa,* but in more open situations.

Mahonia nervosa (Pursh.) Nutt. Oregon Grape.

Common in the coniferous woods, near the south end of the lake.

CRUCIFERÆ (MUSTARD FAMILY)

Arabis glabra (L.) Bernh. Tower Mustard.

The tall stems of this arabis may be found singly or in groups resembling a miniature forest on the rocky hillsides among the Garry oak scrub. Its leaves are the chosen food plant of the orange-tip butterfly, whose presence adds to the gaiety of a sunny spring day.

Brassica arvensis L. Charlock.

In cultivated fields.

Brassica campestris L. Turnip.

A weed of cultivated fields.

Brassica nigra (L.) Kock. Black Mustard.

Very abundant in cultivated areas.

Capsella bursa-pastoris (L.) Medic. Shepherd's Purse.

Common in the cultivated fields.

Cardamine oligosperma Nutt. Bitter Cress.

Very common in moist places in woods and the shady side of rock-outcrops, where the prolific seed output assures a continuance of its presence. Very variable in size according to soil and moisture; from 3 to 18 inches in height.

Dentaria tenella Pursh. Toothwort.

A woodland plant growing in small colonies, lighting up the shadows with pale pink to white flowers.

Draba verna L. Spring Whitlow Grass.

One of the earliest of the spring flowers, the tiny blooms covering the gravelly banks or moss-covered rocks.

Erysimum cheiranthoides L. Wormseed Mustard.

In moist margins of arable land.

Raphanus raphanistrum L. Jointed Charlock.

Along the edges of cultivated fields, in the vicinity of the lake.

Rorippa curvisiliqua (Hook.) Bessey. Western Yellow Cress.

Common in dry ditches and edges of cultivated fields.

Rorippa palustris (L.) Bess. Marsh Cress.

Occasionally in wet places on lake-shore.

Sisymbrium officinale var. *leiocarpum* DC. Hedge Mustard.

In cultivated fields.

DROSERACEÆ (SUNDEW FAMILY)

Drosera rotundifolia L. Round-leaved Sundew.

At one time (about 1924) to be found in patches of sphagnum, in company with *Kalmia polifolia,* both long since exterminated.

CRASSULACEÆ (STONECROP FAMILY)

Sedum spathulifolium Hook. Spoon-leaved Stonecrop.

Common on rock-outcrops.

Sedum stenopetalum Pursh. Narrow-petalled Stonecrop.

In similar places to the former, but much less common.

SAXIFRAGACEÆ (SAXIFRAGE FAMILY)

Heuchera micrantha Dougl. Alum Root.

In rock crevices such as exist on slopes of the woodland knoll.

Philadelphus gordonianus Lindl. Mock Orange.

Borders of wood and thickets in moist places.

Ribes divaricatum Dougl. Common Gooseberry.

In woods, sometimes growing 8 to 10 feet or more in height in shady places supported by a tree or bush.

Ribes sanguineum Pursh. Red-flowering Currant.

Occasionally in wooded parts, north of the lake.

Saxifraga integrifolia Hook. Western Saxifrage.

On the terraces among the rock-outcrops; common.

Tellima grandiflora (Pursh.) Dougl. Tall Fringe-cup.

In wood close to south margin growing in rich soil with elderberry and blackberry.

Tellima parviflora Hook. Fringe-cup.

Rocky places; woodland knoll.

Tiarella trifoliata L. Three-leaved Foam Flower.

A woodland plant, but, along with others of similar habitat, becoming very scarce as the woods are first logged off, then grazed by cattle.

ROSACEÆ (ROSE FAMILY)

Amelanchier florida Lindl. Juneberry.

An ocassional bush on the dry slopes. This shrub is very adaptable to a variety of situations; it may be dwarfed on rocks and luxurious on good soil, up to 40 feet in height.

Cratægus douglasii Lindl. Black Hawthorn.

Often forming dense thickets in moist places near the south end of the lake.

Fragaria bracteata Heller. Woodland Strawberry.

Common in the open thicket and woods and on roadside banks.

Fragaria cunefolia Nutt. Wild Strawberry.

On sunny banks and in meadows near the old railroad-bed.

Geum macrophyllum Willd. Large-leaved Yellow Avens.

Frequent in moist thickets and on shady banks.

Holodiscus discolor (Pursh.) Maxim. Ocean Spray.

Common on dry slopes and in open woods.

Nuttallia cerasiformis T. & G. Bird Cherry.

One of the commonest shrubs on the low-lying parts and along drainage-ditches. It is among the first shrubs to blossom; often in January in a mild winter.

Physocarpus opulifolius (L.) Maxim. Nine-bark.

Occasionally among the dense thickets that line the ditches of the old railroad.

Potentilla anserina L. Silver Weed.

At one place south of the lake in a grassy patch bordering a remnant of the original peat swamp. (Ploughed under in 1953.)

Potentilla palustris L. Marsh Cinquefoil.

On the margins of lake in the shallow water. Although there are luxuriant patches here and there, I have never seen the plant in flower, possibly being too well shaded by the fast-growing willows.

Prunus emarginata (Dougl.) Walp. Wild Cherry.

A few fine trees existed at the base of the woodland knoll. Several small trees and bushes are scattered throughout the adjacent woods.

Pyrus diversifolia Bong. Crab-apple.

Associated with the former and in similar places.

Rosa gymnocarpa Nutt. Woodland Rose.

Frequent in the open woods near the knoll.

Rosa nutkana Presl. Early or Nootka Rose.

With the last, but thrives in drier soil.

Rosa pisocarpa A. Gray. Late Rose.

Common; forms part of the thickets that clothe the margin of the lake.

Rubus laciniatus Willd. Evergreen Blackberry.

An introduced species which has taken hold near the old trestle south of the lake.

Rubus leucodermis Dougl. Black-cap.

Common in thickets.

Rubus macropetalus Dougl. Trailing Blackberry.

Common everywhere around lake. One of the first plant pioneers to populate the disturbed area.

Rubus spectabilis Pursh. Salmonberry.

One patch existed in low places in the woods to north of the lake.

Rubus thyrsanthus Focke. Himalayan Blackberry.

This plant grows rampant wherever it gets a hold, crowding out all other plants in its march of conquest. Several large patches exist near the lake-shore. An escape from cultivation.

Spiræa douglasii Hook. Hardhack.

A common shrub in moist places on the border of the woods or in damp meadows. Probably the most abundant shrub in this area.

Leguminosæ (Pea Family)

Cytisus scoparius (L.) Link. Broom.

This introduced shrub increases as the native flora is removed by grazing or lumbering, and once established it soon crowds out any remaining native plants.

Hosackia parviflora Benth. Bird-foot Clover.

On the rock-outcrop. Abundant on the woodland knoll.

Lathyrus nuttallii S. Wats. Purple Pea.

In thicket and field margins.

Lupinus bicolor Lindl. Small Lupine.

Occasionally on the flats between exposed rocks.

Lupinus latifolius columbianus (Heller) C. P. Smith.

One or two plants on the railroad grade or in thickets in open woodland.

Lupinus micranthus Dougl. Small-flowered Annual Lupine.
Similar to *L. bicolor;* appearing later in the season.

Melilotus alba Desr. White Clover.
A large patch has appeared on the edge of the cultivated land to the south of the lake, no doubt planted deliberately for agricultural purposes. (Ploughed under in 1953.)

Trifolium dubium Sibth. Hop Trefoil.
In association with *T. procumbens.*

Trifolium pratense L. Red Clover.
Introduced with pasture seed and then spread by cattle and other grazing stock.

Trifolium procumbens L. Low Hop Clover.
Common in the cultivated fields. This and similar plants are taking over from the original native flora.

Trifolium repens L. White Clover.
Introduced.

Vicia americana Muhl. Pea Vine.
In open thickets.

Vicia angustifolia Reich. Common Vetch.
In fields and meadows. Introduced.

Vicia hirsuta (L.) Koch. Hairy Vetch.
Open thickets to south of lake. Introduced.

Vicia sativa L. Spring Vetch.
Common in meadows and old cultivated fields. Introduced.

Vicia villosa Roth. Hairy Cow Vetch.
Meadows and fields. Introduced.

GERANIACEÆ (CRANESBILL FAMILY)

Erodium cicutarium (L.) L'Her. Storksbill.
Very abundant in burned-over patches and one of the first introduced plants to invade them. Takes over extensively after overgrazing or after a fire.

Geranium molle L. Dove's-foot Geranium.
Similar location to *G. pusillum.*

Geranium pusillum L. Small-flowered Geranium.
Roadside and waste places.

ACERACEÆ (MAPLE FAMILY)

Acer macrophyllum Pursh. Broad-leaved Maple.
A few trees are present on the slopes at the north end of the lake.

RHAMNACEÆ (BUCKTHORN FAMILY)

Rhamnus purshiana DC. Cascara Sagrada.
At one time fairly plentiful along the ditches and in moist places.

VIOLACEÆ (VIOLET FAMILY)

Viola adunca J. E. Smith. Western Dog Violet.

One or two scattered plants in the meadow at the south end of the lake.

Viola palustris L. Marsh Violet.

One or two colonies exist in the low-lying meadows adjacent to the lake. One colony was closely associated with *Juncus ensifolius.*

ONAGRACEÆ (EVENING PRIMROSE FAMILY)

Epilobium adenocaulon Haus. Willow Herb.

In waste places near the lake.

Epilobium angustifolium L. Fireweed.

Common along moist meadow borders and lakeside in open woodlands, especially where piles of brush had been burned the previous year.

