Museum Notes

Vol. III., No. 1. March, 1928.

Issued by the

Art, Historical and Scientific Association of Vancouver, B.C.

in the Interests of the City Museum.

GAUTAMA THE BUDDHA

BORN 557 B. C. DIED 480 B. C.

FOLLOWERS OF BUDDHISM NUMBER 450,000,000

From Dr. W. A. Briggs' Collection

Sent post free to all members of the Association. Membership Fee, $1.00 per annum, payable in advance. Members also receive the Curator's Monthly Report. Applications for membership should be made to the Curator at the Museum. Single copies, price 25 cents.

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Museum Notes

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The Graphic Art of the Haidas

By Mrs. W. Garland Foster

THE graphic art of the West Coast Indian tribes, now so popular, has much in common with modern symbolistic art. For the native artist did not draw directly from nature, either, being rather inclined to present the idea, for this purpose choosing the conventional design for his subject. This is true, whether he painted, carved or wove the patterns in his work.

The development of carving among the Haidas is apparently connected with the art of their neighbors, the Tlingits and Tsimshians. Indeed these people are generally grouped together in their arts and customs. They show greater adaptability to civilization than others, were best in war and the arts. Their folk tales are similar. Their burial customs identical. The dead were placed in mortuary houses, or in boxes on carved poles, or sometimes in caves, while Shamen, or medicine men, after death, were placed in small houses built in prominent points along the shore. These mortuary houses were decorated with carvings, and often posts were carved with the totem of the deceased.

Formerly, the Haidas built their houses twenty-five or thirty feet above the ground, access being had to them by notched logs for ladders, on which were carved stories as well as crests. In later times the houses were built upon the ground. It is in this connection that the totem poles probably developed. According to the accounts which the Haidas gave Dr. G. M. Dawson, the "carved designs were, originally, made directly on the front slabs of the house, afterwards on a broad, thick plank, upon which they carved representations of stories as well as crests." Tsimshian posts were slenderer than Haida, and the Kwakiutl more slender still, but all were heraldric, referring to the traditions of the house owners. Beside the mortuary columns, the Haidas had outside and inside house poles, entrance to the house being usually through the outside pole. About the time of the advent of white traders the art of totem pole decoration had attained its greatest height. These people had an expression to indicate excellent work of this nature, and when they wished to give high praise said: "The carvings on the house posts winked their eyes."

For a long time, now, the carving of house totem poles has been discontinued among the Haidas, and many of their old poles have been cut down. The practise was largely discouraged by missionaries, by whom the poles were considered symbols of idolatry; but possibly, also, because it was rumoured that the setting up of a totem pole required the burial of a slave beneath it for the glorification of the headmen.

The carving, however, of miniature totem poles has continued the art, which now has attained the position of an industry among these people. And not only poles, but other sorts of ornamental vessels and articles, such as paint bowls, mortars, pipes, rattles, charms, are also produced. The material of which these carvings are made has been incorrectly called Jadeite, probably from some fancied resemblance to that substance; but is really argillite, a soft slate which lends itself to the carving, being when first procured from the marshy bed at the mouth of Slate Chuck creek, near

Skidegate, easily cut and decorated; but, when exposed to the air and rubbed with oil, becomes hard and brittle, taking a high polish.. .

This substance has been used for years for this purpose, for Caroline Leighton, in her account of "Life at Puget Sound, 1865-1881," refers to the natives whom she had seen, stating that "Some of the women had a little piece of bone or pearly shell stuck through the lower lip, which gave them a very barbarous appearance; but in many ways the men had more knowledge of arts and manufactures than any other Indians we have seen." She goes on to describe the little carvings of fine black coal slate. "When first quarried, it is so soft as to be easily cut, and, when aftewards rubbed with oil and exposed to the air, becomes intensely hard."

W. H. Collinson, "In the Wake of the War Canoe," describes the black stone which the Haidas of Skidegate use in the development of carvings. "Miniature totem poles, for mantlepiece ornament, of various sizes, large and small dishes, sometimes inlaid with abilone and ornamented with rows of the teeth of marine animals and fishes, and many other designs, are carved and then smoothed by rubbing them with the dried skin of the

SKIDEGATE SLATE CARVING
(FRONT VIEW)
BY CHIEF CHAS. EDENSHAW

shark, which is superior to sandpaper . . . . The possession of this stone is quite a treasure to them, as it tends to preserve and improve the art of carving and design among them, beside bringing in a revenue."

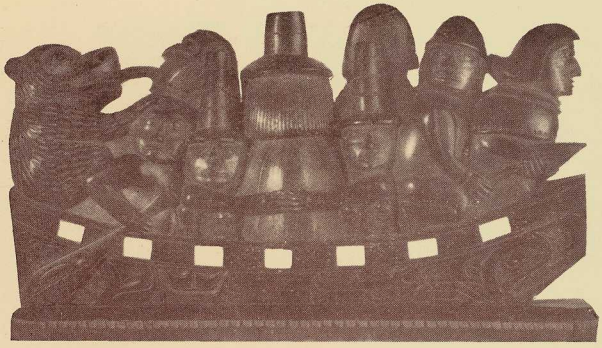
The coal deposits of Skidegate were examined in 1872 by James Richardson, who reported the formation to be (a) upper shales and sandstones, (b) coarse conglomerates, (c) lower shales with coal and iron, to which Dr. G. M. Dawson added, in 1878, (d) agglomerates upon (e) lower sandstones.

The Vancouver Museum is fortunate in possessing a number of these miniature totem poles, in which the carving and finish show a high development of the graphic art of these people.

Recently, there have been added some very fine pieces which have the distinction of being "marked pieces." One, at least, having been identified as the work of a famous carver, Chief Charles Edenshaw (It-in-sa). This chief, who died in 1884, over ninety years of age, was able when Dawson visited the Islands to recall having heard his

family tell of the visit of Captain Douglas, the colleague of Meares, to Massett. The Chief of that time, Blackow-Connehaw, exchanged names with Douglas as was their custom. Edenshaw, also, recalled having heard of the visit of another white man, probably Captain Dixon, although fur-traders from Mexico had followed in the wake of Captain Cooke's expedition as early as 1774.

Chief Edenshaw seems to have been a man of considerable influence among the tribes. He was involved in the complications which occurred at the time of the wreck of the Susan Sturgis, and maintained that he had stood by the white men. In any case, everything points to his having been a mighty man of his tribe. He and a favorite (Tlingit) slave were rivals in the art of carving, some claiming that it is hard to distinguish the work of one from the other. In any case, Edenshaw's ability as a carver is undisputed, his work excelling in execution and finish; and while not much of his work has been identified, enough has been located to prove him a craftsman of no mean order; indeed, there are some who have called him the Michael Angelo of the Haidas. The American Museum of Natural History, in New York, has



SKIDEGATE SLATE CARVING
(BACK VIEW)

a mask, the subject of which is Gagixit, "a man who has been made to lose his senses in the land of otters," procured in 1905 from Mr. Henry Edenshaw, a son of the carver, which is known to be his work. One other historic piece, a replica of the piece which Edenshaw carved for the Princess Louise, which was broken in packing, is in a private collection.

The museum piece, of which is here shown a front and back view, has been identified as a genuine Edenshaw piece. A canoe, of which the Haidas were master makers, is indicated with decorations common in their painting and carving, in this case the sea-bear, probably the crest of the woman. The conventionalized "eye oval" is always a feature of these designs and vaguely recalls the eye of Horus. Of the story which the figures illustrate there is some doubt, although the spear in the hand of one would indicate a war expedition; while the woman in the middle with the talteen on her head must be the daughter of a chief. The small figures behind her with clasped hands, wearing also the talteen, may be her royal descendants. The figures in the bow of the canoe may represent a different part of the story from those in the stern. Both the Haidas and the Tlingits have a story of a chief's daughter who was carried

off by a bear. The Haida story is told in Dean's "Tales from Hidery" (Archives International Folklore, 1899). Many Indian stories relate the union of women and bears, frogs, whales, meaning of course that they married into the phratery of that title.

The pipe which is shown in this cut is not definitely marked an Edenshaw piece, but is of very fine workmanship. The raven in the design is holding a sphere, which relates to his bringing light to the west coast tribes. The carving no doubt indicates that a woman of the raven clan is overtaken by a sea bear (a sea bear being a cross between the grizzly bear and the killer whale—the narwhale as indicated by the fin).

The art of these people has a very definite appeal, even to those who know nothing about the mythological meaning which has taken this form of expression. The action in their work is striking. In his report to the U. S. National Museum in 1888, Ensign Niblack listed as the best specimen of Haida carving "The Bear Mother," done by Skaows (Ke'ay-an), an Indian of Skidegate. This work represents a woman attempting to suckle her bear offspring, and the agony which she endures is depicted in the slate carving as realistically as the sufferings in the Laocoon group.

RAVEN PIPE, SKIDEGATE SLATE

The Vancouver Public Library, 1869-1927

BY E. S. ROBINSON, ESQ., B.A.
CITY LIBRARIAN

"PRESENTED TO THE LIBRARY
OF THE
BRITISH COLUMBIA MILL COMPANY
AT BURRARD INLET
BY
THOMAS SAUEVILLE, M. A.
JANUARY 7TH, 1869"

SO runs an inscription in the first volume of "A Memoir of the Rev. Sydney Smith" by his daughter, which forms a part of the present book collection of the Vancouver Public Library. The second volume has long since strayed to parts unknown, where it is to be hoped the present owner is enjoying the jests of the reverend gentleman. To lose one volume of a set, however, is like losing one glove, neither loser nor finder benefits, but in this instance the library is fortunate in having the first volume containing an inscription so interesting and valuable. It reminds us that we are growing up and that we can no longer hide behind excuses of youth and immaturity. The process has been rapid the last twenty years; so rapid that the "bread and butter things" have obtruded to the almost total exclusion of some others, equally necessary to the welfare and progress of the community.

It was by no mere accident that Thomas Saueville, M.A., donated these books to the Hastings Mill Library. For years a library had been operated as a necessary adjunct to the life of the busy little Mill town. No movies, radios or automobiles were present to while away long hours of leisure. Newspapers arrived at infrequent and irregular periods. The saloons formed the main centre of attraction, broken only by chance visits of itinerant missionaries of various faiths. So the wisdom of providing such a staple as books in the lives of these immigrants, many of whom came from homes of culture in the old land, was so obvious to the owners of the mill that considerable expenditure must have been made in literary material of various sorts. Hundreds of volumes were rented at a fixed annual rate to the employees of the mill. As the town grew, however, it soon became evident that the "mill library" could not be expected to supply the demand for all, so a new arrangement was made whereby the library should become the nucleus of a municipal library, all members in good standing becoming life members in the new institution. This change was partly occasioned by the great fire, and in December, 1887, there took place the opening of the new institution, known as the "Vancouver Reading Room."

Among those who ushered the library into existence are to be found such well-known names as Rev. H. G. F. Clinton, Father Fay, George Pollay, J. C. Keith, M. H. Hirschberg, J. Callister, H. P. McCraney, H. Abbott, R. H. Alexander and F. C. Cotton. But the credit for its survival and initial success may be traced largely to the interest and effort of the late Father Clinton, who was the devoted rector of St. James Church for so many years.

But success was not attained before failure had been tasted. As a library association to which membership fees must be paid before it could be used, the young institution did not seem to thrive. The pittance for its use was not nearly sufficient to maintain an interesting and up-to-date book collection. About this time, too, the newspaper began to thrive, and before long inexpensive periodical literature was sufficiently abundant to force the library under the benevolent wing of the municipality, where it had every right to be as an institution which formed an integral part of the educational system.

George Pollay, as first librarian, 1887-1890, gave his services without thought of remuneration, but books had to be purchased. So in April, 1889, the library board made the first of its requests to the City Council, which have long since become recognized as a legitimate demand on the city coffers. Only $500.00 was asked, but even in those days the Council was short of money, and, although Mayor Oppenheimer gave his moral support to the request, only $250.00 was forthcoming. As books go to-day, this would supply the Encyclopaedia Britannica and Parts "A" to "T" of the Oxford Dictionary, but in those days, doubtless, a considerable collection was purchased for that sum. By

VANCOUVER PUBLIC LIBRARY
CENTRAL BUILDING

1892 we find the sum of $1,000.00 was appropriated for books alone, a portion of the balance of another thousand going to pay the salary of the new librarian who had been appointed successor to Mr. Pollay. This was Mr. Edwin Machin, who, with Mrs. Machin and daughter, now Mrs. Herbert Beeman, brought the library from a struggling, ineffective agency to the status of a powerful force in the community during the twenty long years of service which they gave so unstintingly. Their memory is revered by all who knew them, and portraits of Mr. and Mrs. Machin and Mr. Pollay, together with the late librarian, Mr. R. W. Douglas, now hang on the walls of the Reference Room in the Central library.

Although for many years the salary, so called, amounted to only $65.00 per month, the institution was operated from early morning till late at night by the efforts of Mr. Machin, with relief shifts taken by his wife and daughter. Combining scholarship with an acute insight into human nature, Mr. Machin possessed those qualifications which are so essential to the welfare of a large social service organization like a library. Master of several foreign tongues and endowed with a love of the good things in literature, he

was able to build up the nucleus of a book collection which will never need replacing or superseding. Many long and serious discussions took place around the board table to ensure the best purchases with the small sum at their disposal, and hard bargains were driven with booksellers to obtain the best discounts.

During these early years, and until June, 1893, the library had been housed in quarters at 136 Cordova St., West, one of the first buildings to be erected after the fire. New quarters were found in the building originally intended for a Y.M.C.A., and now known as the Astor Hotel, where the library remained until October, 1903. For some years Andrew Carnegie had been giving large sums of money toward the erection of library buildings on this continent and in the Old Country. In 1901, Vancouver requested and was granted the sum of $50,000.00 to build a library. The next step was to choose a site. Besides the present location, that of the southwest corner of Pender and Hamilton streets was offered to the choice of the public at an election. The usual East End, West End interests, as well as individual interests, were brought into full play, while the interests of the institution and the city at large were overlooked,

KITSILANO BRANCH
OPENED FEBRUARY, 1927

with the usual result in such instances, and the least desirable site chosen. 746 votes were cast for the present location against 407 for the other. Plans were prepared by the late G. W. Grant, and, after innumerable delays through various causes, the building was opened in October, 1903, by Canon L. Norman Tucker.

