

PROVINCE OF BRITISH COLUMBIA
DEPARTMENT OF EDUCATION

PROVINCIAL MUSEUM
of NATURAL HISTORY
and ANTHROPOLOGY

Report for the Year 1950



VICTORIA, B.C.
Printed by DON McDIARMID, Printer to the King's Most Excellent Majesty
1951

PROVINCE OF BRITISH COLUMBIA
DEPARTMENT OF EDUCATION

PROVINCIAL MUSEUM

of NATURAL HISTORY
and ANTHROPOLOGY

Report for the Year 1950



VICTORIA, B.C.
Printed by Queen's Printer at the King's Head Press, Victoria, B.C.
1951

2

To His Honour CLARENCE WALLACE, C.B.E.,
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 1950.

W. T. STRAITH,
Minister of Education.

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

PROVINCIAL MUSEUM OF NATURAL HISTORY
AND ANTHROPOLOGY,

VICTORIA, B.C., April 30th, 1951.

*The Honourable W. T. Straith,
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 1950.

I have the honour to be,

Sir,

Your obedient servant,

G. CLIFFORD CARL,
Director.

H

CONTENTS

DEPARTMENT OF EDUCATION

The Honourable W. T. STRAITH, *Minister.*

F. T. FAIREY, B.A., LL.D., *Deputy Minister and Superintendent.*

PROVINCIAL MUSEUM OF NATURAL HISTORY AND ANTHROPOLOGY

Staff:

G. CLIFFORD CARL, Ph.D., *Director.*

GEORGE A. HARDY, *Assistant in Botany and Entomology.*

CHARLES J. GUIGUET, M.A., *Assistant in Biology.*

WILSON DUFF, B.A., *Assistant in Anthropology.*

MARGARET CRUMMY, B.A., *Secretarial Stenographer.*

BETTY C. NEWTON, *Artist.*

SHEILA GRICE DAVIES, *Typist.*

E. J. MAXWELL, *Attendant.*

CONTENTS

	PAGE
Report of the Director.....	7
Special Exhibits.....	7
New Exhibits.....	7
Field Work.....	7
Publications.....	8
Motion Pictures.....	9
Education.....	9
Museum Lectures.....	9
Other Lectures.....	10
School Loan Material.....	10
Attendance.....	10
Staff Changes.....	11
Building Maintenance and Equipment.....	11
Report of the Assistant in Botany and Entomology.....	11
Report of the Assistant in Biology.....	13
Report of the Assistant in Anthropology.....	14
Accessions.....	15
Article: "Biology of the Scott Island Group, British Columbia," by G. Clifford Carl, C. J. Guiguet, and George A. Hardy.....	21

U

REPORT OF THE PROVINCIAL MUSEUM

FOR THE YEAR 1950

REPORT OF THE DIRECTOR

SPECIAL EXHIBITS

Three special displays were featured in the Museum during 1950. From March 13th to 31st wood-carvings by R. A. Waldie were placed on exhibit; from July 10th to July 31st the Ninth Annual Exhibition of B.C. Indian Arts and Crafts was held under the sponsorship of the B.C. Indian Arts and Welfare Society; and from August 5th to August 20th wild-fowl paintings by George Jenkins were exhibited.

The Indian arts and craft exhibit was particularly outstanding, with entries from many schools, including the Indian Day School at White Horse. The display was officially opened by Dr. Harold P. Johns, Director of Vocational Guidance and Summer School, and prizes were awarded by Col. G. Howland, president of the society: The memorial art scholarship offered each year by the society was won by Dolly Morgan, of the Alberni Indian Residential School.

NEW EXHIBITS

A wall case has been designed and installed by Mr. Duff to explain the North-west Coast native custom of erecting totem-poles, and, in addition, a new demonstration bee-hive was on display during the summer months through the kindness of Dr. J. B. Munro, Deputy Minister of Agriculture.

Because it was necessary to use another alcove on the second floor for an office, space had to be made available by reorganizing the bird exhibit which had occupied this section. This was accomplished by storing the majority of the egg sets, by removing four of the large display-cases, and by removing all duplicate mounted birds. The remaining cases and birds, when rearranged, present a much more effective display.

FIELD WORK

Two major biological field trips were made in 1950—one to Manning Park between Hope and Princeton and one to the Scott Islands off the north-western end of Vancouver Island. On the Manning Park work, G. C. Carl, G. A. Hardy, and C. J. Guiguet spent a week, commencing on May 25th, in covering portions of the area not previously seen and in revisiting other areas. Observations were made on the goats near the western boundary of the park, and on the birds and plants near the divide. The materials gathered on this visit, together with data collected on previous visits to this area, are now being organized for a report on Manning Park for early publication. We are indebted to E. G. Oldham, Forester in Charge of Parks, and to Bob Boyd, Ranger at Pine Woods, for accommodation provided at the Ranger station during this period.

In June the Museum biologists, accompanied by Frank Beebe, again visited the Scott Islands. Camp was set up on Lanz Island during the period June 16th to 20th, after which the party worked from the Fisheries vessel. In this way, material was collected from Lanz, Cox, Beresford, and Sartine Islands. A complete account is found at the end of the present Report. Again we are most grateful to A. J. Whitmore, Chief Supervisor of the Dominion Department of Fisheries, and to Capt. Walter Redford, of the Fisheries patrol vessel "Howay," for transportation and other courtesies extended to our party.

In September Mr. Guiguet and Mr. Hardy spent several days in the Courtenay district, where Mr. Guiguet collected small mammals and birds while Mr. Hardy made a short botanical survey of the area in the vicinity of the Forbidden Plateau Lodge.

In addition to the above, several day trips have been made to areas in the vicinity of Victoria for the purpose of collecting specimens and observing wild-life conditions.

In the anthropological field Wilson Duff made two trips to the lower Fraser Valley, the first during July and August and the second in September. An account of his activities will be found elsewhere in this Report.

PUBLICATIONS

During the year 1950 the following publications have originated from the Museum:—

By G. Clifford Carl—

- “The Distribution of Fresh-water Fishes in British Columbia.” Report of the Provincial Museum for 1949, pp. 21–23.
- “The Sharp-tailed snake in British Columbia.” *Herpetologica*, Vol. 6, Part 5, p. 116.
- “The Museum Steps Out.” *B.C. Teacher*, Vol. 30, No. 2, November, 1950, pp. 64–65; 81.
- “Migrating Mice Mystify Museum.” *Vancouver Daily Province*, October 21.
- “Mice and Men.” *Victoria Naturalist*, Vol. 7, No. 6, pp. 62–65.
- “The Amphibians of British Columbia.” *British Columbia Provincial Museum, Handbook No. 2 (Second Edition—revised)*, pp. 1–62.

By George A. Hardy—

- “The Red Squirrel as a Truffle Hunter.” *Victoria Naturalist*, Vol. 6, No. 8, p. 92.
- “Glaucous-winged Gull and Bonaparte’s Gull.” *Victoria Naturalist*, Vol. 6, No. 9, pp. 97, 98.
- “Some Wild Flowers of a Sandy Beach.” *Victoria Naturalist*, Vol. 7, No. 3, pp. 28–32.
- “The Fawn-coloured Pluteus, *Pluteus cervinus*.” *Victoria Naturalist*, Vol. 7, No. 4, pp. 41, 42.
- “A Day with the Birds in a Saanich Garden.” *Victoria Naturalist*, Vol. 7, No. 5, pp. 52, 53.
- “Production by the Billion.” *Museum and Art Notes, Art, Historical and Scientific Association, Vancouver*, Vol. 1, No. 2 (Second Series), pp. 20–25.
- “Notes on the Life History of the Garry Oak Looper, *Lambdina fiscellaria somnaria* Hlst.” *Proceedings, B.C. Entomological Society*, 46, pp. 13, 14.
- “Notes on Vancouver Island and West Coast Coleoptera.” *Proceedings, B.C. Entomological Society*, 46, p. 18.
- “Notes on and Additions to the Cerambycidae of Vancouver Island.” *Canadian Entomologist*, Vol. 82, No. 4, pp. 85, 86.
- “What to Look for in December.” *Victoria Naturalist*, Vol. 7, No. 6, p. 66.

By C. J. Guiguet—

- “The Marbled Murrelet and White-winged Scoter.” *Victoria Naturalist*, Vol. 7, No. 4, pp. 37–40.
- “Bird News from Provincial Museum Field Notes, October.” *Victoria Naturalist*, Vol. 7, No. 5, pp. 54–56.
- “Notes on the Common Murre Nesting in British Columbia.” *Murrelet*, Vol. 31, No. 1, pp. 12, 13.

By Wilson Duff (editor)—

“Anthropology in British Columbia.” No. 1, 1950, British Columbia Provincial Museum, pp. 1-45.

By Charles E. Borden—

“Preliminary Report on Archæological Investigations in the Fraser Delta Region.” Anthropology in B.C., No. 1, British Columbia Provincial Museum, pp. 13-27.

By J. H. Sewell—

“Archæological Remains in Central British Columbia.” Anthropology in B.C., No. 1, British Columbia Provincial Museum, pp. 28-32.

By Walter B. Johnstone—

“An Annotated list of the Birds of the East Kootenay, British Columbia.” Occasional Paper No. 7, British Columbia Provincial Museum, December, 1949.

By J. A. Munro—

“The Birds and Mammals of the Creston Region, British Columbia.” Occasional Paper No. 8, British Columbia Provincial Museum, pp. 1-90, sixteen figures, August, 1950.

MOTION PICTURES

A 1,200-foot motion-picture film in colour featuring local sea-shore animals and plants was completed in the fall of 1950, and further materials was collected for a film on common local birds. Portions of films donated by C. A. Harwell, western representative of the National Audubon Society, were combined with film from the Museum's collection to make a 600-foot reel on alpine wild life. Material on Indian life was also collected by Mr. Duff, as noted in his report.

EDUCATION

MUSEUM LECTURES

The annual Saturday morning programme of films for school-children was extended over a period of nine weeks, commencing on February 4th. The following is a record of the series:—

Date	Topic	Attendance
February 4	“The World about Us”	313
February 11	“Plants and Animals”	976
February 18	“Spiders and Insects”	710
February 25	“Creatures of the Sea-shore”	614
March 4	“Fishes and Their Relatives”	637
March 11	“Frogs, Turtles, and Crocodiles”	686
March 18	“Birds of Our Coast”	594
March 25	“Animaland”	619
April 1	“Children of the World”	329
	Total	5,478

Again we thank the British Columbia Electric Railway Company for granting special privileges to school-children attending the film-shows, the Audio-Visual Education Branch of the Greater Victoria School Board for distribution of tickets to the schools, and the Public Relations Branch, British Columbia Forest Service, for the loan of a phonograph turn-table.

A similar series of motion-picture films was presented for the general public on Sunday afternoons during the same season. More than 3,250 persons attended the nine presentations. We are indebted to the Victoria Photo Supply Company for providing some of the films used in this programme.

OTHER LECTURES

Apart from the above programmes, lectures and film-shows were given by members of the Museum staff to the following organizations during 1950: University Women's Club (New Westminster), St. John's Young People, Victoria Gyro Club, Victoria Electric Club (two lectures), Capital City Commercial Club, Colwood Community Club, St. Michael's School (three lectures), Dominion Fisheries officers in Vancouver (two lectures), South Saanich United Church, Victoria Kinsmen Club, Cordova Bay Parent-Teacher Association, Esquimalt Hi-Y, Victoria Aquarium Society (two lectures), Victoria White Cane Club (three lectures), Sir James Douglas Parent-Teacher Association, Margaret Jenkins Parent-Teacher Association, View Royal Parent-Teacher Association, Christ Church Cathedral Women's Auxiliary, Lions Auxiliary, B.C. Indian Arts and Welfare Society, St. Saviour's Men's Group, Victoria Outdoor Club, St. Ann's Academy Indian Concert, St. Luke's Young People's Group, North Ward Parent-Teacher Association, Victoria Branch of the Engineering Institute of Canada, Victoria Rovers, Victoria Boy Scouts' Association, Canadian Mining Convention, Camosun Gyro Club, Anglican Young People's Association, Willows Parent-Teacher Association, Victoria Lions Club (two lectures), Victoria Natural History Society, B.C. Historical Society (two lectures), Pacific Northwest Bird and Mammal Society, Centennial United Church Annual Dinner, Vancouver Island Teachers' Convention, South Vancouver Island Junior Rangers, Victoria Fish and Game Protective Association, Victoria Chapter P.E.O., Quadra Parent-Teacher Association, St. Mary's Church Men's Group, Ladysmith Fish and Game Association, Y.M.C.A. Prep Classes (two lectures), Victoria Normal School, and Britannia Branch of the Canadian Legion.

In addition to these, the Director gave a fall course of ten lectures on British Columbia wild life under the auspices of Victoria College and was guest speaker on a radio broadcast on December 9th sponsored by the Parent-Teacher Association. At a meeting of the Pacific Northwest Bird and Mammal Society in the Museum on April 29th several staff members gave demonstrations of museum techniques. Demonstrations and talks were also given to Junior Natural History Society groups and to about thirty school classes visiting the Museum by appointment.

SCHOOL LOAN MATERIAL

A further contribution to the material loaned to the Greater Victoria School Board was made in the form of five large exhibition cases and 122 mounted birds which were removed from the exhibition gallery in May. Extra sets of Indian dioramas were also loaned temporarily to the local School Board to take care of special demands for this material.

ATTENDANCE

The number of visitors to the Museum during 1950 is summarized as follows:—

	Registered	Estimated
January.....	595	793
February.....	1,016	1,354
March.....	1,392	1,856
April.....	1,844	2,458
May.....	2,502	3,336
June.....	5,155	6,873
July.....	8,818	11,759
August.....	8,828	11,765
September.....	4,516	6,021
October.....	1,772	2,362
November.....	883	1,177
December.....	781	1,041
	<u>38,102</u>	<u>50,795</u>

In addition to these visitors, there were 5,478 children who attended the Saturday morning film presentations, a number of school classes, many meetings of Junior Naturalist classes, and over 3,250 persons who attended the Sunday afternoon programmes in February, March, and April, making an estimated grand total of over 60,000.

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

Residence	Registration	Residence	Registration
British Columbia	1,717	Washington	1,443
Alberta	410	Oregon	757
Saskatchewan	333	California	1,998
Manitoba	201	Alaska	15
Ontario	301	Other States	1,480
Quebec	49	Great Britain	60
New Brunswick	11	Other countries	34
Nova Scotia	4	Country not stated	1
Newfoundland	4		
	<hr/>		<hr/>
Total	3,030	Total	5,788
		Grand total	8,818

The sum of \$454.24, collected by the Solarium donation-box during the year, was turned over to the Queen Alexandra Fund for Crippled Children.

STAFF CHANGES

In May, C. J. Guiguet rejoined the staff after seven months' leave of absence, during which time he completed the requirements for a Master of Arts degree at the University of British Columbia. In June, Wilson Duff rejoined the Museum staff after carrying on graduate work in anthropology at the University of Washington in Seattle. During the summer months Allan Watson was employed as temporary assistant.

BUILDING MAINTENANCE AND EQUIPMENT

Early in the year the second floor, including the offices, was redecorated, and in December repainting was continued on the main floor. To provide space for Mr. Duff, an office was constructed in the south-eastern alcove of the second floor by installing a partition in the archway. Space was gained for this purpose by rearranging the bird exhibit, as previously noted.

In January, 100 folding chairs were purchased for use during the spring lecture series and on other occasions. A tape-recording machine was also acquired along with a battery and rectifier so that it can be used in the field.

REPORT OF THE ASSISTANT IN BOTANY AND ENTOMOLOGY

BOTANY

ACTIVITIES

Recorded accessions for the year 1950 amount to 373 sheets of specimens, excluding non-vascular plants. Specimens labelled, filed, and shelved number 652, while 217 additional numbers were mounted and labelled, making the total aggregate 869. Routine matters of this kind were efficiently attended to by Mrs. S. Davies.

Two field trips were undertaken—one to the Scott Islands, where work begun in 1949 on Triangle Island was extended to include the remaining islands of the Scott

group—Sartine, Beresford, Lanz, and Cox. A detailed account is contained in a special article included elsewhere in the general Report for 1950.

The second trip was to Manning Park, the fourth in the series instituted by the Provincial Museum for a study of this area. The results of this and the previous investigations are to be embodied in a separate report on Manning Park.

Several smaller excursions were made, as opportunity offered, during the year, including a short visit to the Forbidden Plateau area in search of additional information concerning its natural history, which it is hoped to use in a reprint of a guide already published by the Museum in the Report for 1943. Day trips to Saanichton Spit, Wittys Lagoon, and other places in the vicinity of Victoria were undertaken in the course of botanical inquiries and investigation. The supply of fresh material for the wild-flower exhibit was the occasion for several, usually weekly, half-day excursions.

In addition to working over the accessions, a considerable amount of time was involved in the determination of plant material sent in from various parts of the Province by teachers, students, and other members of the public. By this service it is possible to spread the usefulness of the Museum far beyond its four walls. Incidentally, much valuable information concerning the plant life of the Province is obtained as a result of the above inquiries, often obtainable in no other way.

It is a pleasure to record the cordial co-operation existing between the Museum and other Governmental departments in exchange of information relevant to botanical interests—agricultural, horticultural, forestry, and plant pathology.

Demonstrations, talks, and lectures on botanical subjects were given to students and other visitors to the Museum as usual, while visits to schools and institutions were made whenever possible.

Shortage of storage facilities continues to be a major problem. Until this is rectified, much material has to be parcelled up and sealed in pest-proof packages where, for practical purposes, it is inaccessible.

MISCELLANEOUS NOTES

Plants additional to the "Flora of Vancouver Island and Queen Charlotte Islands":—

Pontederia cordata L. (Pickerel Weed.) Alberni, V.I.; August 16th, 1950;

O. C. Furniss. This is an Eastern American species presumed to have been introduced as a muskrat food, now, seemingly, well established.

Plants not hitherto known to have been recorded from British Columbia:—

Senecio Jacobaea L. (Ragwort.) Nanaimo, V.I.; July 14th, 1950; E. Hughes.

Attention was drawn to this species by E. G. Anderson, weed commuter from Ottawa, who, in company with E. Hughes, visited the Museum during the summer. Subsequently, Mr. Hughes kindly collected and donated a specimen for our herbarium. A native of Europe, this species is well established in Eastern North America.

Caucalis Anthriscus (L.) Huds. (Hedge Parsley.) Agassiz, B.C.; August 19th, 1950; R. Glendenning. A European species, with an Eastern North American distribution similar to the previously listed plant.

ACKNOWLEDGMENTS

Among the more interesting accessions for 1950, exclusive of Museum collections and not already mentioned, are the following:—

L. J. Clark.—A collection from the Gordon River on the west coast of Vancouver Island. A new locality representation for the herbarium.

W. B. Johnstone.—A number of plants from the Cranbrook district. Always welcome additions to the herbarium, as they are beautifully prepared specimens.

F. X. Potter, principal of the Kamloops High School, who has kindly donated a series of twenty-one species from the Copley collection. Many of these are new to the herbarium and include several rare species.