UMBELLIFERÆ (PARSLEY FAMILY)

Carum gairdneri (H. & A.) Gray. Wild Caraway.

On dry slopes among rose thickets and in open oak woods.

Daucus carota L. Cultivated Carrot.

In old fields and meadows, where it becomes well established.

Heracleum lanatum Michx. Cow Parsnip.

In rich soil along ditches.

Leptotænia dissecta Nutt. Lace-leaved Leptotænia.

At one time frequent among the original ground cover beneath the Garry oak, associated with the wax berry, Easter lily, and chocolate lily.

Lomatium nudicaule (Pursh.) Coult. & Rose. Indian Consumption Plant.

Frequent on dry slopes and open ridges at the south end of the lake.

Œnanthe sarmentosa Presl. Water Parsley.

Abundant in old ditch-bottoms and margins of lake.

Osmorrhiza nuda Torr. Sweet Cicely.

Abundant in the fir woods.

Pastinaca sativa L. Parsnip.

Occasionally as an escape on borders of cultivated fields.

Sanicula menziesii Hook. Menzies' Sanicle.

In open woods and thickets.

Sium suave Walt. Hemlock Water Parsnip.

Occasional on the lake-border; one clump could usually be found from year to year at the north end of lake.

CORNACEÆ (DOGWOOD FAMILY)

Cornus occidentalis Cov. Western Dogwood.

Common on margins of lake and adjoining ditches.

ERICACEÆ (HEATH FAMILY)

Kalmia polifolia Wang. Swamp Laurel.

At one time to be found near the lake-margin, where it occurred with sphagnum and sundew, but now exterminated.

Ledum grœnlandicia Œder. Labrador Tea.

In the moist areas. Among salal, willow, and twin-flowered honeysuckle, and associated with the arctic star flower.

Monotropa uniflora L. Indian Pipe.

Occasionally seen among the Garry oaks that grow on the rock-outcrop bordering the south and west borders of the lake.

Pyrola asarifolia Michx. Wintergreen.

Only one or two colonies remain. One is in a winter-flooded area, covered with second growth of *Populus trichocarpa* and *Salix sitchensis;* the other near the lake-margin among coniferous trees.

Vaccinium cæspitosum Michx. Dwarf Huckleberry.

In one place in the peat-bog, where a remnant escaped extermination until 1953, when it was ploughed up.

Vaccinium parvifolium Smith. Red Huckleberry.

In woods adjoining the lake.

PRIMULACEÆ (PRIMROSE FAMILY)

Anagallis arvensis L. Scarlet Pimpernel.

Common in the rich-soil cultivated fields, though becoming scarcer as the fields are more frequently tilled.

Dodecatheon latifolium (Hook.) Piper. Shooting Star.

Open woods, where it forms a colourful carpet during the early spring.

Trientalis arctica Fisch. Arctic Star Flower.

A large colony has persisted until recently in the peat-bog area south of the lake. It grew in the shade of Labrador tea and hardhack. (This area has recently (1955) been completely cleared and ready for the plough.)

Trientalis latifolia Hook. Star Flower.

Common under coniferous trees.

CONVOLVULACEÆ (CONVOLVULUS FAMILY)

Convolvulus arvensis L. Small Bindweed.

A persistent and troublesome weed in the cultivated areas. Introduced.

POLEMONIACEÆ (PHLOX FAMILY)

Collomia linearis Nutt.

In dry places on the slope of a rock-outcrop.

HYDROPHYLLACEÆ (WATER-LEAF FAMILY)

Nemophila parviflora Dougl. Grove-lover.

Occasionally in the fir woods.

Boraginaceæ (Borage Family)

Myosotis arvensis (L.) Hill. Field Forget-me-not.

In wet fields.

Myosotis laxa Lehm. Water Forget-me-not.

In muddy margins of the lake-shore. In flower every month of the year.

Plagiobothrys medius (Piper) Johns.

Local, in small pools that dry up in the summer such as on the woodland knoll.

Labiatæ (Mint Family)

Mentha arvensis var. *canadensis* (L.) Briq. Canada Mint.

Common along ditch-sides and wet places in fields.

Prunella vulgaris L. Heal-all.

In moist situations in shady fields and thickets.

Satureja douglasii (Benth.) Briq. Yerba Buena.

Common in dry woods, where its trailing stems and sweet-scented green leaves may be seen throughout the year.

Scutellaria galericulata L. Marsh Skullcap.

At one time this plant existed in profusion on the west margin of the lake, but has not been seen for some years now.

Stachys ciliata Dougl. Hedge Nettle.

Frequent in low wet places.

Scrophulariaceæ (Figwort Family)

Castilleja angustifolia var. *bradburyi* Fern. Scarlet Paint-brush.

Occasionally present where parts of the woodland have not been grazed over heavily, but becoming scarcer every year.

Castilleja levisecta Greenm. Yellow Paint-brush.

One small patch in an uncultivated remnant of the original cover. Grows among hardhack and willow in an open glade, and in an old meadow north of the lake. (Ploughed out in 1955.)

Collinsia grandiflora var. *pusilla* Gray. Blue-eyed Mary.

On rock-outcrops, early in the spring.

Kickxia elatine (L.) Dumort. Sharp-pointed Toad-flax.

Very local. A native of Eurasia, it has become well established in the old fields south of the lake.

Linaria vulgaris Hill. Butter and Eggs.

At one time persistent in old fields, but considerably reduced with cultivation. Introduced.

Mimulus alsinoides Dougl. Small Monkey Flower.

Rare; in crevices of rocks.

Mimulus guttatus Fischer. Monkey Flower.

In moist margins of fields and by ditch-sides. Often in association with forget-me-not and brooklime, which together form a rich pattern of blue and gold.

Veronica americana (Raf.) Schw. Brooklime.

Abundant along the margin of the lake and in wet field-borders, where it often forms extensive mats of dark blue and green.

Veronica arvensis L. Corn Speedwell.

A plant of cultivated fields. Introduced.

Veronica peregrina L. Neckweed.

In damp places, especially in small winter pools that form in the hollows among the rocks; in company with *Plagiobothrys, Myosurus* and *Sagina.*

Veronica serpyllifolia L. Thyme-leaved Speedwell.

In damp places in fields.

Orobanchaceæ (Broom-rape Family)

Orobanche uniflora L. One-flowered Cancer-root.

Occasional; as a parasite on stonecrop that covers the north exposure of some of the rock-outcrops.

Plantaginaceæ (Plantain Family)

Plantago lanceolata L. Rib-grass.

Common in waste places such as corners of fields, thickets, and margins of cart tracks where moisture and good drainage are combined. Introduced.

Plantago major L. Common Plantain.

Thrives in rich soil of winter-flooded meadows, but fast disappearing with good cultivation. Introduced.

Rubiaceæ (Madder Family)

Galium aparine L. Cleavers.

In cultivated fields and waste places.

Galium trifidum L. Three-flowered Bedstraw.

In moist places near lake-shore.

Caprifoliaceæ (Honeysuckle Family)

Lonicera ciliosa (Pursh.) Poir. Orange Honeysuckle, Strangler.

Among thickets and in woods over which it climbs and trails its stems. It often strangles the tree that gives it support.

Lonicera involucrata Banks. Black Twin-berry.

Much more abundant than the preceding. In moist places and ditch-sides.

Sambucus racemosa subsp. *pubens* (Michx.) Hult. Elder.

In one or two places in thickets close to the lake-margin.

Symphoricarpos albus (L.) Blake. Wax Berry.

A characteristic under shrub of the Garry oak on the higher ground near the lake.

Valerianaceæ (Valeriana Family)

Valerianella congesta DC. Sea Blush.

One of the showiest of the spring flowers when it occurs in masses of pink bloom on rocky slopes and terraces.

Valerianella samolifolia Hæck. Pale Corn-salad.

Occasionally in shady places bordering the rock-outcrops, where it often forms extensive patches, mingled with or adjacent to *V. congesta.*

CAMPANULACEÆ (BLUEBELL FAMILY)

Campanula scouleri Hook. Scouler's Bluebell.

On shady banks.

COMPOSITÆ (COMPOSITE FAMILY)

Achillea millefolium L. Yarrow.

Along field-borders which are less disturbed than the adjacent land and on the woodland knoll. Will occasionally be found in bloom in a mild December and January.

Anthemis arvensis L. Field Chamomile.

A common introduced weed in the cultivated areas, often forming sheets of white yellow-centred blooms.

Arctium minus (Hill) Bernh. Burdock.

Along the old railway grade; until quite recently (1955).

Aster curtus Cronq. White-topped Aster.

One small patch existed on the woodland knoll though it has never been seen in flower. Colonies are also on the ridges between Blenkinsop Lake and Rithet's bog, where it flowers profusely.

Aster subspicatus Nees. Douglas Aster.

Common along ditch-sides and in waste places in late summer.

Bellis perennis L. Daisy.

Old meadows, and fields adjoining the lake. Introduced.

Bidens cernua L. Bur Marigold.

Common in low-lying old meadows and pastures, where it forms continuous tracts. The plant is particularly disagreeable to walk through when the fruits are ripe, owing to the tenacious nature of their triple-barbed spines which adhere to the clothing at the lightest touch.

Cirsium arvense (L.) Scop. Canada Thistle.

Abundant wherever insufficient cultivation allows its rapid increase, almost to the extermination of everything else in its path of conquest. A patch consisting of entirely white flowers exists in one corner of a field just north of lake. Introduced.

Cirsium vulgare (Savi) Airy-Shaw. Common Thistle.