In 1910 Mr. Machin's resignation was caused by ill-health resulting from an accident, and he was succeeded in office for a few months by Mr. A. E. Goodman, who was, in turn, succeeded early in 1911 by Mr. R. W. Douglas, who held office until June, 1924. Under Mr. Douglas' régime the library took on a new lease of life. Large book purchases were made in the years immediately prior to the war, especially in important reference works, which to-day form a valuable nucleus for a large metropolitan library. The first extensive programme of expansion was also carried out at this time, consisting of the establishment of eight book distribution depots in drug stores in various parts of the city. Lack of funds for a new supply of books and for rentals, however, brought about the failure of these agencies, and they were closed and the bookstock returned to the main library in 1915.

In the face of poor location and lack of funds, the library has continued to fill an increasingly important role in the community. This has been made possible by large municipal grants, which have doubled in the last four years, until the city is now spending fifty per cent. more each year in maintenance than was originally given by Andrew Carnegie for the building. To-day the library is forging ahead, not only in the growth of its book collection, but in the use made of it. Approximately 32,000 borrowers are registered, and last year took into their homes to read nearly 600,000 volumes. Of the constant use of reference and reading rooms no record is kept. It is sufficient to say that few empty chairs are available during the twelve hours the library is open each week-day.

The outstanding development of recent years was the establishment of a branch library in Kitsilano in February, 1927. To that date, no capital outlay had been made by Vancouver in library buildings, and it was with great expectation that the new policy was tried out. The first year's trial amply justified the effort, for nearly 6,000 borrowers availed themselves of the services rendered and borrowed 127,000 volumes. This branch now has some 8,000 volumes on its shelves, and has become an important agency in the social life of the Kitsilano district. It is constantly used by young and old for both serious study and recreational reading.

Amalgamation has created a particularly difficult problem, because neither of the adjoining municipalities of Point Grey and South Vancouver has public library service at present. The Board of Trustees is at present considering a proposal to submit a by-law to establish branch libraries in various parts of the city, while the Civic Centre idea includes a new Central Library building which, it is hoped, will be worthy of the greater city for many years to come. It is also to be hoped that, if the choice of site is settled by popular vote, the antagonism of East vs. West will be forgotten and a site chosen regardless of sectional interests. To an institution which depends for its use to such an extent on convenience of location, it is readily seen how serious is the question of proper location in relation to the business interests of the city which are primarily served by the Central Library.

The Art, Historical and Scientific Association Annual Meeting

CITY MUSEUM — 24th JANUARY, 1928

President's Address

Ladies and Gentlemen:

In bringing to conclusion my duties as your President for the past year, I have again to thank you for your earnest and sympathic co-operation, which has enabled us to advance with increasing strides towards our goal, namely, a fully equipped Museum and Art Gallery.

CITY COUNCIL

We have to thank the City Council for their active assistance and sympathy during the past year; I may mention in this relation the deep personal interest shown by Ald. John Bennett in our progress.

RECEPTIONS

We have to thank Mrs. J. W. Weart, Vice-President, and Mrs. F. T. Schooley, 2nd Vice-President, for their hospitality extended to the Association at their respective homes, at which receptions very interesting and instructive lectures were given by Prof. Chas. Hill-Tout and Mr. J. W. Eastham, on the "Indian mind and outlook towards life" and "Our Dogwood," respectively.

We also have to thank the Burrard Field Naturalist Club, affiliated with this Association, for several valuable collections of Natural History subjects. Meetings of this Club have been held at the Museum and valuable addresses given by the members.

We welcome to our Association Col. W. S. Buell, the official representative of the Vancouver Military Institute. The Institution has deposited with us for safe keeping valuable records and relics relating to the Vancouver contingent of the Canadian Expeditionary Force to the Great War, which will prove of increasing value as the years go on.

Mrs. F. T. Schooley, Mrs. W. H. Lyne and the Hon. Watson-Armstrong, prominent members, were all absent during the present year on extended tours, and each and all visited many of the Museums and Art Galleries as our representatives, adding much to the growing friendly connections that we are making with the cultural world at large.

The Hon. Watson-Armstrong has presented to us a handsome photograph of the late King of Siam, sent to us by the present King, through him, as a memento of his late Majesty, who was an honorary member of our Association. Mr. Armstrong gave an interesting account to the Board of the life of the Siamese Royal Family, and domestic life in Siam.

We have to thank Mr. Menzies, the worthy Curator and Secretary, for the very interesting numbers of the "Museum Notes," which are receiving increased recognition from the Scientific World, and which add increased interest to our proceedings. I also have to thank him for his hearty co-operation and indefatigable zeal in the interests of the Association.

I regret to state that Mr. E. G. Johnstone, our Assistant Curator and Janitor, who has served the Association for many years, has had to retire through illness and physical debility, we hope to make provision for his declining years.

In conclusion, I wish to express my personal sympathy, in which I am sure I have the concurrance of all our members, at the irreparable bereavement sustained by our respected Honorary President, His Honor Judge F. W. Howay, F.R.S.C., in the loss of his only child.

HENRY PYBUS,
President.

Curator's Annual Report

To the President, Directors and Members:

Ladies and Gentlemen,—

This being the 34th anniversary of this Association, the oldest and first Society of a cultural nature formed in this city, I now wish to review some of the activities and progress made during 1927.

MEETINGS

There have been twelve Directors' meetings held since the last annual meeting, at each of which a large majority of the directorate attended.

Commander Henry Pybus, R.N.R., President	11	Meetings
Mrs. J. W. Weart, 1st Vice-President	12	"
Mrs. F. T. Schooley, 2nd Vice-President	7	"
Mrs. A. J. Pilkington, Honorary Treasurer	11	"
Mrs. W. H. Lyne	8	"
Mrs. Stephen Golder	12	"
Mr. James Leyland	8	"
Dr. G. E. Kidd	9	"
Mr. R. P. S. Twizell	3	"
Mr. J. W. Eastham	7	"
Major J. S. Matthews	10	"
Mr. W. R. Dunlop, F.R.G.S.	5	"
Col. W. S. Buell (Military Institute)	3	"
Ald. John Bennett	8	"
Ald. J. A. Garbutt	2	"

MUSEUM NOTES

I am glad to report that the quarterly publication, "Museum Notes," has met with a flattering reception, judging by the letters received from different parts of the world, and I hope that the pioneers of this publication, Mr. Denys Nelson and the Rev. John C. Goodfellow, are gratified at the result. The excellent manner in which this publication is turned out is due to Messrs. Evans & Hastings, the publishers.

VANCOUVER MILITARY INSTITUTE

Through the active interest of Major J. S. Matthews, it has been decided by the executive of the Military Institute that the City Museum shall be appointed the official custodian of all Military Documents, Records and War Relics. A large amount of material has already been assembled, which is being tabulated and stored in special cedar boxes until space is available to suitably exhibit same.

OUTSTANDING DONATIONS

Amongst the many additions to the city collection is the large glass case containing a group of three "Ursus Kermodei," called Little White Bear, peculiar to British Columbia, which was secured through the assistance of Mr. Francis Kermode as a loan from the Provincial Government, by courtesy of Col. McMullin, Provincial Game Department, Victoria, British Columbia.

NUMISMATIC SECTION

The entire collection of coins was taken in hand by Mr. Harvey Keats. who identified and classified same. Mr. Keats is also giving valuable service in identifying the numerous coins that are brought in daily by the public. His article on coins in the December number of "Museum Notes" attracted attention in New York.

PHILATELIC SECTION

The large number of stamp collectors have derived great pleasure in the constantly changed case of Foreign Postage Stamps, lent through the courtesy of Mr. Stephen Golder from his private collection.

FORT LANGLEY, 1827-1927

The Historical side of the Association is much indebted to Mr. Denys Nelson for his excellent publication, "A Century of Settlement," copies of which were distributed to all members, museums and libraries, in August, and many complimentary letters have been received.

BURRARD FIELD NATURALIST CLUB

This active and virile Club held Field parties each month during the summer, and have given many interesting lectures during their winter meetings, besides having added a large quantity of Marine, Botanic and Entomological specimens to the city collection, and valuable original articles for the Museum publication.

HISTORY OF VANCOUVER

It has been suggested that part of the Historical work for this Association to take in hand this year should be the collection, whilst available, of authentic material and data dealing with the history of this city. Vast sources of information are available in the Provincial Archives at Victoria, and the Public Library of this city, also private libraries. This data is to be rigidly checked and examined, and, when ready, published, and that a committee be appointed by the 1928 Board of Directors to take this matter in hand.

PACIFIC BIOLOGICAL STATION

Through the kindly interest of Mr. H. G. Wailes, a friendly link has been made with this Marine Station, and through the courtesy of Dr. Wilber A. Clemens, their Director, this city will be enabled to gradually acquire a complete collection of the fish in B. C. waters, in life-like models, the work of Mr. Good, and beautifully painted in accurate natural colors by Mrs. Good, of Nanaimo, B. C.

FORT LANGLEY

July, 31, 1927, being the 100th anniversary of Fort Langley, this Association, co-jointly with the Native Sons of B. C., held a "basket picnic" at the original Fort site at "Derby," on the banks of the Fraser River, which was attended by a representative gathering, and a most interesting afternoon was spent.

SOCIAL RECEPTIONS

On March 11th, a reception was held at the home of Commander and Mrs. Henry Pybus, at which Prof. Chas. Hill-Tout gave a most interesting address on "The Indian mind and outlook towards life."

On August 23rd, Commander and Mrs. Henry Pybus gave an "At Home" in honor of Mrs. Frederick T. Schooley, to welcome her back after an extended tour abroad. A very interesting account of her travels was given by Mrs. Schooley, which was much enjoyed.

On November 17th, Mr. and Mrs. Frederick T. Schooley held a reception at their home, at which Mr. J. W. Eastham gave an address on "Our Dogwood," which was very much appreciated.

LECTURE

An illustrated lecture was given by Mr. D. W. Gillingham on 17th February, the subject being "The Eskimo and the Arctic," descriptive of a voyage made into the Arctic on board the Hudson's Bay SS. "Baychimo." Mr. Gillingham also displayed a large collection of copper Indian curios, which are now on exhibit in the Museum.

PRESS

The kindly and encouraging notices issued by the local Press from time to time are much appreciated, and encourages one to hope that the activities and endeavours of this Association to advance along the cultural lines that they stand for is not falling altogether on stony ground.

ATTENDANCE

69,235 adults visited the Museum during 1926, and during 1927 the attendance numbered 76,088, and increase of 6,853, the monthly average being 6,354 for the year. These figures do not include the many School classes which, I am glad to report, make more and more use of the collection educationally.

PUBLIC LIBRARY

The Museum is much indebted to Mr. E. S. Robinson and his Staff for the willing and active assistance at all times given.

DONATIONS

Monthly itemized lists of new additions to the collection have been forwarded to all members, but it may be of interest to state that 236 donators have added over 500 items to the collection during the year, to which must be added large classified collections from Mr. W. A. Newcombe, Mr. H. G. Wailes, Mr. R. T. Ashlee, Mr. D. W. Gillingham, Mr. L. E. Marmont, Mr. F. Perry and Mr. G. H. Larnder.

REFERENCE LIBRARY

The following public bodies have placed this Museum on their mailing lists, and we are much beholden to them for their valuable assistance in having done so: Horniman Museum, London, Eng.; Leicester Museum & Art Gallery, England; Haselmere Museum, England; Townley Hall Museum, England; West Highland Museum, Scotland; Provincial Museum of Natural History, Victoria, B. C.; Royal Ontario Museum, Ottawa; National Committee, Ottawa; Museum of American Indians, Heys Foundation; American Museum of Natural History, New York; Smithsonian Institution, Washington; Milwaukee Public Museum, Milwaukee; Brisbane Museum, Queensland; Durban Museum, South Africa; Port Elizabeth Museum, South Africa.

INSTITUTE LECTURES

This Association was represented at the Vancouver Institute by Mr. S. H. Baker on October 28th, the subject chosen being "Some tendencies in the contemporary Novel."

The Burrard Field Naturalist Club was represented by Mr. J. W. Eastham on December 16th with a lecture on "Epidemics in the Plant World."

In concluding, I wish to thank the Directorate and many members who have so kindly given of their time and made possible the many improvements which have been made during the year, and I trust that my curatorship will have met with your approval.

MR. H. E. C. CARRY

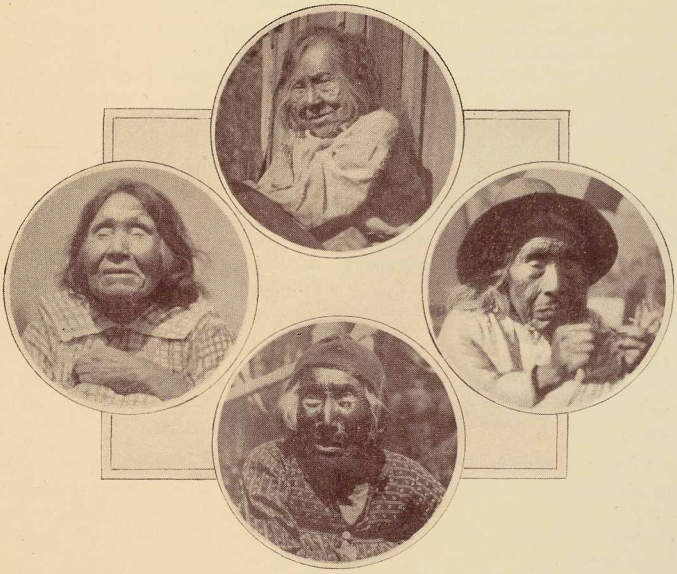
It is with the deepest regret that I record the "passing" of Mr. H. E. C. Carry, our very respected Vice-President, who has been for so many years actively linked with the Association in all its activities, and more especially was his interest centered in the building of an Indian Village in Stanley Park, an undertaking that unfortunately had to be abandoned through the lack of financial support. His unfailing kindliness and valuable advice will be sadly missed at the Board meetings of this Association, at which he was a constant and loyal attendant.

