PROVINCIAL MUSEUM

of NATURAL HISTORY and ANTHROPOLOGY

Report for the Year 1945

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AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

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1946.

To His Honour W. C. WOODWARD,
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 1945.

G. M. WEIR,
Minister of Education.

Office of the Minister of Education,
Victoria, B.C.

PROVINCIAL MUSEUM OF NATURAL HISTORY,
AND ANTHROPOLOGY,
VICTORIA, B.C., March 30th, 1946.

The Honourable G. M. Weir,
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 1945.

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

G. CLIFFORD CARL,
Director.

DEPARTMENT OF EDUCATION.

The Honourable G. M. WEIR, *Minister.*
Colonel F. T. FAIREY, *Superintendent.*

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY.

Staff:

G. CLIFFORD CARL, Ph.D., *Director.*
GEORGE A. HARDY, *Botanist.*
A. E. PICKFORD, *Assistant in Anthropology.*
LILLIAN C. SWEENEY, *Artist.*
MARGARET CRUMMY, B.A., *Clerk-Stenographer.*
H. H. PEGLER, *Attendant.*

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," R.S.B.C. 1936, c. 231.)

ADMISSION.

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

CONTENTS.

PAGE.

Report of the Director 7
- Exhibition and Preparation 7
- Special Exhibitions 7
- Field-work 8
- Publications 8
- Motion-pictures 9
- Education 9
  - Museum Lectures 9
  - Other Lectures 10
  - School Materials 10
- Research 10
- Attendance 10
- Changes in Administration 11

Report of the Botanist 12

Report of the Entomologist 14

Report of the Anthropologist 15

Accessions to the Museum 16

Article: "A School of Killer Whales stranded at Estevan Point, Vancouver Island," by G. Clifford Carl 21

Article: "Notes on some Unrecorded or Little-known British Columbia Plants," by J. W. Eastham 28

REPORT OF THE PROVINCIAL MUSEUM

FOR THE YEAR 1945.

REPORT OF THE DIRECTOR.

During the eventful year 1945 the Provincial Museum has carried on its work in the service of the public along many channels. A brief account of these services and of the various activities of the staff members during this calendar year is given as follows:—

EXHIBITION AND PREPARATION.

The exhibits of living fishes, amphibians, reptiles, and insects have been maintained and continue to attract considerable interest. A colony of bees was again kindly contributed by Dr. J. B. Munro, Deputy Minister of Agriculture; it was placed on view in the demonstration hive and has continued to receive much attention from visitors.

Early in the year the insect display on the second floor was enriched by a beautifully mounted series of dragon-flies donated by Mr. F. C. Whitehouse, of Vancouver. The insects were collected from various parts of the Province, each species known to be present in British Columbia being represented. The collection, arranged personally by Mr. Whitehouse, provides a ready means of identifying these attractive insects.

The series of models of British Columbia fishes being prepared by Mrs. Sweeney has been increased by the following, some of which have been placed on view in the fish section: rockfish, hake, pink salmon (male and female), king-fish, soup-fin shark, thresher shark, mud shark, cat shark, and sleeper shark.

The series of panels or dioramas featuring Indian life and painted by Mrs. Sweeney has been enlarged by the addition of six more prepared during the year.

A display-case on the main floor arranged by Mr. Pickford has featured recent accessions in anthropology.

SPECIAL EXHIBITIONS.

The annual exhibition of Indian art works and handicrafts was held in the Museum during the period May 21st to June 4th under the auspices of the Society for the Furtherance of British Columbia Indian Arts and Crafts. The display which was formally opened by the Honourable Mark Kearley, chairman of the Vancouver Island Branch of the Federation of Canadian Artists, featured the work of the pupils of Christie Indian School, Kakawis, prepared under the direction of Sister Mary Loretta. Other schools contributing to the exhibition included Songhees Indian Day School (Craigflower), Kuper Island Residential School, Penticton Indian Day School, and Coqualeetza Hospital (Sardis). The work of the Christie Indian School pupils received special attention during the display and later some of the designs were featured in magazine articles. Entries for the Christmas card contest from all schools also received much attention and commendation.

In June a special exhibition was held of selected work from the children's Saturday morning art classes offered by the Vancouver Art Gallery. The material was loaned through the courtesy of Mr. C. H. Scott, of the Vancouver School of Art.

During the last two weeks of March the series of panels on Indian life prepared by the Museum staff was placed on view in the rotunda of the Legislative Buildings. The exhibit received much favourable comment both from individuals and from the Press.

The panels have also been displayed in Vancouver during the Catholic Archdiocesan Missionary Exhibition held in the month of May, in the Victoria Normal School in April, and at the Sooke Fair in September.

FIELD-WORK.

In 1945 several trips were made to various portions of the Province for the purpose of gathering biological and anthropological material.

The first of these was made to Estevan Point, west coast of Vancouver Island, in order to study a school of killer whales which had become stranded on the beach. A detailed report of the results of this expedition is given in the appended paper.

During the period July 21st to August 16th a survey was carried out in Manning Park, which is situated in the Cascade Mountains, between Hope and Princeton. The work was undertaken at the invitation of officials of the Provincial Parks Service, Department of Forestry, for the purpose of determining what animals and plants are to be found in this area which has been recently designated as a Provincial park. The survey party consisted of the Director, Mr. G. A. Hardy, and Mr. F. L. Beebe, who obtained leave from the Vancouver Parks Board in order to assist us. During a portion of our time we were joined by Mr. William Thomas, of Princeton, who assisted as packer and guide to the Three Brothers area, an alpine country at about 6,500 feet elevation. During our stay in the Park we collected representative examples of almost all the plants, most of the small mammals, some of the birds, and other specimens as they came to hand. Since all the collected material has not yet been identified and since a portion of the park has not yet been visited a complete report on our field-work in this area is not yet available.

In connection with anthropological activities, Mr. Pickford spent a short period in the field visiting various points in the Fraser Valley; a more detailed account is given in his report. In October a trip was also made to Courtenay, Comox, and Denman Island, at which points valuable specimens were obtained and considerable useful information was gathered.

PUBLICATIONS.

The following publications have originated from the Museum during 1945:—

"Three Apparently Unrecorded Fresh-water Fishes of British Columbia." G. Clifford Carl. Canadian Field-Naturalist, Volume 59, Number 1, p. 25, 1945.

"Vancouver Island Snakes." G. Clifford Carl. Victoria Naturalist, Volume 2, Number 1, pp. 5–6, 1945.

"A Winter Record of the Big Brown Bat." G. Clifford Carl. Victoria Naturalist, Volume 2, Number 2, p. 26, 1945.

"Some Rarely Seen Marine Fishes." G. Clifford Carl. Victoria Naturalist, Volume 2, Number 5, pp. 73–74, 1945.

"A Flight of Termites." G. Clifford Carl. Victoria Naturalist, Volume 2, Number 5, pp. 76–77, 1945.

"Notes on the Salamanders of British Columbia." G. Clifford Carl and Ian McT. Cowan. Copeia, Number 1, pp. 43–44, 1945.

"Notes on some Frogs and Toads of British Columbia." G. Clifford Carl and Ian McT. Cowan. Copeia, Number 1, pp. 52–53, 1945.

"Some Marine Fish Records for British Columbia." G. Clifford Carl and G. V. Wilby. Canadian Field-Naturalist, Volume 59, Number 1, pp. 28-30, 1945.

"Flora and Fauna of the Paradise Mine Area, British Columbia." G. Clifford Carl and George A. Hardy. Report of the Provincial Museum for 1944, pp. 18–38, 1 plate, 1945.

"Northern Shrike." George A. Hardy. Victoria Naturalist, Volume 2, Number 2, p. 25, 1945.

"That Flower-Butterfly Partnership," and other articles. George A. Hardy. Vancouver Daily Province, August 25, October 6, October 20, 1945.

"*Filago arvensis* in North America." George A. Hardy. Rhodora. Volume 47, Number 560, p. 258, August, 1945.

"Some Longhorn Beetles of Vancouver Island." George A. Hardy. Victoria Naturalist. Volume 2, Number 6, pp. 88–92, 1945.

"Notes on the Life History of the Vapourer Moth (*Notolophus antiqua badia*) on Vancouver Island (Lepidoptera, Liparidæ). George A. Hardy. Proceedings of the Entomological Society of British Columbia, Volume 42, pp. 3–6, 1945.

"Indian Fish Traps." A. E. Pickford. Victoria Naturalist, Volume 2, Number 4, p. 58, 1945.

"Publications of the Provincial Museum." A classified list of publications up to December 21st, 1944. Provincial Museum, March, 1945.

Because of continued demand for Occasional paper Number 5, "A Corner Stone of Canadian Culture," by Miss Alice Ravenhill, a further supply was printed early in the year. Several other publications are in preparation.

MOTION-PICTURES.

Little has been accomplished in this field because film was available in only limited quantities or was quite unobtainable. During the spring season a few wild flowers were filmed through the courtesy of Mr. R. L. Colby, of the Department of Trade and Industry, Photographic Branch, and at other times other natural history subjects were photographed as opportunity and film supply permitted.

EDUCATION.

Museum Lectures.

Illustrated lectures for school children of the Greater Victoria area were again presented at the Museum as follows:—

Date.	Subject.	Speaker.
February 17	"The Sun and His Family"	Dr. Joseph A. Pearce, Director, Dominion Astrophysical Observatory, Victoria, B.C.
February 24	"Mites and Monsters"	Dr. G. Clifford Carl, Provincial Museum.
March 3	"Nature's Bank"	Mr. George A. Hardy, Provincial Museum.
March 10	"The Frozen Land"	Mr. William Mathews, Associate Mining Engineer, Department of Mines, Victoria, B.C.
March 17	"Kootenay Customs"	Mr. A. E. Pickford, Provincial Museum.
March 24	"Animals of Cloud Land"	Dr. Ian McTaggart Cowan, Department of Zoology, University of British Columbia, Vancouver, B.C.