L. G. Templeton.—A series of plants from the northern areas of British Columbia. Of particular interest, as data from this area are being gathered for inclusion in a future "Flora" that will embrace the whole of the Province.

Dr. T. C. Frye, University of Washington, Seattle, Wash.—A number of named mosses, originally collected in British Columbia.

We wish to extend our cordial thanks to all those who have in any way contributed material to the herbarium, or have helped in the identification or verification of difficult species.

ENTOMOLOGY

Many inquiries concerning the names and habits of conspicuous insects continued to come into the Museum. Opportunity is taken to give all available information appertaining to the species in question and to encourage further observation on the part of the inquirer.

Accessions are constantly trickling in, though no large single collections have accrued during the year. This has left necessary time for the care and study of the main series of insects which have long since outgrown available accommodation.

A move to improve such conditions has resulted in the acquirement of a twelve-drawer cabinet, which we hope to use as basic unit for further expansion as finances will allow. It is the intention to transfer the more popular collections to these cabinets, where they will be more readily available for reference.

As Museum representative of the British Columbia Entomological Society, the entomologist prepared a paper entitled "Notes on the Life History of *Hydriomena nubilofasciata* var. *vulnerata* Swelt," which was read by proxy at the annual meeting of the society in Penticton.

We wish to thank the following specialists who have so willingly identified material for the Museum: W. Downs, Victoria, Hemiptera; Dr. T. N. Freeman, Ottawa, Lepidoptera; Dr. Melville H. Hatch, University of Washington, Seattle, Wash., Coleoptera; J. R. J. Llewellyn Jones, Cobble Hill, V.I., Lepidoptera; and Hugh B. Leech, San Francisco, Calif., Coleoptera.

REPORT OF THE ASSISTANT IN BIOLOGY

The first four months of 1950 were devoted to postgraduate studies at the University of British Columbia, where mammal data gathered on the Goose Islands in 1948 were analysed and written up.

Upon return to the Museum in April, the Assistant in Biology participated in the field expeditions to Manning Park and to the Scott Islands. In addition, he accompanied the Assistant in Botany to the Courtenay area where Black Creek, the type locality of the Vancouver Island water shrew, was investigated and trapped. No topotypes were taken in three nights of trapping.

At least one day per week, in addition to week-ends, was devoted to local field trips on the south end of Vancouver Island. Local movements of birds and mammals recorded in the Museum field-notes appear (in part) in the *Victoria Naturalist*, published monthly by the Victoria Natural History Society.

During the summer months and with the assistance of Allan Watson, small mammal skulls and skeletons, together with bird skeletons which had accumulated since the previous season, were processed, catalogued, and stored.

The routine curatorial activities which are entailed where large vertebrate collections are housed were carried on continuously, as was a certain amount of lecturing, routine specimen identification, conducted tours, rearranging of exhibits, writing, preparation of skins for scientific study, and a host of minor activities associated with museum work.

Work was continued on major publications, including a handbook of the mammals of British Columbia and a complete report on the ecology of the birds and mammals of the Goose Islands.

Systematic research relating to species of mice gathered on some of the northern coastal islands is under way. In order to clarify some of the obscure aspects involved, local islets are being trapped to ascertain if they are occupied by mice. Those islands which are found to be unoccupied will be seeded with experimental stock and the breeding results will be studied.

No bird-banding activities were carried out this year, due to the absence of the operator during the banding season. The collecting of bird-skins for the schools was temporarily suspended when a large collection of mounted birds was loaned from the Museum gallery. When adequate plastic containers are available, this work will be continued.

ACKNOWLEDGMENTS

This department wishes to acknowledge the active interest and co-operation of the following: Department of Zoology of the University of British Columbia; British Columbia Game Department; Victoria Natural History Society; Provincial Parks Branch of the British Columbia Forest Service; Constable D. Drapper, R.C.M.P., Ucluelet; Vince Madden, Ucluelet; Bruce Irving, Carmanah Point; George Hilliers, Ucluelet; Bert Robson, Atnarko; Eric G. Flesher, Philips Arm; and many other individuals and organizations that have voluntarily contributed information and services during 1950.

REPORT OF THE ASSISTANT IN ANTHROPOLOGY

Shortly after rejoining the Museum staff on June 26th, the Assistant in Anthropology started on the summer's field work, a study of the Upper Stalo Indians, a Coast Salish group living along the Fraser River between Chilliwack and Yale. The work was accomplished during two periods—July 5th to August 5th and September 7th to 22nd. The first period was spent with Indian informants at Yale and Chilliwack; the second at Laidlaw, with visits to Yale and Agassiz. In contrast to the archæological approach of last summer, the emphasis this time was almost entirely upon ethnography. Consequently, very little time was spent investigating archæological sites or visiting local residents who own Indian relics; the great bulk of it was devoted to the Indians themselves. Nevertheless, a number of archæological specimens were acquired or photographed, and a few ethnological specimens were obtained. The most important result, however, was that enough information was gathered on nearly all aspects of the Indians' former life and customs to make up a creditable introductory ethnography of the area.

In addition, visits were made to the Indian hop-pickers at work in the hop-yard at Agassiz, and to Indians fishing at the traditional fishing-grounds above Yale, and 600 feet of colour movies on these activities were taken.

Field work during the remainder of the year was confined to the immediate vicinity of Victoria. On two occasions an afternoon was spent in excavating human skeletal material discovered by local citizens. Throughout November and December, one afternoon each week was devoted to visits to the Songhees reserve for the purpose of gathering local ethnographic information.

The results of the summer's field work are being written up in the form of a general ethnography. This is to be used as a thesis, and also as a contribution to the Museum's new "Anthropology in British Columbia" series.

The new publication series, "Anthropology in British Columbia," has been started as an outlet for the ever-increasing amount of anthropological research being done in the Province. The first number, prepared during the spring and summer, was published and distributed in September. It is hoped to make this an annual Museum publication.

Routine museum work occupied a large part of the fall and winter. Partly as a means of becoming familiar with the anthropological collections, a complete rearrangement of the materials in storage was undertaken. In addition, all costumes and textiles in storage were fumigated and repacked. Display work was confined to the installation of one new case dealing with totem-poles; further display work must await the availability of more storage and working space. Visitors were many. One week-long visit of an American photographer will result in the acquisition by the Museum of over fifty colour slides of our anthropological specimens. Routine correspondence and the acquisition and cataloguing of new collections and specimens were additional curatorial duties of importance.

Participation in the educational activities of the Museum took the form of museum lectures and lectures illustrated by movies. Some fourteen Grade III classes from the Victoria area visited the Museum's Indian exhibit and were given talks illustrated by specimens from the storage collections. Other children's groups and visitors were shown the same material. The movies taken during the summer were edited and made into two short films called "Fishing in the Fraser" and "Hop-picking in the Fraser Valley." These are the first of a projected series of colour movies on many phases of Indian life. The films were shown and talks were given to the B.C. Historical Society and the Quadra School Parent-Teacher Association.

Just before the end of the year a study was made of the whole position of archæology in the Province. This was prompted by an ever-increasing awareness on the part of archæologists that important archæological sites have been and are being destroyed before they can be properly investigated. This applies not only to individual sites near urban areas, but to whole large areas in the Interior of the Province which face imminent flooding as a result of proposed power projects. All available information was gathered and memoranda on the situation were prepared. This information will be used as a basis for requests for new legislation to protect archæological sites where possible and to provide funds for the emergency investigation of areas which are threatened with flooding. At year's end, too, in co-operation with the Archives and the University of British Columbia, plans were completed to begin an archæological survey of the Province. A site form, which is to be sent to individuals in all parts of British Columbia to gather information on archæological sites, was drawn up and prepared for the printer. This information is to be kept in duplicate files at the Museum and at the university.

ACCESSIONS

During 1950 the following specimens were added to the catalogued collections (figures in parentheses indicate the total number on December 31st, 1950): Indian material, 284 (7,028); plants, 355 (22,298); mammals, 93 (5,657); birds, 30 (9,917); reptiles and amphibians, 17 (875); fish, 12 (746).

ANTHROPOLOGICAL ACCESSIONS

The W. H. Halliday Collection.—(Purchase.) A large collection of Kwakiutl model totem-poles, crest figures, a head-dress, and several other fine items of Kwakiutl and Nootka manufacture. These were collected by Mr. Halliday during his long service as Indian Agent in the Kwawkwalth Agency.

The Mrs. Alice McGregor Collection.—(Gift.) A collection of Lillooet coiled basketry, including several types of baskets, trays, and a basketry table, also a few Coast Indian twined baskets.

The Erik L. Teit Collection.—(Purchase.) A particularly fine large collection of Thompson Indian costumes and other items collected by Mr. Teit's father (James Teit) several decades ago.

The A. J. Carmichael Collection.—(Purchase.) Archæological material from the Lytton area, including two fine pieces of soapstone sculpture.

HAIDA

Twined spruce-root baskets, three. In McGregor collection.

Paddles, one pair. Miss Kathleen Agnew, Victoria.

Black slate pipe. Miss Kathleen Agnew, Victoria.

Wooden cradle. Mrs. Denmilne Green, Powell River.

Wooden doll. Mrs. Denmilne Green, Powell River.

KWAKIUTL

Model wooden totem-poles, three. Miss C. I. Alexander, Victoria.

Model wooden totem-poles, twenty. In Halliday collection.

Model wooden crest figures, five. In Halliday collection.

Carved head-dress, killer-whale design. In Halliday collection.

Halibut-hook. In Halliday collection.

Halibut-club. In Halliday collection.

Wooden spoons, seven. In Halliday collection.

Polished stone hammer. In Halliday collection.

Nephrite celt. In Halliday collection.

Framed Curtis photographs, three. In Halliday collection.

NOOTKA

Basketry hat. In Halliday collection.

Twined basketry bottle. In Halliday collection.

Twined baskets, two. In McGregor collection.

COAST SALISH

Stone axe-head. K. Priestley.

Stone anchor. E. C. Dawe.

Human skull. W. Duff, Victoria.

Stone-hammer handle. M. Arnold.

Cedar-bark mat fragments. Constable William Trant.

Chipped stone arrow-point. L. Wildig, Victoria.

Nephrite celt. L. Graham.

Ground slate point. Peter McRae, Victoria.

Nephrite celt. W. Duff, Victoria.

Nephrite celts, two. Brian Wilson, Vedder Crossing.

Nephrite celts, two. Maynard Covey, Port Kells.

Whetstones, two. Maynard Covey, Port Kells.

Sandstone saw. Maynard Covey, Port Kells.

Stone sinker. Maynard Covey, Port Kells.

Stone pendant. Maynard Covey, Port Kells.

Chipped stone points, two. Maynard Covey, Port Kells.

Bone points, three. Maynard Covey, Port Kells.

Work concretion. Mrs. A. H. Spurr, Chemainus.

Soapstone bowl. W. H. Quipp, Hope.

Human skeletons, two. Staff.

Human skull. Joe Murphy, Sidney.

Ground slate point. Mr. Smith, Alberni.
 Human skeleton (incomplete). Mr. Traunweiser, Victoria.
 Stone head (the Mitchell Stone). Mrs. Denmilne Green, Powell River.
 Trout-harpoon. E. Lorenzetto, Laidlaw. (Purchase.)
 Harpoon-head (model). P. Charlie, Yale.
 Stone-hammer fragments, six. Fred Richmond, Hope.
 Sling stone. Fred Richmond, Hope.
 Chipped stone points, ten. Fred Richmond, Hope.
 Broken celt. Fred Richmond, Hope.
 Soapstone bowl. Arthur Castle, Hammond.
 Whetstone. Staff.
 Stone hammer in manufacture. Staff.
 Chipped stone points, two. Staff.

INTERIOR SALISH

Basketry cradle. Susan Joe. (Purchase.)
 Basketry table. In McGregor collection.
 Basketry trays, three. In McGregor collection.
 Baskets, coiled, twelve. In McGregor collection.
 Digging-stick handle. In Teit collection.
 Buckskin bag. In Teit collection.
 Necklace of bone beads. In Teit collection.
 Dancing belt with deer-hoof rattles. In Teit collection.
 Buckskin mat. In Teit collection.
 Women's buckskin dresses, heavily beaded, two. In Teit collection.
 Girl's buckskin dress, beaded. In Teit collection.
 Man's buckskin shirt, beaded. In Teit collection.
 Man's buckskin leggings, beaded. In Teit collection.
 Buckskin belt. In Teit collection.
 Breech cloth. In Teit collection.
 Large feather head-dresses, two. In Teit collection.
 Buckskin pouch and belt. In Teit collection.
 Woman's leggings, one pair. In Teit collection.
 Woman's moccasins, three pairs. In Teit collection.
 Man's moccasins, one pair. In Teit collection.
 Woman's buckskin belt. In Teit collection.
 Buckskin head-bands, two. In Teit collection.
 Porcupine quillwork head-band. In Teit collection.
 Cedar-bark head-bands, two. In Teit collection.
 Birch-bark tobacco-box. In Teit collection.
 Beaded hair-braid ornaments, one pair. In Teit collection.
 Necklace of bone discs. In Teit collection.
 Beaver-teeth dice, four. In Teit collection.
 Arrow foreshafts, bone points, two. In Teit collection.
 Wooden spoons, two. In Teit collection.
 Reed mat. In Teit collection.
 Sagebrush-bark mat. In Teit collection.
 Buckskins, tanned and smoked, three. In Teit collection.
 Net for dip-net. In Teit collection.
 Elk-tooth charm. In Teit collection.
 Chipped stone cores and scrapers, seven. M. L. Woods, Sicamous.
 Chipped stone knives, four. Alex Woods, Sicamous.

Chipped stone arrow-point. Alex Woods, Sicamous.
 Soapstone sculpture, human figure holding bowl. In Carmichael collection.
 Soapstone carvings, two. In Carmichael collection.
 Soapstone elbow pipes, two. In Carmichael collection.
 Soapstone straight pipe (broken). In Carmichael collection.
 Nephrite celts, seven. In Carmichael collection.
 Piece of sawn nephrite. In Carmichael collection.
 Whetstone. In Carmichael collection.
 Ground slate knives, four. In Carmichael collection.
 Bone awls, five. In Carmichael collection.
 Sandstone saws, two. In Carmichael collection.
 Rubbing-stone. In Carmichael collection.
 Sandstone arrow smoothers, two. In Carmichael collection.
 Stone pestle hammers, three. In Carmichael collection.
 Chipped stone knives, six. In Carmichael collection.
 Chipped stone drills, three. In Carmichael collection.
 Chipped stone points, fifty-four. In Carmichael collection.
 Copper ornaments, two. In Carmichael collection.
 Dentalium shells. In Carmichael collection.
 Red pigment. In Carmichael collection.

DENE

Gloves, one pair. Miss Kathleen Agnew, Victoria.

KOOTENAY

Bear-paw snowshoes, one pair. Miss C. I. Alexander, Victoria.
 Chipped stone scraper. No data.
 Pigment stone. A. Attree, Victoria.

CREE

Beaded riding-whips, two. Archdeacon T. K. Irwin, Victoria.
 Beaded shoulder bag. Archdeacon T. K. Irwin, Victoria.
 Beaded purse. Archdeacon T. K. Irwin, Victoria.
 Beaded moccasins, one pair. Archdeacon T. K. Irwin, Victoria.
 Wooden clock stand. Archdeacon T. K. Irwin, Victoria.
 Wooden box shaped like a book. Archdeacon T. K. Irwin, Victoria.
 Stone hammer. D. C. Mulder, Victoria.

HURON

Chipped stone arrow-point. M. Curtis, Victoria.

MEXICAN

Large woven rug. Sidney Ruffner, Redondo, Calif.

BOTANICAL ACCESSIONS

By gift—E. G. Anderson, one; E. A. Bavis, one; H. Barker, one; L. J. Clark, fifteen; O. C. Furniss, three; T. C. Frye, twenty-six; E. A. Garman, one; R. Glendenning, one; V. E. L. Goddard, one; E. Hart, one; S. J. Holland, one; E. Hughes, one; W. B. Johnstone, ten; L. Kelso, seventy-five; M. Lownds, one; R. McKenzie, one; C. H. Nelson, two; N. Putnam, one; L. C. Temple, thirty.

By the staff

ZOOLOGICAL ACCESSIONS

MAMMALS

By gift—

British Columbia Game Department, Victoria, three cougar skulls and one cougar skeleton.

A. Flett, Duncan, one vole.

J. Glassford, Victoria, one mink.

Miss Hazel King, Victoria, one whale rib.

David McCall, Victoria, one bison skull.

Andrew Olson, Lake Cowichan (*per* F. P. Weir), two wolf skulls.

Gordon Paulson, Victoria, one mink.

Captain A. Prince, Victoria, one sea-lion skull.

Dr. D. G. Revell, Victoria, bones of bear.

Bert Robson, Atnarko, skulls of grizzly-bear, beaver, mink, and marten.

Victoria Parks Board, one flying squirrel.

Chief Petty Officer Walters, H.M.C.S. Naden, Victoria, one big brown bat.

By purchase—

W. C. Broadfoot, Victoria, two wolves in the round.

By the staff

80

BIRDS

By gift—

F. L. Beebe, North Vancouver, one barn owl.

Miss Marion Bolingbroke, Victoria, one humming-bird.

J. Boudot, Wellington, one barn owl.

B. R. Burley, Victoria, one snowy owl.

Charles Gould, Victoria, one humming-bird.

Bruce Irving, Clo-oose, one red-winged blackbird and one long-tailed chat.

S. G. Jewett, Portland, Ore., two Ross's goose skins.

G. W. Jones, Victoria, one marsh hawk.

Mrs. E. Leavens, Cultus Lake, one fox-sparrow.

F. P. Newcome, Victoria, one yellow warbler.

Mrs. J. R. Parris, Victoria, one kinglet.

Alex Peden, Victoria, one screech-owl.

Miss Eugenie Perry, Victoria, one western flycatcher.

Capt. W. E. Roskelly, Victoria, one snowy owl.

Mrs. A. Simpson, Sooke (*per* Brian Ainscough), one saw-whet owl.

James Smith, Victoria, one heron.

Chris Stevenson, Victoria, one screech-owl.

W. T. Tildesley, Victoria, one yellow warbler.

Ralph Wherry, Victoria, three snowy owls and one horned owl.

E. F. G. White, Victoria, one snowy owl.

J. H. Whitehouse, Victoria, one varied thrush.

Major Yardley, Victoria, one Cooper's hawk.

By the staff

4

AMPHIBIANS AND REPTILES

By gift—

T. Brayshaw, Hope, one alligator lizard.

Mrs. Allan Brooks, North Pender Island, two sharp-tailed snakes.

Crew of H.M.C.S. Cayuga, one sea-snake, from Mexico.

Ronald Champion, Victoria, one toad.

H. B. Leech, San Francisco, Calif., one salamander.

J. A. Munro, Okanagan Landing, two horned lizards and two leopard lizards, from California.

Ronald W. Peterson, Victoria, two toads.

Dr. D. G. Revell, Victoria, collection of tadpoles.

Murray Speller, Victoria, one alligator lizard.

A. C. Thody, Burns Lake, one garter-snake.

Eric Thorn, Toronto, one long-toed salamander.