FRANCIS BURSILL

On February 4th, 1928, our old friend and associate, "Felix Penne," passed away. He had been connected with this Association for many years, and donated many objects of art to the City collection. His unfailing generosity and kindly assistance will be missed greatly in the coming years.

I am, yours respectfully,

T. P. O. MENZIES,
Secretary and Curator.



TYPES OF THE WEST COAST INDIAN THAT CONNECT US WITH THE DAYS OF ROMANCE.

Through the courtesy of Mr. T. T. Bartlett, we are able to illustrate types of West Coast Indians, which were photographed from time to time during Mr. Bartlett's service as Dominion Constable, Indian Affairs, on the West Coast of Vancouver Island. These old people may well remember the days of "potlach," with all its dances, feasting and ritual, as each of the old people depicted claim to be near if not over the century mark.

Natural History Illustrations

DR. ROBERT E. MCKECHNIE, M.D.C.M., F.A.C.S., LLD.,
CHANCELLOR OF THE UNIVERSITY OF BRITISH COLUMBIA

EDITOR'S NOTE

The addition of a Natural History section to the last issue of "Museum Notes" having met with general approval, it was suggested that a series of articles on the plan outlined by Dr. R. E. McKechnie, M.R.S.S., M.D., and Chancellor of the University of British Columbia, would be appreciated.

J. W. Wailes, of the Burrard Field Naturalist Club, undertook, at my request, to commence the series, and chose the *Protozoa* as forming a logical beginning from the Biological point of view and as having a direct economic bearing on the fishery investigations in British Columbia waters, the need for which is now generally recognized; also, these organisms are plentiful in both the marine and fresh waters of this province, so that illustrations of them would be of practical utility to young scientists and provide a stimulus to their study.

It is only by the co-operation of many workers that their distribution and periods of abundance or absence can be ascertained; the addition of new records and the discovery of hitherto undescribed species are sure to reward the serious study of this division of the animal kingdom.

The gathering of material from the sea and the countryside will enhance the pleasures obtained from summer holidays and excursions, whilst the subsequent examination and study of collections will provide a recreation for winter evenings.

This new feature of our "Museum Notes" is therefore introduced with every confidence that it will meet with the approval of all supporters of the Vancouver City Museum, and that they will do all they can to make it a success and our little Magazine a publication of permanent interest and value.

ONE of the main objects of the maintainance of a local Museum is to awaken and foster a general interest in Natural History and to promote its serious study.

The Vancouver Museum is fortunate in being able to publish a quarterly journal by means of which these aims can be advanced in many ways, among which probably none would be more welcome to local naturalists than the issue of a series of accurate drawings of all the species belonging to various families of animals and plants found in British Columbia.

This is especially the case with regard to numerous groups of organisms that cannot be preserved in their natural state, also that exceedingly numerous class which are of microscopical size, facilities for whose examination are not available in a museum, thus drawings are more convenient and even necessary as aids in their identification.

Another great advantage of such a series is that in most families the number of species that occur locally are a small percentage only of the total number of species in that family that have been named and described; to identify an organism, it is often necessary to consult many books and pamphlets, written in several languages, usually out of print, rare and not procurable in British Columbia.

The University of British Columbia has done and is doing much to collect an adequate library together, and the Dominion Government has libraries at the biological stations at Nanaimo and Prince Rupert, beside those in the Economic Departments of Agriculture, Forestry, etc., but an adequate working library is exceedingly costly and takes many years to form. The Carnegie Public Library has an excellent selection of general works on Natural History, but research work is quite beyond its scope. When monographs of families or genera exist and are procurable at moderate cost, lists of species found locally may suffice; a few papers have already been published giving the names and accompanied by drawings of each species found in British Columbia in various genera; these have appeared in the "Transactions of the Royal Society of Canada" and in "Contributions to Biology," published by the Dominion Fisheries Board and in a few other publications

Anyone taking up the local study of genera so illustrated can begin at once to identify his collections and commence working on their life histories, distribution or economic importance, etc., instead of spending his spare time or vacations for perhaps a year or more in preliminary work or, as frequently happens, directing his attention to some more popular group, of which the literature is easily obtainable, but in which he is little likely to add to our general or local knowledge.

Another great advantage of illustrated lists of species found locally is that at the point where one worker leaves off another can commence, and no time is wasted by doing over and over again the preliminary work.

Vancouver is fortunate in possessing many workers competent to assist in what is perhaps an ambitious programme, but which it should nevertheless be possible to carry out, at all events to a large extent, especially in those directions which have a more or less close bearing on problems of economical importance.

As a commencement, it is proposed to treat those families of animals and plants found in the sea or in freshwaters and on which the fisheries of this province depend.

In this number of "Museum Notes," illustrations of species of the class Dinophyceae found in British Columbia waters are given and will be completed in the next issue.

Dinoflagellates from British Columbia

with Descriptions of New Species.

Study from the Stations of the Biological Board of Canada

BY G. H. WAILES

IN TWO PARTS.

March 1928.

PART I. WITH PLATES 1-3

Class **FLAGELLATA.**

Sub-class DINOFLAGELLATA

The dinoflagellates are an important part of the plankton, both marine and freshwater.

They are, with a few exceptions, characterized by the possession of two filaments or flagellae, one of which lies in a transverse groove, the other in a lengthwise depression; by the vibrations of these they move rapidly, usually in a helical path; their mode of nutrition varies; the thecate or shelled forms are *holophytic,* that is, feed like plants, others are *saprophytic,* that is, live on the soluble animal matter in the water by absorbing it through their surface, and some are *holozoic,* capturing small ciliates or other organisms and ingesting them through temporary openings in their envelopes.

Plankton feeding fish, such as the Pilchard, consume the dinoflagellates largely; they are therefore of considerable economic importance; at times a species may so multiply as to colour the sea for miles, and if, from some cause, perhaps overcrowding, these all die together, the decay of their bodies may poison the water: in California recently the beach was strewn for miles with dead fish and other creatures killed in this way.

The systematic collection and tabulation of particular species often affords valuable information as to the existence and direction of ocean currents and may give notice of change in the direction of their flow; this is especially so in the case of deep-flowing water, no indication of the current being visible at the surface.

More than a hundred different species have been found in B. C. waters, of which fourteen are freshwater inhabitants.

The following list of those belonging to the Tribe Peridinioidae (i.e. those having envelopes or *thecale*) is a fairly complete one of the coastal marine forms, but the investigation of the open sea and greater depths may be expected to add others.

On the other hand, the list of naked forms that belong to the Tribe Gymnodinioidae is only a preliminary one; these species are often difficult to identify; they cannot be preserved, and living specimens are apt to disintegrate under the microscope before they can be adequately examined; they occur numerously in the northern portion of the

Strait of Georgia, and during the summer of 1926 the writer found many species abundant around Cortez Island; in addition to those identified, there were many of which full particulars were not secured, several of them being apparently undescribed species; it was hoped to have completed their examination at Departure Bay during the following year, but very few were found there.

At Cortez Island the tides flow in from Queen Cahrlotte's Sound through Johnston Straits, whilst at Departure Bay the tides come up the Strait of Georgia from the Strait of San Juan de Fuca, and apparently most of the naked Dinoflagellates do not survive the changes of temperature or of salinity due to the waters of the Fraser River; their study on the west coast is much to be desired.

All the drawings are of British Columbia specimens, except in a few cases, which are noted.

The author desires to express his thanks to the Biological Board of Canada for the facilities given him at their station at Departure Bay, and to the director, Dr. W. A. Clemens; his acknowledgments are also due to Dr. Marie Lebour and to Dr. C. A. Kofoid for the use made of their publications. The material examined from the west coast of Vancouver Island was nearly entirely collected by Dr. H. C. Williamson of the Biological Station at Departure Bay. The writer collected some plankton in Quatsino Sound and from Victoria Lake near Port Alice.

The following list of Dinoflagellates is of those species found by the writer in B. C. waters; none have previously been published.

Two species, *Peridinium aciculiferum* and *P. caudatum*, are from collections made by Prof. H. H. Mackay of Toronto University from Lake Nipigon, Manitoba. *Freshwater* species are marked F.

New Species.

Gonyaulax rugosum sp. nov. Pl. II., figs. 22-24.

Cell large, subspherical, breadth equal to or slightly exceeding the hight; girdle girdle left-handed, displaced three girdle breadths, no overhang; first apical plate straight, narrow; sulcus narrow, widening at antapex; surface rugose with large, prominent reticulations.

Lengths 42-50 μ; breadth 26-32 μ.

Camp Island plankton; September 26, 1926.

Found in one haul only; the arrangement of the plates was not elucidated.

Peridinium striolatum sp. nov. Pl. II., figs. 4-7.

Cell large, subspherical, breath equal to or slightly exceeding the height; girdle central, left-handed, broad, displaced about one girdle breadth; longitudinal furrow reaching the antapex, bordered by inconspicuous lists; intercalary striae present or absent; surface of theca with prominent longitudinal ridges. Freshwater.

Length 52-65 μ; breadth 55-65 μ; thickness 45-57 μ; width of girdle 7 μ.

Shaughnessy Heights, Vancouver.

The only similar Peridinae occur in Australia. *P. australe* Playfair is nearest to the present species but is greatly compressed dorso-ventrally at the expense of the plates 3, 1a, and 3a, which are very narrow.

Diplopeltopsis minor var. *occidentalis* var. nov. Pl. III., figs. 17-19. Pl. XI., figs 12, 13.

This variety differs from the type by the absence of the first intercalary plate, 1a, on the epicone, otherwise it is similar.

It occurs frequently on the west coast in association with the type; their comparative numbers could not be estimated, as the absence of this small plate is only noticeable in the case of empty cells.

Its plate formula is 3', 1a, 7", 5''', 1''''.

Order **ADINIFERIDEA** Kofoid and Swezy.
Tribe **Thecatoida** K. and S.
Family PROROCENTRIDAE.
Prorocentrum gracile Brandt. Plate I., fig. 60.
Exuviella. None were found.

Order **DINIFERIDEA** K. and S.
Tribe **Gymnodinioidae** Poche (K. and S. emend.)
Family GYMNODINIIDAE Kofoid.
Amphidinium crassum Lohm. Pl. I., figs. 13, 14.
F. *Amphidinium lacustre* Stein. Pl. I., figs. 57, 58.
Gymnodinium abbreviatum Lohm. Pl. I., fig. 41.
Gymnodinium articum Wulff. Pl. XII., fig. 26.
Gymnodinium bicorne K. and S. Pl. I., figs. 51, 54. Pl. II., figs. 13.
Gymnodinium flavum K. and S. Pl. I., figs. 49, 50.
Gymnodinium multistriatum K. and S. Pl. XII., figs. 24,25.
Gymnodinium lunula Schütt. Pl. I., figs. 29, 52, 53, 55, 65.
Gymnodinium rhomboides Schütt. Pl. XII., fig. 27.
Gymnodinium rubrum K. and S. Pl. I., fig. 40.
Gymnodinium scopulosum K. and S. Pl. I., fig. 48.
Gymnodinium splendens Lebour. Pl. I., fig. 36.
Gymnodinium variable Herdman. Pl. I., fig. 42.
F. *Gymnodinium aeruginosum* Stein. Pl. I., fig. 61.
F. *Gymnodinium viride* Penard. Pl. I., fig. 56.
F. *Gymnodinium sp.* Pl. I., fig. 46.
Gyrodinium corallinum K. and S. Pl. I., fig. 39.
Gyrodinium glaucum Lebour. Pl. I., fig. 37.
Gyrodinium lingulifera var *minor* Sp. Nov. Pl. VI., figs. 2, 3.
Gyrodinium pingue Schütt. Pl. I., fig. 45.
Gyrodinium postmaculatum K. and S. Pl. I., fig. 35.
Gyrodinium spirale (Bergh.) Pl. I., fig. 38.
Cochlodinium archimedes (Pouchet). Pl. I., fig. 47.
Cochlodinium conspiratum K. and S. Pl. I., fig. 44.
Cochlodinium vinctum K. and S. Pl. I., fig. 33.
Torodinium robustum K. and S. Pl. VI., fig. 35.
Family POLYKRIKIDAE. Kofoid and Swezy.
Polykrikos kofoidi Chatton. Pl. III., figs. 3, 4.
Polykrikos schwarzi Bütschli. Pl. III., fig. 2.
Family NOCTILUCIDAE Saville Kent.
Noctiluca scintillans Macartney. Pl. IX., fig. 46.
Family POUCHETIIDAE Kofoid and Swezy.
Nematodinium armatum (Dogiel). Pl. I., figs. 34, 43.
Tribe **Peridinioidae** Kofoid and Michener.
Family DINOPHYSIDAE.
Pseudophalacroma nasutum (Stein). Pl. II., fig. 18.
Phalacroma rotundatum C. and L. Pl. I., fig. 20.
Dinophysis acuminata C. and L. Pl. I., figs. 62, 63.
Dinophysis acuta Ehrenb. Pl. I., figs. 17-19.
Dinophysis ellipsoides Kofoid. Pl. I., figs. 21, 22.
Dinophysis hastata forma . Pl. I., fig. 16.
Dinaphysis sphaerica Stein. Pl. I., figs. 23,24.
Dinophysis tripos Gourret. Pl. XI., fig. 13.

Family GLENODINIIDAE Lebour.

Glenodinium danicum Paulsen. Pl. I., figs. 25, 26, 32.

F. *Glenodinium oculatum* Stein. Pl. I., fig. 59.

Family PERIDINIIDAE Kofoid.

Protoceratium reticulatum C. and L. Pl. III., figs. 5-8.

Gonyaulax alaskensis Kofoid. Pl. III., fig. 29.

Gonyaulax digitale (Pouchet). Pl. II., fig. 17.

Gonyaulax polygramma Stein. Pl. III., figs. 26-28.

Gonyaulax rugosum Wailes. Pl. II., figs. 22-24.

Gonyaulax scrippsae Kofoid. Pl. II., fig. 21.