Total attendance, 3,018.

We are pleased to thank again the British Columbia Electric Railway Company, through Mr. A. T. Goward, Vice-President, for granting special travelling privileges to school children attending the lectures. We also wish to thank Dr. Joseph A. Pearce, Director of the Dominion Astrophysical Observatory; Mr. William Mathews, of the Department of Mines; and Dr. Ian McTaggart Cowan, of the Department of Zoology, University of British Columbia, for their contribution to the programme; and Mr. R. L. Colby, of the Photographic Branch, Department of Trade and Industry, for operating the sound motion-picture projector.

Other Lectures.

During 1945 lectures were also given by members of the staff to the following organizations: Strawberry Vale Parent-Teacher Association, Monterey School, Victoria Lions Club (two lectures), Quadra School (two lectures), Royal Oak Parent-Teacher Association, Hard of Hearing Club, Royal Oak School, Colwood Community Club, Victoria Rotary Club, Tolmie School Parent-Teacher Association, Canadian Authors' Association, Vancouver Branch of the Alpine Club, Victoria Natural History Society (two lectures), St. Michael's School (three lectures), Phalanx Junior Club, Victoria Nursing Home.

On September 10th Mr. Pickford gave an address over CBR, entitled "Early Indian Life as shown in the Exhibits of the Provincial Museum."

In September the Junior Naturalists began to meet at the Museum on Saturday mornings to receive instruction and field experience under various leaders drawn from the Natural History Society.

School Materials.

During the year a number of exhibits have been brought together for proposed use in schools as aids to teaching natural history. These materials now include the following units: Common Cones, Starfishes and their Relatives, Food of the Red Squirrel, The Thrushes, Structure of a Fish, and Common Sea-shells. Others are being assembled as time permits and all will be released for use in schools when arrangements concerning distribution have been completed.

RESEARCH.

Apart from short periods spent in the field the present programme of museum activities allows no great amount of time for research. Nevertheless, Mr. Hardy has been able to continue his studies concerning the ecology of local fungi and to pursue certain investigations regarding life-histories of insects. In anthropology Mr. Pickford has been engaged from time to time in researches concerning the early life of our native tribes, and in zoology the Director has devoted short intervals of time to the compiling of information on the occurrence and distribution of fresh-water fishes of the Province. The results of these various researches are being prepared in manuscript form for possible future publication.

In December, through the co-operation of the Dominion Department of Transport, letters were mailed to all persons in charge of light stations on the coast asking their assistance in keeping records of movements of killer whales in their vicinity. By this means it is hoped to gather information regarding the habits of these animals in British Columbia waters.

ATTENDANCE.

The number of visitors registering at the Museum during 1945 and the estimated attendance based on counts during certain periods is as follows:—

Month.	Registered.	Estimated.
January	2,180	3,393
February	2,877	3,470
March	3,191	4,012
April	3,584	5,250
May	3,610	5,750
June	5,322	8,300
July	7,832	10,980
August	7,930	11,892
September	5,148	7,200
October	3,386	4,950
November	2,530	3,610
December	2,089	2,940
Totals	49,679	71,747

To these figures are to be added 3,018 school children who attended the spring lectures, thirty-nine school classes, eleven squads of soldiers, and twenty-two other organized parties, making an estimated grand total of over 76,000.

Compared with the 1944 attendance record, which was the largest to date, the total number of registered visitors in 1945 showed an increase of 4,110 or over 8 per cent. Both the registered attendance and the estimated total attendance during 1945 are the largest in the history of the Museum.

The attendance record for the month of July, as shown by the Visitors' Register, has been analysed by Mr. Pegler as follows:—

Residence.	Registration.	Residence.	Registration.
British Columbia	2,309	Washington	2,882
Alberta	306	Oregon	350
Saskatchewan	310	California	182
Manitoba	197	Alaska	19
Ontario	251	Other States	756
Quebec	59	Great Britain	106
New Brunswick	15	Other countries	17
Nova Scotia	25	Country not stated	24
Prince Edward Island	12		
Newfoundland	12		
Total	3,496	Total	4,336
Grand total			7,832

Compared with a similar analysis of the July attendance in 1944 the number of visitors registering in 1945 is greater by 1,609, an increase of over 25 per cent. While the attendance from Canada has experienced a slight increase (3,496 as compared with 3,314 in July, 1944), the registration from other countries has increased from 2,909 to 4,336. In general, visitors from Washington still top the list and they, together with those from this Province, account for about 65 per cent. of the number of registrants during the summer. The small number of visitors from more distant parts is no doubt due to the fact that, except for short boat-trips, travelling has been difficult owing to war-time conditions.

CHANGES IN ADMINISTRATION.

During the year two changes in administration have taken place which deserve mention here. Mr. H. G. T. Perry, former Minister of Education, left office in November, and Dr. S. J. Willis, Superintendent of Education for many years, retired from service in September. We wish to express our thanks and appreciation to both Mr. Perry and Dr. Willis for their kindly and helpful interest in the affairs of the Museum during their tenure of office.

At the same time we look forward to many fruitful years under Dr. G. M. Weir, Minister of Education, and Colonel F. T. Fairey, Superintendent of Education.

REPORT OF THE BOTANIST.

ACTIVITIES.

The past season has been an active and progressive one. New accessions, together with the routine work of identification, recording, and general care of the herbarium, have taxed our resources to the limit.

Recorded accessions from all sources amount to 1,922 sheets of specimens; each sheet contains about three plants, making the total number of specimens handled about 6,000. These figures do not take into account innumerable specimens of mushrooms and other fungi which are added to the herbarium at every opportunity.

In addition to the above, identifications and other data have been given for over 500 specimens of plants submitted by casual inquirers. The nature of the information sought, in most cases, concerned weeds and weed eradication, medicinal plants (the possibilities of their culture and marketing) and poisonous plants affecting both farm-stock and man. Authors of projected books or pamphlets have consulted the herbarium in connection with their own particular interests, and school children took advantage of this office for help in the naming of leaves, flowers, and related matters in connection with their school studies. It is estimated that during the spring and summer months inquiries average at least five per day.

The seasonal wild-flower exhibit continues to be an increasingly educational feature, forming an important supplement to the examples of flowers in the cases near-by. During most of the year the exhibit features a floral chain of the more conspicuous species, while in the winter months the evergreens and wild fruits are on display.

A certain amount of time has been taken up with work on the mushrooms, the result of which will appear in due time as an addition to the Handbook series. As very little appears to have been published on the mushrooms of this Province, many difficulties as to identification and literature are encountered during the course of the work, the unravelling of which constitutes a succession of unforeseen delays.

Time is also consumed in the preparation and delivery of talks, lectures, and demonstrations to schools and other institutions. These are usually accompanied by motion-pictures on the subject and, whenever possible, by a series of models to illustrate the preliminary remarks.

The seed collection grows apace and, like the rest of the botanical series, is fast approaching the limits of storage facilities. Apart from their intrinsic scientific value in connection with wild life, food, and plant distribution, seeds afford an interesting introduction to botanical studies, especially to school children, for they are easy to find, preserve, and store; being small and compact they take little space, while their firm consistency enables them to be kept without deterioration, in marked contrast to many other natural objects. In addition, the infinite variety of form, colour, and markings make them excellent subjects for microscopic studies and might well be included in any programme of nature study in school or organized societies for young people who like the out-of-doors.

The chief botanical activity of the year was a field trip to Manning Park, where a biological survey was conducted by the Museum from July 20th to August 16th.

As detailed a study of the vascular plants was made as time permitted. It is felt that only the salient and seasonal features of the terrain traversed were obtained. Such a vast and favourable area for plant development merits much more intensive investigation before it could in any way be considered complete. However, the results provided a large amount of material for study and form an adequate basis for a generalized account of the flora.

Altogether some 900 sheets with three times that number of specimens were obtained, thus greatly enriching the herbarium collection with species not hitherto represented from this district.

ACKNOWLEDGMENT.

It is a pleasure to be able to record the cordial interest and co-operation of other governmental departments in acquiring additional material for the herbarium, often not obtainable by any other means. Surveying parties especially visit distant and unfrequented areas often for the first time in recorded history. Specimens gathered on such occasions nearly always have some new value as indicating range extension of species not hitherto suspected in the area, while in all cases they constitute indispensable first-hand evidence as a basis for a more complete knowledge of our flora.

Of the many contributors to the herbarium collection only a few can be mentioned here.

Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver, has been most co-operative and generous in sharing the results of his work, both with specimens and information, with incalculable advantage to the Museum. His recorded contributions for the current year amount to 533 sheets of specimens, some of which are overflows from the previous season. Most of these are from the Prince George and Chilcotin districts of the Province.

Mr. A. G. Slocomb, under the direction of Mr. N. C. Stewart, of the Topographical Surveys Branch, contributed 105 plants from the northern boundary of the Province, thereby adding most desirable material to the herbarium.

Mr. J. A. Munro, Chief Migratory Bird Officer for British Columbia, Okanagan Landing, presented us with an excellent series from the Vanderhoof district, amounting to some 126 specimens.

Mr. L. J. Clark, of Victoria, donated a fine series of seventy specimens collected from Mount Brew, near Lillooet, an area hitherto unrepresented in our herbarium.

Mr. W. B. Johnstone has in the past been instrumental in providing the herbarium with valuable material from the Cranbrook district. This has been further augmented by some twenty additional species, all in an exceptionally fine state of preservation.

Dr. W. H. Welch, Indiana Academy of Science, Greencastle, Indiana, has added to our collections by fifty Alaskan plants obtained on an exchange basis.

In addition to the above, many valuable contributions have been received and credited, as will be seen by the full accession list below. To each and all of these contributors we wish to extend our cordial thanks and appreciation.