By the staff

6

By gift—

FISH

David Connell, New Westminster, skull and backbone of dogfish.

J. Gilbert, Brentwood, one brotulid fish.

Ben Kolner, Nanaimo, one moon fish.

George Lovitt, Victoria, one hag-fish.

Jack Noble, Victoria, one tuna.

Alan Pratt, Victoria, one black cod.

E. T. Redford, Estevan Point, one sturgeon skull.

M. Sieffert, Victoria, one rainbow trout.

Chris Stevenson, Victoria, one sea-perch.

A. C. Thody, Burns Lake, one peamouth.

Lorne Woodley, Qualicum Beach, two pipe-fish and one peamouth.

Mr. Zarelli, Victoria, one grunt-fish.

By gift—

INVERTEBRATES

R. S. Butt, Victoria, one black widow spider.

George Clark, Victoria, one basket starfish.

J. P. Connors, Victoria, one alder beetle.

Gordon Davies, Victoria, one orb weaver.

D. Foster (*per* Stephen Hives), Victoria, portion of sponge.

A. E. D. Hodgkinson, Victoria, two black widow spiders.

A. Hutchison, Victoria, two wasps' nests.

D. Long, Victoria, one orb-weaver spider.

Dixie McBride, Victoria, one orb-weaver spider.

Richard McBride, Victoria, one flesh fly.

E. F. Nicholls, Victoria, one California prionus.

W. Oberg, Victoria, two June beetles.

G. A. Pole, Victoria, one barnacle.

Mrs. J. D. Porter, Victoria, three butterflies.

Mrs. R. Schmidt, Osoyoos, one scorpion.

Bobby Smith, Victoria, one sea-slug.

Don Smith, Victoria, one black widow spider.

Chris Stevenson, Victoria, one crayfish.

Albert Stone, Victoria, one June beetle.

Mrs. Mary Wallace, Victoria, seven goose barnacles.

Miss Joyce Wilks, Victoria, one foreign cockroach.

By gift—

PALÆONTOLOGY

McIntyre & Harding Gravel Company, Cordova Bay, one mammoth tooth.

L. A. Rhodes, Port Alberni (*per* C. E. Holder), one mammoth tooth.

H. J. Sceats, Victoria, fossils from Sooke formation.

T. Soles (*per* W. W. Anderson), three fossil trilobites from Field, B.C.

H. D. Wallis, Victoria, fossil in sandstone.

Cliff Williams, Ladysmith, two fossil molluscs.

BIOLOGY OF THE SCOTT ISLAND GROUP, BRITISH COLUMBIA

By G. CLIFFORD CARL, C. J. GUIGUET, AND GEORGE A. HARDY,
PROVINCIAL MUSEUM, VICTORIA, B.C.

CONTENTS

	PAGE
Introduction	21
Triangle Island	25
Description	25
Climate	26
Plant-life	29
Mammals	39
Birds	41
Invertebrates	46
Lanz Island	49
Description	49
Plant-life	49
Mammals	50
Birds	50
Amphibians	54
Invertebrates	54
Cox Island	55
Description	55
Plant-life	55
Mammals	55
Birds	56
Invertebrates	56
Beresford Island	57
Description	57
Plant-life	57
Mammals	57
Birds	59
Invertebrates	59
Sartine Island	60
Description	60
Plant-life	60
Mammals	60
Birds	61
Invertebrates	61
Acknowledgments	62
Bibliography	63

INTRODUCTION

The Scott Island group is comprised of five islands and associated rocks situated north-west of Cape Scott, the northernmost tip of Vancouver Island, British Columbia, at about latitude 50° 50' north and longitude 128° 40' west (*see* Fig. 1). From east to

west the islands are named Cox, Lanz, Beresford (East Haycock), Sartine (West Haycock), and Triangle. The largest, Cox Island, is about 2½ miles long and 1 mile wide, while the smallest, Beresford, is only a few acres in extent. The islands are quite well known to fishermen and others who travel up and down the west coast of Vancouver Island because of their rather poor reputation in regard to weather. The Scott group seem to be located in a storm-centre where clear and fine weather is the exception. Gales are of frequent occurrence and fog is often present even when adjacent areas are clear. The islands are rendered even more inhospitable by the fact that tidal currents are strong and safe anchorages are entirely lacking.

Some years ago, because of its proximity to routes of boat traffic, Triangle Island was chosen by the Dominion Department of Transport as a site for a light-station. However, after nine years of operation it was found that the light was not serving its purpose, being obscured by clouds and fog during long periods of dirty weather. Moreover, the frequent spells of bad weather made living conditions very trying and also made the servicing of the station very difficult. These difficulties are briefly mentioned in the following short history of the light-station supplied by the Department of Transport:—

TRIANGLE ISLAND

July 21st, 1909: By Order in Council, Provincial Government of British Columbia reserved Triangle Island for six months to enable a survey to be made for a lighthouse and wireless-station.

August 7th, 1909: Mr. Killeen left Victoria on the "Leebro" to stake off a strip 400 feet wide from the landing on the north side right across the island to the south side.

August 9th, 1909: Plans and specifications for a concrete lighthouse tower and dwelling were mailed from Chief Engineer's office, Department of Marine and Fisheries, Ottawa.

September 15th, 1909: "Leebro" left Victoria with material for a double dwelling and tower.

October 11th, 1909: Three car-loads of lighthouse material were shipped from Dominion Lighthouse Depot, Prescott, Ont.

September 12th, 1910: Letter from the Deputy Minister advising that a Notice to Mariners has been issued stating Triangle Island light will go into operation on November 1st, 1910.

September 16th, 1910: Letter from the Deputy Minister advising that the light will give four flashes every ten seconds.

October 3rd, 1910: Letter from the Deputy Minister advising that J. W. Davies has been appointed permanently to the keepership at a salary of \$1,020 per annum, with annual increments of \$60 to a maximum of \$1,200.

April 29th, 1911: Letters from the Commissioner of Lights concerning a report that the lantern glass works loose in gales and that the lantern required to be stayed. Gordon Halkett, Superintendent of Lights, Victoria, reported that the vertical type of lantern at Triangle Island was not strong enough to resist the vibration caused by excessive winds, which have registered as high as 120 miles an hour. The lighthouse tower is on a bluff 680 feet high; wind collects in a bay below and is expelled with force in great gusts, whereas it blows steadily in other parts of the island. The wind destroyed the copper vanes on the tower, blowing pieces off the arrow, which were later found showing cracks due to vibration.

February 20th, 1912: Mrs. Davies, suffering from internal hæmorrhage, was taken off successfully but with great difficulty owing to weather conditions and brought to hospital at Victoria.

October 23rd, 1912: Wireless service reports the roof blown off their dwelling. Car-shed adjoining engine-house of lighthouse blown away and all smoke-stacks blown off dwelling.

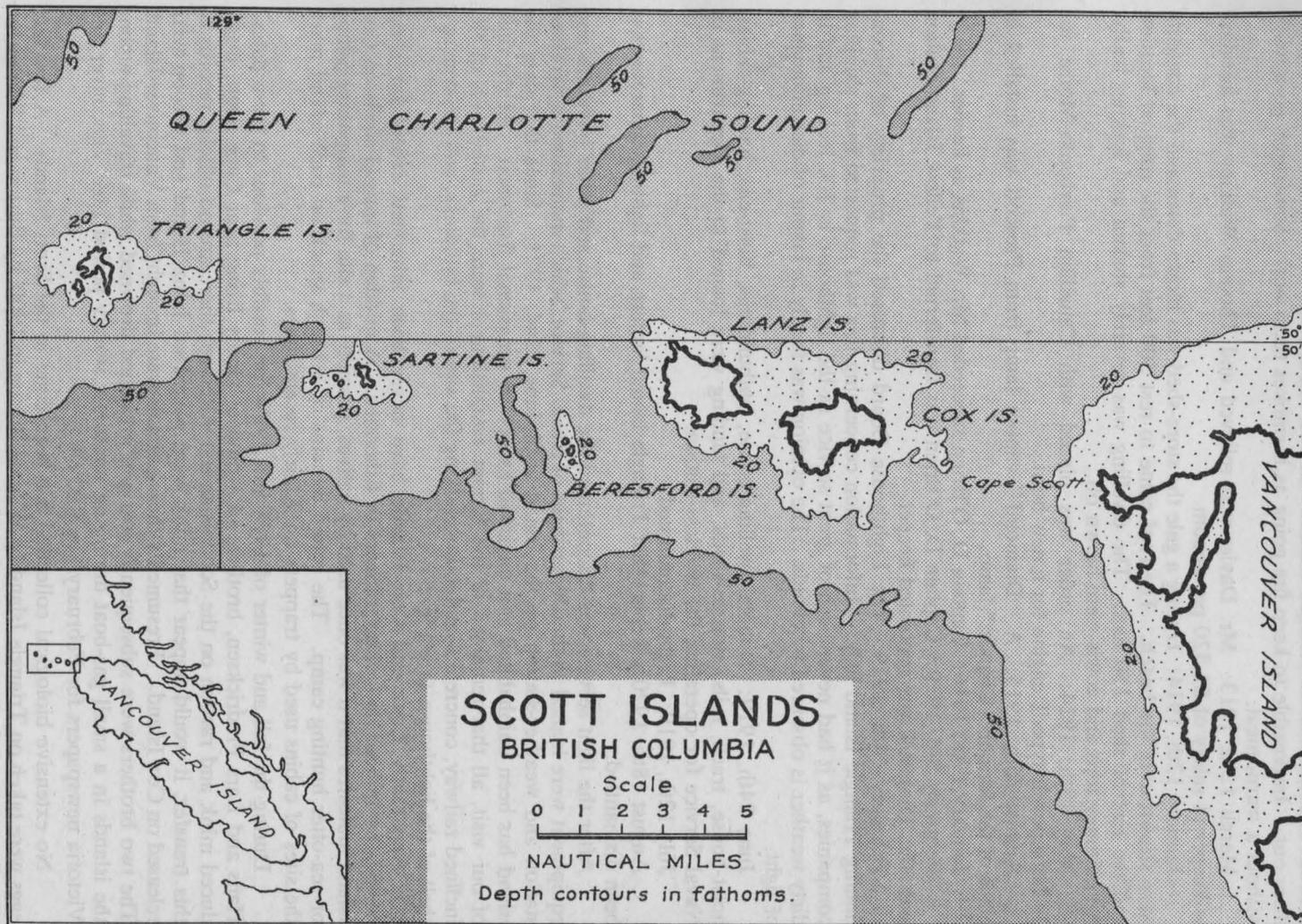


Fig. 1. Chart showing location and geographic relationships of the Scott Islands, British Columbia.

December 1st, 1912: Lightkeeper Davies requested a transfer to another station on account of conditions at Triangle Island. In bad weather the building leaks and swamps them out. Impossible to keep fire going as it smokes them out. Sometimes go a week without a warm meal.

March 12th, 1913: Mr. Davies was relieved and Thomas Watkins was installed as keeper at salary of \$1,320 per annum.

January 12th, 1914: During a gale the store-shed was blown down and the contents were strewn over the beach. The roof came to rest 300 feet from the original location and the rest of shed 150 feet. The dwelling was severely shaken and leaking badly. All chimney tops and cowls were blown off.

May 18th, 1914: An order was placed with Canadian Fairbanks-Morse for 29-horsepower type-T engine for a new hoist.

August 26th, 1915: A "Diamond" vapour lamp from Prescott was installed in place of the former "Chance" lamp.

January 17th, 1916: Captain D. O'Brien succeeded Mr. Watkins as keeper.

February 3rd, 1919: Captain D. O'Brien was transferred to Yellow Island Station and Alex Dingwell was appointed keeper.

February 14th, 1919: The Lighthouse Board discussed the propriety of discontinuing Triangle Island light. Information concerning this was requested from shipping companies, as it had never been of great service as the lighthouse is 700 feet up and in dirty weather is obscured by clouds. The opinion was finally in favour of discontinuance of light.

June 24th, 1919: Double dwelling-house, outbuildings, hoist-car, hauling-cables, hoist-house, track, rails, storage-sheds, and landing were loaned to the Department of Naval Service for operating the wireless-station.

July 12th, 1919: Light discontinued.

August 18th, 1920: Report that Triangle Island lantern and lighting apparatus has been dismantled.

After the light service was discontinued the dwelling-house and other buildings and equipment were loaned to the Department of Naval Service, which maintained a wireless-station and weather-station on the island until June 22nd, 1921. Since that date the island has been uninhabited and unvisited except by occasional fishermen. At the time of our visit, all that remained of the former establishment were the rusted rails of the inclined railway, concrete foundations marking the site of the buildings, and the concrete shell of the lighthouse (*see* Fig. 5).

Apparently Lanz and Cox Islands have never been inhabited except for short periods by Indians and white trappers or fishermen. A midden of mussel-shells on Cox Island indicates that it was once used by natives, possibly as a site for a temporary fishing or sea-otter hunting camp. The rotted remains of a rough shack on each island mark the sites of cabins used by trappers until fairly recent times.

During the fall and winter of 1938 and 1939 (or possibly previous to these dates) Hans and Lars Fredricksen, brothers of a pioneer family living near Cape Scott, introduced mink and racoon on the Scott Islands. Although there are no official records of this transfer, it would appear that mink were placed on Lanz Island and racoon were released on Cox Island. Presumably these animals were brought from Vancouver Island. The two brothers were subsequently lost and presumed drowned while travelling among the islands in a small gas-boat during an unusually stormy period (*see* Vancouver and Victoria newspapers for February 8th, 1939).

No extensive biological collecting has been done in the Scott Islands. A few bird eggs were taken on Triangle Island by William Burton in 1900, by Burton and Warburton Pike in 1909 (Colonist, June 23rd, 1909), and by C. F. Newcombe in 1913. A small plant collection was made on Triangle Island by C. F. Newcombe and W. A. Newcombe,

also in 1913, and recorded in "A Preliminary Catalogue of the Flora of Vancouver and Queen Charlotte Islands," published by the Provincial Museum in 1921.

Complete biological investigations of Triangle Island, the Scott Islands, and the insular complex along the east and west coasts of Vancouver Island were first proposed by C. J. Guiguet, the Museum biologist, some years ago. The proposals were based upon seven years of zoological exploration along the northern coast, during which time data regarding these islands were gathered chiefly from coastwise fishermen. Their reports of multitudes of pelagic birds, the possibility of recording Triangle Island as a nesting-area of murre and marbled murrelets, and reports of the presence of rodents upon the islands made it seem worth-while to undertake a general study of the islands associated with Vancouver Island. Through the co-operation of the Dominion Fisheries Department, which provided transportation, the first step was taken in 1949 when a Museum expedition visited Triangle Island during the period June 24th to July 1st. In addition to the writers, the party included F. L. Beebe, Zookeeper, Stanley Park, Vancouver.

The following year we returned to the Scott group and camped for a short period on Lanz Island. Because of the uncertainty of the weather and lack of shelter we were able to spend only short periods of time on the remaining islands, working from the boat, which had to return to safe anchorage each night. The dates we visited the islands are as follows: Lanz Island, June 16th to 20th; Cox Island, June 16th, 17th, and 21st; Beresford Island, June 20th, 21st, and 22nd; Sartine Island, June 21st and 22nd.

The following report is a record of our findings during these two field expeditions.

TRIANGLE ISLAND

DESCRIPTION

Triangle Island, the outermost of the group, is situated about 26 nautical miles north-west of Cape Scott, off the northern end of Vancouver Island. It is separated from its nearest neighbour, Sartine Island to the south-east, by about 6 miles of open water, which ranges in depth up to 59 fathoms. The nearest Mainland point is Cape Caution, 68 miles east. As its name implies the island is roughly triangular in shape, though the coast-line is decidedly irregular (*see* Fig. 3). The greatest distance from point to point, as the crow flies, is approximately three-quarters of a mile. Along the northern and eastern sides the land rises abruptly from the water, or from narrow, rocky, beaches, for several hundred feet, then slopes quite steeply upward to the island's highest point, 690 feet above sea-level, which was the site of the old light-station. This highest point is on a ridge which runs roughly north and south and parallel to the west shore. From the ridge the land drops away precipitously to the narrow, rocky beach below, except for a hog-back which runs roughly westward from the light-station site to the westernmost point of land, forming the only relatively easy means of ascent and descent on the west side of the island. Off the western point and joined to it at low tide is a secondary island, about 600 yards in length, with very steep sides rising to a height of 325 feet above the sea. Numerous other islets and rocks are associated with the Triangle Island group, notably off its northern and southern points.

Since the greater part of the island surface lies at a considerable slope an accurate estimate of the land area cannot be made from a chart or aerial photograph which shows the area as a flat surface. Consequently, we have no figure for the land surface area, but from experience can point out that such figures must be considerably more than if the land were flat.

On the occasion of our visit we landed on a gravelly beach in a bay on the north-east side of the island and made camp at the base of the remains of the inclined railway which served the old light-station. A small trickle of water at this point was apparently the only fresh supply on the island. From this location we could make our way a short

distance along the beach in each direction until stopped by rock faces, or could climb laboriously up the steeply rising slope to the highest point on the island, from which trips could be made in other directions. Travelling overland was extremely difficult; the slopes are steep, the footing is bad due to the presence of tangled masses of roots and hummocks of sod undermined by numerous bird burrows, and progress is further impeded by the very dense growth of salmon-berry pruned waist-high by wind. Despite these difficulties we explored the major part of the southern half of the island, including the islet off the south-west point. The more inaccessible parts were examined through binoculars.

CLIMATE

Fortunately, meteorological data are available for Triangle Island for the period May 15th, 1910, to June 22nd, 1921, through the Department of Naval Service, which maintained a station here between these dates. Table I gives some of these data for the years for which complete information is available. Generally speaking the climate is mild and moist; temperatures range from a minimum of 9.9 degrees Fahrenheit, recorded on January 11th, 1911, to a maximum of 78 degrees, recorded on May 13th, 1912. Precipitation is moderate, fairly well spread over the year, and with a small proportion in the form of snow. The number of cloudy days and of foggy days in the year is fairly high.

Wind-storms of gale proportions are of frequent occurrence. Seven such storms were recorded during the latter half of 1910, one in which winds reached a velocity of 105 miles per hour (December 1st, 1910). Similar storms occurred each year for which there are records, the south-east winds reaching recorded velocities varying between 50 and 100 miles per hour. On two occasions during our stay, in the last week of June, 1949, wind-storms developed to such proportions that we were forced to collapse the tent in order to save it from destruction. At these times we sought shelter under overhanging cliffs until the gale blew itself out.

A similar episode was apparently experienced by Burton and Pike. A newspaper account (*Colonist*, June 23rd, 1909) states, "The Victoria sportsmen are living the simple life tented on Triangle Island, and during a heavy gale of last week they had their tent blown down. The 'Quadra,' which was anchored off the island, had to put to sea and return after the storm had blown itself out."

Apart from wind, which plays a major role in determining the presence or absence of both plant and animal species, the climatic factor which exerts the most influence on plants is the amount of available moisture. On Triangle and probably on the other islands of the group abundant water is available both as rain and as moisture-laden air, even during the summer months. Further evidence of moist conditions is found in the presence of moisture-loving species of plants and others which are normally found in humid areas.