Gonyaulax spinifera (C. and L.) Pl. III., figs. 20-23.

Gonyaulax triacantha Jörg. Pl. III., figs. 24, 25.

Peridiniopsis asymmetrica Mangin. Pl. III., figs. 9-13.

Peridiniopsis rotunda Lebour. Pl. III., figs. 14-16.

Diplopeltopsis minor Lebour. Pl. III., figs. 17-19. Pl. XI., fig. 11.

Diplopeltopsis minor var *occidentalis* Wailes. Pl. XI., fig. 12.

Genus **PERIDINIUM** Ehrenberg

Sub-genus **Archaeperidinium** Lebour

Group ORTHOPERIDINIUM.

Peridinium thorianum Paulsen. Pl. III., figs. 32, 33.

Peridinium triqueta (Stein). Pl. I., figs. 12, 15. Pl. VI., figs. 14, 15.

Peridinium monospinum Paulsen. Pl. III., figs. 34-36.

Peridinium minutum Kofoid. Pl. III., figs. 42, 43.

Peridinium discoides Wailes. Pl. VI., figs. 25-28.

Peridinium avellana Meunier. Pl. VI., figs. 8, 9, 20.

Peridinium excentricum Paulsen. Pl. VI., figs. 30-34.

F. *Peridinium aciculiferum* Lemm. Pl. VI., figs. 36, 37.

F. *Peridinium caudatum* var. *guilfordense* Playfair. Pl. VI., figs. 10, 11.

F. *Peridinium inconspicuum* Lemm. Pl. III., figs. 40, 41.

F. *Peridinium umbonatum* Stein. Pl. III., figs. 1a, 1b.

Sub-genus **Peridinium.**

Section CONICA.

Peridinium achromaticum Levander. Pl. III., figs. 37-39.

Peridinium conicoides Paulsen. Pl. IV., figs. 16-18.

Peridinium conicum Gran. Pl. IV., figs. 19, 20.

Peridinium faroënse Paulsen. Pl. VI., figs. 12, 13.

Peridinium leonis Pav. Pl. IV., figs. 12-15.

Peridinium pentagonum Gran. Pl. IV., figs. 8, 9.

Peridinium subinerme Paulsen. Pl. III., figs. 48, 49.

Peridinium trochoideum (Stein). Pl. VI., figs. 6, 7.

F. *Peridinium striolatum* Wailes. Pl. II., figs. 4-7.

F. *Peridinium tabulatum* (Ehrenb.) Pl. III., figs. 46, 47.

F. *Peridinium willei* Huit. Pl. III., figs. 44, 45.

Section OCEANICA.

Peridinium depressum Bailey. Pl. IV., figs. 1-4.

Peridinium oblongum Aurvillius. Pl. IV., figs. 5-7.

Peridinium obtusum Karsten. Pl. IV., figs. 10, 11.

F. *Peridinium cucumis* Wailes. Pl. VI., figs. 4, 5.

Section TABULATA.

Peridinium claudicans Paulsen. Pl. II., figs. 1-3.
Peridinium punctulatum Paulsen. Pl. V., fig. 5.
Peridinium subpunctulatum Wailes. Pl. V., figs. 6-9. Pl. VI., figs. 21, 22.

Group METAPERIDINIUM.

Section PYRIFORMIA.

Peridinium granii Osten. Pl. V., figs. 25-27.
Peridinium ovatum (Pouchet). Pl. V., figs. 3, 4.

Section DIVERGENS.

Peridinium crassipes Kofoid. Pl. V., figs. 1, 1a, 2.
Peridinium divergens Ehrenb. Pl. V., figs. 15, 16.

Section HUMILIA.

Peridinium brevipes Paulsen. Pl. VI., figs. 16, 17.
Peridinium cerasus Paulsen. Pl. I., figs. 30, 31.
Peridinium decipiens Jörg. Pl. VI., fig. 1.
Peridinium micrapium Meunier. Pl. V., figs. 17-20.
Peridinium monocanthus Borck. Pl. II., figs. 19, 20.
Peridinium sub-curvipes Lebour. Pl. I., figs. 7, 7a.

Section PARAPERIDINIUM.

Peridinium asperum Wailes. Pl. VI., figs. 23, 24.
Peridinium pallidum Osten. Pl. V., figs. 10-14.
Peridinium pellucidum (Bergh.) Pl. V., figs. 21, 22. Pl. VI., figs. 18, 19.

Genus **MINUSCULA** Lebour.

Minuscula bipes (Paulsen). Pl. V., figs. 23, 24.

Genus **PYROPHACUS** Stein.

Pyrophacus horologicum Stein. Pl. II., figs. 11, 12.

Genus **OXYTOXUM** Stein.

Oxytoxum diploconus var *fusiformis* Okamura. Pl. II., figs. 14-16.

Genus **CERATIUM** Schrank.

Ceratium fasus (Ehrenb.) Pl. I., figs. 5, 6. Pl. XII., figs. 21, 22.
Ceratium furca (Ehrenb.) Pl. I., fig. 8, Pl. II., fig. 10.
Ceratium lineatum (Ehrenb.) Pl. II., fig. 9.
Ceratium tripos var *atlantica* Ost. Pl. I., fig. 4. Pl. III., fig. 1.
Ceratium macroceros (Ehrenb.) Pl. XI., figs. 16-18.
Ceratium longipes (Bailey). Pl. I., fig. 2.
Ceratium horridum Gran. Pl. I., fig. 1.
Ceratium divaricatum (Lemm.) Kofoid. Pl. II., fig. 8.
Ceratium azoricum Cleve. Pl. I., fig. 3.
F. *Ceratium hirundinella* O. F. Müller. Pl. I., figs. 9-11.
Ceratium pentagonum Gourret. Pl. XII., fig. 23.

Genus **PODOLAMPAS** Stein.

Podolampas palmipes Stein. Pl. I., figs. 27, 28.

FAMILY PERIDINIIDAE KOFOID

TERMS AND NOTATION. In the Family *Peridiniidae* a girdle runs round the theca transversely; it may be circular or have a displacement and form a helix; the helix may be right-handed as in pl. V., fig. 25, or left-handed as in pl. III., fig. 20. The girdle may make more than a complete revolution as in fig. 20, pl. III., this is termed the "over-hang"; the girdle may be bordered by *"lists"* and may be excavated,

as in *Gonyaulax* or not as in pl. III., fig. 12. The depression in the ventral area forming a longitudinal groove is called the "sulcus".

The upper half as figured is the "Epicone" terminated by the "Apex"; the lower portion is the "Hypocone" terminated by the "Antapex".

The right and left hand are the same as those of the observer when looking at a dorsal view. Kofoid's system of numbering the plates and abbreviations and names of the plates are as follows; see pl. III., figs. 20, 28, 30 and 31; pl. IV., figs. 1-3, 8, 9.

Girdle plates 1-6
Apical plates 1'-4'
Anterior intercalary plates 1a-3a
Precingular plates 1"-7"
Postcingular plates 1'''-5'''
Posterior intercalary plate 1p
Antapical plates 1''''-2''''

In the present paper the small plates of the ventral area and the girdle plates have not been enumerated; except in the Genus *Gonyaulax*, in which Kofoid has worked them out; there islittleinformation available about them.

The following are the plate formulae for the different thecate genera (as given by Lebour) and to which they form a key.

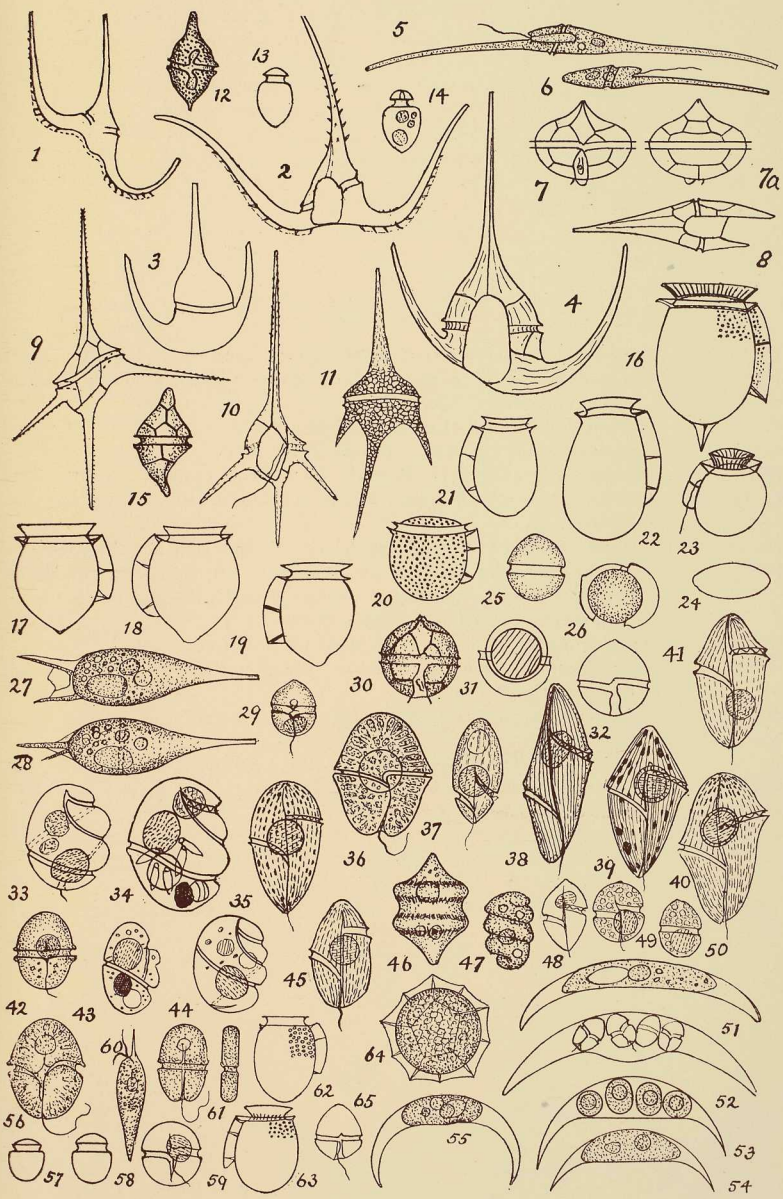
The girdle plates are omitted.

Genus Goniodoma	3'-4'	0	7"	5'''	0	3''''
Genus Protoceratium	2'	0	6"	6'''	1p	1''''
Genus Spiraulax	4'	1a	6"	6'''	1p	1''''
Genus Gonyaulax	3'-5'	0-2a	6"	6'''	1p	1''''
Genus Diplosalis	3'	1a	6"	5'''	0	1''''
Genus Peridiniopsis						
Sub-Genus Peridiniopsis	3'	1a	6"	5'''	0	2''''
Sub-Genus Diplopelta	3'	2a	6"	5'''	0	2''''
Genus Diplopeltopsis	3'	2a	7"	5'''	0	1''''
Genus Kryptoperidinium	3'	2a	7"	5'''	0	2''''
Genus Entzia	4'	1-2a	7"	5'''	0	1''''
Genus Diplosalopsis	3'	2a	7"	5'''	0	2''''
or	4'	1a	7"	5'''	0	2''''
Genus Peridinium	4'	2-3a	7"	5'''	0	2''''
Genus Minuscula	4'	3a	6"	5'''	0	1''''
Genus Ceratium	4'	0	5"	5'''	0	2''''
Genus Podolampas	2'	1a	6"	3'''	0	4''''
Genus Pyraphacus	5'-9'	0	9"-12"	9'''-12'''	0	3''''-4''''
Genus Oxytoxum	5'	0	5"	5'''	0	1''''

(To be continued.)

Figures	PLATE I.
1.	*Ceratium horridum* Gran. X150.
2.	*Ceratium longipes* (Bailey) Gran. X150.
3.	*Ceratium azoricum* Cleve. X200.
4.	*Ceratium tripos* var. *atlantica* Ostenfeld. X200.
5, 6.	*Ceratium fusus* (Ehrenb). Fig. 6. Product of recent division. X150.
7, 7a	*Peridinium sub-curvipes* Lebour. Ventral and dorsal views. Plates partly filled in after Lebour. X300.
8.	*Ceratium furca* (Ehrenb). Ventral view. X200.
9, 10, 11.	*Ceratium hirundinella* O. F. Müller. Fig. 9, from Sproat's Lake. X150. Fig. 10, from Wellington Lake, X200. Fig. 11, from Hoggan Lake, Gabriola Island, X200.
12.	*Peridinium triqueta* (Stein) Lebour. Ventral view. Gabriola Pass. X300.
13, 14.	*Amphidinium crassum* Lohm. X200.
15.	*Peridinium triqueta* (Stein) Lebour. After Meunier. X500.
16.	*Dinophysis hastata* Stein forma. Quatsino. X300.
17-19	*Dinophysis acuta* Ehrenb. X300.
20.	*Phalacroma rotundatum* C. and L. X300.
21, 22.	*Dinophysis ellipsoides* Kofoid. Fig. 21, from Nanaimo. Fig. 22, from Quatsino, West Coast Vancouver Island. X300.
23, 24.	*Dinophysis sphaerica* Stein. Fig. 23, left hand side view. Fig. 24, Section X300.
25, 26.	*Glenodinium danicum* Paulsen. Fig. 25, dorsal view. Fig. 26, liberation of spore. X300.
27, 28.	*Podolampas palmipes* Stein. Fig. 27, ventral view. Fig. 28, left hand side view. X300.
29.	*Gymnodinium lunula* Schütt. Dorsal view of active individual. X350.
30, 31.	*Peridinium cerasus* Paulsen. Fig. 30, ventral view. Fig. 31, liberation of spore. X300.
32	*Glenodinium danicum* Paulsen. X400.
33.	*Cochlodinium vinctum* K. and S. X300.
34.	*Nematodinium armatum* (Dogiel). X300.
35.	*Gyrodinium postmaculatum* Kofoid and Swezy. X250.
36.	*Gymnodinium splendens* Lebour. X300.
37.	*Gyradinium glaucum* Lebour. X300.
38.	*Gyrodinium spirale* (Bergh). X200.
39.	*Gyrodinium corallinum* K. and S. X175.
40.	*Gymnodinium rubrum* K. and S. X150.
41.	*Gymnodinium abbreviatum* K. and S. X200.
42.	*Gymnodinium variable* C. Herdman. X300.
43.	*Nematodinium armatum* (Dogiel). X300.
44.	*Cochlodinium conspiratum* K. and S. X400.
45.	*Gyrodinium pingue* (Schütt). X300.
46.	*Gymnodinium sp.* Victoria Lake, Quatsino. X500.
47.	*Cochlodinium archimedes* (Pouchet). X200.
48.	*Gymnodinium scopulosum* K. and S. X250.
49, 50.	*Gymnodinium flavum* K. and S. X300.
51-55.	*Gymnodinium lunula* Schütt. Figs. 52, 53, 55. *Gymnodinium bicorne* K. and S. Figs. 51, 54. X200.
56.	*Gymnodinium viride* Penard. Wellington Lake. X300.
57, 58.	*Amphidinium lacustre* Stein. X300.
59.	*Glenodinium oculatum* Stein. X350.
60.	*Prorocentrum gracile* Schütt. X400.
61.	*Gymnodinium aeruginosum* Stein. Ventral and side views, Harrison Lake. X400.
62, 63.	*Dinophysis acuminata* C. and L. X 300.
64.	*Trochiscia dictyon* (Jörg). X200.
65.	*Gymnodinium lunula* Schütt. X300.