During the year several specialists have given their services in examining and reporting on certain groups of plants. Dr. J. H. Schultz, Department of Horticulture, The State College of Washington, Pullman, Washington, has checked all our specimens of Vaccinium, thus giving us authoritatively named examples for comparison and materially aiding in the final accounting of the species appertaining to the Province.

Mrs. Harvey M. Hall, through Dr. H. L. Mason, of the Department of Botany, University of California, Berkeley, California, has critically examined certain of our fern genera, providing us with a most welcome opportunity of obtaining the results of recent research concerning our species.

In addition to this revisional work we are indebted to other specialists for identification and confirmation of difficult species. In this regard we wish to convey our sincere appreciation to the following:—

Dr. Carleton R. Ball, Extension Service, United States Department of Agriculture, Washington, D.C. Willows.

Mr. J. W. Eastham, Provincial Plant Pathologist, Vancouver. Grasses, sedges, and rushes.

Dr. Leon Kelso, Washington, D.C. Castillejas.
Dr. J. Walton Groves, Dominion Experimental Farm, Ottawa. Fungi.
Mrs. Hugh Mackenzie, Victoria. Mosses.
Dr. M. L. Fernald, Gray Herbarium, Harvard University, Cambridge, Mass. Confirmation of *Filago arvensis*.

MISCELLANEOUS NOTES.

The following plant is not known to have been previously recorded from British Columbia:—

Arnica Lessingii Greene, Charlie Cole Creek, Tuya Lake area, July 29th, 1943, W. H. Mathews.

This is one of the three northern purple anthered species of Arnica. Although it is plentifully recorded from Alaska, and to a lesser degree from the Yukon Territory, no previous examples are known to have been taken in British Columbia.

The following record is an addition to the "Flora of Vancouver and Queen Charlotte Islands," 1921:—

Cratægus columbiana Howell. Fanny Bay. M. N. Jackson. June 21st, 1945.

This is an interesting record for it constitutes the first known occurrence west of the Cascades. Mr. Jackson reports several small bushes growing on a sandy tract near the coast. No evidence that it has been imported by human agency is demonstrable or suspected for it is growing wild on uncultivated land.

REPORT OF THE ENTOMOLOGIST.

A percentage of the botanist's attention is devoted to insect inquiries, accessions, and general care of the collections. Here again much remains to be done in order to facilitate the efficient storage of the extensive material that has accrued during the years. While storage-boxes are satisfactory in many ways, they are exceedingly inconvenient from the view-point of availability to public inspection, entailing too much handling for the good of their contents. A series of glass-top drawers in a metal case as is used for the small mammals is the ultimate goal in view. Then the species may be arranged in a permanent manner, and so placed as to allow of inspection and additions in a time-saving manner. Until some such arrangement can be installed it is almost impossible to properly accession and catalogue the species, a highly desirable work in view of the many inquiries concerning the number and names of our British Columbia insects.

The outstanding addition to our collection is an almost complete series of the British Columbia dragon-flies, numbering some 348 specimens of 78 species, donated by Mr. F. C. Whitehouse, a most ardent and accomplished specialist in this group. These are installed in one of the table cases on the second floor and were personally arranged and labelled by the donor.

A large number of additions to the insect series, chiefly Lepidoptera and Coleoptera, were made during the course of a biological survey in Manning Park, while many species of all orders have accrued from time to time during the season, credit for which is acknowledged under "Accessions."

A pleasing development in this branch of natural history is the interest shown by the children in the various "bugs"—moths, horntails, ichneumons, butterflies, beetles, ticks, and spiders, etc.—that attract and interest them, while even grown-ups declare they have seen "new" species of giant moths or "bugs," so that the trail to the botanist's office is a well-worn one during the season.

Whenever possible research is undertaken into the life-histories or other phases concerning the activities of insects, the results of which are duly noted and recorded for possible publication.

This season one or two life-histories of the local butterflies and moths were partially or wholly completed, while a paper on the life-history of the Vapourer moth was read at a meeting of the British Columbia Entomological Society in Vancouver and since published in the Proceedings.

Several talks and lectures on insects, including spiders, were made to schools during the course of the year.

Coming under this category is an extensive collection of entomological books and papers from the library of the late W. H. Hanham, acquired by purchase from his heirs. Sorting and classifying these acquisitions has entailed considerable "time out" from the other duties of the entomological botanist.

REPORT OF THE ANTHROPOLOGIST.

The interest shown by the general public in our Indian exhibits during the year has been most encouraging, particularly is this the case with the visiting schools who have increased their attendance. That the short talks and demonstrations given by the Anthropologist to school groups have registered with the children is proved by subsequent visits by individual children asking for further information. A similar response has been forthcoming from adult visitors, those showing interest in particular branches of Indian life have expressed warm appreciation of the special attentions given to them. This is especially true of students, of visitors from the United States, and of Service men returning from Europe and the Antipodes.

The publicity arising from the occasional lectures given during the year by the Anthropologist and particularly that from his broadcasts over CBR in the late summer has had a distinct influence over the number of accessions reaching the Museum. The public has again contributed generously to our collections and many of the specimens thus acquired are of outstanding interest, but we are still in need of further donations, especially costume material.

A field trip was made in the late summer in which the Anthropologist co-operated with a student group under the guidance of Dr. Marion Smith, of Columbia University, New York. On this occasion the excavation of a village site at Agassiz brought to the Museum a valuable collection of artifacts. This field trip was extended by a visit to the famous archæological site at Lytton, where sketches and descriptions were made. Lillooet was also visited, where arrangements were made for an important excavation planned for 1946. Contacts were made with Indian informants at every point and the accord thus extended culminated in an invitation from the Chief of the Pemberton Bands to visit his people. During this trip native ceremonies were observed and recorded and an extension of trade in native arts and crafts was fostered.

A demand has arisen from the schools of the Province for educational material dealing with our Indians. In response to this demand the following Museum publications have been sent out: "The Native Tribes of British Columbia" and "A Corner Stone of Canadian Culture," both by Miss Alice Ravenhill. The demand, however, is growing and illustrative material is now requested for school use. To cope with this new demand pictorial panels and description scripts have been devised. In pursuance of this system a series of nine panels has been painted by the Museum artist, Mrs. Lillian Sweeney, under the direction of the Museum staff. These show typical scenes in the life of the principal tribes of British Columbia which are portrayed on folding backgrounds and base-boards. Folding forward from the main scene are wings painted with a foreground treatment which together with the cut-out figures give a realistic perspective to the scene as a whole. Each of the panels thus made up is being accompanied by a written script of about ten thousand words, descriptive of the tribal life as a whole. These sets are sent out with a limited number of specimens from the Museum selected to demonstrate the native life.

ACKNOWLEDGMENT.

To mention the names of every person to whom we are indebted in this connection would be but to repeat acknowledgments which are made in the detailed lists following. We do feel, however, that a general acknowledgment is due; from the accessions received during the season it is evident that there has been a general reawakening of interest in the preservation for posterity of the fast disappearing relics of the aboriginal life of this Province. As custodians of the collections made to this end we feel that not only should acknowledgments be made but an appeal should also be voiced for further contributions of like kind.

In the acknowledgments for 1945 particular mention should be made of the extremely valuable contribution made by Mr. A. D. Corker and his sister, Mrs. J. Buchanan, of Vancouver, in the large handsome black slate carving coming from the hands of one of the old Haidan masters in this art. Similar thanks are also due to Miss Mary Campbell for her invaluable gift of two very ancient stone bowls carved with human figures taken from the deep layers of a shell-mound in the vicinity of Cumberland.

ACCESSIONS.

During 1945 the following numbers of specimens or groups of specimens were added to the catalogued collections (figures in parentheses denote the total number on December 31st, 1945): Indian material, 222 (6,191); plants, 1,923 (19,115); mammals, 108 (5,214); birds, 50 (9,154); reptiles, 8 (270); amphibians, 22 (555); fishes, 22 (661).

Coming directly or indirectly from individual collectors the following anthropological items are noted:—

The Jennings Collection.—(Purchase.) Some valuable pieces, chiefly Tsimshian and Haidan, were acquired in this group; these include two unique carvings in bone, an art for which the Tsimshians were justly famous. The one object is a small carving of a human mask and the other a representation of a shaman in native costume; both are beautifully executed. Also included in this collection are three very fine silver bracelets and a black slate totem-pole, together with some relics of the trading days.

The Walter Marriot Collection.—(Purchase.) This collection was made at Thiberts Creek; its purchase adds many items to our study material concerning the northern Déné and neighbouring tribes. A bone dagger with a carved eagle-head handle and a carved wooden rattle are among the more interesting pieces.

The F. C. Whitehouse Contributions.—(Gifts.) Mr. Whitehouse has set an example which we would like to see followed by others with his opportunities. In following his work with the dragon-flies referred to elsewhere in this report, he has acted as a voluntary agent for the anthropological section of this Museum; through his representations Mrs. E. Lawman and Mr. A. E. McKay, both of Squilax, have released to us some very nice specimens of nephrite chisels and other artifacts found within range of their homes.

The James McCallum Collection.—(Gift.) This collection was donated by Mr. McCallum following the excavation of a village site on his property which has been referred to above. The collection comprises a good series of points and chisels and is doubly welcome because of its association with a detailed study.

The Captain L. A. Peck Collection.—(Gift.) This comprises a series consisting mostly of bone artifacts from Eburne and other shell mounds on the mainland. It adds material of which we were much in need to fill gaps in our series.

The Nina Walls Collection.—(Purchase.) A series from Nootkan territory including bows, arrows, and other items.

The Elkington Collection, per Mrs. E. F. Stewart.—(Purchase.) Includes an interesting wood figurine, miniature coppers, and other material from Alert Bay, together with a horn spoon and a pair of unique bark moccasins from Telegraph Creek.

The Ormiston Collection, per J. A. Boulton.—(Purchase.) A very fine series of five original old house-posts from Comox and district. These are carved with human and totemistic figures and are identified with early European contacts along this coast.