With the last though not so abundant. Its large heads of flowers are very attractive to butterflies and other insects.

Gnaphalium palustre Nutt. Cudweed.

In the cultivated areas.

Helenium autumnale L. Sneezeweed.

One or two plants used to be found in the moister parts of old meadows, but as these have recently been drained, most of the plant association prior to this has disappeared.

Hieracium albiflorum Hook. White Hawkweed.

Common in fir woodlands.

Hypochæris radicata L. Cat's Ear.

One of the commonest introduced weeds and among the first to invade "new" territory such as bulldozed scars, burns, etc.

Lactuca muralis (L.) Fresen. Wall Lettuce.

A common under-cover plant in woods. It sometimes completely dominates the herbs in such situations. Introduced from Europe, where it often grows on old walls—hence the common name.

Lactuca serriola L. Prickly Lettuce.

An introduced weed of cultivated places.

Madia glomerata Hook. Tarweed.

Common along the edges of roads and old trails and the drier slopes of meadow lands. In the driest period of the year, August and September, colonies of this plant show up as conspicuous blue-green patches among the dry grasses.

Senecio vulgaris L. Common Groundsel.

Abundant in the cultivated fields, but variable in quantity according to the degree of disturbance by the hoe. Introduced.

Solidago canadensis var. *subserrata* (DC.) Cronq. Golden-rod.

In the old meadows and field-borders. After a fire over part of the old peat-bog association in 1951 this species increased to a dominant status.

Sonchus oleraceus L. Common Sow-thistle.

In fields and waste places. Introduced.

Taraxacum officinale L. Dandelion.

Along with *Hypochæris radicata* but less abundant. Introduced.

ANNOTATED LIST OF BIRDS

PIED-BILLED GREBE. *Podilymbus podiceps* (L.).

Recorded for every month in the year except December. At other times, particularly in the spring, its noisy calls and "pumping" sounds can be heard.

In late summer the parti-coloured young may be seen accompanying the adults. The adults have been observed to bring up food from below the water and to give it to the young waiting on the surface.

In the five-year period I have seventy observation records.

DOUBLE-BREASTED CORMORANT. *Phalacrocorax auritus* (Lesson).

Usually one or two cormorants visit the lake during February to May and again in October; on one occasion seven were counted. They like to sun themselves on the old railroad trestle, where they can sometimes be seen drying off their outstretched wings. Sixteen references to this bird are recorded in my notes.

GREAT BLUE HERON. *Ardea herodias* L.

One or two were seen on or about the lake nearly every month in the year. None was noticed during July. Fall birds were evidently young of that year. Nesting in the vicinity was unverified though suspected in May, 1945, from frequency of visits to a tall Douglas fir, since logged off. On one occasion a heron was seen to alight on the projecting end of a small log on which several mallards were resting; the weight of the heron tilted the log, upsetting the ducks, which, with much squawking, clambered back again.

TRUMPETER SWAN. *Cygnus buccinator* Rich.

A flock of eight birds stayed for a short while in the flooded fields in December and January, 1945. It consisted of five immature and three adult birds. They were frightened away early in January as, unfortunately, they frequented a place too close to the road.

CANADA GOOSE. *Branta canadensis* (L.).

Geese are nearly always seen flying over on migration, but in four instances a few birds landed and grazed in an adjoining meadow for close on three weeks, but whether these were wild birds of passage or came from Elk Lake for a short visit, as they are known to do in other waters, is not known.

WHITE-FRONTED GOOSE. *Anser albifrons* (Scopoli).

Once in October, 1947, a flock of fifty or more were seen on the lake resting and feeding. They were an imposing sight, particularly when on one occasion they swam in single file along the edge of the lake, their white markings contrasting with the green of the lily leaves. About 4 p.m. they took off and circled about a newly cut oat-field, awaiting a chance to land undisturbed.

SNOW GOOSE *Chen hyperborea* (Pallas).

Once, only, a flock was seen flying over on migration. They were not very high at the time, but no indication of landing in the vicinity was apparent.

MALLARD. *Anas platyrhynchos* L.

This is the commonest duck in the district, and one that may be, or used to be, found throughout the year. In 1945–47 nesting birds could frequently be found, but since then none has been noticed. Possibly clearing and grazing have driven would-be nesters away to quieter regions. In 1952 one nested on the top of a large stump where it had rotted in the centre. Here the nest and eggs were safe from ordinary ground marauders, and the eggs were successfully hatched.

BALDPATE OR WIDGEON. *Mareca americana* (Gmelin).

Without question this is the most abundant duck during the fall to spring months, amounting at times to an estimated 1,000 or more during the cold weather, when they congregate in nearly monospecific flocks. At other times scattered groups of fifty to sixty birds were often noted. Once in a while widgeon were seen in attendance on coot or ring-billed duck, awaiting until they came to the surface with some weed or other gathered on the bottom and would then attempt to take some of it away from the rightful owner. The shrill whistle continually uttered by these birds is often the first sign that they are in the vicinity.

GREEN-WINGED TEAL. *Anas carolinensis* Gmelin.

Always a few to be seen during the winter months, from September to April; usually in small flocks up to a couple of dozen. In April they begin to pair up and engage in the varied antics of courtship. By the end of April they have all departed for the nesting haunts elsewhere.

PINTAIL. *Anas acuta* Linnæus.

Not so regular a visitor as some other ducks. Seen in ones and twos and up to thirty or forty in a flock, depending on the extent of the flooded fields. They seem to prefer the shallow water, where they can easily reach the bottom with their bills from the surface, which they accomplish by " up-ending " like the mallard. From records over the five-year period they appear to have increased in number.

SHOVELLER. *Spatula clypeata* (L.).

Fairly common and always to be seen regularly and with little fluctuation in numbers over the period observed. The shoveller is particularly addicted to the flooded fields bordering the lake and may be seen from a single bird to sixty or more from September to March.

WOOD DUCK. *Aix sponsa* (L.).

A few birds have been observed every year from May to October, though not in all these months in any one season. Breeding pairs were seen in May, 1947. Usually the birds that frequent the lake are fully grown birds of the year in juvenile plumage, and, therefore, most often to be seen on the lake in summer and early winter. Probably one, or at most two, family groups pass through at one time. Over a dozen birds were seen in September, 1951.

REDHEAD. *Aythya americana* (Eyton).

A rare visitor to the lake. Only eight records are listed in the period under consideration. They were seen from February to April and once in November through the years 1948 to 1951. Two were seen in February, 1945, the first I had seen here. A flock of ten was noted on March 8th of the same year. They spent the greater part of the time below rather than above water during the period under observation. On February 18th they were still there. They were asleep, checking drift by paddling lightly with one foot, causing them to move in a semi-circular direction. By April 7th there were three pairs; April 23rd one pair. On May 18th only one male was seen.

RING-NECKED DUCK. *Aythya collaris* (Don.).

During the early part of the period under observation, ring-necked ducks were constantly seen from January to March and again from June to July. I have thirty-nine references. As many as fifty have been counted in one scattered flock. Usually they were in much smaller numbers. January 8th, 1948, twenty-five were seen; January 26th, 1948, over twenty-five; February 2nd, 1945, over fifty spread over lake in groups of eight to ten or so. About twenty remained by March 18th, 1948; twelve by April 7th. No more seen until October 14th when twelve were counted. By December 13th of that year they had increased to between forty and fifty. They have not been observed by me in such numbers since.

CANVAS-BACK. *Aythya valisineria* (Wilson).

Noted on only two occasions on the lake—two on December 15th, 1949, and one on February 12th, 1951.

SCAUP DUCK. *Aythya* sp.?

One or two records; evidently an accidental visitor. Exact determination of species not sure. I have seven or eight records over the period of observation.

COMMON GOLDEN-EYE. *Glaucionetta clangula* (L.).

Also a somewhat scarce visitor, but one or two have been recorded for most years; usually two or three, and those were females, associated with other ducks, from December to March.

BUFFLE-HEAD. *Glaucionetta albeola* (L.).

The buffle-head occurs every year and is one of the commonest ducks of this area in the winter season from December to March. Being a diving duck, it is seen most often on the lake rather than the flooded fields. It varied in number from one or two to over thirty at any one time.

RUDDY DUCK. *Erismatura jamaicensis* (Gmelin).

Nearly always one or two were seen during the season October to April. They disappear before the mating season. They vary in numbers from one to six and invariably seek the centre of the lake, where they are generally actively diving or splashing about, hardly still for a second. At another time, January 26th, 1951, a flock of twenty-five to forty birds were observed.

AMERICAN MERGANSER. *Mergus merganser* L.

Noted on eight visits from January to April during the years 1950 to 1952. Not certainly identified in earlier years.

On April 12th, 1950, a flock of twelve was seen on the lake. They first attracted attention by moving down the lake in line-of-battle formation, each consistently keeping its distance from the other. This was about 2.30 in the afternoon. At 5.30 they were resting with heads under the wing and drifting about singly or in several groups. Two adult males were noted; the rest were females or immature birds.

A note in my diary for February 21st, 1951, is as follows: "A notable feature on the lake, a rough estimate of their numbers was placed at 100. They kept close together, occasionally making a great splashing and commotion as they dived and ducked about in unison in a most vigorous and excitable manner, much after the manner of gulls when bathing in the middle of a lake, though with much more splashing and chasing about."

RED-BREASTED MERGANSER. *Mergus serrator* L.