Table I.—Meteorological Data for Triangle Island, B.C., for the Years 1911 to 1919, Inclusive

Year	Mean Temperature	Precipitation	Number of Completely Cloudy Days	Number of Fair Days	Number of Foggy Days	Highest Velocity of Wind
1911	40.24	74.85	203	86	240	95
1912	45.40	59.61	152	200	123	100
1913	45.37	83.30	148	152	152	60
1914	45.98	33.69	167	178	140	50
1915	48.12	47.77	157	188	114	90
1916	44.49	29.65	134	146	120	90
1917	45.43	68.56	146	155	130	85
1918	46.55	59.68	124	192	85	80
1919	45.52	57.91	136	183	96	64



Fig. 2. Beresford (East Haycock), Sartine (West Haycock), and Triangle Islands from the "Howay."

(Photo by G. C. Carl.)



Fig. 3. Triangle Island from the air.

(Air photo by Royal Canadian Air Force.)



Fig. 4. Light-station and wireless buildings on Triangle Island, about 1915.

(Photo courtesy of T. E. Morrison, Agent, Department of Transport, Victoria, B.C.)



Fig. 5. Bay on north coast of Triangle Island; concrete base of the abandoned light on the horizon; our camp on the beach. June, 1949.

(Photo by G. C. Carl.)

PLANT-LIFE

The flora of Triangle Island is typical of the Coast Forest Biotic area, except that trees are lacking. It is not so much the species present that make the flora of this island so unique, but the manner in which they are disposed over its surface.

In the first place the heavy growth of vegetation that covers the island appears to be the result of several factors: the climate is both humid and equable; the soil is probably rich in minerals from the advanced stage in decomposition of the underlying rocks; while nitrogen is supplied in abundance by the myriads of sea-birds that frequent the island during the nesting period.

A blanket of mist or fog covers the island for the greater part of the year, affording protection from the direct rays of the sun; this, combined with a plentiful supply of moisture, probably simulates conditions found elsewhere only in dense forests. However, these advantages are probably offset by the strong winds which prevail, often of gale proportions, and from all quarters of the compass. The effect of these is seen in the dwarfed and stunted shrubs that are the most conspicuous feature of the vegetation. From a distance the island appears to be covered with a verdant cloak of smooth grass-like texture, but on close examination it proves to be an almost continuous mantle of salmon-berry, closely and evenly wind-pruned to a height of from 2 to 6 feet. Forest plants such as the false lily-of-the-valley and salal occur in extensive beds on exposed cliffs and slopes without any cover from taller vegetation.

Approximately sixty-five species of vascular plants were obtained by the Museum members, while to these have been added a further fifteen kindly supplied by W. A. Newcombe, who, in company with the late Dr. C. F. Newcombe, visited the island in 1913. This makes a total of roughly eighty species so far recorded for Triangle Island.

A study of this list has indicated a subdivision into five arbitrary groups, which are presented here on an approximate percentage basis for the purpose of discussion:—

	Per Cent
Sea-shore or maritime species.....	22
Cold bog and northern species.....	20
Sheltered Coast Forest association.....	} 50
Open Coast Forest association.....	
Introduced species.....	8

Sea-shore or Maritime Species

The smaller the island the greater the proportion of shore-line to the total area. It is not surprising, therefore, to find that almost one-quarter of the species are sea-shore or maritime species.

The majority of these are of wide distribution on the west coast, with a sprinkling of circumpolar species, such as the scurvy grass (*Cochlearia officinalis*), silverweed (*Potentilla pacifica*), and seaside sandwort (*Honchenya peplodes*).

Two western species, *Draba hyperborea* and *Bæria maritima*, meet here. The former occurs on the coast from the Aleutians down to the southern limit or near limit on the Scott Islands. The latter occurs from California to about its northern limit on these islands. *Bæria* is a genus containing several species having their centre of abundance in California.

Cold Bog and Northern Species

While no true bog or marsh areas exist on the island, there are occasional depressions on the northern part of the interior of the island which might be called incipient bogs. Here massive tufts of the rush *Juncus Balticus*, 3 feet or so in height, afford a precarious hold for star-flower (*Trientalis arctica*) and bunchberry (*Cornus intermedia*), enabling them to reach the light from among the tangles of salmon-berry (*Rubus spec-*

tabilis) and wild crab-apple (*Malus fusca*) which surround them on all sides. Most representative of this type of flora is crowberry (*Empetrum nigrum*), which forms small, interrupted patches among the other plants, together with occasional plants of bilberry (*Vaccinium cespitosum*) and the sedge *Carex sitchensis*. Of Northern West Coast distribution, apart from bog plants, the paint-brush (*Castilleja unalaskensis*), which here finds the near southern limit of its range, the willow herb (*Epilobium glandulosum*), and the rice root (*Fritillaria camtschatensis*) may be mentioned.

All the herbaceous species reach their normal development and do not appear to be dwarfed or stunted in any way. Tufted grasses, especially *Deschampsia cespitosa*, which is particularly luxuriant, afford excellent shelter for the low-growing plants, but the dense monospecific stands of salmon-berry, crab-apple, and twin-honeysuckle, for the most part, completely crowd out the smaller species. The majority of the latter are confined to the cliff bases and slopes, and ravine sides near sea-level.

Coast Forest Association

This normally comprises two types: that growing in the shelter of the trees and those flowering only in open places, such as rock expanses, swamps, and streams, within the forested zone.

In the first category are such shade plants as the false lily-of-the-valley (*Maianthemum bifolium*), miner's lettuce (*Montia sibirica*), salal (*Gaultheria shallon*), lady fern (*Athyrium filix-femina*), and the sword fern (*Aspidium munitum*). On Triangle Island most of these grow completely exposed, on steep slopes or in the few ravine bottoms free of the almost ubiquitous salmonberry.

In the open type of Coast Forest association, are *Mimulus guttatus*, *Scrophularia oregona* (which here reaches its northern or near-northern limit of range), *Aquilegia formosa*, *Arabis hirsuta*, *Heracleum lanatum*, *Achillea lanulosa* and the fern *Cystopteris fragilis*. Most of the members of this type were at the base of the cliffs or higher up on the slopes where an opening existed among the dominant shrubby growth.

Introduced Species

In the group of introduced species may be mentioned annual sow-thistle (*Sonchus asper*), velvet grass (*Holcus lanatus*), and mouse-ear chickweed (*Cerastium viscosum*). In all cases these species have a precarious hold, and show every indication that they will be completely suppressed in the course of time by the native vegetation. They were seen only in the immediate vicinity of the old buildings on the beach.

In brief summary the present flora of Triangle Island appears to be in a stage of transition from a forest climax type to one for which the maritime and northern bog or tundra phytosociological elements may ultimately prevail. No trees are present on Triangle Island and there is no evidence that any ever existed there; yet from this alone we cannot assume that trees never grew there, for a gradual gradation from heavy forest to none at all is observable in the Scott islands when studied as a whole.

Further details of the plant species are given in the following annotated list. Those collected by Dr. C. F. Newcombe and W. A. Newcombe were severally identified by J. Macoun, J. K. Henry, C. V. Piper, and J. Davidson. (See "A Preliminary Catalogue of the Flora of Vancouver Island and Queen Charlotte Islands," Provincial Museum, 1921.)

ANNOTATED LIST

Polyodiaceæ (Fern Family)

Struthiopteris spicant (L.) Scop. Deer-fern.

One or two small specimens were found in the shelter of the salmon-berry on the summit of the island. They were best seen by crawling on all fours among the bushes in the ravines, where they reached a height of 5 to 6 feet. Circumpolar in distribution.

Polypodium vulgare var. *hesperium* (Maxon) Nels & Macbr. Common Polypody.

Very scarce. Growing in similar places to the deer fern. A western variety of the species which has a circumpolar distribution.

Athyrium filix-femina var. *sitchense* Rupr. Lady-fern.

Sometimes forming extensive beds on the sheltered slopes of ravines. A western variety, occurring from Alaska to California. The species is circumpolar in distribution.

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

Scarce. A few dwarfed specimens were found on the slopes in sheltered nooks. A western species, Alaska to California.

Dryopteris dilatata (Hoffm.) A. Gray. Wood-fern.

Occasionally growing with the lady fern or forming small beds in similar places. In the wide sense, a circumpolar species.

Cystopteris fragilis (L.) Bernh. Bladder-fern.

One or two specimens were found on the bank of the ravine near camp. Of wide circumpolar distribution.

Gramineæ (Grass Family)

Agrostis palustris Huds. Creeping-bent.

Recorded in the Newcombe collection (1921) as *A. alba* var. *maritima*, a synonym of the above, according to Hitchcock. This is of wide distribution in coastal marshes from British Columbia to California.

Agrostis exarata Trin. Spike Red-top.

The cliffs and ridges support a luxuriant grass flora, of which this is one of the several species.

Aira præcox L. Early Hair-grass.

Originally introduced into North America from Europe, now widely distributed on both the Atlantic and Pacific coasts.

Deschampsia cæspitosa var. *longiflora* Beal. Tufted Hair-grass.

The most abundant grass on the island. Most of the cliff faces and ridges were covered with the large tufts, affording excellent cover for the nesting puffins and auklets, whose burrows extended beneath them. The long fibrous roots of this grass are an important mechanical aid in the retention of the rich soil, which is thus able to remain on almost vertical slopes.

Holcus lanatus L. Velvet-grass.

A grass originally introduced from Europe, common on the Atlantic and Pacific coasts. On Triangle Island probably brought in with supplies to the lighthouse. Collected by the Newcombes.

Poa palustris L. Fowl Meadow-grass.

Recorded for Triangle Island in the Newcombe collection (1921). This is another grass of wide North American distribution. The type of the species is European.

Poa nevadensis Vasey. Nevada Blue-grass.

In the Newcombe collection under the name *P. thurberiana* Vasey.

Poa pratensis L. June Grass.

A native of Europe, now abundant all over the North American continent. Newcombe collection.

Bromus sitchensis var. *aleutensis* (Trin.) Hall. Alaska Brome-grass.

Frequent on the grassy slopes. A west coast species ranging from the Aleutian Islands to Washington.

Festuca rubra L. Red Fescue.

Frequent. A common grass of circumpolar distribution in its several varietal forms.

Elymus mollis Trin. Dune-grass.

Small patches were found growing on or at the base of the grassy cliffs. Circumpolar in distribution, in the wide sense.

Hordeum brachyantherum Newski. Wild Barley.

Growing in tufts among the other grasses. A coastal species, distributed from Alaska to California and from Labrador to Newfoundland.

Cyperaceæ (Sedge Family)

Carex sitchensis Prescott (*obnupta* Bailey). Slough-sedge.

Occasional clumps on the summit in the slight depressions, in association with *Empetrum* and *Juncus balticus*.

Juncaceæ (Rush Family)

Juncus Balticus Willd. Baltic Rush.

In the depression on the summit, where it formed massive tufts 3 feet high and over 1 foot across, with deep boggy soil between tufts. On these the bunchberry, starflower, and bilberry struggled to reach the light. The type locality of this species is in Europe. It has a wide distribution in the northern part of America and Eurasia, extending south to California on the west coast of America.

Liliaceæ (Lily Family)

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

Characteristic of moist, shady banks and dells in the coast forests, but on Triangle Island it grows luxuriantly in dense and extensive patches entirely in the open and on exposed cliffs and slopes.

Fritillaria camtschatcensis (L.) Ker-Gwal. Kamchatka Fritillaria, Northern Chocolate Lily.

Frequent among the grasses and shrubs on the cliff slopes. Occurs on the Asiatic coast to Kamchatka and from the Aleutian Islands along the coast to Oregon and Northern California.

Orchidaceæ (Orchid Family)

Habenaria hyperborea (L.) Lindl. Northern Bog-orchid.

Reported for Triangle Island by Newcombe. Under several names, this species is widely distributed in Northern Europe, Iceland, and America.

Polygonaceæ (Buckwheat Family)

Polygonum lapathifolium L. Willow-weed.

One specimen was obtained growing just above high-tide mark. This is a large coarse specimen but insufficiently developed for exact subspecific determination. A variable species, and of wide Eurasian and North American distribution.

Rumex acetosa L. Sorrell.

Recorded by Newcombe. A European species, which in the wide sense is of circumpolar distribution.

Caryophyllaceæ (Pink Family)

Sagina crassicaulis S. Wats. Beach Pearlwort.

Frequent in rock crevices and sandy niches along the shore at high-tide mark. Ranges from the shores of Eastern Asia to California.

Sagina occidentalis S. Wats. Western Pearlwort.

Recorded by Newcombe. A Western American species, Alaska to California.

Honchenya peploides (L.) Whrk. Sea-beach Sandwort.

On sandy patches among the rocks along the shore. In its several forms, circumpolar in distribution.

Cerastium viscosum L. Mouse-ear Chickweed.

One or two depauperate specimens were growing near the old buildings at sea-level. A weed of cultivation, no doubt introduced during the settlement.

Stellaria calycantha (Ledeb.) Bong. Northern Starwort.

Fairly common among the herbage on the grassy cliffs and ravine sides. A circumpolar species, with several local varietal forms.

Stellaria crispa C. & S. Chamisso's Starwort.

Usually found in tree-shaded places on the larger islands and the Mainland coast. A Western American species, occurring from Alaska to California.

Portulacaceæ (Purslane Family)

Montia Hallii (Gray) Greene. Hall's Miner's Lettuce.

Frequent in the shade of the larger herbs, along the shore and ravine sides. This small species occurs from East Asia and Alaska to California along the North American Coast.

Montia sibirica (L.) Howell. Miner's Lettuce.

Common among the herbage at sea-level and grassy cliff-sides. The flowers are pink on this island; they are usually white away from the coast.

Montia Howellii Wats. Howell's Miner's Lettuce.

Collected by Newcombe (1921).

Ranunculaceæ (Buttercup Family)

Ranunculus Bongardi Greene, *uncinatus* D. Don. Bongard's Buttercup.

Plentiful on the ravine and grassy slopes and on the small benches at sea-level. This is best known as a moist woodland plant in the coast forests. A Western American plant, occurring from Alaska to California.

Aquilegia formosa Fischer. Columbine.

One of the most conspicuous flowers, growing in tufts and patches on rich soil, cliff sides or in ravines.

Cruciferae (Mustard Family)

Rorippa palustris (L.) Besser. Marsh-cress.

Collected by Newcombe. Of wide circumpolar distribution in its various forms.

Cochlearia officinalis L. Scurvy-grass.

Small, depauperate plants were growing in rock crevices near high-tide limit. In its several variations, of extensive circumpolar distribution.

Draba hyperborea (L.) Deav. Northern Whitlow-grass.

Collected by Newcombe. The Scott Islands are the southern or near-southern limit of its distribution. North to Alaska. On rocks just above high tide.

Arabis hirsuta var. *rupestris* Nutt. Hairy Rock-cress.

Among the diversified herbage on rich soil slopes and cliff sides. The species is circumpolar in distribution.

Cardamine oligosperma Nutt. Bitter Cress.

Near the old building at sea-level. Normally inhabits shady woods. A western species distributed from British Columbia to California.

Cardamine occidentalis (S. Wats.) Howell. Western Bitter Cress.

Collected by Newcombe.

Barbarea orthoceras Ledeb. Winter-cress.

Occasional along the beaches at high-tide level. Of wide northern distribution—Mongolia and Siberia to Eastern North America; south to California on the west coast.

Saxifragaceæ (Saxifrage Family)

Saxifraga Newcombei Small. Newcombe's Saxifraga.

Very common and in all manner of situations, varying in size from a few inches to 24 inches according to the nature of the substratum on which it grows. Found in rock crevices on the shore, on old timbers of the buildings, on ravine banks, and any moist or sheltered place where it could obtain a hold. By some authorities this plant is considered to be a variety of *S. ferruginea* Groh, which as a species ranges from the Aleutians to Oregon.

Ribes divaricatum Dougl. Common Gooseberry.

One specimen was obtained on the south shore. This is a west coast species, occurring from British Columbia to California.

Tellima grandiflora Dougl. Fringe-cup.

Quite common on sheltered, rich soil slopes. Found on the west coast from Alaska to California.

Rosaceæ (Rose Family)

Rubus spectabilis Pursh. Salmon-berry.

The most abundant plant on the island, where it forms the major covering of the interior slopes and valleys, presenting a formidable obstacle to travel. It grows in compact, continuous masses to a height of 3 to 5 feet, the tops closely and evenly wind-pruned. The fine brittle spines with which the stems are loosely covered were an added inconvenience to progress, for their constant irritation caused a rash wherever they came in contact with the exposed skin. Neither flowers or fruit were much in evidence at the time of our visit. This shrub occurs in the coastal forests from Asia to California.

Fragaria chiloensis (L.) Duch. Beach Strawberry.

Common on the rocks along the beach and also on the banks of ravines, which it shared with the grasses and other herbaceous plants. It ranges from East Asia to California along the coast.

Potentilla pacifica Howell. Silverweed.

Common in the sandy nooks and crannies along the shore-line. In its several varieties, circumpolar in range.

Potentilla villosa Pall. Villous Cinquefoil.

Abundant on the rocks at sea-level. One of the few flowering plants that flourish at the water's edge, where they are splashed by the spray at the high tides. It has a wide range along the coast and high up into the adjacent mountains from East Asia to Washington.

Geum macrophyllum Willd. Large-leaved Yellow Avens.

Common in the grassy swales and ravine banks. Widely distributed in its various forms, from Asia, east to Newfoundland, and south to California.

Malus fusca (Raf.) Sneiders. Western Crab-apple.

More commonly referred to as *Pyrus diversifolia* Bong. in the older works. Quite common in the salmon-berry tangles, where it forms patches of impenetrably dense and unyielding stems and branches, pruned off to the same level as the former. Occasionally, in the ravines, it extended a little above the general sea of shrubbery, where the white flowers gleamed brightly in the shafts of sunlight that occasionally pierced the clouds; a welcome sight amid the monotony of the surrounding greenery. Found on or near the coast from Alaska to California.

Leguminosæ (Pea Family)

Vicia gigantea Hook. Sitka Vetch.

Fairly common along the shore, where it often forms tangled beds among the driftwood at the high-tide level. A west coast species, from Alaska to California.

Empetraceæ (Crowberry Family)

Empetrum nigrum L. Crowberry.

Growing on the summit, on the northern exposure, where it forms extensive stands among the salmon-berry and crab-apple, which are here somewhat shorter than usual. A species of wide circumpolar distribution.

Onagraceæ (Evening Primrose Family)

Epilobium glandulosum Lehm. Glandular Willow-herb.

Fairly common, forming part of the herb and grass association on the ravine banks and steep slopes facing the sea wherever the soil is rich and moist yet free from the competition of the woody shrubs. Distributed across the northern part of America from North Asia to Newfoundland.

Epilobium lactiflorum Hausskn. Thin-leaved Willow-herb.

Frequent in the herb and grass association. Of northern distribution, Alaska to Greenland, south to California on west coast, and in Europe.