In addition to the above collections, the following items have been added during the year to our display and study material:—

ANTHROPOLOGICAL ACCESSIONS.

TSIMSHIAN.

By gift—

Medicine-man's bowl, wood. Miss Anne Sheepshanks, England.
Small totemistic carving in bone. Miss A. Ewart, Victoria.

NOOTKAN.

By gift—

Basket and lid, twined. Miss Alice Ravenhill, Victoria.
Whalebone war club. F. W. Towler, Tofino.
Basket and lid, twined. G. H. Stevens, Victoria.
Two bone daggers from shell mound. Mrs. R. H. Humphreys, Kyuquot.
Plaster cast of carved walrus tusk. C. L. Bland, Quatsino.

SALISHAN (COAST).

By gift—

Urinal tube for cradle. Frank Smith, Vancouver.
Five arrow-heads, spear-heads, etc., oval stone perforated, thirty-one bone points. Archdeacon R. Connell, Victoria.
Portion of old basket. British Columbia Electric Railway Company, per E. G. Hart, Victoria.
Whistle (Bella Coola) alder, slave killer. Lieutenant-Colonel A. K. Robertson, Kaleden.
Cedar paddle, set of six abalone pendants, four lehal sticks, etc. Constable W. F. Trant, Bella Coola.
Stone implements. Oli Unset, Smith's Inlet.
Cranial and skeletal fragments. Mrs. W. Martin and Mrs. Ethel Tee, Victoria.
Pestle hammers. J. A. Heritage, Victoria.
Two multiple-coil baskets. G. H. Stevens, Victoria.
Stone pulley, etc. Colonel Charles Flick, Mayne Island.
Nephrite chisel. Neil Kelley, Cobble Hill.
Net sinker, etc. Colonel H. R. Lacon, Denman Island.
Painted paddle, drum and stick, abalone shell. Dr. G. Clifford Carl, Museum staff.
Human skull, Cadboro Bay. A. E. Pickford, Museum staff.
Material from shell mound at Shoal Bay. Mrs. George Davidson, Victoria.
Human skull, artifically deformed. Miss Mary Molliet, Parksville.

SALISHAN (INTERIOR).

By gift—

Burden basket, Lillooet. Miss J. E. Bruce, Victoria.
Two baskets, coiled and imbricated. P. Walker, Victoria.
Arrow-head, obsidian. Mr. Holstein, Sooke.
Pestle hammer. Mrs. Sheppard, Lillooet.
Pestle hammer. Constable Dowling, Lillooet.

Pestle hammer and arrow-head. A. E. Pickford, Museum staff.
Puberty tube, bone. J. W. Wilson, Lillooet.
Basketwork cradle, Lillooet. G. H. Stevens, Victoria.
String of stone beads, etc. R. F. Burton, Kamloops.
Human skull, Lytton; human skeleton, Grand Forks. Commissioner T. W. S. Parsons, Victoria.
Canoe, 23 feet long. Major F. W. Longstaff, Victoria.

By purchase—
Basket-making materials.

BOTANICAL ACCESSIONS.

By gift: Bobby Adams, Victoria, one; L. J. Clark, Victoria, seventy; J. W. Eastham, Vancouver, 533; E. H. Garman, Victoria, four; Miss Hilda Hinder, Victoria, six; S. S. Holland, Victoria, one; M. N. Jackson, Fanny Bay, one; W. B. Johnstone, Cranbrook, twenty; Mrs. A. F. Lane, Victoria, one; A. E. Lawrance, Alaska, one; C. P. Lyons, Victoria, one; Dr. M. D. McKichum, Saanichton, seven; Don Munday, North Vancouver, fourteen; J. A. Munro, Okanagan Landing, 126; F. P. Newcome, Victoria, three; Commissioner T. W. S. Parsons, Victoria, one; Richard Pearce, Victoria, one; W. D. Pemberton, Victoria, four; Patsy Ritchie, Victoria, ten; A. G. Slocomb, Victoria, 105; D. Spragg, Saanich, one; W. H. Warren, Victoria, two.

ZOOLOGICAL ACCESSIONS.

MAMMALS.

By gift—
Lieutenant-Colonel R. C. Andros and family, Victoria. One mounted cougar.
R. F. Burton, Kamloops. One grizzly bear skull, one black bear skull, one cougar skull, one coyote skull.
L. J. Clark, Victoria. One racoon skull.
O. F. Maisonville, Sointula. One sea-lion skull.
Dr. J. B. Munro, Victoria. Four ferrets.
A. E. Sherwin, Victoria. One big brown bat.
S. A. K. White, Victoria. One black rat.

By the staff 92

BIRDS.

By gift—
C. E. Baker, Ganges. One green-winged teal.
L. J. Clark, Victoria. One golden-eye.
J. O. Clay, Victoria. One towhee, one sparrow.
J. A. Flett, Duncan. Two merlins, two horned owls.
James Hatter, Vancouver. One golden-eye, one harlequin.
Mrs. Johnston, Cowichan Lake. One horned owl.
Pat Little, Victoria. One blue grouse.
M. Lohbrunner, Victoria. One petrel.
P. W. Martin, Victoria. One murrelet.
J. A. Munro, Okanagan Landing. One golden-eye.
K. Racey, Vancouver. One plover.
S. W. Rand, Alberni. Piece of wood showing work of sapsucker.
L. G. Thomas, Sidney. One golden eagle.
E. F. G. White, Victoria. Two warblers.

By the staff 33

AMPHIBIANS AND REPTILES.

By gift—

Mrs. G. Ballantyne, Redonda Bay. One red salamander.
Miss D. Dalziel, Okanagan Landing. One lizard, one garter snake, one blue racer.
Stewart Hagar, Victoria. Three red-backed salamanders.
A. C. Mackie, Vernon. Three snakes and one live alligator lizard.
F. Rendle, R.M.D. 4, Victoria. Collection of tree-frogs.
C. W. Thomas, Princeton. One frog, one tree-toad, one lizard.
Frank Weir, Cowichan Lake. One garter snake.
S. A. K. White, Victoria. One snake-skin.
Peter Young, Langford P.O. One clouded salamander.

By the staff 21

FISH.

By gift—

A. Davidson, Victoria. One wolf-eel.
W. Davis, Victoria. One stickleback.
Kyuquot Trollers, Victoria. One king-of-the-salmon.
John Meier, Hulatt, B.C. Three Rocky Mountain whitefish.
H. H. Pegler, Victoria. One rockfish.
G. H. Smith, Victoria. One kingfish, one turbot, three flounders, four liparids, one hake, two ratfish, two singing fish.

INVERTEBRATES.

By gift—

Bobby Adams, Victoria. One California oak-borer.
Allan Baker, Victoria. One eyed hawk-moth.
L. Anderson, Victoria. One tiger-moth.
Glen Beanlands, Billy Bowles, and Paul Steeves, Victoria. One white admiral caterpillar.
Z. Bosworth, Victoria. One sawfly.
Miss M. Bowyer, Prince George. One wood-borer.
P. Bridge, Victoria. One caterpillar.
L. J. Clark, Victoria. One tent-caterpillar.
R. Crocker, Langford P.O. One black widow spider.
H. H. Currie, Nelson. One long-horn beetle, one sawfly, one vapourer moth caterpillar.
Miss D. Dalziel, Okanagan Landing. One earthworm.
H. B. Darnell, Victoria. One Venus flower-basket.
David Duke, Victoria. One caterpillar.
A. H. Garland, Victoria. One tiger-moth.
Marlin Gort, Victoria. One polyphemus moth.
Dorothy Hardwick, Victoria. One horntail.
Bill Hibbert, Victoria. One sea-lemon.
Allison Hill, Victoria. One horntail.
W. H. Hill, Brentwood. One wood-borer.
F. T. Humphries, Victoria. Two polyphemus moths.
Chester Kearley, Metchosin. One wood-borer.
Tut King, Victoria. One chiton.
R. Knight, Sooke. One swallow-tail butterfly caterpillar.
M. Lohbrunner, Victoria. One scarabid beetle.
R. Makovsky, Victoria. One starfish.
P. Parizeau, Victoria. One earthworm.

A. E. Pickford, Victoria. One long-horn beetle.
Malcolm Potts, Victoria. One mourning cloak caterpillar.
Patsy Smelling, Victoria. One banded borer.
G. H. Smith, Victoria. Three egg-cases of whelk, one heart-urchin, and collection of goose barnacles and caprellids.
Veronica Stevens, Victoria. One garden spider.
Mrs. L. Sweeney, Victoria. One bark-beetle, one bee-fly.
Miss Iris Thompson, Victoria. One thirteen-striped chafer.
Dr. J. P. Walker, Victoria. One wasp-nest.
Miss M. Webster, Craigellachie. One electric-light bug.
Mrs. M. C. White, Victoria. One California oak-borer.
Frank Whitwell, Saanichton. Two crayfish.
A. Young, Victoria. One wood-borer.

PALÆONTOLOGY.

By gift—
J. A. Flett, Duncan. Collection of fossils from Duncan and Nanaimo areas.
F. P. Newcome, Victoria. Two fossil plants.
Mrs. E. L. Trickey, Victoria. One mammoth tooth.

MISCELLANEOUS.

By gift—
H. Nation, Victoria. Photo and negative of lampreys.

A SCHOOL OF KILLER WHALES STRANDED AT ESTEVAN POINT, VANCOUVER ISLAND.

By G. Clifford Carl, Provincial Museum, Victoria, B.C.

On the morning of June 13th, 1945, Noah Paul, a native of Hesquiat Indian Village, came upon a number of killer whales on the beach between Boulder Point and Estevan Point, west coast of Vancouver Island. He passed on this information to officials at Estevan Point Station, but it was not until almost two weeks later that word of the whales reached the writer, and as a consequence they were not fresh by the time examination was possible. Fortunately, however, Mr. Fred J. Cringan, a member of the Estevan Station staff, obtained a series of photographs of the mammals while they were still in good condition and prints of these have been made available for study.