This merganser is an occasional visitor to the lake. I have five records of small flocks numbering from six to eight birds, all taken from October to April in 1951–52. On February 21st, 1951, a couple were resting on the old trestle. One was lying partly on its side with bill tucked under the scapular and one foot under a wing.

HOODED MERGANSER. *Lophodytes cucullatus* (L.).

First noted on February 2nd, 1948. Twelve records from November to June, and up to eight individuals at one time, both on lake and flooded fields. At later dates they were in pairs. The crest is a conspicuous feature when the bird is alarmed and seems to be an accurate indicator of its moods, varying in degree of erection as the mood changes.

TURKEY VULTURE. *Cathartes aura* (L.).

One was seen soaring high over head in May of 1947.

SHARP-SHINNED HAWK. *Accipiter striatus* Viellot.

The sharp-shinned hawk is fairly regular in occurence from August to June and the commonest hawk of the district. On February 2nd, 1948, one was seen in a very bedraggled shape, apparently having just had a bath in a near-by pond. It went through all the motions of shaking and preening itself after an ablution.

COOPER HAWK. *Accipiter cooperi* (Bonaparte).

One was seen gliding swiftly over the wooded area on May 4th, 1945. Another noted on April 7th, 1948.

RED-TAILED HAWK. *Buteo jamaicensis* (Gmelin).

Red-tailed hawks are seen here every year, usually one or a pair, though becoming scarcer with the reduction of the wild land surrounding the lake. About twenty records over the period, from January to October, but not in all these months in any one season. Usually seen in pairs soaring high above the trees. Suspected of desiring to nest in the area before over-cultivation as a pair often lingers for a week or two during the spring.

ROUGH-LEGGED HAWK. *Buteo lagopus* (Pont.).

On September 27th, 1945, twenty-two were seen in formation gliding silently in the same plane to the north-west. Again a migrating flock of ten was seen on September 19th, 1952, gliding along in a similar formation high in the air.

MARSH HAWK. *Circus cyaneus* (L.).

Seen positively once, January 25th, 1952. This bird was sitting, gorged on the remains of a widgeon, at the edge of a flooded field.

PIGEON HAWK. *Falco columbarius* L.

A small black hawk which looked like the species has been observed at widely scattered intervals.

SPARROW HAWK. *Falco sparverius* L.

Occasionally in the fall; generally observed sitting on an exposed branch of a dead tree-top.

GOLDEN EAGLE. *Aquila chrysaetos* L.

Seen once or twice during this period soaring over head.

BLUE GROUSE. *Dendragapus obscurus* (Say.).

One or two could always be heard or seen in the wood on the north slope before the area was logged over. A hen and young were seen on July 5th, 1945.

RUFFED GROUSE. *Bonasa umbellus* (L.)

Rare; its explosive take-off usually is the first indication of its presence. I have four records from November to April. The dense growth of crab-apple, willow, and other shrubs affords excellent cover for a bird of this type.

CALIFORNIA QUAIL. *Lophortyx californica* (Shaw & Nodder).

A covey or two of quail can be found almost at any season of the year.

RING-NECKED PHEASANT. *Phasianus colchicus* Gmelin.

Frequent about the brush bordering the cultivated fields, though becoming scarcer each year.

SORA. *Porzana carolina* (L.)

This elusive bird is no doubt a regular summer inhabitant of the water-lily growth bordering the margins of the lake. Occasionally one was heard calling or seen furtively stalking among the lily-pads.

AMERICAN COOT. *Fulica americana* Gmelin.

A summer resident, nesting among the lily-pads. The half-grown young were seen accompanying the parents in June; they were well grown by August 16th. The colour of the young has no resemblance to the plumage of the adult. The habit they have of closely following the parent and begging for food is the surest indication of identity when far out on the water. These birds are augmented in number (thirty to forty) by migrants in the spring. Coots sometimes closely attend widgeon and other diving ducks for a share of their food.

KILLDEER PLOVER. *Charadrius vociferus* (L.).

A constant visitor, its cheery call being one of the most frequently heard from the fields and low-lying meadows. A flock of twenty-one was seen on January 8th, 1948. One brood was off the nest by April. Young were flying by May 20th.

WILSON SNIPE. *Capella gallinago* (L.).

Present in the muddy fields every year, generally in small numbers up to six or so. Records from November to April. Only once heard " drumming " in the spring.

GREATER YELLOW-LEGS. *Totanus melanoleucus* (Gmelin).

Once or twice seen and heard flying swiftly over the lake, close to the surface of the water.

On January 3rd, 1954, three were seen in a flooded meadow to the south of the lake. Presumably the same birds were observed in the same place on January 8th, 10th, and February 2nd, 1954. On February 17th of the same year five birds were noted. They swim as readily as they wade. In one instance they were seen to settle on the open water, swimming until they reached the shallows.

GLAUCOUS-WINGED GULL. *Larus glaucescens* Naumann.

A regular winter visitor to the flooded fields.

HERRING GULL. *Larus argentatus* Pont.

Occasionally seen in a mixed flock of glaucous-winged gulls and short bills.

SHORT-BILLED GULL. *Larus canus* L.

Seen every year during the winter season, either in the flooded areas or occasionally having a bathing party in the middle of the lake, when they indulge in a noisy splashing.

BAND-TAILED PIGEON. *Columba fasciata* Say.

A regular visitor from April to November in variable numbers. In the late summer they feed on the berries of dogwood, cascara, and crab-apple. In the spring they are attracted to newly sown field crops, probably picking up uncovered seed. The size of the flock varied from one to two hundred in September. They evidently nest here; an egg was found on the ground beneath a fir-tree on July 7th, 1947.

MOURNING DOVE. *Zenaidura macroura* (L.).

Occasionally seen in the oak woods and in the other open areas adjoining the lake. A pair was discovered nesting in an oak-tree on a slope on the north side of the lake on July 16th, 1953, the first nesting record for Vancouver Island (Hardy 1953).

SCREECH OWL. *Otus asio* (L.).

A resident bird in the wooded places. Occasionally seen in broad daylight resting on a branch half asleep, but usually heard calling after dark.

SHORT-EARED OWL. *Asio flammeus* (Pont.).

A fall migrant; castings of small mammal skulls and bird feathers pointed to the presence of this bird.

NIGHTHAWK. *Chordeiles minor* (Forster).

One of the last of the summer residents to arrive. Their characteristic calls and high diving stunts announce their presence in a way familiar to all country folk. No nests were noted in the area.

BLACK SWIFT. *Nephocetes niger* (Gmelin).

Seen positively on two occasions—May and August. At both times the birds were flying very high, skimming rapidly and soon disappearing from sight.

RUFOUS HUMMINGBIRD. *Selasphorus rufus* (Gmelin).

A regular summer visitor, appearing first about April 4th.

BELTED KINGFISHER. *Megaceryle alcyon* (L.).

Frequently noticed perching on the old railway, which affords an excellent vantage point from which to pounce on a fish.

RED-SHAFTED FLICKER. *Colaptes cafer* (Gmelin).

Abundant; may be heard, if not seen, on every visit to the area.

PILEATED WOODPECKER. *Ceophlœus pileatus* (L.).

One or two pairs are in permanent residence, often proclaiming their presence by their loud " cue-cue-cue " if otherwise invisible.

LEWIS WOODPECKER. *Asyndesmus lewis* (Gray).

At one time this bird nested in the old trees at the south end of the lake, but none has been seen here since the late 1920's.

HAIRY WOODPECKER. *Dryobates villosus* (L.).

Not a common resident. Seen only in the months from October to April, usually single birds engaged in prying the bark off dead willow, oak, or fir branches and trunks. The sharp tapping of the bird's bill against the wood draws attention to its activities.

DOWNY WOODPECKER. *Dryobates pubescens* (L.).

Nearly always to be found among the trees and larger shrubs busily prying off the bark from the smaller twigs and branches in search of insects. Sometimes whole trees and branches are neatly peeled of the bark, the exposed wood always showing the etch-work of wood-boring beetles.

WESTERN FLYCATCHER. *Empidonax difficilis* Baird.

A summer resident, common in the thickets surrounding the lake, from May to August. A nest was found on June 2nd, 1948, built in a crevice of bark on Douglas fir trunk about 5 feet from the ground.

TRAILL FLYCATCHER. *Empidonax trailli* (Audubon).

Probably common as it is easily overlooked; if the call note can be heard, there is no doubt as to the species.

WESTERN WOOD PEWEE. *Myiochanes richardsoni* (Swainson).

Summer resident from May to August. It frequents the taller shrubs and tree growths and often uses fence-posts and wires as a vantage point in quest of insects.

OLIVE-SIDED FLYCATCHER. *Nuttallornis borealis* (Swainson).

Nearly always seen or heard in the spring months, characteristically on the topmost twig of the tallest tree in the vicinity. A nest, undoubtedly of this species, was found blown from a tree-top.

SKYLARK. *Alauda arvensis* L.

Prior to 1945 this introduced bird was common. This period of plenty was followed by a reduction in numbers almost to the vanishing point, but recently (1953) it is on the increase and is coming back to its original haunts in the cultivated fields adjacent to the lake.

VIOLET-GREEN SWALLOW. *Tachycineta thalassina* (Swainson).

A regular summer visitor, often preceded about 19th or 20th of March by a van-guard of thirty or forty individuals, which then disappear for a week or so before the permanent force arrives. By August all have gone, my last date being July 31st.

BARN SWALLOW. *Hirundo rustica* L.

Arrives later than the previous species; first seen in May and then through to August. On August 7th, 1947, I note that the bird was abundant, but that no violet-greens were seen. On one occasion the parents were seen feeding their young perched along a fence-wire; the latter awaited the rapid approach of the parents with wide-open bills, taking the food from the adults as they flew by without stopping.