Epilobium adenocaulon Hausskn. Northern Willow-herb.

Epilobium angustifolium L. Fireweed.

Both of these are recorded by Newcombe. They are of wide North American distribution; the latter also occurs in Eurasia.

Umbelliferae (Carrot Family)

Heracleum lanatum Michx. Cow-parsnip.

Common on the rich soil slopes and flats at the base of the cliffs. Its large floral umbrellas were among the first flowers to be noticed as the boat approached the shore. Across-continental distribution in the north from Alaska to Labrador and south to California in the west.

Angelica lucida L. [*Coelopleurum gmelini* (D.C.) Ledeb.] Sea-coast Angelica.

Common on the grassy and herbaceous slopes and flats. East Asia to Labrador, south to California.

Conioselinum Benthami (Wats.) Fer. (*C. gmelini* C. & R.). Western Hemlock Parsley.

Common near the sea-level wherever the soil is sufficiently deep. Along the coast from East Asia to Oregon.

Cornaceæ (Dogwood Family)

Cornus canadensis L. var. *intermedia* Farr. (*C. unalaskensis* Ledeb.). Bunchberry.

Growing on the summit where it clings to the clumps of the *Juncus* in order to reach the light. The stems are abnormally long, reaching over a foot in length. Widely distributed in its varietal forms throughout the northern part of the continent and south to California.

Ericaceæ (Heath Family)

Vaccinium cæspitosum Michx. Dwarf Blueberry.

Growing on the summit in association with *Empetrum* and *Trientalis*. Alaska to Labrador and south on the west coast to California.

Vaccinium uliginosum L. Bog Blueberry.

Collected by Newcombe. A northern bog species of circumpolar distribution.

Gaultheria shallon Pursh. Salal.

Common, forming dense monospecific stands on the cliffs and ravine sides where the rocks are covered with soil. This is a west coast species extending from Alaska to California.

Primulaceæ (Primrose Family)

Trientalis arctica Fisch. Northern Starflower.

Growing on the summit, where it was associated with *Juncus*. The internodes were of abnormal length and were supported by the *Juncus* as it struggled upwards to reach the light. It ranges from Alaska to Oregon.

Scrophulariaceæ (Figwort Family)

Scrophularia oregona Pennell. Scrophulary.

A large bed of it was growing luxuriantly near the old buildings at sea-level. The flowers proved very attractive to numerous insects, including bees, moths, and various bugs. This is a west coastal species, reaching its northern limit here.

Mimulus guttatus D.C. Monkey-flower.

Plentiful at the base of cliffs in rich, moist soil. One of the most showy flowers on the island. Distributed from Alaska to California, extending into Alberta and Saskatchewan.

Castilleja unalaschensis (C. & S.) Malte. Alaskan Paint-brush.

Growing on cliff faces and ravine sides (see Fig. 7). Most of the blooms were pale cream with a slight reddish tinge in some examples. Found from the Aleutians to Triangle Island, which seems to be its southern limit. Not seen on the other islands of the Scott group.

Castilleja Dixoni Fernald. Dixon's Paint-brush.

A west coast species. Collected by Newcombe on Triangle Island and by us on Lanz, Cox, and Sartine Islands.

Plantaginaceæ (Plantain Family)

Plantago maritima juncooides Lam. Sea-shore Plantain.

In rock crevices on the sea-shore, where it is subject to inundation or the spray of salt water. The species is circumpolar; the subspecies is found from Alaska to California.

Rubiaceæ (Bedstraw Family)

Galium aparine L. Cleavers.

Frequent in the rich soil association in ravines and small benches by the sea. Of wide circumpolar distribution, Eurasia south to Texas.

Caprifoliaceæ (Honeysuckle Family)

Lonicera involucrata Banks. Black Twinberry.

A typical shrub of the forested areas, but here exposed and without any cover. Frequent, growing on cliff or ravine sides where it formed low tangled thickets. Very much dwarfed and wind-pruned to 3 feet, though attaining a height of 5 to 6 feet in sheltered situations. The stems were much twisted and contorted; if straightened they would have been 6 to 8 or more feet high. Widely distributed across Canada from Alaska south to California.

Sambucus racemosa L. Red-berried Elder.

One small patch was seen on the south side of the island. In the wide sense, a species of circumpolar range; several races and subspecies are recognized, all very closely related.



Fig. 6. Precipitous slopes on Triangle Island, dwarfed twin honeysuckle in foreground.

(Photo by G. A. Hardy.)



Fig. 7. Alaskan paint-brush (*Castilleja unalaskensis*) on cliff face, Triangle Island.

(Photo by G. A. Hardy.)

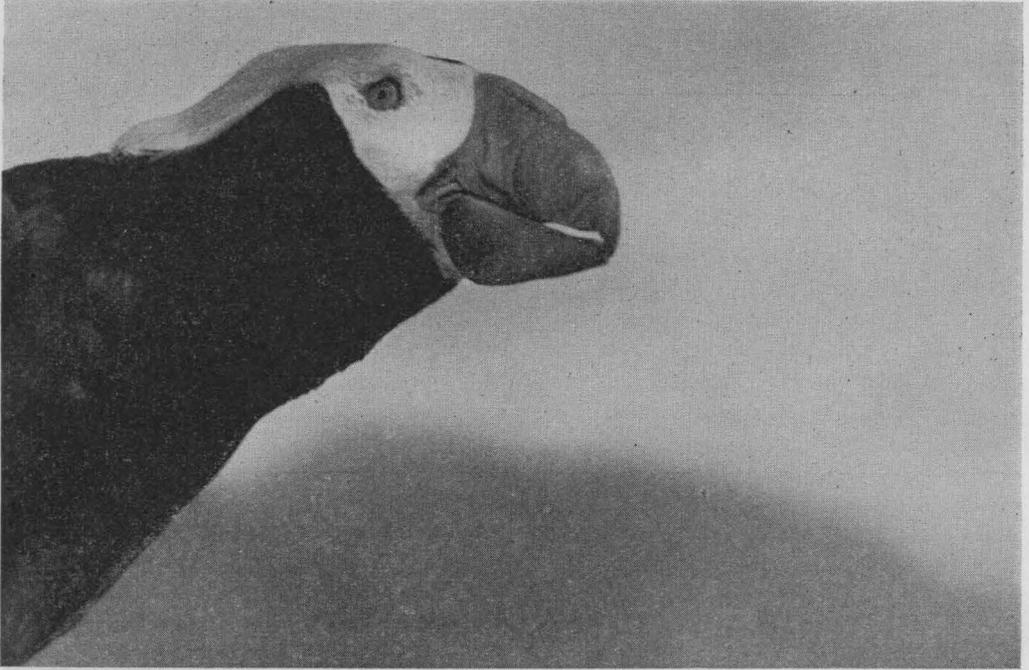


Fig. 8. Horned puffin, a breeding bird on Triangle Island.

(Photo by G. C. Carl.)



Fig. 9. Portion of a breeding colony of murre, Triangle Island, June, 1949.

(Photo by G. C. Carl.)

Valerianaceæ (Valerian Family)

Valerianella samolifolia Haeck. Corn-salad.

Usually found in shady woods. Growing among the general herbage on the rich soil cliffs and banks of ravines. Occurs on the west coast from the Queen Charlotte Islands to California.

Compositæ (Daisy Family)

Bæria maritima Gray. Sea-shore Bæria.

Collected by Newcombe. This belongs to a genus having California as its centre of distribution. Of the ten species, this is the only one that extends into British Columbia. Apparently Triangle Island is its most northern or near-northern limit of distribution.

Achillea millifolium lanulosa Nutt. Yarrow.

Abundant on the open, grassy cliffs and wherever sufficient rich soil occurred. Circumpolar in its several closely similar species and varieties.

Anaphalis margaritacea occidentalis Green. Pearly Everlasting.

Small plants, not in flower, were found on the ravine slopes. A Western American species, this subspecies occurs along the coast from Alaska to California.

Circium edule Nutt. Edible Thistle.

Occasional on the ravine and deep soil slopes. British Columbia to California.

Sonchus asper (L.) Hill. Spiny Sow-thistle.

One or two depauperate specimens were found clinging precariously to the steep, rocky slopes near the old buildings at sea-level. Introduced from Europe, common in gardens and cultivated ground throughout temperate North America.

MAMMALS

Despite the complete isolation of Triangle Island, two species of small terrestrial mammals are well established there—the white-footed mouse (*Peromyscus*) and the meadow-mouse or vole (*Microtus*). The specific names are deliberately omitted here because morphological characteristics apparent in both populations indicate that these mammals have diverged to such an extent from similar species inhabiting the nearest land-masses that the question of their specific affinities requires a great deal more study. These studies are under way and the results will be published as separate papers, which will include description of new species or subspecies as the case may be. The problems arising in these studies involve many factors—plasticity of the species, length of time in isolation, original occupancy of the island by these mammals, nature of their arrival, (that is, few or many), ecological conditions affecting the populations, and so on. Present knowledge of glaciation on this coast is in direct contradiction to the mammalian picture in many cases. The amount of endemism apparent in mammals on some of the islands indicates long periods of isolation—if the processes of natural selection through mutation are the agents affecting change. If, on the other hand, the differences observed occurred in a very short space of time, and are due to the inherent individual characteristics of one or two individuals which chanced to land on the island, these differences may be, in fact, only manifestations similar to those obtained in the selective breeding of captive animals. Whether the systemist is justified in describing such animals as new species is a matter of conjecture and controversy. To proceed and describe without detailed study of the problem seems contrary to scientific procedure.

On Triangle Island, the area immediately adjoining the shore-line was occupied predominantly by *Peromyscus* and the grassy slopes above the high beach by *Microtus*. A certain amount of overlapping in range was apparent near the beaches, and where rills or rocky intrusions penetrated inland the habitat was utilized to an equal extent by both species. The *Microtus* were confined chiefly to those parts of the island upon which

grass was growing, and *Peromyscus* to the beach debris, rocky shores, and under the skirt of the predominant salmon-berry.

Rather than present a long, detailed verbal description of these animals here, Fig. 16 has been prepared to illustrate the relative differences in over-all size of the *Peromyscus* on the principal surrounding land-masses, excluding the remainder of the Scott Islands. It may be pointed out that the white-footed mice taken on Triangle and Sartine Islands appeared, from casual inspection, to approach more closely *P. sitchensis* of the northern outer islands than they do *P. maniculatus* of the coastal Mainland and inner islands. No illustration of the *sitchensis* group is presented here. Fig. 15 illustrates the relative size of *Microtus* on Triangle and Vancouver Islands.

A point of interest, and a point which may bear weight in the final analysis of these mammals, is the presence of a white blaze or star in 68 per cent of the *Peromyscus* taken on Triangle Island. This white blaze, studied by Barto and Huestis (1933), was found to be an inherent characteristic, occurring in approximately 3 per cent of wild *Peromyscus* in Oregon.

It may be argued that the large percentage of occurrences of the "Huestis star" in the Triangle Island mice indicates that the initial occurrences of *Peromyscus* upon that island was represented by very few individuals.

The manner by which small animals have arrived upon isolated islets such as those under study is another matter of conjecture and controversy. From speculation four main theories have arisen:—

- (1) That residual populations lived through the ice-age in unglaciated insular areas and survived to repopulate the glaciated portions as the ice withdrew.
- (2) That the retreat of the ice left temporary ice-bridges which may have been vegetated and over which the ancestors of the present populations migrated, and (or) that large masses of vegetated ice-floes harbouring mice may have accumulated in the coastal waters and lodged against the islands.
- (3) That slides bearing acres of vegetation were borne off on the tides, carrying with them mammals and other forms of life, which ran ashore when the rafts eventually lodged—possibly on distant islands.
- (4) That large populations of Indians inhabiting the coast, and moving seasonally to fish on insular groups, may have transported certain species of mammals to those groups where they subsequently became established.

The relative merits of these theories cannot be discussed here at length. Sufficient to say that perhaps each one has supporting evidence, varying with geographical location of the island or islands involved. The fact remains that mice have arrived and have differentiated morphologically from Mainland forms, and in order to comprehend the status of these insular populations in our faunal picture, a great deal more exploration, study, and analysis are required.

On Triangle Island, both *Microtus* and *Peromyscus* were well represented. Individuals of both species were present in large numbers and the adult series collected were limited only by time available for preparation. The larger mice in the series of both species had molars with the crowns almost completely worn away. Fully adult animals of smaller size had molars complete. The worn condition is seldom encountered in Mainland populations. The inference is, of course, that these insular mice live longer than do those on the large land-masses, which may in part account for the gigantism exhibited. The lack of predation and possible absence of parasitic and non-parasitic diseases may account in part for the apparent longevity. The food-supply in the summer appeared to be more than sufficient to support the large populations occurring. Certainly no obvious overutilization was observed—but the limiting factor controlling the

number of mice upon these islands is probably the availability of suitable range during the winter months (Guiguet, 1950). In the intraspecific competition resulting it is reasonable to assume that a large percentage of adult mice would survive at the expense of the annual increment of immature animals.

Steller Sea-lion. *Eumetopias jubata* (Schreber).

The rocky shores of Triangle Island were utilized by sea-lions as hauling-out grounds, while those of the larger islets lying immediately off the main island were utilized as breeding-grounds and rookeries. These islets, during the last week in June, harboured large numbers of pups, cows, and bulls. The nature of the terrain and distance made numerical estimates difficult, but by count and area estimates we arrived at a figure in the neighbourhood of 1,000 animals. This estimate was discarded when the fisheries vessel arrived to take us off. Rifle-fire from that vessel caused a general exodus from the largest rookery; every crevice and small valley disgorged sea-lions, the whole islet momentarily resembling a piece of carrion crawling with maggots. A figure in excess of 2,000 would still be conservative.

Several pups were discovered dead along the shores of Triangle Island. These animals had apparently died from natural causes, for examination revealed no gunshot wounds. While it is possible that severe storms may kill a percentage of the newly born, it seems more reasonable, in light of the persecution inflicted on these animals by man, that the mothers had been destroyed, resulting in ultimate starvation of the pups.

The need for study into the food habits of this species is clearly indicated in British Columbia. The annual slaughter of thousands of sea-lions by Federal Government agencies and fishermen, with no effort made to utilize the carcasses is deplorable, and will at a future date be regarded as a black page in the waste of wildlife.

Hair-seal. *Phoca vitulina richardii* (Gray).

Seals were uncommon in the vicinity of Triangle; whether this was due to the large number of sea-lions in the area we were unable to determine. One dead animal was picked up on the beach, having been killed by rifle-fire, and the nose removed for bounty. Whether it was killed on the spot or drifted in with the tide is unknown, but these animals usually sink very rapidly when killed.

Whales.

Two whales were observed passing the island at a distance. These were identified as finback whale, *Balænoptera physalus* (Linnæus), and humpback whale, *Megaptera novæangliæ* (Borrowski), from their outline and actions.

Rabbits.

A number of domestic rabbits live upon the island, apparently introduced by one of the lighthouse-keepers. They appear to have established themselves, since a small population was apparent at the time of our visit.

BIRDS

Resident species of passerine birds were poorly represented upon most of the Scott Islands, due probably to the lack of diversified habitats, the extremely wet nature of the place, and the high winds which occur. In the spring, however, it seems likely that migrants bound for the Queen Charlotte Islands and other northern coastal areas may use the Scott Islands chain as a "jumping off" area for the long flight across Queen Charlotte Sound. In May of 1948 passerine birds were observed in northward flight by a Museum party some 20 miles west of the Goose Islands, about 80 miles north of the Scott Islands, and fishermen often report "small land birds" well out to sea in this area. Consequently, the passerine birds recorded by us on Triangle and the other Scott Islands do not represent

a complete list when migration is considered. From the "summer resident" point of view, however, we believe lists here presented are fairly representative.

The list of pelagic and littoral species recorded is typically coastal for the season at which we visited the islands. At the peak of the coastal migration many more species of sea-birds and waders may occur. It is the presence of large numbers of nesting pelagic birds, however, that makes Triangle, Sartine, and Beresford Islands an ornithologist's paradise despite the inhospitable nature of the conditions there.

The following annotated list of birds of Triangle Island is arranged after Munro and Cowan (1947):—

Loon. *Gavia immer* Brunnich.

Common loons were observed daily moving northward past Triangle Island. Several individuals were seen feeding near the kelp-beds in front of the camp.

Black-footed Albatross. *Diomedea nigripes* Audubon.

These large oceanic birds were occasionally seen along the west coast of Vancouver Island on the trip up. One individual was observed from the north-west side of Triangle Island with field-glasses and fishermen report them regularly from the "steamer grounds" at the south end of Queen Charlotte Sound to the east of Triangle Island. A Museum party recorded albatross well inside, at the north end of the sound, in 1948.

Sooty Shearwater. *Puffinus griseus* (Gmelin).

This shearwater, commonly termed the whale bird, was the most numerous bird observed along the west coast of Vancouver Island and in the vicinity of the Scott Islands. A bird of the open seas, it often moves into littoral waters, apparently to feed. In periods of relative calm and heavy fogs it sometimes enters the inside passages.

Several large flocks south of Triangle Island were observed feeding, probably upon sand-lance (*Ammodytes personatus*) which had surfaced in the area.

Northern Fulmar. *Fulmarus glacialis* (Linnæus).

Three fulmars were observed flying with the shearwaters on the approach to Triangle Island. Two of these birds were in the white colour phase, one was grey. Several white fulmars were observed along the west coast of Vancouver Island on the trip up.

Fork-tailed Petrel. *Oceanodroma furcata* (Gmelin).

Burton collected an egg of this species on Triangle Island on June 20th, 1909. The Museum party took no specimens or eggs in the last week of June in 1949, although several small burrows examined were undoubtedly old nesting-sites of petrel. The island appears to be an ideal nesting-ground for these birds and undoubtedly occupied colonies exist on some of the headlands which we were unable to visit.

Boreal Petrel. *Oceanodroma leucorhæa* (Vieillot).

An egg of this species was also collected by Burton on July 20th, 1909. Remarks concerning the fork-tailed petrel apply here as well. Museum parties recorded no concrete evidence of nesting in 1949 apart from unused petrel burrows, the specific identity of which was impossible.

Pelagic Cormorant. *Phalacrocorax pelagicus* Pallas.

Pelagic cormorants were using all of the available niches on Triangle Island for nesting. Two colonies, one on the east side of the island and one on the west, were estimated to harbour some 2,400 breeding individuals. Other precipitous parts of the island examined by field-glasses were occupied by these birds, indicating a large total population. Birds at this time of the year were incubating, eggs examined being fresh. Courting behaviour and birds carrying nesting material were of common occurrence in the rookeries.

White-winged Scoter. *Melanitta fusca* (Linnæus).

These ducks were the only representatives of the Anseriformes observed near the islands. They were seen on the coast littoral and passing by in flight. Undoubtedly other species occur at different times of the year, but their absence over a ten-day period seems remarkable.

Bald Eagle. *Haliaetus leucocephalus* (Linnæus).