TYPE OF BEACH AND DISTRIBUTION OF CARCASSES.

The beach between Estevan Point and Hesquiat has a gentle slope for most of its length and the westernmost portion, facing almost due south, is exposed to considerable wave-action during heavy winds. Many large boulders up to 6 and 8 feet in diameter are strewn along the shore between tide-levels; very little sand and gravel is present, the substratum being mostly rock worn smooth by water-action. Along this shore from a point about one-half mile east of the lighthouse and for a distance of 700 yards, the bodies of eighteen adults and one fœtus of the killer whale (*Grampus rectipinna*) were found. Near the Point a small male was discovered and about 1½ miles eastward from the light another small male was located, making a total of thirteen females, seven males, and one male fœtus.

Thirteen of the total were concentrated along a portion of the shore not more than 150 yards in length about one-half mile from Estevan Point. The remainder, except the easternmost and westernmost individuals, were spread out over a distance of about 500 yards. In elevation all were about awash during a 12-foot tide.

GENERAL CONDITION OF THE WHALES.

By the time the whales were examined by the writer on July 1st, the carcasses were much bloated and large areas of outer skin layers had peeled off in all but a few. Oil was oozing from natural openings and cracks in the body-wall; this and the fact that the bodies had been rolled around over the boulders by wave-action, smearing the surrounding area with grease, made it extremely difficult to walk around the specimens for fear of slipping on the rocks.

Several of the carcasses had been mutilated by the local Indians, who had removed certain portions for food, notably saddles of blubber from the back and sides. In three instances the dorsal fin had also been removed, which may have some significance in view of the fact that the Nootka whale hunters of the past considered the hump bearing the dorsal fin "taboo" and therefore removed it first to be set aside and not eaten. One of the older men of the village, Dionys Jacob, stated the oil was used as food, dried meat and fish being dipped into it before being conveyed to the mouth. The blubber is dried (or smoked) and also used as food. Only the older people of the village care for the flesh and oil of the whale.

One whale carcass, an 18-foot female, had been badly mutilated by the light station's road foreman in an unsuccessful attempt to break up the carcass with blasting-powder. An initial charge of ten sticks of powder merely rolled the body over; a second similar charge disembowelled the whale and shattered the backbone.

Close to another 18-foot female lay a partially decomposed whale measuring 6 feet 4 inches in total length. Because of the small size and presence of an umbilical cord, this specimen was assumed to be a fœtus.

Except for the fœtus and the eviscerated specimen, all the carcasses were bloated by reason of the presence of gas within the abdomen. Portions of the gut were protruding from the anus, and in the case of males, the penis was distended, presumably also because of the internal pressure. Nevertheless, although the whales had been dead for more than eighteen days of moderately warm weather, the flesh and internal organs were not badly decomposed. An explanation for this may be found in the fact that the flesh and viscera were bathed in oil, which may have slowed decomposition. Blow-fly maggots were present in some; however, many larvæ were abandoning the carcasses before attaining maturity possibly because of the high oil content which apparently was disagreeable to them.

TYPE OF INFORMATION GATHERED.

Since time was short, it was not possible to make a detailed study of each specimen. Therefore, the greater part of the available time was spent in recording the most important external measurements of each whale and in preparing a complete skeleton of one. During the remaining time more detailed records of certain individuals were gathered and photographs were obtained.

In all cases measurements were made of total length, length of dorsal fin and flipper, and width of fluke. In some, other dimensions were also taken, as shown in Tables 1 and 2. The total length given is the distance between verticals at snout and base of notch of fluke; the measurement of the dorsal fin is vertical height; the measurement of the flipper is from mid-shoulder to tip—i.e., axial. The figure given for girth around the abdomen is slightly greater than normal due to bloating of the carcass.

In Table 1 the measurements are presented under the two sexes and these are further divided arbitrarily into groups according to size. In Table 3 the data are given as per cent. of total length in order to facilitate comparison.

ANALYSIS OF RESULTS.

Assuming that males 20 feet and over and females 16 feet 9 inches and over in total length are adults, it is apparent that males attain a greater length than females. The average length of four adult males is 21 feet 4 inches as compared with 18 feet for twelve females. It is interesting to note, however, that the sexual disparity in size as shown by these specimens is not nearly so great as one is given to believe is the case from published accounts. It seems to be generally accepted that the adult male killer whale is twice the size of the adult female, but the data made available by the Estevan whales indicate that mature males exceed mature females in length only by about 18.5 per cent.

TABLE 1.

External Measurements of *Grampus rectipinna* stranded at Estevan Point.

Specimen Number.	Total Length.	Snout to Penis.	Snout to Vent.	Length of Dorsal.	Length of Flipper.	Width of Fluke.	Length of Penis.	Girth of Penis at Base.
ADULT MALES.								
12	22′ 0″	12′ 0″	.....	3′ 2″	3′ 3″	7′ 1″	3′ 5″	3′ 5″
7	21′ 8″	12′ 4″	.....	3′ 5″	3′ 10″	7′ 11″	3′ 3″	2′ 3″
3	20′ 4″	.....	.....	.....	2′ 11″	6′ 0″	.....	.....
6	20′ 0″	11′ 5″	.....	3′ 5″	3′ 9″	6′ 11″	3′ 4″	2′ 9″
Average	*21′ 4″*	*11′ 11″*	.....	*3′ 4″*	*3′ 5″*	*6′ 11½″*	*3′ 4″*	*2′ 9½″*
SUBADULT MALES.								
4	15′ 4″	.....	.....	.....	1′ 10″	3′ 11″	1′ 11″	.....
19	14′ 7″	8′ 8″	10′ 1″	1′ 4½″	1′ 7½″	3′ 5″	1′ 3″	.....
JUVENILE MALE.								
20	10′ 7″	6′ 8″	7′ 5½″	9½″	14″	2′ 4″	7″	.....
FŒTAL MALE.								
21	6′ 4″	4′ 2″	4′ 9¼″	5¾″	8¼″	1′ 2¼″	4½″	3½″
ADULT FEMALES.								
18	19′ 5″	.....	.....	1′ 11″	2′ 5″	4′ 7″	.....	.....
13	18′ 6″	.....	12′ 2″	1′ 10″	2′ 2″	4′ 4″	.....	.....
9	18′ 6″	.....	12′ 0″	1′ 9″	2′ 0″	4′ 6″	.....	.....
5	18′ 5″	.....	.....	.....	2′ 0″	4′ 4″	.....	.....
1	18′ 4″	.....	.....	1′ 11″	2′ 5″	4′ 3½″	.....	.....
2	18′ 4″	.....	12′ 1″	1′ 11½″	2′ 1″	4′ 7″	.....	.....
17	18′ 2″	.....	.....	2′ 1″	2′ 1″	4′ 9″	.....	.....
10	18′ 0″	.....	12′ 0″	1′ 9″	2′ 1″	4′ 6″	.....	.....
14	17′ 10″	.....	12′ 0″	1′ 10″	1′ 4″	4′ 2″	.....	.....
15	17′ 3″	.....	.....	1′ 8″	2′ 4″	4′ 8″	.....	.....
8	17′ 2″	.....	11′ 3″	1′ 7″	2′ 1″	3′ 10″	.....	.....
16	16′ 9″	.....	.....	1′ 11″	2′ 0″	4′ 8″	.....	.....
Average	*18′ 0″*	.....	*11′ 11″*	*1′ 9½″*	*2′ 2½″*	*4′ 5″*	.....	.....
SUBADULT FEMALES.								
11	15′ 4″	.....	.....	1′ 4″	1′ 7″	3′ 4″	.....	.....

TABLE 2.

Detailed External Measurements of Four Specimens of *Grampus rectipinna* stranded at Estevan Point.

	Fœtus (Male).	No. 20 (Male).	No. 19 (Male).	No. 11 (Female).
Total length	6′ 4″	10′ 7″	14′ 7″	15′ 4″
Snout to gape	8¼″	1′ 3½″	1′ 8″	1′ 6½″
Snout to eye	10¾″	1′ 6″	1′ 10½″	1′ 11″
Snout to blow-hole	10″	1′ 10½″	2′ 2″	2′ 2″
Snout to anterior edge of dorsal fin	2′ 7½″	4′ 10″	6′ 5½″	6′ 6″
Snout to umbilicus	3′ 4″	4′ 11″	6′ 6½″	.....
Snout to penis	4′ 2″	6′ 8″	8′ 8″	.....
Snout to vent	4′ 9¼″	7′ 5½″	10′ 1″	10′ 1″
Length of dorsal fin	5¾″	9½″	1′ 4½″	1′ 4″
Length of flipper	8¼″	1′ 2″	1′ 7½″	1′ 7″
Width of fluke	1′ 2¼″	2′ 4″	3′ 5″	3′ 4″
Girth behind flipper	4′ 4″	6′ 8″	9′ 10″	9′ 0″
Girth at base of fluke	9¼″	1′ 4″	2′ 2″	1′ 11″
Length of penis	4½″	7″	1′ 3″	.....

TABLE 3.

External Measurements expressed as Per Cent. of Total Length, *Grampus rectipinna* stranded at Estevan Point.