PLATE I.



G. H. Wailes del. ad nat.

PLATE II.

1-3. *Peridinium claudicans* Paulsen. Ventral, dorsal, and right side views. X300.

4-7. *Peridinium striolatum* sp. nov. Ventral, dorsal, apical and antapical views. From Vancouver. X465.

8. *Ceratium diivaricatum* (Lemm.) Kofoid. X265.

9. *Ceratium lineatum* (Ehrenb). Dorsal view. X265.

10. *Ceratium furca* (Ehrenb). Ventral view. From Ucluelet. X330.

11, 12. *Pyrophacus horologicum* Stein. Apical and ventral views. From Ucluelet. X265.

13. *Gymnodinium bicorne* Kofoid and Swezy. From Camp Island. X400.

14-16 *Oxytoxum diploconus* var. *fusiformis* Okamura. Broad and narrow views, fig. 16. Showing splitting of antapex towards the end of the megacytic stage. From Camp Island. X400.

17. *Gonyaulax digitale* (Pouchet). Ventral view. X400.

18. *Pseudophalacroma nasutum* (Stein). Broad and narrow views. From Ucluelet. X400.

19, 20. *Peridinium monacanthus* Broch. Dorsal and ventral views. From Camp Island. X330.

21. *Gonyaulax scrippsae* Kofoid. Ventral view. X530.

22-24. *Gonyaulax rugosum* sp. nov. Dorsal and ventral views of two individuals from Camp Island. X400.

PLATE II.

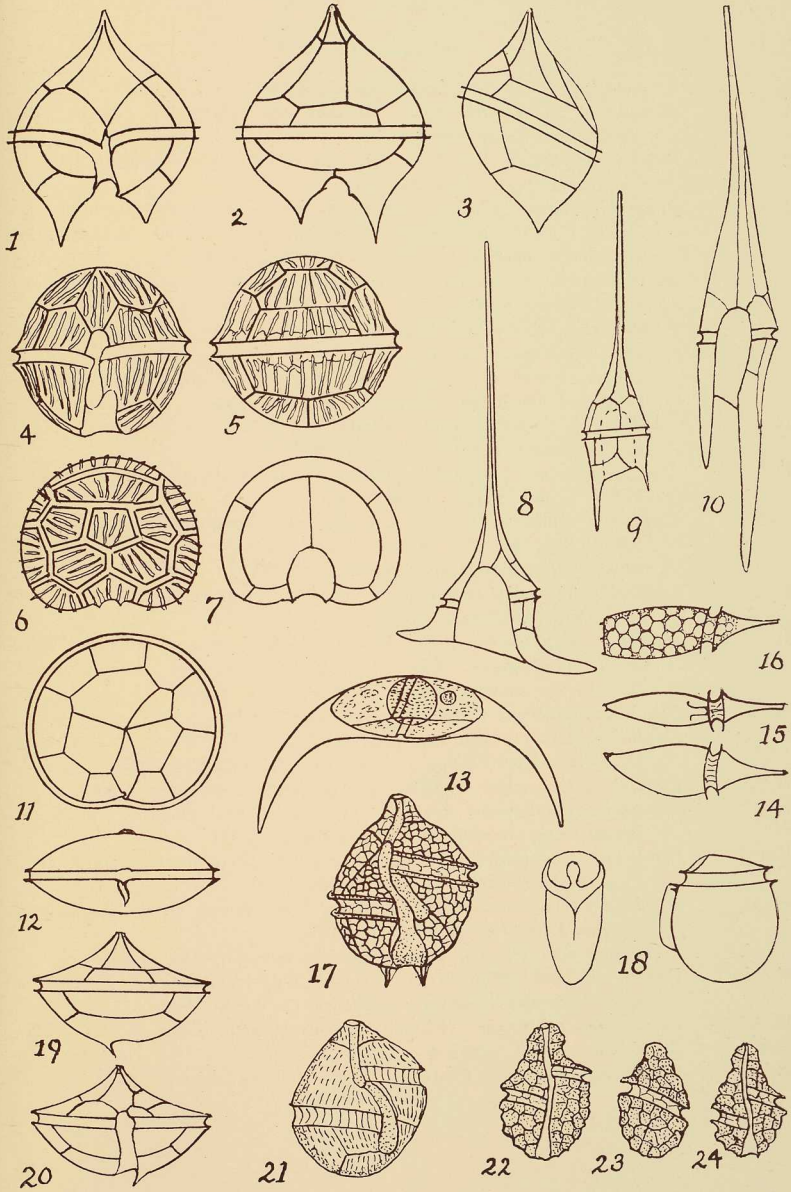


PLATE III.

1. *Ceratium tripos* var *atlantica* Ostenfeld. X200.

1a, 1b. *Peridinium umbonatum* Stein. Hoggan Lake, Gabriola Island. X300. Ventral and dorsal views.

2. *Polykrikos schwarzi* Bütschli. Chain of eight zooids measuring 130 μ in length and 60 μ in breadth. X200.

3, 4. *P. kofoidi* Chatton. Chain of four zooids 115 μ in length and 80 μ in breadth. X200. Fig. 4. One measuring 130 μ in length and 90 μ in breath, discharging a spherical body 65 μ in diameter. X100.

5-8. *Protoceratium reticulatum* (C. and L.) Ventral, dorsal, antapical and apical views. X400.

9-13. *Peridiniopsis asymmetrica* Mangin. Figs. 9, 10, 11. Ventral, dorsal and antapical views. Fig. 12. Dorsal view of living organism. Fig. 13. Dorsal view of compressed form, of which the plates were not elucidated and which may possibly be another species. All X300.

14-16. *Peridiniopsis rotunda* Lebour. Ventral, dorsal and left side view; (plates partially drawn in after Lebour). X300.

17-19. *Diplopeltopsis minor* Lebour. Ventral, dorsal and antapical views; (plates in figs. 17 and 18 partly drawn in after Lebour). X300.

20-23. *Gonyaulax spinifera* (C. and L.). Fig. 20. Ventral view after Kofoid X500. Figs. 21, 22. Ventral views. Fig. 23. Dorsal view of variously shaped individuals. Nanaimo. X400.

24, 25. *Gonyaulax triacantha* Jorgensen. Fig. 24. Ventral view. X350. Fig. 25. After Kofoid. X500.

26-28. *Gonyaulax polygramma* Stein. Fig. 26. Ventral view of individual without antapical spines. X350. Fig. 27. Ventral view. X400. Fig. 28. Dorsal view showing plates (after Kofoid). X500.

29. *Gonyaulax alaskensis* Kofoid. Ventral view. X300.

30, 31. *Peridinium Genus.* Diagrams illustrating Kofoid's system of numbering the plates. Fig. 30, apical view. Fig. 31, antapical view.

32, 33. *Peridinium thorianum* Paulsen. Ventral and dorsal views. X250.

34-36. *Peridinium monospinum* Paulsen. Fig. 34, Ventral view. Figs. 35, 36, Dorsal views showing variation in shape. X300.

37-39. *Peridinium achromaticum* Levander. Fig. 37, Three-quarter ventral view. Figs. 38, 39, Ventral and dorsal views. X300.

40, 41. *Peridinium inconspicuum* Lemm. Ventral and dorsal views; plankton of Hoggan Lake, Gabriola Island. X500.

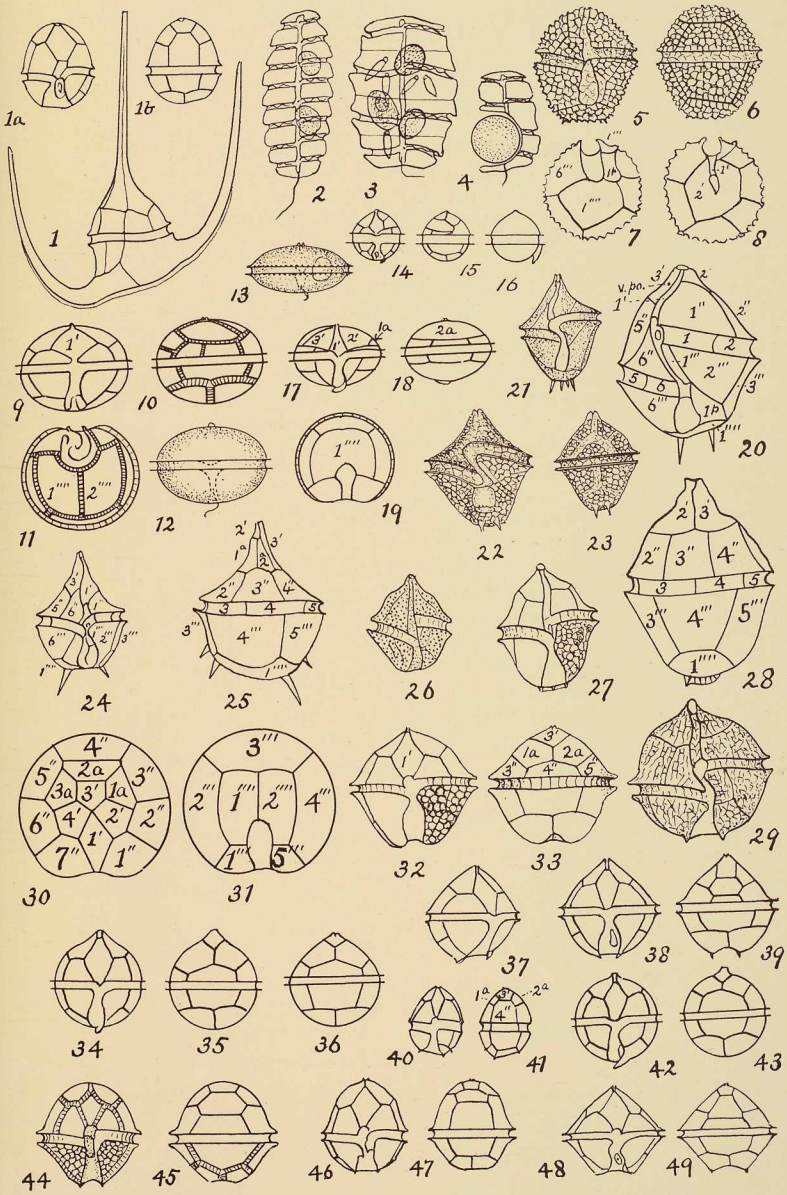
42, 43. *Peridinium minutum* Kofoid. Ventral and dorsal views. X300.

44, 45. *Peridinium willei* Huitf-Kaas. Ventral and dorsal views. X300. The apical intercalary bands are omitted in the dorsal view.

46, 47. *Peridinium tabulatum* (Ehrenb). Ventral and dorsal views. X250. "Hydra Lake," Nanaimo.

48, 49. *Peridinium sub-inerme* Paulsen. Ventral and dorsal views X250.

PLATE III.



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Museum Notes

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EDITOR—STEPHEN GOLDER

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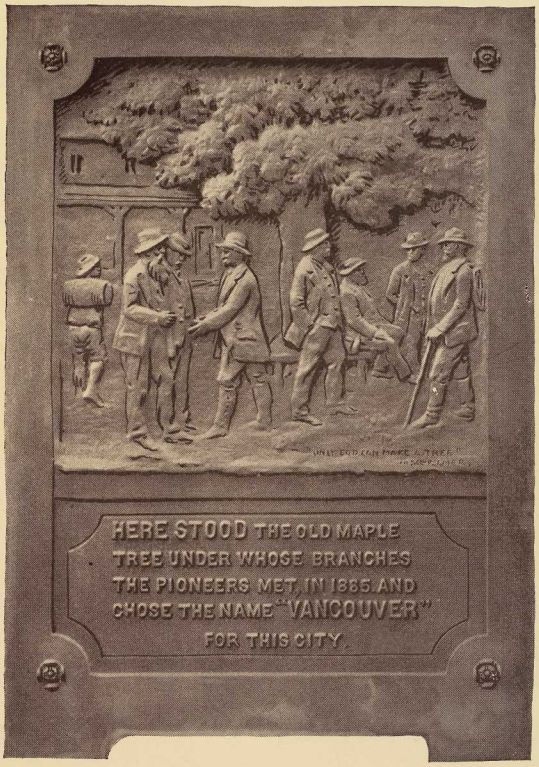

This tablet was erected to commemorate Vancouver's Historic Maple, which stood at the corner of Carrall and Water Streets before the Great Fire of 1886.