Eagles were present continuously during our stay upon the island. Twelve were counted in the air on one occasion. These were flying low over the slopes, obviously hunting. None was observed to make a kill, but it is assumed they were searching for rabbits or roosting puffin. On several occasions eagles were flushed from the remains of sea-lion pups upon the beach. The presence of such a large number of eagles can probably be attributed to an abundance of food, although the island had been used for nesting. Two old nests, built on the edge of precipitous slopes near the crown of the island, were examined. One contained an unincubated egg which appeared to have been laid the previous year; the other was empty. Both nests showed evidence of annual rebuilding. The absence of nesting birds in 1950 is unexplained.

Duck-hawk. *Falco peregrinus* Tunstall.

Four pairs of falcons (*F. p. pealei* Ridgway) were observed on the island. All were believed to be nesting, although only two nests were visited. These were utilized only as roosts at the time of our visit, the young of both being on the wing.

From the evidence found near the roosts, it was apparent that these birds were feeding primarily upon Cassin auklets.

Black Oyster-catcher. *Hematopus backmanii* Anderson.

Three nests of this species were observed on the gravels of the upper beaches. Undoubtedly more nested in the inaccessible areas. Some of the eggs examined were slightly set, others were unincubated.

Glaucous-winged Gull. *Larus glaucescens* Maumann.

Nesting gulls of this species were observed along all of the rocky shores visited. They were found nesting in the grassy tussocks at high-tide mark and on some high cliff edges. No young birds were observed, but eggs examined contained fully formed chicks, and in one instance young were heard peeping in the shell.

Common Murre. *Uria aalge* (Pontoppidan).

Murres were found nesting in large numbers. Several rocky peninsulas, islets, and headlands of the main island were covered at their crowns and down the slopes with hundreds of murres. The population was conservatively estimated to number about 3,000 birds.

Eggs were found 300 feet above the sea on the grassy cliff edges and tops of the south-western peninsula (an island at high tides). Each egg was attended by the two adults. Approximately 200 pairs were found actually nesting in two widely separated groups. All specimens of eggs examined on the breeding-grounds were fresh, with their exteriors clean. Cloacal examination of females indicated the eggs had been deposited very recently. Walter Maguire, the well-known British Columbia oologist, who handled and prepared the nineteen eggs collected, found no sign of incubation. No downy young were observed. It seems reasonable to assume that the actual laying of eggs had only recently begun and that in all probability the birds observed roosting on the pinnacles would be nesting very soon. It is likely that many of these were already nesting on the many cliff faces that we were unable to see. However, no eggs were seen when the birds were flushed by gunshot.

The race occurring here is *U. a. inorata* Salomonsen.

Pigeon Guillemot. *Cephus columba* Pallas.

Guillemots occurred in numbers wherever broken rock afforded nesting-sites adjacent to the sea. No evidence of burrowing was found on Triangle Island, although in some coastal areas entire populations of this species were in burrows.

Courting behaviour, copulation, and freshly prepared nesting-sites were observed, but no eggs were found.

Marbled Murrelet. *Brachyramphus marmoratus* (Gmelin).

The possibility of studying the breeding habits of this species was one of our prime considerations in visiting Triangle Island, but none was seen in the area. It may be argued that the absence of timber on Triangle, Sartine, and Beresford Islands is significant in this respect. Previous records of these birds in breeding condition are associated with wooded areas. The absence of marbled murrelet in the vicinity of Lanz and Cox Islands may be explained, somewhat unsatisfactorily, by the presence of mink there, because concentrations of breeding marbled murrelet occur along the mink-inhabited shores of the Mainland and Vancouver Island. The concentration of mink on a small island such as Lanz, however, presents a much greater threat than on the larger land-masses, where the populations are dispersed over wider areas.

The factors listed above are merely conjecture. It is entirely possible that marbled murrelets occur in large numbers in the Scott Island areas at different seasons under different climatic conditions.

Ancient Murrelet. *Synthliboramphus antiquus* (Gmelin).

A pair was observed on the coast littoral near our camp. On several occasions during the night, calls were heard that may have been uttered by ancient murrelets. The bedlam of Cassin auklet calls, however, made identity uncertain. No burrows or eggs of this species had been discovered on the island previously, and no record was obtained by us. The absence of timber may be a limiting factor with this species also. Colonies visited on the Queen Charlotte Islands were all situated in open forest with salal underbrush.

Cassin Auklet. *Ptychoramphus aleuticus* (Pallas).

Triangle Island supports the largest breeding colony of Cassin auklets so far recorded in British Columbia. Numerical estimates were impossible except by sample techniques utilizing burrows. Time did not permit such a study. Countless burrows were found from high-tide mark to the top of the island. At night the din of calling birds, which had spent the day underground, made a solid background of noise, accompanied by the whirr of countless wings as the "swing shift" took place, and birds that had spent the day at sea came in to incubate. A small guy-line, extending from our tents to a point of rock some 30 feet distant, was struck continually by birds hurtling down the slopes from the higher burrows. Expecting to find a large series under the rope in the morning, we were surprised to find none. The speed at which the birds were travelling carried their bodies into the sea, some 50 yards distant, where they were lost.

Upon one occasion, in the night, a howling gale accompanied by rain exerted an influence upon the birds in that it delayed the flight. Investigation revealed that they had left the nest but were cowering in the mouths of the burrows, calling incessantly. Several birds, caught by hand, were found to be soaking wet and while still capable of flight their efficiency was no doubt impaired. Many of these wet birds struck the wall of the tent, some even entering it, incidents which did not occur on previous dry nights. It is probable that a high mortality is experienced during such storms.

Young birds almost capable of flight were found in most nests examined. Of three eggs uncovered, two were fully set and one had been deserted, probably due to the death of the adults.

Examination of the stomachs of adult birds collected revealed they had been feeding primarily upon the shrimp-like enphansid, *Thysanæssa spinifera* Holmes.

Rhinoceros Auklet. *Cerorhinca monocerata* (Pallas).

No burrows or specimens of this auklet were discovered on Triangle Island. Adult birds in full breeding plumage, however, were most numerous on the coast littoral to the south, and it is probable that groups or scattered individuals nest on some of the inaccessible headlands.

Tufted Puffin. *Lunda cirrhata* (Pallas).

Triangle Island harbours the largest breeding population of tufted puffin so far recorded on the British Columbia coast. As with the Cassin auklet, no numerical estimates are presented here, but the birds numbered well into the thousands.

These birds were nesting in burrows among the grassy tussocks, beginning at an altitude of approximately 200 feet and extending to the top of the island. Steep slopes and the grassy edges of precipitous cliffs appeared to be the preferred habitat; burrows were most numerous in these areas.

All nests examined contained one well-incubated egg tended by a single adult. No downy young were found.

During the day the puffins were comparatively inactive. At dusk, however, a noticeable increase in fighting activity took place. Whether or not a "swing shift" occurred was undetermined, but large flights were observed coming off the sea. The twilight fighting resembled the activity seen about a disturbed hornet's nest, with birds "buzzing" over the high shoulders where the nests were most plentiful.

Raven. *Corvus corax* Linnæus.

Recorded only from the remains of one bird found in the abandoned lighthouse on the top of Triangle Island.

Likely this species occurs more regularly at other seasons of the year, when the birds are not occupied in nesting activities. The lack of timber on the island probably accounts for the absence of ravens at this time of the year.

Northwestern Crow. *Corvus caurinus* Baird.

No evidence of this species was observed on the island. Remarks concerning the raven may apply here, although the nest of the northwestern crow is often found near the ground in low shrubbery.

Winter Wren. *Troglodytes troglodytes* Linnæus.

There appeared to be a small evenly distributed population of winter wrens in the swales and larger crevices of the island where shrubbery occurred. Their songs were heard every morning and evening, despite some very inclement weather conditions.

Nesting evidence was observed in the form of small fledglings just out of the nest.

Orange-crowned Warbler. *Vermivora celata* (Say.).

Four individuals of this species were recorded for the island, including one singing male, which we heard on the salmon-berry slopes above the camp every morning. The bird on territory was obviously nesting, although no other record of breeding was established.

The race occurring here is *V. c. lutescens* (Ridgway).

Red Crossbill. *Loxia curvirostra* Linnæus.

A flock of from thirty to fifty red crossbills was observed daily near the camp. Two small flocks of three and four birds were also seen. An adult male collected proved to be a non-breeding bird (inspection of testes).

Fox-sparrow. *Passerella iliaca* (Merrem).

Fox-sparrows were evenly distributed over all sections of the island that were visited. Young birds were seen regularly being fed by adults, and a nest containing five eggs was found at the edge of a salmon-berry thicket. A count taken from our camp near the beach to the lighthouse on top, a distance of less than one-half mile, revealed ten breeding pairs in a strip approximately 30 yards wide. Coupled with an even distribution, this seems to indicate a large total population inhabiting Triangle Island.

The race occurring here is *P. i. fuliginosa* Ridgway.

Song-sparrow. *Melospiza melodia* (Wilson).

The song-sparrow population was comparable to that of the fox-sparrow. No nests were found, but small young being fed by adults were observed on many occasions. The population appeared to be confined to the margins of grass and salmon-berry thickets and individuals were often seen foraging in the beach debris.

The race occurring here is *M. m. morphna* Oberholser.

INVERTEBRATES

*Molluscs**Haplotrema (Ancotrema) sportella* Gould.

A carnivorous snail, with a greenish-yellow shell in a flattened coil. The species is widely distributed from Alaska to California; in British Columbia it has been recorded from Vancouver Island.

Polygyra (Triodopsis) columbiana Lea var. *pilosa* Henderson.

A herbivorous species, readily recognized by the numerous short, stiff hairs covering the shell. It is also found from Alaska to California. The typical form *columbiana* has been recorded previously from British Columbia but there appears to be no other records for *pilosa*.

Prophysaon andersoni (Cooper). Anderson's Slug.

Provisionally identified by Walter J. Eyerdam. Anderson's slug is found from Alaska south to California, including Vancouver Island.

Ariolimax columbianus (Gould). Pacific Giant Slug.

A large species generally distributed along the Pacific Coast from California to Alaska. Specimens often became caught in mouse-traps, to which they were apparently attracted by the bait.

*Crustaceans**Anisogammarus ramellus* (Weckel). Fresh-water Amphipod.

A fresh-water "shrimp," abundant in the small stream at our camp-site on the north side of the island. Apparently this species has not been reported previously from British Columbia.

Pagurus hirsutiusculus (Dana).*Pugettia producta* (Randall).*Hemigrapsus nudus* (Dana).

Three species of common shore crabs collected along the north beach. Presumably because of the heavy surf, boulders and rocks on the beach were firmly imbedded in fine sand, affording poor shelter for shore species.

Fabia subquadrata Dana. Pea-crab.

A lone female (not ovigerous) was found in one of several dozen California mussels opened on July 1st by F. L. Beebe.

Insects

From the nature of its climate, Triangle Island is not suited for insects of weak flight, hence no butterflies were seen, but the rank growth of herbage afforded adequate shelter and food for those of less aerial habits. Insects were notable for numbers rather than for varieties of species; a sweep of the net brought handfuls of Hemiptera in various stages of growth, while large bumble-bees swarmed over the flowering herbs by day and small geometrid moths were evident at dusk. The salmon-berry leaves showed evidence of extensive nibbling from a small green caterpillar. Incidentally, the abundance of insect larvæ coincided with the appearance of young sparrows, warblers, and other nestlings, affording them a plentiful supply of succulent insect diet at the most critical period of their lives.

The general character of the insects collected is similar to that of Vancouver Island and the adjacent Mainland but with a notable tendency toward melanism.

It is not pretended that the following short list is even superficially representative, let alone exhaustive. Under favourable conditions of time, season, and weather, the insect fauna may well be found to be surprisingly large for so isolated an area.

Bugs (Hemiptera)

Psyllidæ.

Aphalara nebulosa Kincaid Ashmead.

A very small species. Six were taken by sweeping among *Scrophularia oregana*. Chilliwack is the only other known British Columbia locality on record.

Miridæ.

Irbisia sericans (Stal.).

Quite common in the same place. Twenty-seven specimens were taken.

Fulgoridæ.

Several nymphs of an undetermined species were collected.

Cicadellidæ. Leaf-hoppers.

Cicadella hieroglyphica?

A mass of nymphs that may be of this species was taken. Others taken might be *Philenus* sp. In both cases they were too immature for exact determination.

Beetles (Coleoptera)

Carabidæ. Ground-beetles.

Scaphinotus marginatus Fisch. spp. *fulleri* Horn.

Several specimens in the black phase were taken under stones and boards. The only other locality for this subspecies known to us west of the Cascades is Terrace, B.C., on the Mainland some 250 miles to the north.

Pterostichus algidus LeC.

Frequently found under stones and debris.

Cantharidæ. Blister-beetles.

Podabrus piniphilus Esch.

Several were taken by sweeping herbage.

Elateridæ. Click-beetles.

Dalopius tristis Brown.

A common species, obtained by sweeping herbage, chiefly *Scrophularia*.

Butterflies and Moths (Lepidoptera)

Phylænidæ. Owlet-moths.

Septis castanea Grt. Chestnut Quaker.

This large species was taken under boards and stones by day for it is nocturnal in habit.

Geometridæ. Looper-moths.

Xanthorhæ defensaria and var. *conciliaria* Swelt. Variable Carpet.

Fairly common, flying at sundown about the flowers of *Scrophularia* and *Heracleum*.
Eupithecia species? Flying about the *Scrophularia*.

Pterophoridaæ. Plume-moths.

Oidæmatophorus stramineus Wlshm.

Oidæmatophorus monodactylus L.?

Both these species were taken flying about the *Scrophularia* at dusk. They are rather too worn for certain identification.

Pyralidæ.

Phylctænia washingtonalis Grt.

Abundant among the salmon-berry bushes. A large number of small green caterpillars of the moth were found eating the leaves; some of these were full fed and pupated soon after capture. One or two adults emerged a short time later. Two pupæ gave rise to a species of *nemertine* worm instead of the expected moth.

Bees and Wasps (*Hymenoptera*)*Bombus sitchensis* Nyl. Bumble-bee.

A melanic form of this western species was common about the blossoms of *Scrophularia*. This form does not appear to have been recorded anywhere else. It is tentatively identified by K. V. Krombein, United States National Museum; full confirmation awaits the examination of males, which were not obtained.

Several species of *Diptera* were collected, mostly very small; these have not yet been identified.

Spiders

Antrodiaetus pacificus.

Cryphæca montana.

Tetragnatha laboriosa Hentz.

Clubiona canadensis Emerton.

Isopods

Porcellio scaber Latreille ss. *niger* Say. Sowbug; wood-louse.

An introduced species of European origin, common on the Mainland and Vancouver Island; probably accidentally brought to Triangle Island. Not found on other islands of the Scott group.

Centipedes and Millipedes

Among the incidental small invertebrates collected were a number of centipedes and millipedes, including a species unknown to science. These have been examined and identified by Dr. M. V. Chamberlin, of the University of Utah, as follows:—

Centipedes

Otocryptops sexspinosus (Say).

Found in debris above the high-tide mark. Specimens have also been taken on Lanz Island, Vancouver Island (Departure Bay and Victoria), and at Vancouver on the Mainland.

Arctogeophilus melanonotus (Wood).

Also found in beach debris. The species has also been taken from Cox Island, Graham Island, Vancouver Island, and at Vancouver.

Millipedes

Nearctodesmus carli Chamberlin.

A small species found in damp places under bits of driftwood above the tide-level. Specimens were also found on Cox, Lanz, and Sartine Islands, but so far none has been taken elsewhere.

LANZ ISLAND

DESCRIPTION

In 1950 the Museum party returned to the Scott Islands and made its headquarters on Lanz Island, since it offered the best shelter and had a beach suitable for the landing of supplies and equipment. Camp was set up near a stream at the head of a small bay on the east side facing Cox Island. The site chosen apparently had been utilized before, since we found the rotted remains of a wooden cabin buried in the forest debris when we cleared away the underbrush for our tent. We remained on the island from June 16th to 20th, after which we worked from the fisheries boat, since it was impractical to camp on the remaining islands.

In size, Lanz Island is only slightly smaller than Cox Island, the largest of the group; it is about $2\frac{1}{4}$ miles long and about $1\frac{1}{2}$ miles wide, roughly rectangular in shape. In general, the shore is rocky with occasional narrow beaches of boulders and rocks, principally along the east coast (see Fig. 10). In other parts the shore-line rises rapidly from the high-tide level so that it is impossible to make one's way along the beach for any distance without climbing precipitous cliffs or going over headlands. For this reason we were unable to explore more than about 1 mile of shore-line in the vicinity of the camp.

Travel over other parts of the island was also extremely difficult because of the dense nature of the underbrush, as described in the next section. Consequently, our activities were largely confined to the more accessible beaches where, incidentally, the variety of habitats and number of wild-life species was found to be greatest. However, from the ship and also from aerial photographs it could be seen that the island was uniformly timbered and that two high points were present in the southern half. Elevations on the chart are 695 feet for the south-western height and 655 feet for the south-eastern point. The central portion of the island rises to about 550 feet in elevation.

PLANT-LIFE

Floristically, Lanz Island is typical of the Coast Forest association.

On the seaward side, Sitka spruce is dominant, forming a bulwark against the storms that lash the coast. Evidence of this is reflected in the scarred and stunted boles of the ancient trees which are partially dead or with twin leaders, obviously once horizontal branches that have replaced the broken-off original. Some of the trees lie at angles, contorted and tilted by the wind, while the trunks are variously disfigured with large swellings and excrescences, apparently as a result of injury due to mechanical strains or fungal infection, or a combination of both.

At the base of the spruces and fringing the shore, where it was not too rock-bound for plant-growth, is a dense stand of honeysuckle, elder, alder, salal, and willow, that together form an impenetrable barrier in many places.

The interior of the island supports a dense stand of hemlock and cedar, accompanied in moist or more open places by crab-apple, alder, elder, salal, false azalea, and small-leaved huckleberry (see Fig. 11). In places where the undergrowth is less dominant, woodland herbaceous plants flourish, such as twayblade, foam flower, single delight, gold-thread, and bunchberry. The deer-fern was noticeably abundant and luxuriant.

On the beaches and dotting the many pinnacles of rocky land-masses that had become detached from the shore-line were many flowering plants that formed a brilliant

display, greatly relieving the dull green and grey monotony of the general tones of the prevailing tree and bush growth. Among the species present were the northern chocolate lily, woolly cinquefoil, sea-side strawberry (some with pink flowers), blue-eyed grass, Alaskan paint-brush, and columbine. Skunk-cabbage and nettles were found growing in the shade of the thickets near the shore-line.

On the summit of one of the pinnacles about 6 feet in diameter, the crowberry grew in a dense mat, intermixed with the small-leaved huckleberry. On another pinnacle a small patch of wild clover (*Trifolium fimbriatum*) was observed.

In summary, fifty species of plants were noted or collected. Of these, it is roughly estimated that 70 per cent. are typical Coast Forest, 18 per cent sea-shore, and 12 per cent of northern distribution. No true bog plants were observed.

MAMMALS

Only three species of mammals were observed on Lanz Island—white-footed mice, mink, and hair-seals. Two bull sea-lions were seen on a rock near Lanz but no large colonies occur in the immediate vicinity.