Number.	Total Length.	Snout to Vent.	Length of Dorsal Fin.	Length of Flipper.	Width of Fluke.	Length of Penis.
MALES.						
12	22′ 0″	.....	14.4	14.7	32.9	15.5
7	21′ 8″	.....	16.2	18.2	37.7	15.0
6	20′ 0″	.....	17.1	18.7	34.6	16.6
4	15′ 4″	.....	.....	11.9	25.5	12.5
19	14′ 7″	69.1	9.4	11.1	23.4	8.6
20	10′ 7″	70.4	7.5	11.0	22.8	5.5
Fœtus	6′ 4″	75.3	7.6	10.9	18.7	5.9
Average	.....	*71.6*	*12.0*	*13.6*	*27.9*	*11.3*
FEMALES.						
18	19′ 5″	.....	10.1	12.7	24.1	.....
13	18′ 6″	67.6	10.2	12.0	24.1	.....
9	18′ 6″	64.9	9.5	10.8	24.3	.....
1	18′ 4″	.....	10.6	13.4	23.8	.....
2	18′ 4″	.....	10.8	11.5	25.5	.....
17	18′ 2″	.....	11.5	11.5	26.1	.....
10	18′ 0″	66.6	9.7	11.6	25.0	.....
14	17′ 10″	67.3	10.3	10.7	23.3	.....
15	17′ 3″	.....	9.7	13.5	27.0	.....
8	17′ 2″	66.1	9.3	12.3	22.5	.....
16	16′ 9″	.....	11.4	11.9	27.8	.....
11	15′ 4″	65.8	8.7	10.3	21.7	.....
Average	.....	*66.4*	*10.1*	*11.8*	*24.3*	.....

With regard to size it is interesting to note that the largest of four male and seven female killer whales stranded at Masset in 1941 was 20 feet 6 inches and 18 feet 8 inches in length respectively (Cameron, W. M., Prog. Reports, Pacific, No. 49, p. 17, 1941). These figures are in close agreement with those obtained from the Estevan Point specimens. On the other hand, a male 25 feet 4 inches in length has been reported from Maine (True, F. W., Proc. U.S. Nat. Mus., Vol. 27, No. 1357, pp. 227–230, 1904) and the species is said to attain a total length of 30 feet (Kellogg, Remington, Nat. Geo. Mag., Vol. 77, No. 1, pp. 35–90, 1940).

Evidence regarding the size at which sexual maturity is attained may be gathered from Table 3. For example, the length of penis, expressed as a percentage of total length, varies from 5.5 per cent. in the smallest male to 15 or 16 per cent. in the adults, the greatest size difference being shown between the specimens measuring in length 14 feet 7 inches and 20 feet respectively. This would seem to indicate that sexual maturity in males was reached along with a body-length of about 15 feet 6 inches.

A similar conclusion is reached as a result of examining the figures given for dimensions of dorsal fin, flipper, and fluke in Table 3.

With regard to age, a tentative conclusion may also be reached. Judging by dimensions of newly born killer whales, of which records are in the Provincial Museum, it would seem that the 10-foot 7-inch specimen (No. 20) is a yearling and that the two next in size (Nos. 19 and 4) are probably 2-year-olds, thus suggesting that sexual maturity in males is reached early in the third year.

There is considerable variation in the relative sizes of the appendages between individuals of each sex. In the case of the males this variation is due in part to relative growth, as indicated by the fact that the length of the dorsal fin, the flipper, and the width of the fluke are proportionately greater in the larger animals. In the case of the females there is little indication that the ratio, appendage size to body-

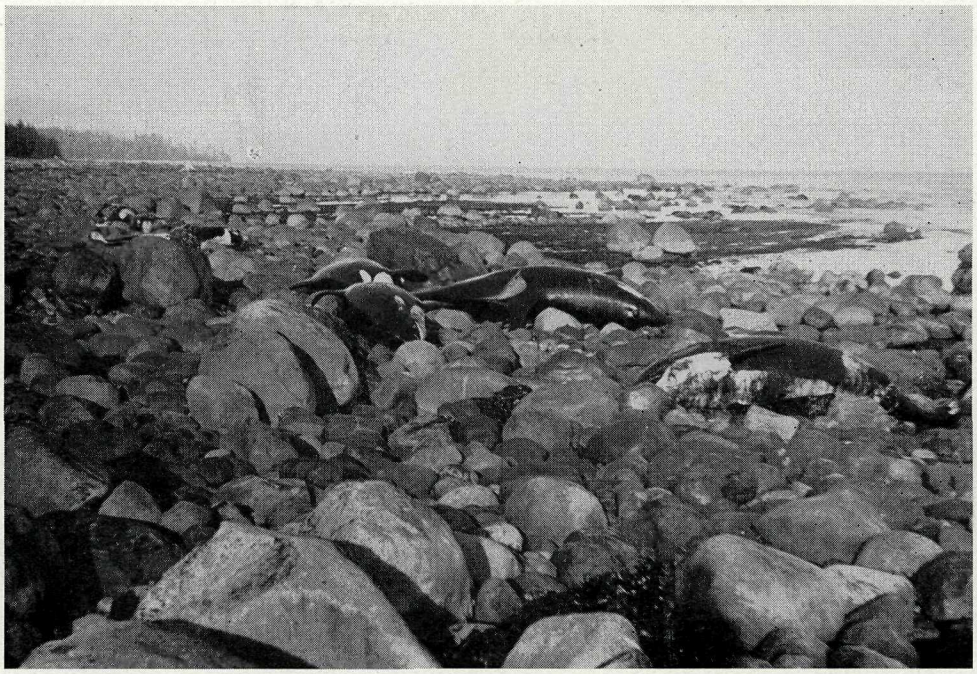

Fig. 1. Killer whales stranded at Estevan Point; view looking east toward Boulder Point.

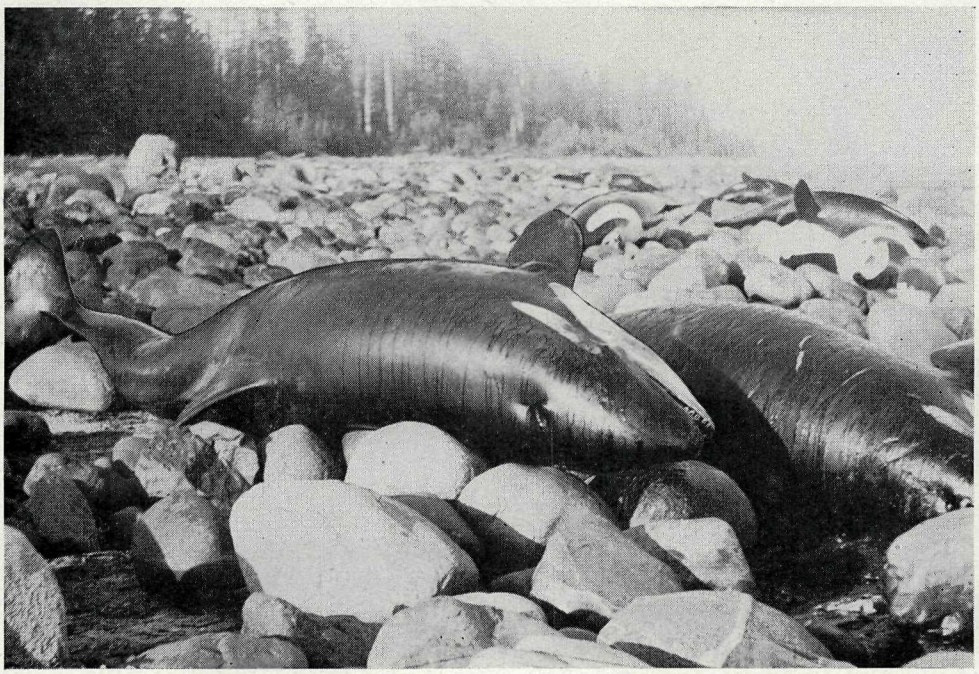

Fig. 2. In foreground, two female killer whales, Nos. 17 and 16.

(Photos by Fred J. Cringan.)

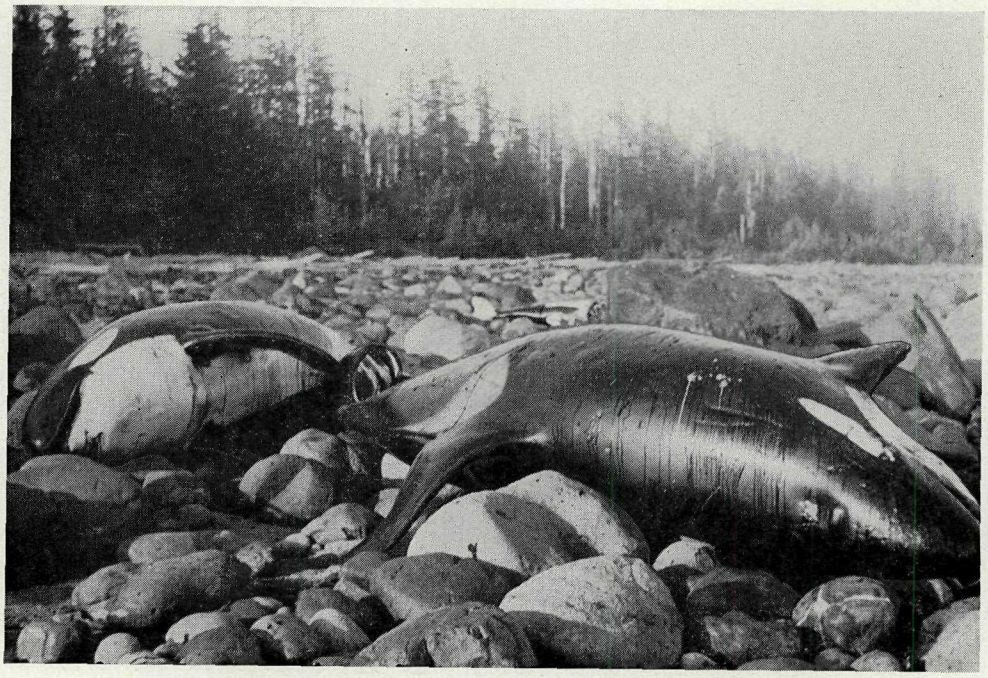

Fig. 3. In foreground, two male killer whales, Nos. 6 and 7.

Fig. 4. Ventral aspect of two female killer whales.

(Photos by Fred J. Cringan.)

length, increases with the growth of the body, but this may be due to the fact that the range in body size is insufficient to demonstrate this point.