CLIFF SWALLOW. *Petrochelidon pyrrhonota* (Vieillot).

Seen on two occasions hovering over the water—one in July, the other in August, 1948.

PURPLE MARTIN. *Progne subis* (L.).

Positively noted on only one occasion (August 7th, 1947), when a flock of about eight birds was drifting southwards, gliding and fluttering with easy grace above the tree-tops uttering their liquid call notes. They were evidently on their annual southerly migration.

STELLER JAY. *Cyanocitta stelleri* (Gmelin).

Usually an erratic winter visitor, present in some years, absent in others. It is fond of acorns, exposing the nut by grasping and holding the acorn with one foot, and then delivering hammering blows with the beak that soon splits the shell open.

RAVEN. *Corvus corax* L.

A pair is seen or heard every year, but the birds have difficulty in remaining in the area due to persecution by farmers and others who claim they attack chickens and young stock.

NORTHWESTERN CROW. *Corvus caurinus* Baird.

A rather unnoticeable visitor to the district. Usually crows were observed as they passed over in large flocks of twenty-five or more, such as on February 20th, 1950, and March 24th, 1950. One seen stealing through the bushes on May 19th, 1947, possibly looking for small birds' nests.

CHESTNUT-BACKED CHICKADEE. *Parus rufescens* Townsend.

A common resident, being most in evidence during the winter months when family parties combine with kinglets, creepers, and nuthatches to form a food-hunting bee.

LEAST BUSH-TIT. *Psaltriparus minimum* (Townsend).

First birds of this species to be recorded for Southern Vancouver Island were seen on October 3rd, 1946, in a brush-patch near the lake. Since then I have six records, up to and including 1952. Now it can be seen every year, usually in the fall and winter, in flocks of five to fifteen birds. No nests have been found by me in the vicinity. They feed among willows, ocean spray, and other bushes, moving about quickly and restlessly, soon leaving for pastures new.

RED-BREASTED NUTHATCH. *Sitta canadensis* Linnæus.

A common resident. It may be heard on almost any visit to the area. It was observed in December, 1951, to pry into the cones of Douglas fir, probably for insects that were hiding between the loose scales. A shower of scales and the winged fruit is sometimes the first indication of their presence in the tree-tops.

BROWN CREEPER. *Certhia familiaris* (L.).

Occasionally seen during the winter and spring months. I have six records spread over the years 1948 to 1952, during the months of January to May.

WINTER WREN. *Troglodytes troglodytes* L.

Nearly always to be seen or heard in the thick forest growth in the lake vicinity.

BEWICK WREN. *Thryomanes bewicki* (Aud.).

In similar places as the preceding species. Its pleasing repertoire of songs and calls is often the only bird song to be heard on a winter's day.

AMERICAN ROBIN. *Turdus migratorius* (L.).

Always in evidence, but flocking during the fall, winter, and spring months, when they visit the berry-patches of hawthorn, dogwood, and cascara in season.

VARIED THRUSH. *Ixoreus nævius* (Gmelin).

A regular winter visitor to the wooded areas, varying in numbers according to the severity or mildness of the season.

HERMIT THRUSH. *Hylocichla guttata* (Pallas).

Occasionally seen on spring and fall migrations to and from their summer haunts in the more densely forested regions to the north and west.

SWAINSON THRUSH. *Hylocichla ustulata* (Nuttall).

A regular summer visitor to the woodlands, where its pleasing call note is one of the dominant features of bird-life during the early summer months.

WESTERN BLUEBIRD. *Sialia mexicana* Swainson.

Seen once in a while during the spring and fall migration. On two occasions a small flock wintered here. They were partial to the open fields, where they often perched on near-by fence-posts or on tall weeds, from thence making sallies to the ground or snapping at a fly in mid-air, then returning to the same perch.

GOLDEN-CROWNED KINGLET. *Regulus satrapa* Licht.

Usually seen during the winter months, frequently travelling along with chickadees, creepers, and other small birds in search of insect food in the coniferous trees.

RUBY-CROWNED KINGLET. *Regulus calendula* (L.).

Along with the former, and observed about as often. The very pleasing spring song is rarely heard in this area, at least not at the time of my visits.

ALPINE PIPIT. *Anthus spinoletta* (L.).

Sometimes in large flocks in September and again in April, when they frequent the open fields. On September 29th, 1949, thirty to forty birds were seen swirling about the meadows, and again on April 20th, 1951, over sixty were seen. On September 19th of the same year an estimated 200 birds were noted.

CEDAR WAXWING. *Bombycilla cedrorum* Vieillot.

Occasionally seen, probably more common than records would indicate. It nests regularly hereabouts, readily utilizing pieces of white string hung up for its convenience. Later in the season the soft kitten-like mewing of the young birds is often the only indication of their presence. This bird has the flycatcher habit of snapping up insects in mid-air and returning to the same perch. It is very partial to a bath during the hot weather.

NORTHERN SHRIKE. *Lanius excubitor* L.

Seen only on two occasions in the early spring, but I suspect it is more prevalent than these observations would indicate. It likes to perch on some conspicuous tree-top or power-line, from where it makes sorties for insects or other food. Dates of occurrence are April 19th, 1943, and March 22nd, 1952.

SOLITARY VIREO. *Vireo solitarius* (Wilson).

A regular summer visitor; first and last dates noted are May 12th and September 26th.

WARBLING VIREO. *Vireo gilvus* (Vieillot).

One of our most melodious songbirds and one which gives us a long period of its tree-top music, lasting from June to August. It is one of our commonest vireos. I have dates of occurrence from April 14th to August 18th in the Blenkinsop Lake area.

LUTESCENT WARBLER. *Vermivora celata* (Say.).

This is probabaly the commonest warbler in the district. Recorded dates are from April 14th to August 27th.

YELLOW WARBLER. *Dendroica petechia* (L.).

Constantly to be seen in the area during the spring and summer months. Earliest and latest dates are April 29th to August 18th.

MYRTLE WARBLER. *Dendroica coronata* (L.).

Only seen on spring and fall migrations, usually in company of Audubon warblers.

AUDUBON WARBLER. *Dendroica auduboni* (Townsend).

This bird may always be seen on first arrival early in April or May and again when departing in October. At the latter date they congregate in flocks and are more easily noticed. They have the fly-catcher habit of chasing an insect from some vantage point of tree then returning to the original post.

TOWNSEND WARBLER. *Dendroica townsendi* (Townsend).

Not often seen, but certainly always there as the tangled willow growth and, at one time, abundant coniferous trees formed an ideal habitat for these secluded woodland birds from May to October.

MACGILLIVRAY WARBLER. *Oporornis tolmiei* (Townsend).

Seen or heard on several occasions from May to October. Usually among a dense growth of bushes.

YELLOW-THROAT. *Geothlypis trichas* (L.).

Seen on three occasions among the dense willow growth in June, August, and September.

BLACK-CAPPED WARBLER. *Wilsonia pusella* (Wilson).

Noted occasionally from June to August. It is a frequenter of the dense willow growth that surrounds the lake.

WESTERN MEADOWLARK. *Sturnella neglecta* Audubon.

Around the open cultivated areas, especially meadow land. It may occasionally be heard singing during the winter in mild weather.

RED-WINGED BLACKBIRD. *Agelaius phœniceus* (L.).

Not so common as formerly, but birds have been seen in small flocks around the margin of the lake from April through October. Their loud chattering usually proclaims their presence from afar.

BREWER BLACKBIRD. *Euphagus cyanocephalus* (Wagler).

Noted on one occasion (March, 1949), when a flock of about a dozen perched on the roadside telegraph-wires. Sometimes seen in company with the red-winged.

WESTERN TANAGER. *Piranga ludoviciana* (Wilson).

Occasionally seen among the trees bordering the lake, in May and in August. At the last date a family party was feeding in the tree-tops.

BLACK-HEADED GROSBEAK. *Pheucticus melanocephalus* (Swainson).

Quite common before the woods were logged over. Particularly obvious when in song in May and June, when the woods resounded with its joyous song. Not noted after July.

PURPLE FINCH. *Carpodacus purpureus* (Gmelin).

Seen or heard every month of the year. It is very partial to the topmost twig of a fir-tree, from which it calls or sings according to the season. In winter it feeds, in part, on the white fruit of the wax berry.

PINE SISKIN. *Spinus pinus* (Wilson).

Seen in every month of the year; noticeably in December and January, when it occurs in large flocks. Keeping close together, these birds seem to fly, twist, and turn in unison, here one minute, gone the next, as they visit extensive wooded areas in search of food, examining fir and alder cones for possible seeds.

AMERICAN GOLDFINCH. *Spinus tristis* (L.).

Seen every year among ripe thistle-heads, on which it feeds, leaving a tangled mass of thistle-down to mark its passage.

RED CROSSBILL. *Loxia curvirostra* L.

Seen only once, March 18th, 1952, in a small flock. Their noisy whistles proclaimed their identity as they settled in the topmost branches of a fir-tree.

SPOTTED TOWHEE. *Pipilo maculatus* Swainson.

Always to be found in the thick shrubby growth.

SAVANNAH SPARROW. *Passerculus sandwichensis* (Gmelin).

Every fall and spring, migrants frequented the open fields in the vicinity of the lake.

OREGON JUNCO. *Junco oreganus* (Townsend).

More noticeable in the winter months, but a nest with eggs was found in the bank of a wooded hillside in June, 1954.