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Museum Notes

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Vancouver's Historic Maple

By Noel Robinson

ONE thing is quite certain, and that is that "Gassy" Jack Deighton, whose rough frame hotel, the Deighton House, as it was named by courtesy, faced upon the famous old Maple Tree (reproduced on the front page of this issue) at the junction of what are now Carrall and Water Streets, never dreamed in those days that his name would be associated with the beginnings of the great city which has risen from the ashes of the fire of June 13th, 1886, the anniversary of which the Vancouver Pioneers have just celebrated. He must, however, have been aware that the Granville townsite was known as "Gastown" and that it had earned that sobriquet as a result of his own loquacity. I recall that the late Captain George Marchant, veteran skipper of the historic "Beaver," once became very irritated, in conversation with me, because Jack Deighton had been dubbed "Gassy." Shaking his massive head, and raising a great forefinger, he said,—and there was a ring of indignation in his tone—"Gassy! Why he was the best talker we had, and he could talk interestingly about anything." And you could always rely upon George Marchant for an accurate statement, even when he was most disgruntled—as he often was.

It was beneath the shade of that spreading maple that the men of this city who were here on the ground-floor discussed anything and everything, and it was there that this city was finally named. There are only a few among us now whose memories carry back to those days, the days of that little clearing in the forest when the population did not number three hundred, though there are quite a sprinkling who go back to 1886, and the year or two immediately preceding that date. One of the best known and most genial of those earlier pioneers, R. H. H. ("Dick") Alexander is one of them, but he, I am sorry to say, lies seriously ill at his home. It was "Dick" Alexander who, as a boy, impersonated Mrs. Bardell's son in the famous "Bardell versus Pickwick" trial, given at the Hastings Mill in those days.

The other day I enjoyed a reminiscent chat with one of the earliest of those pioneers, Magistrate Harry Alexander, the first white boy born in this city, and, like Dick, the son of that great old stalwart, the late R. H. Alexander, who came over the Rockies, after all kinds of adventures—I shall always remember the vivid account of some of those experiences which he gave me upon one occasion—and became manager of the Hastings Mill. Harry, though a very small boy then, has a clear recollection of Vancouver's beginnings. He recalls that the maple was one of the finest he had ever seen and that it was boxed round with a seat, and he can remember some of the characters who used to foregather there and quaff tankards of Jack's, no doubt, excellent beer (none of your beer-parlor stuff of to-day), such men as Joe Mannion, who ran the Granville House, Jonathan Miller, who constituted the whole of the first police force and was afterwards the first postmaster; old Brew, the first customs officer, and that veteran mariner Captain "Bill" Soule—all gone to their rest.

"Gastown commenced at Carrall and virtually ended at Abbott, though it scattered as far as Cambie," he recalled, "but none of those were really streets or named then. At the corner of what we now know as Water and Abbott there was a store, and just beyond the little frame Methodist church and the parson's house. Water Street—not named then—was the only street. There were two hotels and one saloon on the south side, and the Deighton House on the corner, facing the Sunneyside hotel, and a butcher's

shop. Jonathan Miller's house was next to it. The settlement ran back to about the lane between Water and Cordova. A rough sort of road ran through the bush right back to False Creek, where there was a slaughter house. At the intersection of Water and Carrall a two-plank sidewalk ran through the bush to Hastings Mill, with a road beside it which carried on about where Railway Street now is, past George Black's and along the old Douglas Road to New Westminster. That was a very beautiful walk, and the original St. James' Church, where the Rev. George Ditcham, who preceded Father Finnes Clinton, was parson, and which was destroyed in the fire, was where you cross the railway track from the North Vancouver Ferry."

There were several logging camps, and the first logging locomotive went in at Kitsilano. Oxen did all the logging in those days. Hastings Mill was the only industry and was the backbone of everything.

Space does not permit of any further details, but perhaps these few particulars will enable those of this generation, when they gaze upon the memorial fountain, to conjure up a little of the picture which this tiny settlement in the midst of the primeval forest, from which the present busy city of several hundred thousand inhabitants has risen, presented at that date. As Time obliterates the memory of those first years, and the last of those who remember them passes on, such details are of value. Even then there were one or two who, like the famous navigator, Captain Vancouver,—as witness the evidence supplied by his log—had a vision, prompted by the sight of our splendid harbor, of what a city would rise from those small beginnings.

I am writing these lines just before starting for the annual Pioneers' picnic to Bowen Island, which is one of the most delightful events of the year, and there, no doubt, memories of "Gastown" days will be recalled.

Circular Tides

By Henry Pybus, Comdr., R. N. R., M. M.

THE Phenomena of circular tides, which are observed at the estuaries of nearly all large rivers, baffled explanation for a long time. My attention was called to the subject in 1881, at Shanghai, China, when a German captain tried to explain it by the theory that it was caused by the molten mass of the earth's interior being affected by the attraction of the moon causing a wobbling motion which produced the circular tides.

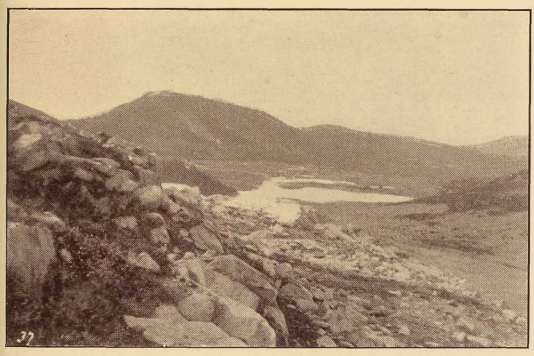
It struck me that the Law of Resolution met the case, viz., if two opposing forces are represented in direction and force by the two sides of a parallelogram, the diagonal will represent the resultant.

Long and patient observation has confined my belief that this is a complete solution of the question.

Ecological Notes on the Plant Life of the Garibaldi Region of British Columbia

BY FRED PERRY, VANCOUVER, B. C.

THE Garibaldi region of British Columbia is situated in the Coast Range Mountains, twenty miles from the terminus of the Pacific Great Eastern Railway (Squamish), at the head of Howe Sound. Daisy Lake, the depot at which the traveller alights, is at an elevation of 800 feet. Two routes, from this depot, lead into the uplands. The old one, being much steeper and consequently drier, presents a different floral aspect than the new trail which keeps to the dense woodland.



GENERAL ECOLOGICAL VIEW OF GARIBALDI PARK

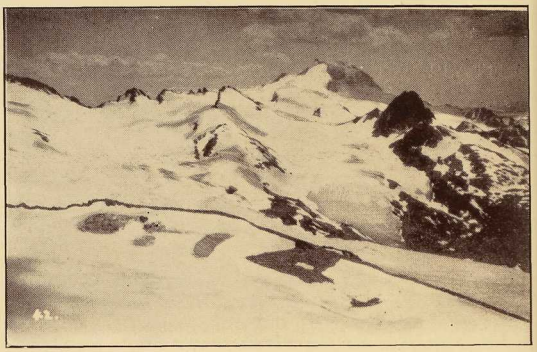
Many Pyrolas, Monotropa, Vaccinium, and, at the foot of the mountain, the Vine Maple, can be seen. Clintonia uniflora, Monotropa uniflora, Monotropa multiflora, Asarum caudatum, and the fir, cedar, hemlock and cottonwood are typical of this, the Canadian zone.

No accurate records of the precipitation have been made of this zone in this area, but, from the remarks of settlers and others who have spent some time here, I assume that it is somewhat lower than at the coast. It may be around 40 to 50 inches per annum, and, except for about 7 to 8 weeks in July and August, it seems to be fairly evenly distributed.

The precipitation above the Hudsonian zone is nearly always in the form of snow, which never leaves till about the second or third week in July, and then only for a period of about seven to eight weeks.

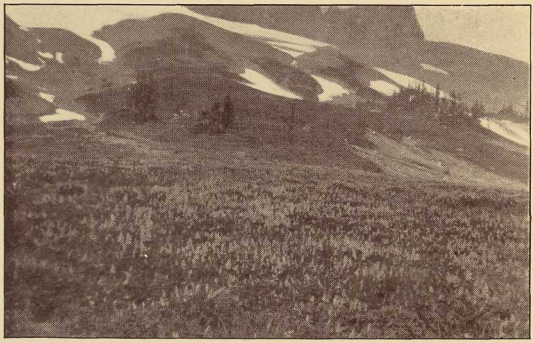
On reaching the first meadows (4000 feet) one is just at the commencement of the Hudsonian zone. This area, which is marked by fairly extensive narrow flats, is very rich in the flora of this zone, at least three plants being recorded for the first time, namely, Sanguisorba sitchensis, Trientalis arctica and Hippuris montana. There are few shrubs, Rhododendron albiflorum is common, while Clodothamnus pyrolaeflorus and Menziesia glabella are absent. Most of this area, until comparatively recent times, must

have contained many lakes. The Spagnums, Polytrichiums and other mosses have almost completed their work of filling them up, and the herbacious plants that have succeeded in gaining a hold are very numerous; Potentilla palustris, Viola glabellum, Caltha leptosepala, Trollius albiflorus, Kalmia polifolia, Eriophorum gracile, Menyanthes trifoliata, Disporum oreganum and Tofieldia glutinosa, altogether a very rich and varied bog flora.



DOMINANT FEATURE OF GARIBALDI PARK

From here on to the sub-alpine zone many species are met with, varying, of course, with the soil, drainage and exposure. The most common is Valerian sitchensis, which seems to be the most catholic of all plants in the mountains. It is found as low as 2,500 feet and as high as 6,500 feet and seems to be tolerant of all conditions except that of marshes and bogs. This plant reaches its prime on the slopes at an elevation of 6000 feet, on rich soil and a southern exposure. It will tolerate shade and even peaty soil. Its wide distribution is in part due to the fact that its seed (being plumose) is admirably adapted for dispersal by wind. It is a food plant most favored by marmot, and it seems to flower under any conditions. Its seeds are ripe about one month after flowering.



ALPINE MEADOW AT FOOT OF BLACK TUSK, LUPINS DOMINANT.

The higher parts of the Hudsonian zone are reached at an elevation of 5000 feet, when the southern slopes of the Black Tusk ridges are reached. Here the vegetation has attained its highest state of perfection.

The drier and more gravelly part of the slopes develop their flora early; Erythronium grandiflorum and Claytonia lanceolata are the first to flower; the last named is the first to bear ripe fruit after seven or eight days from its flowering, the explanation being obvious. The plant, being one of the lowest in height of all the mat herbage, is completely smothered in a few days by its more lusty

neighbors, being thus deprived of all sun and air. If it did not therefore respond by a rapid development of its fruits it would not last long. On the other hand, the Erythronium throws its fruit high and erect, while its leaves suffer from the rapid growth of its neighbors, its capsules are subject to the full rays of the sun, thus ensuring a longer period for the ripening of the seed.

Another plant that has a similar relation to its environment is Viola glabellum.

On the gravelly creek beds, Petasites nivalis flowers very early and its flowers are soon covered with its own leaves and that of its close relative, Petasites dentata, necessitating its rapid fruiting.

The flora of snow patches deserves closer study than has been afforded them. One of the most interesting is Anemone occidentalis, which occurs on the fringes and does not appear to be subject to very severe competition. Its fruits mature as late as two months after flowering. Another, Anemone parviflora,— which occurs on the extremely exposed ridge of Empetrum Peak—fruited within ten days of its flowering, probably because the extremely high winds to which it was exposed had the effect of drying it out, coupled with the fact that the soil was sandy, and it did not permit of any long period of fruiting by reason of the too rapid draining of the soil. On the peaty fringes of the snow patches, Kalmia polifolia bloomed to perfection. Like all the Ericaceae, it would not tolerate any but peaty soil, and, in common with them, it was one of the last to ripen its fruits, nine to ten weeks being necessary to ensure its capsules bursting.

Potentilla flabellifolia could always be found where the snow patches had a gravelly or stony soil. It would not tolerate peat, and its fruits ripened about six weeks after flowering.

Caltha leptosepala is a typical snow patch plant, preferring its icy cold soil to any other; tolerant to peat, but doing better in gravel and maturing its fruits three to four weeks after flowering.

Saxifraga Tolmiei is the ideal snow patch plant, preferring stoney soil. It can be seen thriving under water with a film of ice on it, or within a few feet of the glacier, which is 25 feet thick at the base of Helmet Peak. Its fruits mature late, which is probably due to the very cold soil counteracting adversely the hot sun to which it is exposed. This is, I think, the smallest leaved of all the Saxifragas, and one which would well repay closer study.

The creeks, which usually arise from extensive snow patches on the high peaks, give rise to a totally different flora, which is always later than the surrounding herbage, and extremely showy. The banks of these creeks are a week or two earlier flowering, owing, probably, to the rapid drainage through the loose gravel. Mimulus Lewisii, Senecio triangularis and Parnassia fimbriata give a brilliant red, yellow and white border to the beds of the creeks, but when the creeks lose their volume of icy water, then the whole soon becomes a mass of color. Mimulus alpinus is a yellow blaze on the wet moss (usually Philenotis).

Both Mimulus, Lewisii and alpinus are slow in maturing their fruits, five or six weeks being necessary for their ripening. A plant which provides a relieving touch of blue to the creek banks is Veronica alpina, which is 7 to 8 weeks in fruiting. The two Saxifragas, Lyalli and odontophylla, are also late in fruiting. Both have brown and white speckled fruits, making them almost as attractive in fruit as in flower. They also have sharply dentate leaves, and I would imagine are equally worthy of the horticulturist's attention.

On the stony slopes between the creeks, Phlox Douglasii is common and associated

with Silene Macounii, Pentstemon procerus, Sedum divergens and occasionally Castilleja Bradburyii, but, from the arid nature of the soil, they soon lose their floral charm and are late in fruiting. Senecio triangularis, Veratrum veride, Hieracium alpinum, Erythronium grandiflorum and Lupinus arcticus all thrive in this environment. Valerian sitchensis seems to be dominant, fruiting first of all, closely followed by Lupinus arcticus.

On the tiny flats or ledges, bogs are formed mainly by that common moss Philonotus fontana, which, in the bright sunlight, turns a pale yellow. Occasionally Epilobium luteum is found, its creamy blooms covering the moss with its discarded flowers. Parnassia fimbriata is found in this environment, blooming and seeding very late.

On travelling upward on the creeks, one soon passes into the sub-arctic regions. The snow in the hollows lingers late in August, leaving no time for any vegetation except for a few hardy Lichens, and, where the soil is rich, a few clumps of Epilobium latifolium, its masses of magenta flowers giving a most striking display. It prefers new soil and is one of the first invaders, and is followed closely by Arnica alpinum.