The length of dorsal fin and flipper and the average width of the fluke in males is relatively greater than in females.

In males the vent is located more to the posterior than in females. The male fœtus showed the most posterior location of the vent.

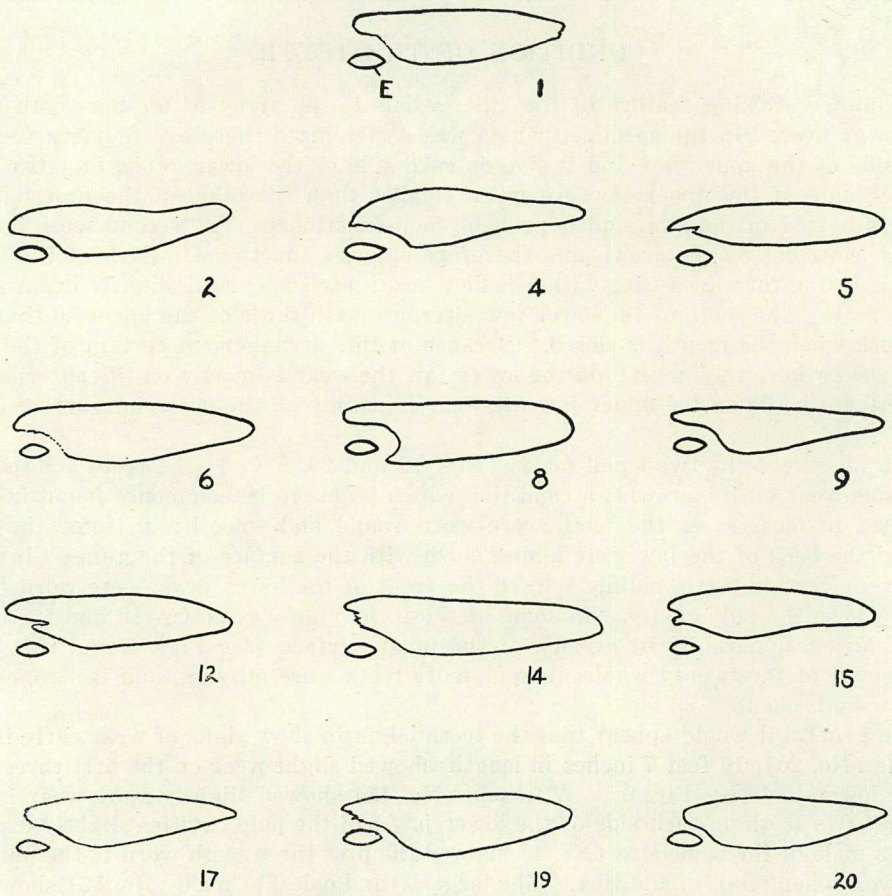

Fig. 9. Variation in eye-patch in thirteen killer whales stranded at Estevan Point. From sketches made in the field; not drawn to same scale. The figures are field numbers of specimens and " E " marks the relative position of the eye.

VARIATION IN COLOUR PATTERN.

Killer whales are conspicuously marked with creamy-white on an almost black background, the light area usually being in three main patches. The larger portion extends from the tip of the lower jaw posteriorly along the belly to a point behind the vent (*see* Fig. 4). In the head region it covers the throat and extends dorsally somewhat further than the line drawn from the corner of the mouth to the insertion of the flippers. Between the flippers the white area is constricted into a narrow band which extends along the mid-line of the belly to the region between the umbilicus and vent where it broadens and branches to form two curved wings, one on each side above the vent. The smaller light areas are in the form of two elongated patches, one on each side of the head above and behind the eye.

The presence of a pale saddle behind the dorsal fin is suggested in two of the photographs taken by Mr. Cringan (Figs. 1 and 3), but this was not verified by the writer.

The outline and position of these conspicuous light areas appear to vary somewhat, the variation being most noticeable in the case of the eye-patches. In thirteen specimens this pattern was still visible at the time of examination; sketches and measurements were made to show the outline and position in relation to the eye, as shown in Fig. 9.

CONDITION OF THE TEETH.

Another striking feature of the killer whale is the array of teeth in both upper and lower jaws. In the specimen which was skeletonized there are fourteen teeth on each side of the upper jaw and twelve on each side of the lower. The first two teeth on each side of the upper jaw are much smaller than the others; the first tooth in front is buried in the gum and is probably non-functional. The second tooth on each side is worn flat on the crown and therefore appears functional. Each of the larger teeth is in the form of a cone with a hollow base; each is curved slightly inwards and to the rear. The teeth of the lower jaw alternate with those of the upper so that they interlock when the mouth is closed. Because of this arrangement certain of the teeth show wear where they meet; on the lower jaw the wear is mostly on the anterior face of the teeth while on the upper jaw the wear is mainly on the posterior surface of the teeth.

In all except the two small males (Nos. 19 and 20, Fig. 6) the teeth showed considerable wear on the crowns, a condition which seems to be commonly found in killer whales. In most cases the teeth were worn round and smooth; in some the teeth toward the back of the jaw were almost flush with the surface of the gums. In many specimens certain teeth, mainly toward the front of the lower jaws, were worn flat so as to expose the pulp cavity. In some of these the pulp was destroyed and the cavity was enlarged apparently by erosion of the inner surface (*see* Figs. 5 and 8). In at least seven of the twenty whales, one or more teeth were missing, and in two, certain teeth were broken.

In general it would appear that the teeth begin to show signs of wear early in life. A male (No. 20), 10 feet 7 inches in length, showed slight wear on the first three teeth of the lower jaw (*see* Fig. 6). A female (No. 11) showed slightly more wear in that the first two teeth on each side of the lower jaw had the pulp cavities slightly exposed, while a male of the same size (No. 4) showed the first three teeth worn to the pulp and had two broken teeth in addition. The largest (and oldest?) male (No. 12) showed all the teeth badly worn, seven in the lower jaw eroded so as to expose the pulp cavity, others rounded off scarcely above the gums. In this specimen the wear was most evident on the right side, suggesting that the lower jaw was out of alignment, a condition reported to be found in other specimens of killer whales (Ulmer, Frederick A., Notulæ Naturæ, Acad. Nat. Sc. Phil. No. 83, 1941).

FŒTUS.

The fœtus was that of a male 6 feet 4 inches in length. Although it was badly decomposed, portions of the skin still showed traces of colour, a tan yellow on the throat and belly, muddy black on back and sides. A portion of the umbilical cord was still present and the penis was extended. Except for certain bones of the skull, the jaws and teeth, all of which were preserved, most of the skeleton was unossified.

As the fœtus was found within a few feet of a large female (No. 17), it is assumed that this adult was the parent, and it seems likely that the fœtus was born prematurely during the female's struggles to get into deep water.

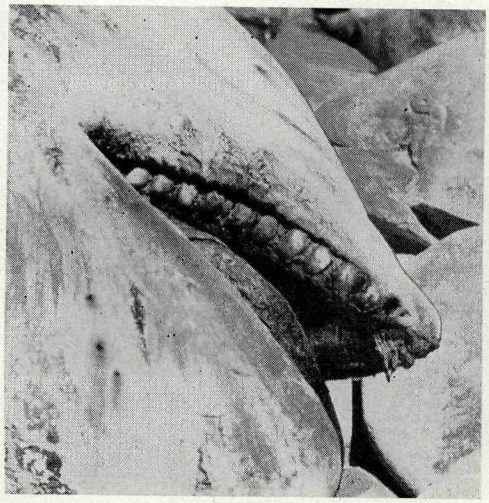

Fig. 5. Condition of teeth in adult female killer whale. (No. 13.)

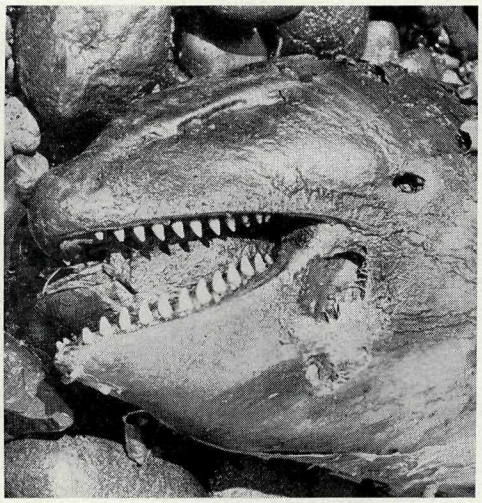

Fig. 6. Condition of teeth in juvenile male killer whale. (No. 20.)

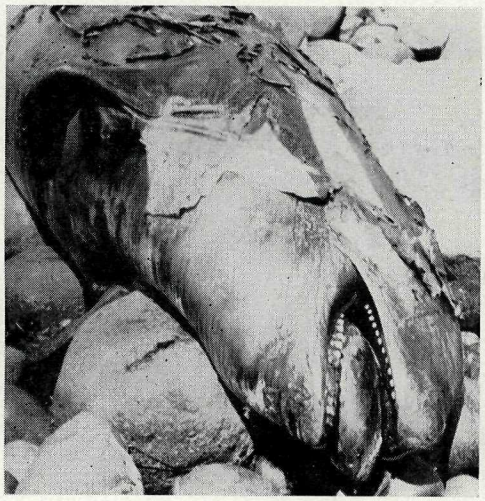

Fig. 7. Adult female killer whale; stranded June 13th, photographed July 4th, 1945.

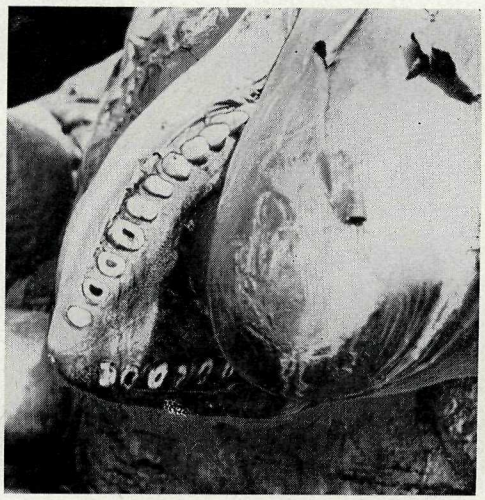

Fig. 8. Condition of teeth in adult killer whale, Estevan Point, July 4th, 1945.