CHIPPING SPARROW. *Spizella passerina* (Bech.).

One of the commonest birds in spring and early summer; particularly noticeable in the open oak glades, where they watch for passing insects in flight or on the ground.

WHITE-CROWNED SPARROW. *Zonotrichia leucophrys* (Forster.)

A regular spring and summer resident; its cheery song is among the first to greet the ears of the town and country dweller.

GOLDEN-CROWNED SPARROW. *Zonotrichia coronata* (Pallas).

A winter resident in milder years, frequenting the dense growths of hardhack, snowberry, and blackberry bushes, where it obtains both food and shelter.

ANNOTATED LIST OF MAMMALS

MUSKRAT. *Ondatra zibethica osoyoosensis* (Lord).

Muskrats frequent both the lake and the ditches leading out of it, mining into the banks of the latter. Occasionally they are seen floating horizontally on the water feeding, balancing by projecting the tail up at a 45-degree angle, lowering it when about to dive.

RACCOON. *Procyon lotor vancouverensis* Nelson & Goldman.

Signs of family parties were often seen in the soft mud at the margins of the lake. Coons feed extensively on the salal berries, as is evident from the content of their droppings, which are often left characteristically at the base of trees.

FIELD VOLE. *Microtus townsendi tetramerus* (Rhoads).

The extensive tunnels of this vole were to be seen in the older meadows before they were ploughed up.

RED SQUIRREL. *Tamiasciurus hudsonicus lanuginosus* (Bachman).

At one time common; now, along with the other forms of wildlife, practically exterminated. Boys with .22 rifles and pistols seem to be the chief menace to small life in the vicinity of the lake nowadays. I have seen squirrels eating fungi dug out of the ground.

COAST DEER. *Odocoileus hemionus columbianus* (Richardson).

At one time a permanent part of the fauna, but rare nowadays due to encroaching civilization. During the winter, tracks have occasionally been seen in the snow, while local residents report seeing animals at rare intervals.

COMMON SHREW. *Sorex vagrans vancouverensis* Merriman.

Dead specimens have occasionally been found on the trails, evidently killed and rejected by a cat or owl. There is something about them that does not appeal to the taste of an owl; apparently they are killed in mistake for a mouse.

BATS.

Small bats have been seen and signs of their presence indicated by the wings of moths lying on the ground, but no specimens were collected.

OTTER. *Lutra canadensis pacifica* Rhoads.

Two individuals were seen playing about on a floating log on January 2nd, 1956. They uttered a soft hissing call, and continually sniffed the air, raising up on their hind legs and endeavouring to locate my presence behind a screening bush. In a short time they noiselessly disappeared under the water.

WHITE-FOOTED MOUSE. *Peromyscus maniculatus angustus* Hall.

While not actually seen in the area under discussion, it is no doubt present, judging from the numbers trapped in nearby houses and sheds.

ANNOTATED LIST OF FISH

CATFISH. *Ameiurus nebulosus* (LeSueur). Introduced.

Abundant, so much so that the young ones occasionally plug up the irrigation-pipes conveying the lake-water to the adjoining land.

SUNFISH. *Lepomis gibbosus* (Linn). Introduced.

Common. These two fish provide food for herons, mergansers, cormorants, and other fish-eaters frequenting the lake.

TROUT.

Old records mention the cool clean water of the lake frequented by trout, though no material is available to indicate the species.

ANNOTATED LIST OF INSECTS

BUTTERFLIES (RHOPALOCERA)

Papilio zelicaon Luc. Mountain Swallowtail.

Occasionally seen, especially about the flowers of the sea-blush (*Valerianella congesta*). On the wing from April to September. The yellow, black-ringed caterpillar feeds on carrot-tops and other Umbelliferæ.

Papilio rutulus Luc. Western Swallowtail.

Frequent. The odd-looking caterpillar or nigger-head feeds on willows. Green at first, the caterpillar turns brown in the last moult.

Papilio eurymedon Luc. Black and White Swallowtail.

Seen along with the others. The larva is similar to that of the western swallowtail but feeds on a greater variety of shrubs. This and the preceding have a much shorter period on the wing than *zelicaon*—April to June.

Anthocharis sara flora Wright. Orange-tip.

Occasionally to be seen in the open spaces, where it has probably drifted from near-by Mount Douglas, where it is always to be found in April. The caterpillar feeds on *Arabis glabra.*

Colias occidentalis Scud. Western Sulphur.

Seen on two occasions as it flew rapidly over the fields adjoining the lake. The larva feeds on alfalfa and probably other leguminous plants.

Neophasia menapia F. & F. Pine White.

One or two individuals have been seen or captured over the years. A fir-feeder in the larval stage.

Pieris rapæ L. Cabbage White.

The most abundant butterfly, particularly in the cabbage-fields of the near-by truck-farmers.

Cœnonympha inornata insulana McD. Vancouver Ringlet.

One of the commonest of our butterflies wherever there are open meadows and grassy tracts. The larva feeds on grasses. There are two broods—May and October.

Speyeria bremneri Edw. Bremner's Silver Spot.

This fine butterfly frequents the open meadows north of the lake, but is not by any means common. The larva feeds on the wild violet. The adult is on the wing in July and August.

Euphydryas taylori Edw. Taylor's Checker-spot.

Found over grassy fields adjoining the lake. The caterpillar feeds on plantain, and may be found on sunny days in February and March as it comes out after hibernation. The butterfly is abroad in April and May.

Phyciodes campestris Behr. Meadow Crescent-spot.

It used to be found on grassy banks that have now been levelled off. No specimens have been seen since 1952. The food plant is the wild aster (*Aster douglasii*).

Polygonia satyrus Edw. Brown Comma.

Regularly seen every year on the sunny borders of woods in early spring and again in the fall. The caterpillar feeds on the nettle.

Polygonia oreas silenus Edw. Western Comma.

Obtained on one occasion; probably commoner than supposed, as it superficially resembles *satyrus.* A gooseberry-feeder in the larval phase.

Nymphalis californica Bdv. California Tortoise-shell.

A butterfly of irregular occurrence; some years absent, in others turning up in large numbers. They are migrants from the east and south, drifting here in the summer, hibernating over winter, and disappearing again in the following spring. One such influx took place in 1945; a few were seen again in 1951, but not in such numbers as in 1945. The normal food plant is *Ceanothus,* but the larva will eat alfalfa and other plants when the former fails.

Nymphalis milberti Godt. Milbert's Tortoise-shell.

Always to be found in the summer months. Its food plant is the nettle. Like other members of the genus, it hibernates in the adult stage.

Nymphalis antiopa L. Mourning Cloak.

One of our commonest butterflies, appearing in spring after hibernation, and later in the year after the larvæ of the spring brood have completed their metamorphosis. The food plant is willow.

Vanessa atalanta L. Red Admiral.

A strikingly beautiful butterfly, with a broad scarlet band across each of the black forewings. It feeds on nettle in the early stages and, like all the Vanessas, hibernates over winter in the butterfly stage.

Vanessa cardui L. Painted Lady.

A butterfly of cosmopolitan distribution, occasionally occurring in large migratory numbers in some years and almost, if not completely, absent in others. Such a year of abundance was in 1952, when it was found in many parts of Vancouver Island, while in 1953 not one was seen. It appeared again in 1956. It feeds chiefly on the thistle, and for that reason it might be classed as a beneficial insect.

Vanessa caryi Hbn. West Coast Lady.

Very similar to the last named, but not nearly so common. It is confined to the west coast of North America. In 1952 it was quite common and could be seen on flowers of thistles, dahlias, and other garden plants along with *V. cardui*. Only one has been seen since, and none before that date under the period in review.

Basilarchia lorquini burrisonii Mayn. White Admiral.

A common species in the district, wherever willow, the food plant, occurs.

Strymon melinus. Common Hair-streak.

Scarce; occasionally seen in the open woodland bordering the lake. The caterpillar feeds on blackberry and other shrubs.

Incisalia mossi Hy. Edw.

One of the first to appear in the spring. It haunts rocky slopes, where its food plant, the stonecrop, grows.

Incisalia iroides Bdv. Western Elfin, Salal Butterfly.

This species used to be seen in a brushy patch on the western side of the lake; this has since been removed and the ground ploughed up for pasture. Recorded food plants include ocean spray and stonecrop.

Lycæna helloides Bev. Purple Copper.

Frequent in low places where, its food plant, Polygonum occurs. It is double-brooded, the first showing up in May and June, the second in August and September.

Everes amyntula Bdv. Western Tailed Blue.

Common in the brush land adjacent to the lake. The larva feeds on flowers of vetch.

Glaucopsyche lygdamus columbia Skin. Columbian Blue.

Common in similar places as the above. The food plant is *Lupinus* sp.

Lycænopsis pseudargiolus echo Edw. Southern Blue.

The most frequently seen " blue " and the first to appear in the spring. The caterpillar feeds on ocean spray.

Thorybes pylades Scud. Northern Cloudy-wing.

Occasionally seen. A Trifolium feeder in the caterpillar stage.

Erynnis propertius Scud & Burg. Large Dusky-wing.

Common among the oak-trees, on the leaves of which the caterpillar feeds.

Hesperia comma manitoba Scud. Canadian Skipper.

In grassy fields during August and September.

Ochlodes sylvanoides Bvd. Woodland Skipper.

Usually abundant in grassy places in late summer.

Moths (Heterocera)

No collecting at night, the best time to study the moth fauna, has been done in the area, hence the following list is very superficial and gives no indication of the number of even the commoner species occurring here.