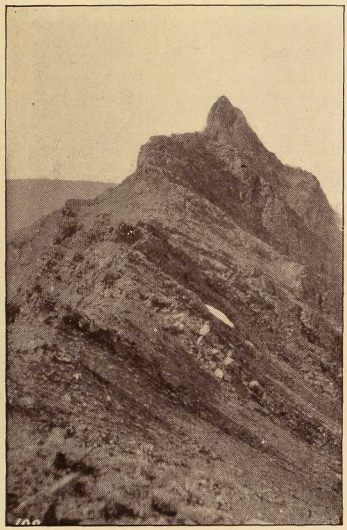
RECEDING SNOUT OF HELMET GLACIER
RARE ALPINE PLANTS FOUND ON FOREGROUND

The region of the last of the flowering plants being reached, they are noticed to possess distinct characters from the mat herbage. The first is their prostrate nature, secondly their infrequence, thirdly their extreme floristic nature, and lastly their poverty of perfume. All the mat herbage plants are poor in perfume; only one, Phlox Douglasii, has any, and that is of a distinct aromatic nature. All the others are poor or non-existent in regard to their perfume. Some of the others, such as Aplopappus Lyallii and Polemonium confertum give off a strong aromatic odor, but only from the resinous nature of their leaves and stems.

Silence acaulis, Phlox Douglasii, Aplopappus Lyallii, Solidago multiradiata, Phacelia sericea, Erigeron compositus, Salix nivalis, Salix arcticus, and occasionally Polemonium confertum, Polygonum viviparum, Oxyria digyna, Loiselleuria procumbens, Gentiana glauca and Campanula rotundifolia are all inhabitants of the various ridges around Garibaldi. The elevation of their habitat is from 7000 to 8000 feet and is well named by Warming as the Sub-Glacial Fell Field. Their prostrate form can be easily accounted for by the strong winds which they have to contend with. In one place, on Empetrum Ridge, which is situated at the head of a gully, the winds are so strong that on a clear sunny day in August we heard roaring noises, and upon closer examination found tiny whirlwinds carrying up debris of all kinds from the ridge. Naturally the only vegetation which can survive is a few very stunted arctic willows.

We measured some of the roots of the Silence acaulis and found six feet to be a

common length. Their prostrate form is easily explained in view of the tremendous winds. The great enemy of all plant life is cold, dry wind. This drives all moisture away from the leaves, thus compelling the plant to assume various protective devices, such as resinous covering of the leaves, intense woolliness or hairiness. Their stomata is always underneath the leaves or tucked away between the woolly or hairy covering. Their extreme floristic character is probably due to the extreme short season and to the fact that very few of the flowers develop mature ovaries, therefore demanding many flowers to ensure at least some being fertilized by the comparatively few insects that frequent these inhospitable regions. Then, again, the fearful inroads that mice and chipmunks make on what few seeds are produced—but more of this last factor later.



HELMET PEAK
TYPICAL EXAMPLE OF SUB-GLACIAL FELL FIELD

The last flowering plant that we met with was that interesting composite Crepis nana. This plant, with its peculiar glaucus leaves, was conspicuous in the fact that some of its flowers were always in fruit, so that if the first did not succeed, there were always more following, and so on till the end of the season; and of the seeds that did germinate, at least three or four seasons were necessary before it could develop enough reserve strength to produce flowers.

A few notes were taken on the fertilizing agents of the sub-glacial flora. The most important seemed to be solitary bees. These were noticed on the Silene acaulis and Phlox Douglasii. Flies, however, were in evidence, especially on the staminate flowers of the arctic willows, and arose in great swarms when disturbed. Very few birds were noticed, the most common being the Ptarmigan, which seemed to feed exclusively on the young shoots of grasses, sedges, and the fruit of the Empetrum nigrum, which had a distinct alkaline taste. This plant, by the way, is one of the first to flower and fruit.

The following table gives the number of species of the families represented in the sub-glacial Fell field of Garibaldi:

Compositae	7	Caryophyllaceae	3
Scrophulariaceae	3	Salicaceae	3
Ranunculaceae	3	Rosaceae	3
Hydrophyllaceae	2	Polemoniaceae	2
Gentianaceae	1	Saxafragaceae	2
Empetraceae	1	Ericaceae	2
Onagraceae	1	Campanulaceae	1

The Compositae easily lead both in the number of species and individuals represented.

Aplopappus Lyallii and Solidago multiraidiata was present on every ridge. The success of this family was evidently due, primarily, to its fine adaptations for seed dispersal and to its many protective devices against the elements. None are annuals.

They are closely followed by the Scrophulariaceae, Caryophyllaceae, Rosaceae, Salicaceae and Ranunculaceae, which have most of the seed dispersal characters of the Compositae.

The Polygonaceae are well represented by two of the hardiest of all Arctic plants—Polygonum viviparum and Oxyria digyna. I am somewhat at a loss to account for the success of Oxyria digyna; it may be due to the large amount of organic salts in the plant, and certainly its free and readily dispersed seeds would help. There is no doubt as to the cause of the success of Polygonium viviparum, for it is the only Arctic plant that produces vegetative buds, coupled with the fact that its swollen root stocks provide a reserve of food that stands it in good stead against the arctic emergencies.

The Scrophulariaceae survive, probably, because of the fact of their semi-parasitic nature.

The solitary gentian Gentiana glauca shows a Biennial like growth, and, I am inclined to think, relies more on its vegetative reproduction than on its seed.

The only representative of the Onagraceae, Epilobium latifolium, closely reminds one of the composites in its methods of seed dispersal.

The Ericaceae are very poorly represented; Loiseleuria procumbens is the only one. They are very old and woody plants and are probably survivors of a past epoch.

The same can be said of the Empetrum nigrum, except that its seeds may be dispersed by the few birds that frequent the region.

The Saxifragaceae are poorly represented. Only two are recorded. They usually frequent protected crevices in rocks. Saxifraga caespitosa is extremely resinous, while Saxifraga bronchialis is stiff and woody.

The destruction of seed by mice, chipmunks, etc., must be very great, far greater than I ever anticipated. In one case I noticed a plant of Phlox Douglasii and counted forty-six seeds on it. I passed on to pick some seeds of Silene acaulis, and while doing this heard a slight crackling sound, and, looking at the Phlox Douglasii, saw two mice busy on the plant. Returning to the plant, I found only four whole seeds and the plant littered with the hard shells of the capsules of the remaining forty-two seeds. The sweet mucilage of these seeds seems to be attractive to all rodents and no doubt contributes to the excessive quantity of fat noticed by observers on them when they retire for the winter hibernation.

Silene acaulis does not appear to suffer in the same proportion as the phlox from the depredations of mice, etc. That they do suffer is very evident from the excreta of rodents, etc. in their vicinity. The seed of Silene is much smaller than that of the phlox and may be scattered by the marauders.

Sometimes arctic plants—except the Composites—produce exceedingly few seeds. Many of the clumps of Silene acaulis were observed to have had many flowers but no seeds, and, in the case of the Polemonium confertum, I counted 13 flower stems on one plant, with 5 to 7 flowers on one stem, and only 11 seeds were gathered from the whole plant. On reflection, one is compelled to come to the conclusion that what with the extreme temperatures, the long cold winters, the fearful desicating winds and their enemies in the mice and other rodents, it is striking compliment to their vitality that any survive at all.

The opportunities afforded by our long stay in this region rewarded our efforts

by the recording of five new species; Sanguisorba sitchensis, Trientalis arctica and Potentilla palustris, all found in bogs, while Hippuris vulgaris was found in the woodland, and we were surprised at finding Dryas Drummondii while hunting on the moraine at the foot of the Sphinx Glacier. Dryas Drummondii was a particular good find, as it has not hitherto been recorded nearer than Hope, B. C. It must, however, be present on the intervening mountains or its existence could not be explained on the moraine.

A fine stand of Pinus Albicaulis was noted on the southern slope of Empetrun Ridge. This fine pine does not appear to tolerate any competition, and can always be looked for on the edges of precipices, or on steep slopes, at an elevation of 6,000 to 7,000 feet. Its seeds, being quite large, are eagerly sought by chipmunks.

In conclusion, I may state that, so far, Saxifraga oppositifolia and Dryas octopetala have not been recorded from the Garibaldi region. I have no doubt that the absence of Saxifraga oppositifolia can be accounted for by the intensely broken character of the rocks, as I have never seen this plant where the rocks have been newly fractured. One fern was collected on Empetrum Ridge—probably Botrychium simplex. It was collected at no other place in the region. One of the puff-balls was also collected on this ridge. I am at a complete loss to account for the presence of four plants on this ridge that were not observed on any other part of the Garibaldi region, namely, Botrychium simplex, the above-mentioned puff-ball, Anemene parviflora and Anemone multifida. I am conscious that I have made a poor contribution to the plant Ecology of the Garibaldi region, but I look forward to the day when a Warming or a Tansley will do justice to the fine field awaiting them.

Vancouver's Harbour and Shipping

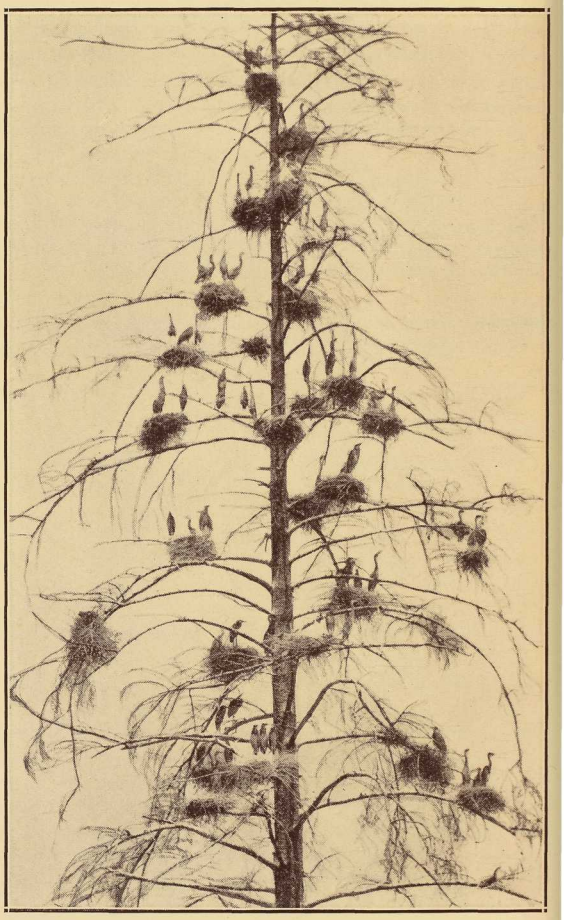
ON JUNE 13th, 1792, two boats crept through the entrance to Vancouver's harbour and cautiously made their way up the Inlet, escorted at a respectful distance by a fleet of Squamish Indian canoes, the crews of which beheld with awe the first white men to enter these waters. In the cutter of H.M.S. Discovery was Captain George Vancouver, and accompanying him in the Discovery's launch was Lieutenant Peter Puget. The Discovery and Chatham, the ships in which Vancouver made his famous voyage, had been left miles away, and the explorer and his lieutenant culminated a series of open-boat investigations by the discovery of the sheet of water which Vancouver named Burrard Inlet, after his old shipmate, Captain Harry Burrard. (Ronald Kenvyn in "B. C. Magazine," June, 1911.) But what of to-day? Huge liners and freighters steam through the Narrows where once the little open boats of the explorers paddled cautiously, followed by the wondering but friendly Squamish Indian canoes, commerce and industry having taken the place of the majestic fir and cedar forest. A waterfront now stands of magnificent wharves taxed to their very limit, golden grain from the prairies and timber from the forests being transported away to the outside world by an endless chain of modern freighters.

The Stanley Park Heronry

BY DONALD W. GILLINGHAM

THE Stanley Park Heronry, one of the most familiar landmarks at Brockton Point, and famous the world over, has been removed. Gradually killed by the excrement of the young birds, the giant white spruce was found to be rotting at the base, so the Parks' Board ordered the tree felled at the end of January, 1927, on the principle that it was a menace to public safety. Its removal was not generally known until this summer.

The Board was further influenced in its decision by the condition of the heronry itself. According to reports, the birds had been so harassed by eagles, which almost wiped out one season's brood, that some of them abandoned the aerial village for a more hospitable shore, leaving the heronry with only half the usual number. This tragedy, combined with the fear of the birds being exterminated in the near future and the knowledge of the tree's decay, lead the Board to pronounce the heronry's span of interest and



THE STANLEY PARK HERONRY, once the home of a large colony of northwest coast herons. This photograph, which is perhaps the only representative picture we have, was taken from an adjacent tree by Mr. Gillingham in 1923, and shows 27 nests and 81 young.

value to the park as over, so the old spruce came down.

The only record we have of its history—the tree was one hundred and sixty-six years old—comes from Mr. Winram, chief forester of Stanley Park, who started work in the park in 1910. The spruce was alive then though as white as chalk, and contained about the same number of nests. In 1922 there was still a little green noticeable at the tips of the lower boughs, but a year later, when the above photograph was taken, not a sign of life remained. It is possible that the herons had built there for thirty years.

It would be gratifying to discover the birds establishing themselves somewhere else in the park, but that seems to be beyond all hope, for already another spring has gone by and they have not turned up. The first spring they came back in full force, but, after viewing the ruins of their ancestral home, circled the park and disappeared. No doubt the brooding urge has caused them to rebuild in some other part of the country, though a report of a new heronry anywhere has not been received. It seems a pity that the birds were not allowed to forsake the heronry on their own accord, for they might have re-established themselves close by and so maintained one of the four natural wonders of the park.

With the tree's removal Stanley Park has suffered an irreparable loss, which will be felt more and more as time goes on and the news spreads to other parts of the globe. There are scores of heronries in the world, but there was only one such single-tree heronry, within ten minutes' drive from the heart of a great city, in all the parks of Canada, and possibly North America. It was unique, and it was great.