White-footed Mouse. *Peromyscus* sp.

As on Triangle, the *Peromyscus* populations were well represented. A large series of these mice was collected in short order. The mouse populations here, as on other coastal islets in the summer months, were concentrated along the beach and forest edge.

The animals here differ from the Triangle, Beresford, and Sartine Islands mice by being smaller in size, in which respect they are similar to those taken on Cox. The mice on these two inner, wooded islets (Lanz and Cox) are, in turn, similar in general morphological characters to the *maniculatus* complex existing on some of the islands nearer the Mainland coast. Until the full statistical analyses (now nearing completion) are aligned, no postulation regarding the racial affinities of these mice will be attempted. For the interested layman, however, Fig. 17 serves to illustrate a general comparison of the species involved.

Mink. *Mustella vison* Schreber.

Mink were introduced on Lanz Island about 1938 or 1939 by the Fredricksen brothers, of Cape Scott. At the time of our visit the mink population appeared to be large. The effect of these mammals upon sea-bird nesting was forcibly brought to our attention, since this unauthorized introduction of a carnivorous mammal has apparently eliminated the island as a nesting-site for pelagic birds. Rookeries examined at various points on the island invariably told the same story of desertion. The presence of mink and nesting sea-birds on the same islet, from the evidence gathered here, results in the ultimate destruction of nesting bird-life.

The mink appeared to be living well on the beaches, where the waters abound in various species of fish and invertebrate life, and healthy, well-furred animals were a common sight along the shores and about our camp.

It is not known from which source the original stock was selected, but in all probability the animals are from Vancouver Island, where the race *M. v. evagor* Hall occurs.

Hair-seal. *Phoco vitulina richardsoni* (Grey).

Hair-seals were regularly observed in the coast littoral of Lanz Island, particularly around the rocky shores where kelp and the inevitable rockfish occurred.

BIRDS

The burrows of pelagic birds were present on all of the grassy headlands visited on Lanz Island, but none found was occupied. It seems obvious that the comparatively recent establishment of mink on the island is responsible for the absence of breeding birds.



Fig. 10. East shore of Lanz Island, with a typical rock pinnacle on right.

(Photo by G. C. Carl.)



Fig. 11. Forest association, Lanz Island: Sitka spruce, hemlock, and salal.

(Photo by G. C. Carl.)

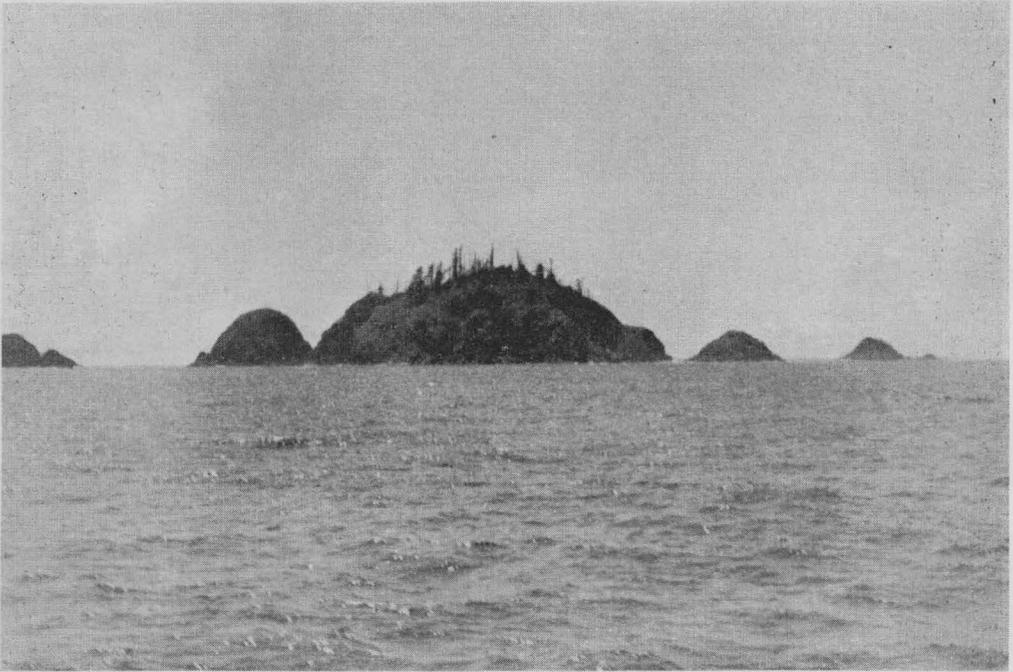


Fig. 12. Beresford Island and associated rocks.

(Photo by G. C. Carl.)



Fig. 13. Pelagic cormorants on Beresford Island; Lanz and Cox Islands in background.

(Photo by G. C. Carl.)

The burrows examined had apparently been unused for several seasons; the roots of grasses and other plants choked the passages. No egg-shell remnants were found, but according to the size of the burrows and their general character the colonies here were predominantly those of Cassin auklet. One headland on the south-east corner of the island was perforated by large burrows, which resembled those of rhinoceros auklet seen on the Queen Charlottes. A search in the salal of the timbered slopes revealed no sign of ancient murrelet nesting-sites, although a small number of these birds were heard on three occasions passing into (or over?) the timber by night. No petrel burrows were found, and the absence of nesting gulls and black oyster-catchers points to the incompatibility of breeding birds of these groups and the carnivorous mink.

In view of this evidence the present policy of the British Columbia Game Department in limiting the introduction of mink to areas not utilized by nesting pelagic birds seems well founded.

Birds of the coast littoral waters of Lanz Island were essentially the same as those listed for Triangle. Terrestrial species however were more plentiful, due perhaps to the presence of coniferous timber with a substantial amount of deciduous edge. The annotated list presented here represents only our observations in the short period spent on the island. Undoubtedly more species occur at other seasons of the year.

Duck-hawk. *Falco peregrinus* Tunstall.

A pair of falcons was obviously nesting on the high, rocky bluffs at the south-east point of the island. A single bird observed on the north side of the island may have been one of these.

The birds here are probably Peales' falcon, *Falco peregrinus pealei* Ridgway, the western race of the species.

Bald Eagle. *Haliaeetus leucocephalus* (Linnæus).

Bald eagles were a common sight on Lanz Island. A pair of adults, observed daily on the south side, were obviously nesting on the island although the actual site was not located.

Spotted Sandpiper. *Actitis macularia* (Linnæus).

Two individuals were observed along the beaches of the south side, but no evidence of nesting was found.

Rufous Humming-bird. *Selasphorus rufus* (Gmelin).

Probably nesting on the island, this species was observed daily along the deciduous growth at the forest's edge.

Western Flycatcher. *Empidonax difficilis* Baird.

This is the common flycatcher on the coastal islands, and the species was well represented on Lanz Island.

Raven. *Corvus corax* Linnæus.

These birds were observed working the beaches at low tide and in flight over the timber. Probably nested on Lanz Island.

Northwestern Crow. *Corvus caurinus* Baird.

Crows were observed daily along the beaches and forest edge.

Chestnut-backed Chickadee. *Parus rufescens* Townsend.

These birds were heard and seen on several occasions along the forest edge and in the coniferous forest on the south side of the island.

Winter Wren. *Troglodytes troglodytes* Linnæus.

Seen and heard daily in the coniferous forest along the south shore of the island.

American Robin. *Turdus migratorius* Linnæus.

This species was uncommon on the island. Field notes indicate only that it was seen.

Varied Thrush. *Ixoreus naevius* (Gmelin).

Seen and heard daily in the coniferous forest, the varied thrush was well represented.

Hermit-thrush. *Hylocichla guttata* (Pallas).

The early morning and evening was characterized by the song of these birds, which appeared to be quite numerous on the island.

Russet-backed Thrush. *Hylocichla ustulata* (Nuttall).

This was the most common thrush on the island, seen and heard daily. It was observed in numbers working the beaches for small marine crustacea.

Golden-crowned Kinglet. *Regulus satrapa* Lichtenstein.

These birds were observed only once. A small flock was seen in the upper canopy of the coniferous forest in the central part of the island.

Orange-crowned Warbler. *Vermivora celata* (Say).

This was the only species of warbler observed on Lanz Island. The birds occurred commonly in the forest edge along the south side.

Red Crossbill. *Loxia curvirostra* Linnæus.

Small flocks of red crossbills observed passing over the coniferous forest were identified by their notes and flight characteristics.

Fox-sparrow. *Passerella iliaca* (Merrem.).

Fox-sparrows were the most numerous passerine birds observed on the island. They occupied the forest edge and were seen daily working in the beach debris in company with song-sparrows.

Song-sparrow. *Melospiza melodia* (Wilson).

Song-sparrows were second in number only to fox-sparrows. These birds occupied the forest edge at the sea, and were also numerous at the edge of the forest on the high grassy bluffs of the south-east corner. They were often observed searching in the beach debris.

AMPHIBIANS

Amphibians are represented on the Scott Islands by a single species, the north-western salamander, *Ambystoma gracile gracile* (Baird), found on Lanz Island. An adult measuring 160 millimetres ($6\frac{5}{16}$ inches) in length was discovered under a rotting log while clearing a site for camp, and an egg-mass was found in a near-by stream. The embryos were well formed but no gills were visible when examined on June 16th. Neither salamanders nor egg-masses were found on Cox Island during the short period we had ashore, and the species is apparently absent from Triangle Island.

INVERTEBRATES

The centipedes *Madabius eigenmanni* (Bollman), *Geophilus mordax* Meinert, and *Otoxryptops sexspinosus* Say and the newly described millipede, *Nearctodesmus carli* Chamberlin, were found to be present under debris above the beach-line.

Immature spiders of the genera *Cicurina* and *Amaurobins* were also present.

The isopod *Ligidium gracile* Dana and the snail *Vespericola columbianan* Lea were found in damp areas under debris.

The slug *Ariolimax columbianus* (Gould) was also common; occasionally specimens were taken in mouse-traps. Some individuals were very dark in colour.

The amphipod *Anisogammarus ramellus* (Weckel), also found on Triangle Island, was abundant in the small stream near camp.

Insects

The melanic phase of the bumble-bee *Bombus sitchensis* was abundant, flying about the blossoms of *Vicia gigantea*.

The Carabid *Scaphinotus marginatus* also abounded, particularly around the bait put out for mink. All are of the purple phase; no black specimens, such as exist on Triangle Island, were seen.

A few geometrid moths, too worn for identification as to species, were noted. The genera *Xanthorhæ* and *Hydriomena* seem to be indicated.

COX ISLAND

DESCRIPTION

Cox Island, the largest of the group, is separated from Lanz Island by a channel of about one-half mile in width and up to 20 fathoms in depth. Except for a short period at high or low tide, a considerable current runs through the channel. In turn, the two islands are separated from Vancouver Island to the east by Scott Channel, which is about 5 miles wide at its narrowest point and which reaches a maximum depth of 49 fathoms. Tidal currents here vary in velocity between 1 and 3 knots and run approximately north and south.

The island is roughly rectangular in shape and measures about 2½ miles in length by about 1 mile in width. As in the case of the other islands in the group, the beaches are narrow and rocky, the land rising sharply from the tide-mark, except in a few sections where shallow valleys run up from the shore. The entire area is densely wooded with thick underbrush, which makes overland travel impractical. The highest point, located near the south-west shore, is 1,025 feet in elevation.

Little time was spent on Cox Island because of various unfavourable circumstances. C. J. Guiguet and F. L. Beebe camped on the beach the night of June 16th for the purpose of trapping for small mammals. The traps were left out until June 20th, when the island was again visited, this time by all four members of the party but only for a few hours. On this occasion the traps were reset and were left overnight only.

PLANT-LIFE

For the most part the flora is identical with that of Lanz, though neither island was adequately examined, Cox least of all. However, the following species obtained in the short time spent there were not seen on any of the other Scott Islands.

Adiantum pedatum v. *aleuticum* Rupr. Maidenhair Fern.

Plentiful on rock faces where seepage from above keeps them moist. It ranges from Alaska east to Quebec and south to California.

Juncus lescurii Bol. Salt-rush.

On sandy beach. A sea-shore species, ranging from Vancouver Island to Chile.

Rumex crispus L. Curly-dock.

A common garden and field weed elsewhere.

MAMMALS

On Cox Island four species of mammals were recorded—white-footed mice, shrews, racoons, and mink. The last two species were introduced, the mink probably invading from Lanz Island where they were released.

White-footed mouse. *Peromyscus* sp.

A large population of this species occurred on Cox Island and large series were collected easily. These mice closely resembled those from Lanz Island (see Fig. 17). As on Lanz, the population was occupying the beach debris and forest edge at the sea.

Shrew. *Sorex* sp.

One long-tailed shrew was collected during the last night of trapping, otherwise no indication of their presence was observed. Where shrews are plentiful one inevitably finds evidence of their presence in the mutilation of other specimens caught in traps. As no such evidence was found, it is believed that the *Sorex* populations were low on Cox Island at the time of our visit.

Shrews are mysterious little animals, and sometimes for no apparent reason they are most difficult to catch. In previous trapping along the coast, little difficulty has been encountered in collecting adequate series of shrews whenever they occurred. In light of the single specimen taken on Cox, and from reports on the erratic behaviour of these creatures elsewhere, it is possible that populations may occur on the other Scott Islands, our trapping records to the contrary. This possibility is strengthened when one considers the dual occurrence of *Sorex* and *Peromyscus* on most of the other British Columbia coastal islets investigated.

Raccoon. *Procyon lotor* (Linnaeus).

The racoon, also introduced by the Fredricksen brothers, were probably of the race *P. l. vancouverensis* Nelson and Goldman, which occurs on Vancouver Island.

This species was well established upon that part of the island visited by the Museum party. Tracks in the sand were very numerous and droppings containing the remains of marine invertebrates were scattered profusely along the beach debris. A young male collected was fat and in excellent condition. During the night several animals were observed by flash-light.

The effect of these animals upon the bird colonies of Cox Island was undetermined, due to inclement weather conditions which limited our visits to the island. First Mate Chaster, of the "Howay," however, reports landing on a point at the south-west side of the island where his dog uncovered several nesting birds. From his description these birds were either Cassin auklets or ancient murrelets. Since Mr. Chaster's visit occurred after the introduction of racoon, one would gather it is possible that these animals do not influence nesting pelagic birds to the same extent as do mink. ✓

Mink. *Mustella vison* Schreber.

Mink are recorded as present on Cox Island on the basis of finding obscure tracks of two animals on a gravel beach. It is not unreasonable to suppose that the stretch of water between Lanz and Cox presents little in the way of a geographic barrier to this species.

BIRDS

Since the limited time spent upon this island was devoted primarily to the collection of small mammals, no detailed list of birds was compiled. In view of the similarity of major ecological features, however, it can reasonably be assumed that the passerine bird-life here differs but little from that on Lanz Island.

We secured no data regarding compatibility of nesting pelagic birds and the introduced racoon.

INVERTEBRATES

The following invertebrates are also present on Cox Island:—

Centipedes

Arcto geophilus metanonotus (Wood).

Millipedes

Nearctodesmus carli Chamberlin.

Isopods

Ligidium gracile Dana.

BERESFORD ISLAND

DESCRIPTION

Beresford Island, better known by local fishermen as East Haycock, is a small, rocky islet located about 2½ miles south-west of Lanz Island. It is roughly oval in shape and about 400 yards long. In contour it rises steeply to a rounded top about 320 feet above sea-level (see Fig. 12). The shore is rock, which emerges directly from deep water, making it possible to land only on a relatively calm day and only from a small boat skillfully handled. Closely associated with the main islet are a number of rocks, some up to a few acres in extent, which are favourite hauling-out places for Steller sea-lions.

Our visits to Beresford Island were brief, since it was inadvisable to camp on the island and it was necessary to do our work while the ship stood offshore. Thus, we spent about two hours ashore on June 20th, during which traps were set and general exploration was carried on. We returned the next day for another short visit, during which traps were picked up and plant specimens were collected. Two of our party made a final visit ashore on June 22nd just prior to our departure from the area.

PLANT-LIFE

Beresford Island is of special interest, in that of the three outermost islands in the Scott group it is the only one which supports trees. These are Sitka spruce, very old and much battered by the elements, growing on the rounded summit on the highest part of the island. From their general appearance these trees are for the most part long past their prime. It would seem to indicate that this island is on the way to becoming as treeless as Sartine and Triangle. A point in this connection would have been to ascertain the existence of young or seedling trees, but as time was limited it was not possible to carry out a detailed examination.

The flora in general is about the same type as on Triangle, though in different proportions. Here, elder and twin honeysuckle were noted as the dominant shrubs. A great deal of the terrain is composed of steep, rocky cliffs deeply indented with bays, with little hold for plant-life. *Beria maritima* was growing freely in the cracks and crevices which were splashed by the water at high tide. A little higher up, *Draba hyperborea* was equally locally abundant, and in a great variety of stature, according to the substratum; small, squat plants in the rock crevices and large, luxuriant plants nearly a foot high in good soil-pockets.

On the higher ridges, an abundance of the grass *Deschampsia cæspitosa* formed growths similar to that on Triangle.

In summary, the flora is similar to that of Triangle, but with the Coastal Forest association more typical, in that a few trees were present. Twenty-five species of plants were observed or collected.

MAMMALS

Beresford Island and the larger reefs in its immediate vicinity are utilized by sea-lions as a hauling-out grounds and rookery (see Fig. 14). Large numbers of these animals, including numerous pups, were observed. We are unable to present a numerical estimate as our trip coincided with the Federal fisheries expedition controlling these animals. Rifle and machine-gun fire dispersed the population, with some 2,000 animals reported killed. When the smoke had cleared away, there appeared to be many more live sea-lions in the area than dead ones, which seems to indicate that originally the population had been very large.

Little sign of mice was found on the grassy slopes of Beresford Island. A diligent search for some indication of their presence was carried out by field-party members, and

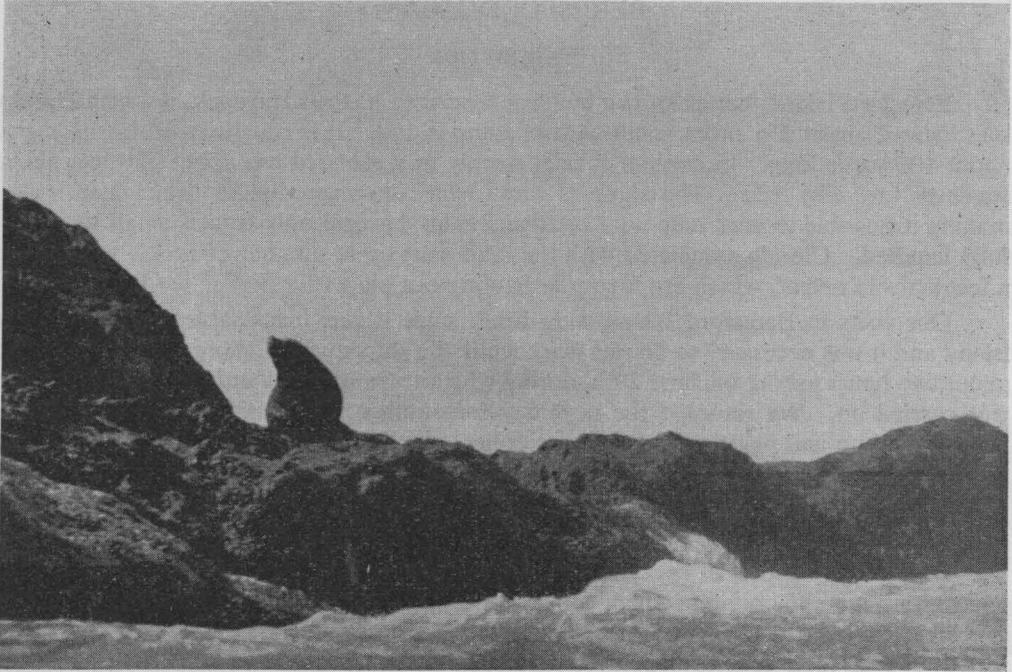


Fig. 14. Bull sea-lion on Beresford Island.