Hawk-moths (Sphingidæ)

Hemaris diffinis rubens Hy Edw. Snowberry Bee-hawk.

Usually seen by day hovering over the blossoms of the sea blush (*Valerianella congesta*). The caterpillar feeds on the wax berry, and *Lonicera nitens* in our gardens.

Silk-moths (Saturniidæ)

Telea polyphemus Cram. Polyphemus Moth.

The wings of this moth were found under a maple-tree, on which the caterpillar feeds. It is presumed they came from a moth caught by a bat, which is known to clip off the wings of the larger insects before eating the body.

Tiger Moths (Arctiidæ)

Halisidota argentata Pack. Silver-spotted Tiger.

The over-wintering nests of this species may occasionally be seen high up near the tip of the Douglas fir branches. They are often mistaken for nests of the tent caterpillar. The silver-spotted tiger is never abundant enough to be of economic importance.

Apantesis ornata complicata Wlk. Island Tiger.

A caterpillar was obtained as it was crawling over the grass in the fall of the year, just prior to hibernation. It feeds on *Plantago lanceolata* and *Polygonum persicaria.*

Owlet Moth (Phalænidæ)

Pseudorthosia variabilis Gnt. Yellow Dart.

Taken in flight in Garry oak grove.

Feltia ducens Wlk. Gothic Dart.

Often seen in the late summer feeding on thistle, carrot, and other flowers.

Rhynchagrotis exsertistigma niger Sm. Projecting Dart.

A pupa was obtained at the base of a large maple near the lake.

Lacinipolia stricta Wlk. Cinnamon Polia.

Found along with *Feltia ducens,* feeding by day on flowers of carrot and thistle.

Autographa californica Speyer. Common Silver Y.

Ocasionally put up in daytime among weedy growth, such as thistle. On the wing until late in the fall.

Cænurgina erechtea Cram. Common Grass Moth, Forage Looper.

This moth may always be flushed among the grassy fields, in bright sunlight in late summer. It feeds on leguminous plants.

Cænurgina erechtea parva Blkme.

This is the small spring form of the preceding species. The larvæ feed on various leguminous plants, of which *Lathyrus nuttalli* is a favourite.

Hypena decorata Sm. Decorated Snout.

Not often seen by day and then only when it is disturbed from among low herbage in or near nettles, on which the larva feeds.

Malacosoma pluviale Dyar. Western Tent Caterpillar.

Periodically this insect becomes a pest, at which times the willows, rose-bushes, and others are stripped of their leaves. The caterpillar is tawny with yellow markings.

Malacosoma disstria erosa Stretch. Forest Tent caterpillar.

Occurs with the former, the distinctive caterpillars often found together. The caterpillar is darker than the preceding and with a blue line along the back.

Loopers (Geometridæ)

Hydriomena nubilofasciata Pach. February Highflyer.

Common in the Garry oak woods. It is one of the earliest seasonal moths to appear. A variable species of which two named forms are now recognized—*raptata* Swelt. and *vulnerata* Swelt., the common forms here.

Hydriomena albifasciata Pach. White Dot Highflyer.

Occasionally disturbed by day, from tree-trunks or palings on which it rests; not nearly so common as the former. Occurs where the Garry oak grows, and a little later in the year than *nubilofasciata.*

Hydriomena irata Swelt. Variable Highflyer.

Appears later in the season than either of the preceding. In the larva stage it feeds on coniferous trees.

Xanthorhœ defensaria Gn. Variable Carpet.

A common and very variable moth, with several named varieties; the first to appear in the spring is the form *gigantaria* Swelt. followed by and overlapping with the forms *conciliaria* Swelt. and *mephistaria* Swelt. The designated species is most abundant in late summer and fall, but intermediates occur connecting all the forms. The caterpillar feeds on a variety of shrubs and herbs, including chickweed, bedstraw, and knotweed.

Xanthorhœ munitata convallaria Gn. American Carpet.

Not so common as *defensaria;* usually startled into flight from tree-trunks, where it rests during the day.

Xanthorhœ pontiaria Tayl. Chalky Carpet.

Occasionally disturbed as it rests on a tree-trunk.

Xanthorhœ fossaria blackmorei Swelt. Blackmore's Carpet.

With the former, which it closely resembles, but it is less frequently seen.

Mesoleuca gratulata Wlk. Bird's Head Carpet.

Abundant in the spring months. The larva feeds on brambles and blackberry-bushes.

Epirrhœ plebeculata vivida B. & McD. Orange-winged Carpet.

Fairly common in open woods. One of the first of the late winter and early spring day-flying moths to appear. The caterpillar feeds on *Galium aparine* and *G. trifidum*.

Euphyia unangulata intermediata Gn. The Intermediate.

Sometimes seen at rest on palings or tree-trunks.

Euphyia lacteata Pach. March Gem.

Appears about the same times as *E. plebeculata,* when it is quite common in some seasons, near miner's lettuce (*Montia* sp.), upon which the larva feeds. It flies in bright sunshine.

Perizoma basaliata Wlk. Twin-spot Wave.

Common, from May to August, when it may be disturbed from its resting-place among herbage or on tree-trunks.

Perizoma curvilinea Hlst. Sinuous Wave.

Sometimes disturbed by day from a tree-trunk, from March to September.

Perizoma costiguttata Hlst. Spotted-edge Wave.

Less often seen than the last species, but found in similar places in May and June.

Earophila vasiliata Gn. and form *niveifasciata* Hlst. Brindled Wave.

Occasionally seen in flight by day in bramble thickets and open woodlands in the early spring. The caterpillar feeds on thimbleberry.

Venusia pearsalli Dyar. Pearsall's Wave.

Usually found at rest on alder, upon which the caterpillar feeds, and other tree-trunks. Our commonest early-spring moth.

Semiothisa granitata Gn. Spotted Granite.

In the Douglas fir woods, occasionally disturbed from tree-trunks in midsummer.

Semiothisa teucaria Stkr. Triple-lined Granite.

Fairly common in June and July among the Garry oaks, on which the caterpillar feeds.

Melanolophia imitata Wlk. Western Carpet.

Frequently found resting on tree-trunks in the spring.

Neoalcis californiaria Pach. California Carpet.

In similar places to the last, but found in late summer.

Lambdina fiscellaria somniaria Hlst. Dreamy Thorn.

Periodically a pest on Garry oak-trees, but very little in evidence since 1950. Very common in the years 1945 to 1950, 1949 being probably the peak year of abundance. An occasional caterpillar can be beaten from the oak-tree in any year, no matter how scarce they may otherwise appear. The moth flies in late September and October.

Longhorn Beetles (Cerambycidæ)

Ergates spiculatus LeC. Spiny Wood-borer.

The larva feeds in various dead or dying coniferous trees. The beetle is a night flyer, and may occasionally be found under bark or logs during the day.

Pidonia scripta LeC. Letter Longhorn.

Common on the flowers of the wild roses (*Rosa nutkana* and *R. pisocarpa*), often in association with *G. filicornis.*

Stenocorus vestitus Hald. Russet Longhorn.

Usually to be found on the flowers of wild roses, but not so common as it was several years ago.

Anoplodera vexatrix. Small Angled Leptura.

Occasionally on flowers.

Grammoptera filicornis. Clouded Longhorn.

On flowers of roses in company with *P. scripta*.

Anoplodera obliterata Hald. Black-marked Halter.

Found about newly felled Douglas fir, in which the larva feeds.

Anoplodera crassipes LeC. Yellow-footed Leptura.

On flowers of ocean spray and yarrow.

Anoplodera læta LeC. Resplendent Oak Borer.

An oak-feeder in the larval stage. Sometimes found by day on flowers of yarrow, or running over newly cut Garry oak.

Leptura chrysocoma Kby. Golden Longhorn.

Turns up occasionally on the flowers of yarrow.

Anoplodera dolorosa LeC. Black Leptura.

On flowers of *Spiræa discolor*.

Molorchus longicollis LeC. Ichneumon Longhorn.

One example of this odd little longhorn was taken on the wing in the open woods adjoining the lake on May 14th, 1951. As its common name implies, it looks like an ichneumon fly, for the forewings, instead of forming a case to conceal the true flight wings, are reduced to mere scales, while the flight wings extend out or along the body and are not folded out of sight as in most beetles.

Anocomis litigiosa Csy. Black-clouded Miner.

Sometimes seen flying or resting near or on newly cut Douglas fir.

Phymatodes decussatus LeC. Oblique-lined Miner.

May be seen in the hot July sunshine about dead or dying Garry oak-trees. The larva feeds under the bark of this tree.

Saperda populnea L.

One specimen was found on the leaf of *Salix sitchensis* on May 22nd, 1944, the second record from Vancouver Island.

Leaf-eating Beetles (Chrysomelidæ)

Calligrapha california coreopsivora Brown.

Abundant in 1947 on *Bidens cernua;* many of the plants were denuded of leaves. This species, according to Brown (1945), is widely distributed across the continent; in the East it feeds on *Bidens frondosa* as well as *cernua*. It is also reported from *Coreopsis,* hence the sub-specific name.

SUMMARY AND CONCLUSIONS

The chief interest in the Blenkinsop Lake area lies in the fact that it is a remnant of the peat-bog formation of British Columbia. This condition is brought about, in part, by the retardation of the drainage surrounding the lake at the end of the last glacial period by the rim-rock to the south of the lake, thus creating a bog, which prolonged

the flora associated therewith long after the plants of the district in general had become adapted to a warmer and drier regime.