(Photos by G. C. Carl.)

A newly born killer whale stranded at Cherry Point, V.I., on September 28th, 1944, was 8 feet 1 inch in length and the bones of the skull were completely fused. The Estevan Point specimen, however, being smaller by almost 2 feet and having unfused cranial elements, would seem to be several months short of full term in development.

External measurements are given in Table 2.

OTHER OBSERVATIONS AND NOTES.

Specimen No. 11, a 15-foot 4-inch female, was selected for the removal of the skeleton for study purposes. The stomach was found to be empty; no fœtus was present in the uterus. The liver was large and extremely spongy; the intestine appeared remarkably long for a carnivorous mammal. The greater part of two days was required to remove the complete skeleton single-handed, the skull and ribs entailing the most labour.

The abdominal cavity of a male (No. 12) was also opened but the stomach was found to be empty. No fœtus was found in the female (No. 10) disembowelled by blasting-powder, and time did not permit examination of others.

With regard to food of the killer whale, Billy Ambrose, a local Indian, stated that one which was shot "some time ago at Nootka" was found to contain "five or six whole spring salmon in fresh condition." Another native, Dionys Jacob, told of two killer whales going aground at Ucluelet. An Indian jumped on one's back while it was still alive and shot it with a rifle.

A POSSIBLE EXPLANATION.

Two theories may be advanced in an effort to explain the stranding of these whales: first, that they were stunned or killed by practice-bombing, and second, that they ran aground while pursuing their prey. The first theory is not supported by the evidence available. The majority of the carcasses were grouped together on a comparatively short stretch of beach, which would not have been the case had they drifted in from some distance at sea. Moreover, an inquiry directed to the R.C.A.F., Pacific Command, brought the answer that bombing had not been carried out in the vicinity of Estevan Point within the period of time in question.

The second theory—namely, that they ran aground while in pursuit of prey—is better supported by the facts. According to Noah Paul, who was first to see the whales on the morning of June 13th, several of them still showed signs of life, from which it may be assumed that these mammals became stranded during the previous twenty-four-hour period. The weather during this time was clear, with a 20-mile-per-hour wind from the north-west; the highest tide was 11.8 feet at 2.30 a.m. The beach has a long and gentle slope and is strewn with large, rounded boulders. These conditions of weather, falling tide after 2.30 a.m., and rocky beach are favourable to the stranding of creatures such as killer whales which are known to venture often into shallow water. The positions of the bodies, grouped as they were with all but two on a short stretch of shore, is also evidence of accidental stranding.

As further evidence it may be pointed out that it is not uncommon for these mammals to ground themselves on gradually shelving beaches. Eleven adults became stranded near Masset, Queen Charlotte Islands, along a 75-yard stretch of beach about January 14th, 1941 (Cameron, W. M., *loc. cit.*). A number became temporarily grounded at Cherry Point, Vancouver Island, at 1.30 a.m. on September 28th, 1944; the adults finally worked themselves into deep water, but a newly born female was left trapped in a slight depression. Similar instances of the stranding of killers and false killers (Pseudorca) are recorded from other parts of the world.

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NOTES ON SOME UNRECORDED OR LITTLE-KNOWN BRITISH COLUMBIA PLANTS.

By J. W. Eastham, Provincial Plant Pathologist, Vancouver, B.C.

Onoclea Struthiopteris (L.) Hoffm. Ostrich Fern.

This is rather a rare plant in the southern parts of the Province, though there are specimens in the Provincial Museum from Agassiz, Chilliwack, Hope, Lumby, and Revelstoke. The localities given in Henry's "Flora of Southern British Columbia" (1915) are evidently taken from Macoun's "Catalogue of Canadian Plants," which says "common along C.P. Ry. east of Agassiz and along Eagle R. in the Gold Range, 1889 (*Macoun*)." It appears to be more abundant farther north. I found it sparingly just across the Fraser River from Quesnel and also just outside Prince George on the Vanderhoof Road, but it was especially abundant along the road from Prince George to Giscome, often lining both sides of the road and extending into the adjoining woods (1944). The nomenclature appears confused. I have used for the heading the name given in Henry's Flora, but Britton and Brown's "Illustrated Flora of Northern States and Canada" (1913) gives *Matteuccia Struthiopteris* (L.) Todoro; Broun's "Index to North American Ferns" (1938), *Pteretis nodulosa* (Michx.) Nieuwl.; and J. P. Anderson's "Flora of Alaska" (1943), *Struthiopteris filicastrum* All.

Acorus Calamus L. Sweet Flag.

In July, 1945, a specimen of this plant was sent to me for identification by Mr. G. A. Muirhead, District Agriculturist at Salmon Arm. The finder of the plant had noticed its aromatic odour and wished to know if it had any commercial value. Further inquiry elicited the information that it occurred over some 2 acres of the swampy shore of Shuswap Lake, near Tappen. The land it grows on has never been cultivated and is under water until the middle of July.

Britton and Brown give the range in North America as "Nova Scotia to Ontario and Minnesota, south to Louisiana and Kansas," but it appears to have a wider range westwards in the north. Fraser and Russell give four stations for it in their "List of the Flowering Plants, Ferns and Fern Allies of Saskatchewan" (1937). Dr. Turner, of Fort Saskatchewan, Alberta, has also sent it to me from Lily Lake, 23 miles north-west of that point, and thinks there is very little chance of its having been introduced there by human agency, Lily Lake being "remote from the beaten track."

As regards the origin of the British Columbia plant, it is difficult to judge without further investigation. The situation would indicate a natural origin. The plant, however, is occasionally cultivated as an ornamental one for fish-ponds and water-gardens, and seeds might be carried on the feet of water-birds from such a colony. On the other hand the plant might have been introduced in a similar way from a wild colony.

Calla palustris L. Marsh Calla: Water Arum.

Henry's Flora provides a record from Hazelton, "the only British Columbia station, far west of its range." In recent visits to Central British Columbia I found it abundant at Summit Lake, about 30 miles north of Prince George; in a slough about 23 miles north-east of Vanderhoof; and in Burns Lake, just south of the town of that name. H. Groh (Can. Field-Nat. *58*: 17, 1944) records it from Reid Lake, 20 miles north of Prince George, and from Endako. There is also a specimen in the herbarium of the University of British Columbia from Prince Rupert, so that it probably occurs right across British Columbia at or above latitude 54, as Dr. Turner has sent it to me from Lily Lake, Alberta, in about the same latitude. I have not seen it myself south of this, but there is a specimen in the University herbarium from Quesnel. Where it

occurs it is usually very plentiful, forming dense beds, but its distribution appears to be discontinuous.

Carex Sprengellii Dewey.

I found a large plant of this on the Links, Prince George, July, 1944, but did not meet with it again. It does not appear to have been previously recorded from British Columbia, although apparently common in Alberta.

Polemonium acutiflorum Willd.

I am indebted to Mr. A. E. Porsild for the identification of this plant, which he has recorded from Alaska and the Canadian North-west Territories. He states ("Materials for a Flora of the Continental North-west Territories of Canada" (1943)) that it is "an Asiatic species which in western America reaches but a short distance east of the Mackenzie." On July 16th, 1944, I found it growing in great abundance on an extensive tract of swampy meadow just south of Topley Landing, Babine Lake. Mixed with *Delphinium Brownii,* it formed a sheet of blue extending almost to the horizon. In August of the same year Mr. C. F. Cornwall, District Agriculturist at Williams Lake, sent me specimens from Anahim Lake, Chilcotin, latitude 52½. These are possibly the first records of the plant within the area covered by Henry's Flora.

Phacelia Franklinii (R.Br.) A. Gray.

I found this plant fairly plentiful, July 15th, 1944, in dry rocky ground in thin woodland, a few miles south-west of Redstone, Chilcotin, along the Chilco Lake Road. The only previous British Columbia record I have found is in Macoun's catalogue where it is given from "Eliguck Lake, northern British Columbia (*Dawson*)." This lake is about 90 miles north-west of Redstone in latitude 53.

Petasites palmata (Ait.) A. Gray.

This widespread eastern species, ranging from Newfoundland west to the Rocky Mountains, appears to be common in latitude 54, at least from Prince George to Burns Lake, and extends south to Quesnel. At the season of the year when I visited the north (July), the flowers were gone, except in one plant collected at Barkerville (altitude about 4,000 feet), but the leaves seem sufficiently characteristic. These are somewhat like those of *P. speciosa* but smaller (10–15 cm. broad in my specimens), the sinus at the base more open, and the upper surface with the flattened, appressed hairs characteristic of that species absent or only slightly developed. Ulke, in his "Flora of Yoho National Park" (1934), records it as "occasional at middle and high elevations" and in his "List of the Vascular Plants of the Horse-thief Creek, Purcell Range, B.C." (Can. Field-Nat. *49*: 75, 1935) "occasional; on moist cold peaty slopes above timberline." Mr. A. E. Porsild informs me that there are specimens in the Canadian National Herbarium, Ottawa, from Revelstoke and Vermilion Crossing (Kootenay National Park), so it evidently has a wide distribution in the more northern and eastern areas of the Province, although not recorded by Henry.

Petasites vitifolia Greene.

A single plant, just past flowering, collected on the summit of the road between Francois and Ootsa Lakes (altitude probably 3,000 feet or over). I have referred to this species. Rydberg ("Flora of Rocky Mountains" (1917)) gives the range as Manitoba to Alberta, and Dr. Turner has sent me specimens from Fort Saskatchewan, Alberta, taken in about the same latitude as the example in my collection.

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