(Photo by G. C. Carl.)

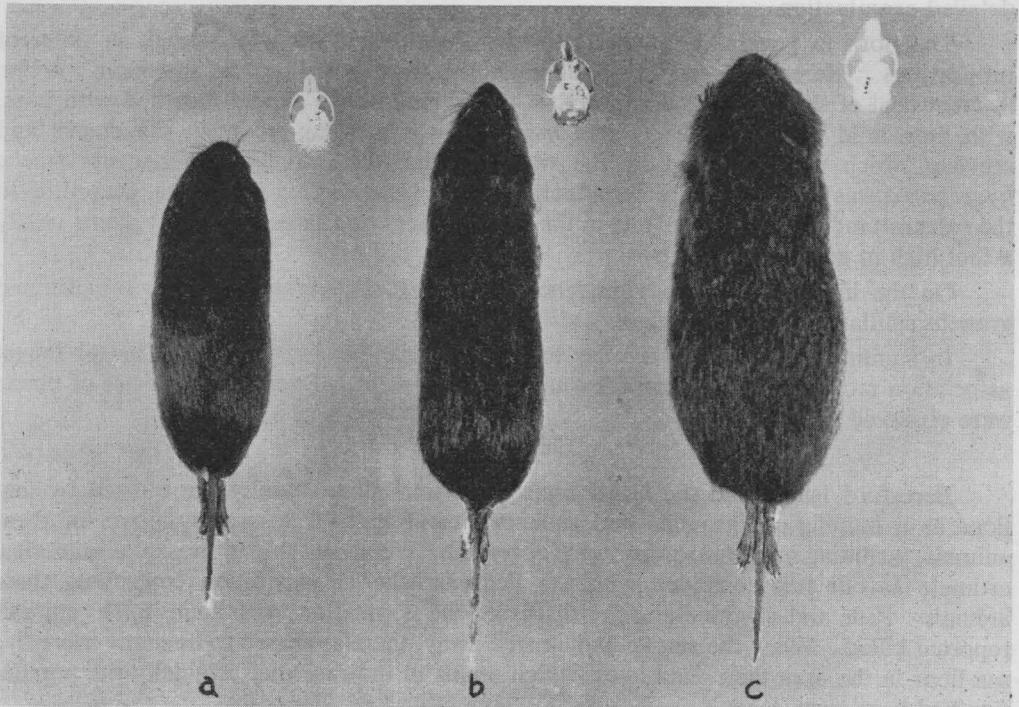


Fig. 15. Field-mice (*Microtus townsendii*): (a) From southern end of Vancouver Island, (b) from north end of Vancouver Island, (c) from Triangle Island.

(Photo by Division of Visual Education.)

large numbers of traps were set with little hope of catching any small mammals. In the morning, however, twelve adult *Peromyscus* were taken from traps set in the rocks close to the beach; those along the upper reaches caught nothing. The population of mice here appeared to be low.

These animals showed morphological affinities closer to the Cox and Lanz Islands mice than to those on Sartine and Triangle Islands (see Fig. 17).

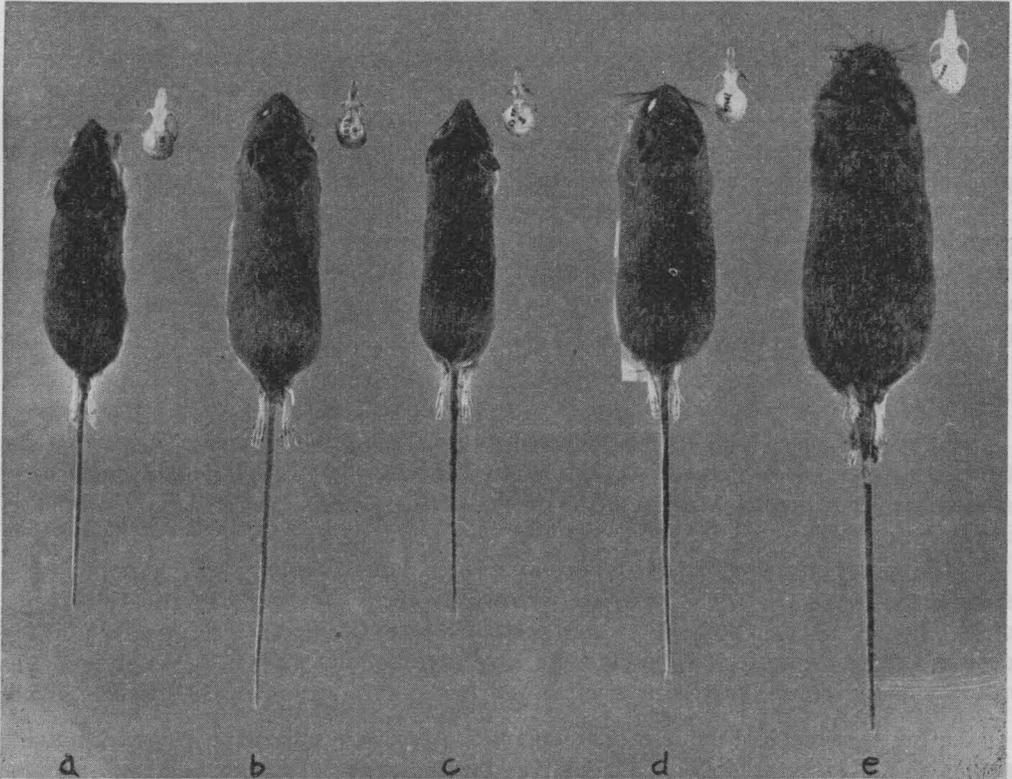


Fig. 16. White-footed mice (*Peromyscus*): (a) *P. maniculatus austerus* (Baird) from the Lower Mainland, (b) *P. m. macrorhinus* (Rhoads) from Northern Mainland, (c) *P. m. angustus* Hall from coastal Vancouver Island, (d) *P. m. interdictus* Anderson from interior Vancouver Island, (e) *Peromyscus* sp. from Triangle Island.

(Photo by Division of Visual Education.)

BIRDS

Glaucous-winged gulls were nesting in numbers on this island. Several specimens of auklets and puffins were collected by excavating burrows. The puffins, cormorants, and gulls were incubating eggs, while burrows of the auklets contained large fledglings in near juvenal plumage.

Time did not permit an exhaustive search here, consequently only a short list of birds was obtained. This list included Peale's falcon (nesting), bald eagle (nesting), fox-sparrow, song-sparrow, and a bird which was believed to be a Savannah sparrow. The bird-list for the coast littoral waters of Beresford Island was essentially similar to that recorded for Triangle Island.

INVERTEBRATES

The following invertebrates were also collected on Beresford Island:—

*Millipedes**Litiulus alaskanus* (Cook).*Isopods**Ligidium gracile* Dana.

SARTINE ISLAND

DESCRIPTION

Sartine Island, known locally as West Haycock, is located about half-way between Lanz and Triangle Islands. Its nearest neighbour is Beresford, about 4½ miles to the east. In size Sartine Island is about a half-mile long and 200 yards wide. In profile from an eastern approach the island presents an irregular outline consisting of a series of pinnacles and humps of which the highest reaches an elevation of 350 feet above the sea. The shore-line is rock, rising directly from the water, except along the north-eastern portion where there exists a narrow beach of basaltic rocks and boulders, some of large size. Here, also, landing is possible only from a small boat during favourable weather and tide conditions. Two short visits were made, one on June 21st and one on the following day to pick up traps and specimens.

PLANT-LIFE

Although Sartine Island is little more than a steep, knife-like ridge of rock, in places there is present a deep rich soil, favourable to plant-growth. Like Triangle Island there are no trees, but possibly, owing to the much smaller size, the forest climax association is not so well marked.

The most noticeable herbaceous covering is the dune-grass, *Elymus mollis*; the steep sides of the ridges are almost completely covered with it. No doubt it is the luxuriance of its binding roots and stolons that has prevented extensive denudation of soil, which is deep in spite of the angle of 70 to 80 degrees. On the summit where the ground broadens out in places, salmon-berry is present but not to the same extent as on Triangle Island.

A few specimens of the fern *Polypodium Scouleri* were unexpectedly found growing among the *Elymus*, while a small plant of the hedge-nettle, *Stachys ciliata*, was also obtained here. The rock-cress *Arabis hirsuta* was plentiful. Perhaps the most interesting species is the western buttercup, *Ranunculus occidentalis* ssp. *insularis*, which was growing freely on the sod-covered terraces on the steep slopes about the summit of the main ridge. This was not seen on any of the other islands. The paint-brush *Castilleja unalaskensis* appeared to be replaced by *C. dixonii*, as no cream-coloured specimens were noted. Altogether, twenty-three species of vascular plants were collected or observed on Sartine Island, chiefly of the coastal and open-forest association.

MAMMALS

A few sea-lions, seals, and the ubiquitous white-footed mouse were the only mammals found on this islet. Along the beaches mice appeared to be less numerous here than on the three islets previously discussed, as revealed by trapping-returns. Since factors such as weather conditions exert a tremendous influence upon the activities of small mammals, this observation is viewed with caution. In one night of trapping an adequate series of adult animals was taken.

The mice here resemble those from Triangle Island more closely than they do those from Lanz and Cox, especially in foot measurement. The "Huestis star," however, was not apparent in the sample taken (see Fig. 17).

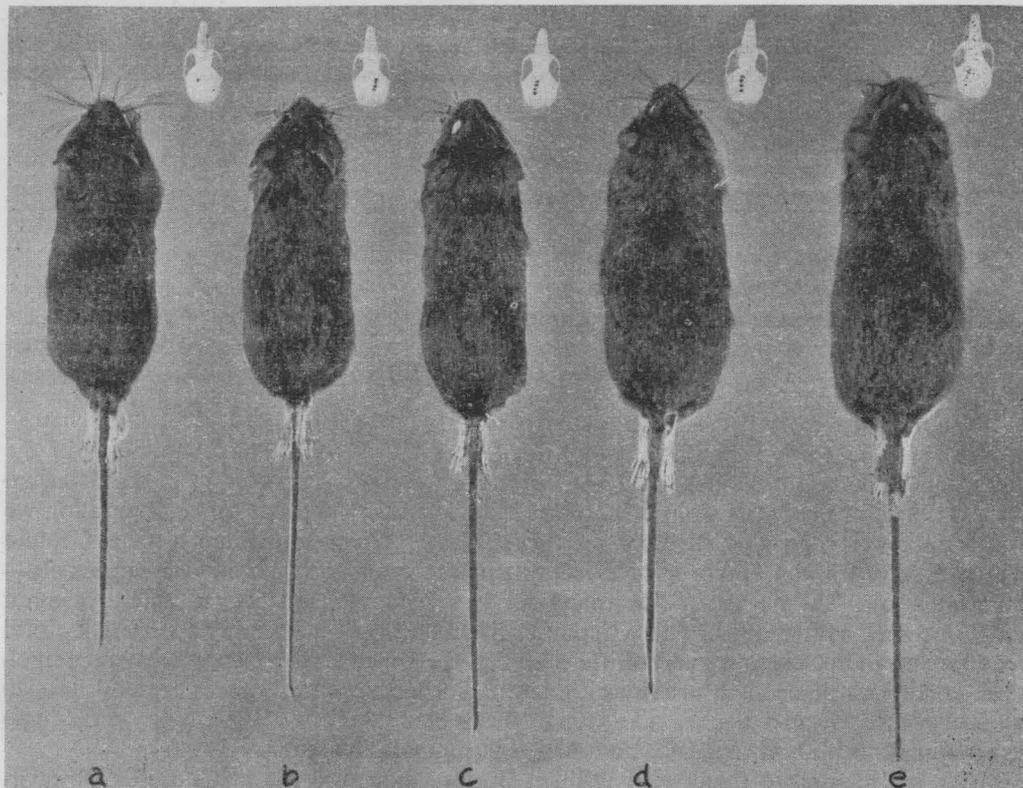


Fig. 17. White-footed mice (*Peromyscus*): (a) Cox Island, (b) Lanz Island, (c) Beresford Island, (d) Sartine Island, (e) Triangle Island.

(Photo by Division of Visual Education.)

BIRDS

Cassin auklets, tufted puffins, and glaucous-winged gulls were nesting in numbers here, as on the other islands. In addition, the black oyster-catcher was nesting along the gravels of the high beach. Nesting pelagic cormorants were not observed, but a large part of the island was not visited. Judging from the numbers of these birds seen in the area, it is almost certain that they nest there.

Peale's falcons, with flying young, were observed near the high cliffs on the southwest side of the island.

Fox-sparrows and song-sparrows were most plentiful on this island and represented the only passerine birds observed.

Coast littoral species here were similar to those listed for the other Scott Islands.

INVERTEBRATES

The following invertebrates were also found on Sartine Island:—

Isopods

Ligidium gracile Dana.

Porcello scaber Latreille ss. *niger* Say.

Ligia pallasii (Brandt).

Pentidotea wosnesenskii (Brandt).

Isopods, possible of this species, were extremely numerous on the beach boulders. Specimens collected for positive identification had escaped from a temporary container before we returned to the ship.

Millipedes

Nearctodesmus carli Chamberlin.

Land Snails

Vespericola columbiana Lea.

Haplotrema vancouverensis (Lea).

ACKNOWLEDGMENTS

We are pleased to list here the many persons who have assisted us in some way in carrying out this study. First we would name A. J. Whitmore, Chief Supervisor of the Dominion Department of Fisheries, who arranged for the transportation of the Museum party on both of our visits to and from the Scott Islands. Without this co-operation we would not have been able to carry on this project. We are indebted also to Captain Walter Redford and Captain Mitchell Gay and the crews of their respective vessels—"Howay" and "Atlin Post"—for many services rendered and for extremely pleasant hours of travel. First Officer (now Captain) Raymond W. Chaster was especially helpful in getting us and our gear on and off the ship and the beaches of the various islands, often when conditions made such activities difficult if not hazardous. We are grateful, too, to our co-worker, Frank Beebe, zoo-keeper from Stanley Park, Vancouver, B.C., who accompanied us on both our trips and helped in innumerable ways.

We are pleased to thank also William Burton, meteorologist at Gonzales Observatory, for meteorological data; T. E. Morrison, Agent, Dominion Department of Transport, for photographs and information pertaining to the history of the Triangle Island Light-station; the Royal Canadian Air Force, Photographic Establishment, for copies of air photographs of Triangle Island; Geoffry A. Playfair, British Columbia Forest Service, for the loan of a short-wave radio; the late Walter S. Maguire, oologist, New Westminster, B.C., who prepared the birds' eggs collected; H. H. Booth, of Nanoose Bay, and J. Laffin, of Port Hardy, for information concerning the Scott Islands.

We are also indebted to the following specialists who have kindly identified material: A. E. Porsild, Chief Botanist at the National Museum, Ottawa (plants in general), who checked and verified the whole collection; Dr. F. W. Pennell, Curator of Plants, Academy of Natural Sciences, Philadelphia, Pa. (*Castilleja*); W. Newcombe, for information concerning certain Triangle Island plants, not seen by us; Dr. Ian McT. Cowan, University of British Columbia, Vancouver, B.C. (mammals); William Downes, Victoria (Hemiptera); Dr. D. H. M. Hatch, University of Washington, Seattle, Wash. (Coleoptera and isopods); M. C. Lane, Walla Walla, Wash. (Elateridæ); Dr. D. Freeman, Ottawa (Lepidoptera); K. V. Krombein, United States National Museum, Washington, D.C. (Hymenoptera); T. B. Kurata, Royal Ontario Museum of Zoology, Toronto, Ont. (spiders); Dr. R. V. Chamberlin, University of Utah (millipedes and centipedes); Walter J. Eyerdam, Seattle, Wash. (molluscs); Mrs. J. F. L. Carl, Victoria, B.C. (decapod crustacea); Prof. Albert H. Banner, University of Hawaii (Euphausiids); C. R. Shoemaker, formerly of the United States National Museum, Washington, D.C. (Amphipods); and, finally, to the many members of the British Columbia fishing fleet for the contribution of first-hand information regarding these islands.

BIBLIOGRAPHY

- Anderson, R. M. 1946. "Catalogue of Canadian Recent Mammals." Bulletin No. 102, National Museum of Canada.
- Barto, Elizabeth and Huestis, R. R. 1933. "Inheritance of a White Star in the Deer Mouse." *Journal of Heredity*, Vol 24, No. 6, pp. 245-248.
- Carl, G. Clifford. 1949. "Triangle Island Night Life." *Vancouver Daily Province*, October 15.
- 1950. "Migrating Mice Mystify Museum." *Vancouver Daily Province*, October 21.
- 1950. "Mice and Men." *Victoria Naturalist*, Vol. 7, No. 6, pp. 62-65.
- Guignet, C. J. 1950. "Notes on Common Murres Nesting in British Columbia." *Murrelet*, Vol. 31, No. 1, pp. 12-13.
- 1950. "An Ecological Study of Goose Island, B.C." Pages 72-75 of unpublished thesis, University of British Columbia Library, Vancouver, B.C.
- Henry, J. K. 1915. "Flora of Southern British Columbia and Vancouver Island."
- McCabe, T. T. and Cowan, Ian McT. 1945. "Peromyscus Maniculatus Macrorhinus and the Problem of Insularity." *Trans. Royal Can. Inst.*, Vol. 25, Pt. 2, No. 54, pp. 117-212.
- Munro, J. A. and Cowan, I. McT. 1947. "Review of the Bird Fauna of British Columbia." *Provincial Museum. Spec. Pub. No. 2.*
- Provincial Museum. 1921. "A Preliminary Catalogue of the Flora of Vancouver Island and Queen Charlotte Islands." *Provincial Museum, Victoria, B.C.*, pp. 1-86.

NEWSPAPER ARTICLES

- "Site Selected for Lighthouse." *Victoria Colonist*, June 23rd, p. 14, 1909.
- "Famous Light at Triangle Island to Be Discontinued." *Victoria Times*, p. 14, June 11th, 1919.
- "Skeleton Rules Desolate Island." *Victoria Colonist*, p. 3 (magazine section), March 3rd, 1935.

VICTORIA, B.C.Printed by DON McDIARMID, Printer to the King's Most Excellent Majesty
1951