Recently the lake area has been partially drained and the water-level lowered by irrigation. Further, much of the land is cleared of the original vegetative covering and has been planted in crops, with the attendant introduction of weeds and an otherwise alien flora.

As a result, several plants that were native here, even so recently as ten, certainly thirty, years ago, have been exterminated or have become very scarce. Among these may be mentioned the maidenhair fern, ladies' tresses, lady's slipper, Lyall's anemone, dwarf bilberry, sundew, sphagnum moss, swamp laurel, arctic star flower, and skull-cap. They amount to about 6 per cent of the total number of species.

On the other hand, a large number of plants have been introduced by cultivation and by other activities of man. These amount to about forty-three species or 18 per cent of the list of plants observed here; they are chiefly weeds of field and meadow and include such well-known species as shepherd's purse, vetch, geranium, convolvulus, butter and eggs, mustard, wall lettuce, thistle, broom, and many others, as already noted.

At present writing 76 per cent of the recorded plants are native and still persist in more or less permanence, or until further changes are made in land utilization. It is inevitable that many of these will disappear as the land is put to residential use.

Birds not being so closely confined to definite areas by virtue of their ability to fly and also because of their migratory instinct have not appreciably changed. Species such as the pileated woodpecker and varied thrush naturally go elsewhere when the woodlands are logged over or cleared; the same can be said of other birds too, so that the reduction in bird-life is the result of reduced habitat rather than the destruction of the birds themselves as is the case in plant-life.

One bird which has certainly disappeared is the Lewis woodpecker. New-comers include the house-finch, which was seen in large flocks in the fall of 1953, though not seen since the trees and bushes have been removed from the area.

As with the birds, as cover and natural vegetation disappear, mammals also migrate elsewhere. Muskrats, for instance, had their burrows in every ditch-side, but since these have been cleared out there is a temporary reduction in their number, but as long as the lake remains undrained there will probably always be a nucleus for future expansion.

One animal that has certainly been reduced in numbers is the field vole, which frequented the old grassy meadows in large numbers. Since these have been ploughed up, the voles have been reduced in numbers.

Possibly the only addition to the mammalian population of the area is the house-cat, which in many cases has gone wild. This animal must have had a greater influence in the reduction of the native birds and mammals than any other factor connected with man's invasion of native territory.

Possibly the introduction of catfish and sunfish has made far-reaching changes in the aquatic life, but as this has not been investigated, no comparison can be made.

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ABNORMAL APPENDAGES OF THE PACIFIC EDIBLE CRAB, *CANCER MAGISTER* DANA

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Since 1950 six specimens of *Cancer magister* bearing abnormal appendages have been received at the Biological Station. The purpose of this article is to record with brief descriptions these abnormalities. No attempt was made to examine the internal anatomy of the appendages.

A photograph of each appendage is shown in Plate I; each photograph is identified by a letter corresponding to one which appears in the text description below. The photographs were taken by Mr. C. J. Morley.

A. Right cheliped of female, carapace width 127 mm., with small abnormal cheliped arising from the base of the movable dactylus. There is no articulation in the abnormal cheliped. The inside margins of the dactyli are serrated as in normal chelipeds. The crab was caught by the trawler " Norma N " off the Fraser River during 1950.

B. Left cheliped of male, carapace width about 170 mm., with a fixed abnormal cheliped originating at the base of the movable dactylus. The inside margins of the two abnormal dactyli are weakly serrated. At the base of the fixed cheliped is a small rod-like projection. Submitted by Mrs. W. Reader, Victoria, B.C., April, 1952.

C. Right fifth ambulatory leg of male, carapace width 174 mm., with partial splitting of the dactylus. The crab was caught in Shoal Harbour, Vancouver Island, about March 30th, 1954, and submitted by Mrs. W. Reader.

D. Right cheliped of large male, exact size unknown, with abnormal appendage arising from the upper surface of merus. This appendage consists of an immovable basal segment with two small projections arising independently from its distal portion. The longer projection is formed of two articulated segments; the distal end of the second segment is broken, indicating that the segment was formerly longer. The short projection is of one segment, articulated at its base. A wound scar is present on the opposite side of the merus. The crab was caught in Burrard Inlet on July 25th, 1952.

E. Right third maxilliped of male, carapace width 146 mm., with small abnormal cheliped arising from the merus of the exopodite. This cheliped has replaced the palp of the maxilliped which normally arises from the merus. The cheliped is articulated. There is a wound scar on the merus of the exopodite at the base of the cheliped. This crab was caught by the boat " Bob " in Burrard Inlet in 1951.

F. Left cheliped of large male, exact size unknown, with abnormal divergent dactyli arising from the outer edge of the propodus adjacent to the normal movable dactylus. The fixed dactylus (normal) projects inward, so that it does not mesh properly with the movable dactylus. The outer edges of the abnormal appendage are serrated. The crab was caught by the trawler " Frank Winfield " near Clo-oose, Vancouver Island, on April 26th, 1954.

As far as known, abnormal appendages have not been recorded previously for *C. magister*. Records of abnormalities are available for other species of brachyuran crabs. Calman (1913, 1924) described two specimens of the European edible crab, *Cancer pagurus,* with chelæ in place of normal walking legs. A case of duplicity in the chela of *Portunus puber* was described by the same author. Perkins (1925) recorded abnormal appendages of *Carcinus mœnas.*

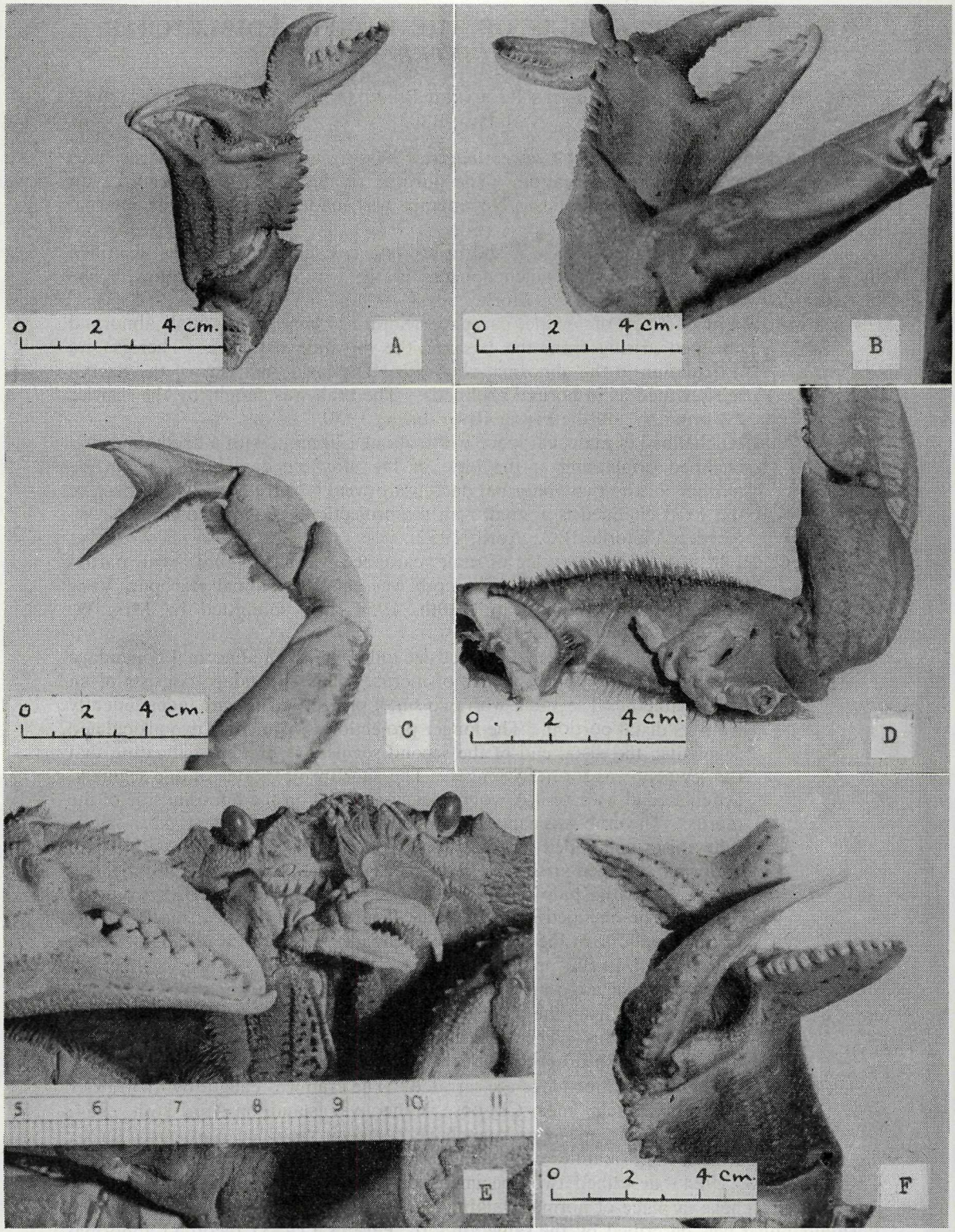

Plate I. Abnormal appendages of the crab *Cancer magister*.

The writer believes that the present abnormalities have resulted through disorientated regeneration following injury. In two of the cases described here, wound scars are visible. The authors cited above were of the opinion that most abnormal appendages were the result of regeneration after injury. Perkins (op. cit.) found abnormal walking-legs on a female of the species *Carcinus mœnas,* which was parasitized by *Sacculina* sp. In the present specimens of *C. magister,* no parasite was found.

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