CORRECTION

In the article "Graphic Art of the Haidas" in the last number of Museum Notes, Vol. III., No. 1, page 7, 3rd line from bottom, read "Taden Skeet" for "Talteen." —W.G.F.

A Toast to Vancouver

BY PAULINE JOHNSON

THERE's wine in the cup, Vancouver,
An there's warmth in my heart for you,
While I drink to your health, your youth and your wealth,
And the things that you will do,
In a vintage rare and olden,
With a flavor fine and keen,
Fill the glass to the edge while I stand up to pledge
My faith to my western queen.

Pictographs of the Similkameen Valley of British Columbia

BY REV. JOHN C. GOODFELLOW
PRINCETON, B. C.

THE beginnings of painting long antedate the beginnings of recorded history. Indeed recorded history may be said to begin with the crude paintings of pre-historic artists. Painting is one of the oldest of the arts. It is also one of the most universal. In certain caves in France, and in Spain, there have been discovered drawings, and paintings, by no means "crude." Among these are representations of the reindeer, the bison, and other animals long extinct in Southern Europe. How many thousands of years old some of these pictures may be is hard to determine. Certain it is they adorned the walls of dim caverns long before the Roman legions advanced across Europe. The Cro-Magnons revealed a genuine sense of art. Evidently they were less fitted to survive than some of their neighbours; though, even in early times, the race was not always to the swift; the battle was not always to the strong.

Examples of pre-historic art are to be found in America as well as in Europe. On this side of the Atlantic we are particularly rich in examples of pre-historic art. These are to be found scattered all over the continent. But for the present we are concerned only with British Columbia, and only a small area of that Province—the Similkameen Valley of the Southern Interior. Even this must be still further narrowed down to the strip of road that follows the course of the river Similkameen from Princeton to Hedley. Here are to be seen a number of pictographs of more than passing interest.

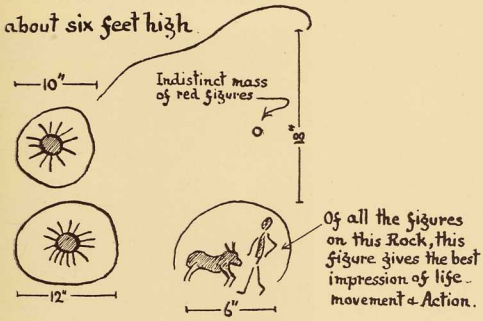
British Columbia is rich in pictographs, and petroglyphs. *Petroglyphs are carved, or engraved, IN rocks. Pictographs are painted ON rocks, or other material. They are sometimes referred to as "graphs" or "glyphs," as the case may be. The words are convenient, for they represent two well-defined branches of pre-historic art. Both of these are abundantly illustrated in British Columbia. Pictographs are more common in the Interior. There are few petroglyphs in the Similkameen Valley.

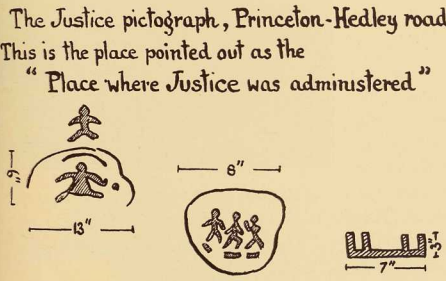
I had been some months in the Interior before I learned of the existence of pictographs on the Princeton-Hedley road. The opportunity soon came to visit them in company with Evan J. Thomas, the forest ranger. In various sections the road is lined with huge boulders. The road follows the old Indian trail along by the north bank of the river. The boulders were as familiar a landmark to early Indians as they are to the autoists of to-day. The first task Mr. Thomas and myself set ourselves was to locate all the boulders on which pictographs were to be found. With a single exception they are all located on these fallen boulders strewn along the road-side. The exception is on a rock face, and is, perhaps, the most important of all. It is known locally (among the Indians) as the "Place where Justice was administered."

*This is the simplest classification for our present purpose. Compare Mallery page 31. "In the plan of this work a distinction has been made between a petroglyph, as Andree names the class, or rock-writing, as Ewbank called it, and all other descriptions of picture-writing. The criterion of the former is that the picture, whether carved, or pecked, or otherwise incised, and whether figured only by coloration or by coloration and incision together, is upon a rock either in situ or sufficiently large for inference that the picture was imposed upon it where it was found. Ths criterion allows geographic classification."

Our next task was to give each graph a pet-name, for the sake of ready reference. These pet-names were suggested either by the location of the boulder, or by some distinguishing mark of the pictograph itself. Those suggested by location are Norman, Hayward, Soukon, Smith, Cory, and Stirling. The pictographs themselves suggested such names as Lone, Triangle, Square, Mark Twain, Arrow. Two names were suggested by the boulders on which the graphs were found—Shelter and Razor. The pictograph located at the "Place where Justice was administered" we christened "Justice." One rock remained. We called it "Taylor." Altogether we discovered fifteen sets of pictographs. The pet-names should be a help to the student.

One thing remains to be done: that is, to note the exact distance each boulder is from Princeton. Unfortunately we had no speedometer on our car.





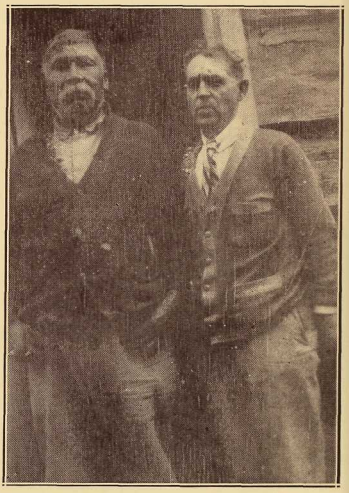
For the most part the pictures are distinctly crude. They may be full of interest, but they reveal little sense of real art. Only on the boulder on the river side of the road, almost directly opposite the entrance of Smith's Creek to the Similkameen, do we find a picture that seems to have life, and movement. Of course there are some conventional signs on Smith's pictograph, but the figure of a man seems to be the personification of action. Apparently he is seeking to lay hold on some animal depicted—probably a horse. To the left are two drawings, like our conventional signs for the sun. They are about ten and twelve inches across respectively. Above is a confused mass, clear enough long ago, maybe, but now quite undecipherable. Being higher up, it has been more exposed to wind and weather, and with the passing of the years has lost its firmness of outline.

The others may be indicated by the names which the pictographs suggested for themselves: arrow, triangle, square, etc. In almost every case these are accompanied by crude drawings of the human figure. Sometimes the foot of an animal may be indicated.

In seeking to find the interpretation of these rock paintings, we learned many strange, and sometimes conflicting stories. Mr. Thomas took me to see Charlie Squakem, an old Indian who came originally from the Nicola Valley, but who has lived in the

Similkameen ever since he was a boy. Charlie seemed willing enough to tell us all he knew, but, alas, there were many things we desired to know that he could not tell. He knew that the pictographs were there, and that they were made by Indians. But that was a long time ago. They were there when he first came to the Valley. How they originated, or what they meant, he professed not to know. But he knew that there were others further down the Valley, near Keremeos. Since Charlie did not know much about the paintings, we talked about the paint. This was made from red ochre. About a mile west of Princeton is a great rock, known locally as the Red Bluff. Here the Indians got their paint mixture. Thus the river the rock frowns on was named Tulameen, which means "red paint." The Tulameen flows into the Similkameen. The town of Princeton is beautifully situated in the "forks" of the two rivers.

Charlie referred us to Mrs. Arcat. ('Arcat,' by the way, is a corruption of the name 'Agatha.') She said that the pictures had been on the rocks a long time. "My mamma told me that they were made by old-time gels (girls). The girls were just playing. The marks don't mean anything." Yet even the casual observer will note that in the pictures there is too much evidence of design to be the work of "gels, just playing." But it is wise to remember that many wise men have tripped over "Billstumpshis mark." Domenech's "Manuscript Pictographique American" is a case in point. It was said of the author of this book that "the eyes of a pale enthusiast looking for his destiny can see the history of a thousand years in the track of an ink-bedraggled fly." Domenech's work was published by royal instruction, only to discover that time and talent, and much money, had been devoted to preserving the records of some child's mind. Most of the copies of the book were destroyed, but a few survived. They are exceedingly rare, and the Vancouver library is fortunate enough to possess a copy.



CHARLIE SQUAKEM (*left*) and EVAN J. THOMAS (*right*) at the door of Charlie Squakem's House.

Another Indian had a story which had some points in common with that of Mrs. Arcat. He said that the marks were made "long time ago," and that they were made by girls. At that time girls were required by their parents to stay out all night periodically at some lonely place. This was done with the Spartan idea of making the girls hardy, brave, and unafraid of the dark. To indicate that they had been at certain spots, they made these marks on the rocks. Thus the records were a guarantee of obedience to parental wish or command. This seems to correspond, in the main, with what James Teit wrote in his work on the Thompson Indians (pp. 311. ff). The following quotation is from Teit: "Lads painted records, which were pictures representing their ceremonies and their dreams, on boulders or oftener on cliffs in wild spots near a waterfall, etc. These were generally pictures of animals, birds, fishes, arrows, fir branches, lakes, sun, thunder, etc. Figures of women were symbolical of their future wives. It was believed the making of rock paintings insured long life."

(*Continued on Page 23*)

The Art of the Eskimo

BY DONALD W. GILLINGHAM

THE belief that the Eskimo is an inferior and comparatively inartistic type of aborigine is quite common. This misconception possibly arises from associating the Arctic native with a region of ice and barren land which tradition makes us believe has no poetry about it at all, and from the fact that the Eskimo has no outstanding original, decorative art (formal art—such as the textile designs found on the well-known Chilkat blanket made by several Indian tribes of our North Pacific Coast) which ethnologists have thought worthy of distinction. So little art research work, too, has been done in the far north, especially among the Siberian tribes.

The reverse of this belief is true, though it is not erroneous to think of the Eskimo as a simple person. He is, undoubtedly, simple and childish in his ways, which is partly the outcome of a nomadic and peaceful existence. He has not the keen, analytical mind of the Indian. His frank and inoffensive countenance declares that at once. But his is the type of mentality that often produces the highest art, in an aesthetic sense; the art which has freedom and grace and depicts nature rather than reduces nature to geometrical terms.

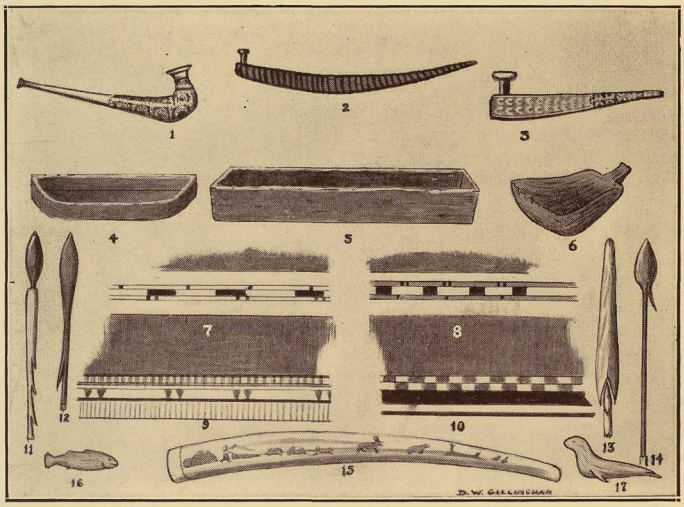
The rare, naturalistic skill with which the Eskimo can use the pencil is extraordinary. He is far ahead of even the famous Bushman. Mr. Rasmussen, explorer, had several native artists draw for him sketches of the animals and things they saw about them, and the results, which he has published in his book, "Greenland by the Polar Sea," can be favourably compared with the work of our own artists.

The excellence of these drawings invites the questions, "How did the Eskimo come to possess this naturalistic tendency? Was it gradually acquired through environment and occupation, or was it inherited from some artistic and mysterious race?" Before the hyperborean art can be discussed with any intelligence, these questions will have to be answered.

Supposing that the Eskimos and the Chukchis are off-shoots from the Yellow Race, which was the origin of most of the Asiatic peoples, and that the division came, say, with the disaster in the Gobi Desert. Limited numbers escaped over the north-eastern rim of the desert and established themselves in what is now known as Manchuria, but, being so few, became a nomadic and peaceful race and, ages later, were driven north to Siberia by the more savage peoples to the south of them, who represented the main overflow from the Gobi Desert. After becoming acclimatized to the Arctic conditions, they migrated across Bering Straits to North America, spread as far east as Greenland, and eventually were so severely pressed by their Indian enemies in the interior that they had to confine themselves to the Arctic coast. (Though the Greenland Eskimo has a slightly different dialect and standard of decorative art to the Alaskan tribes, the difference is possibly due to a thousand years or so of segregation.) On the other hand, the rest of the offshoots from the mysterious Yellow Race, the main body of "refugees" from the Gobi Desert, now known as the Ainu, Japanese and Chinese, etcetera, increased and became exceedingly gregarious, a condition which inspires a warlike temperament in any race and consequently affects its art. At a considerable later period they originated this grotesque, symbolical branch of their art, mostly of religious significance,

while the Eskimos, being nomadic hunters and more concerned with the struggle for existence, had no reason to conceive such weirdness, but a very good reason to develop a naturalistic art.

Would this not explain the origin of the Eskimo's naturalistic tendency? It is generally acknowledged that the Japanese and the Chinese are, on the whole, more



EXAMPLES OF HYPERBOREAN ART

These drawings are not comparative in size, except the arrow-heads and the border designs. Numbers 1, 2 and 3 represent the types of pipes used by the Eskimos along the shores of Bering Sea. The second of the three is made of wood bound with buckskin, and the other two are carved from ivory and beautifully etched. Numbers 4, 5 and 6 are examples of carved work done by the Copper Eskimos in Coronation Gulf. The first of the group is a soap-stone seal-oil lamp (now in the museum), the third is a large soap-stone pan, thirty inches long, and the fourth is a ladle made out of muskox horn (also in the museum). Numbers 7, 8, 9 and 10 represent four different coloured designs found on the borders of the Alaskan and Mackenzie River Eskimos' parkas, taken from photographs by Mr. Gillingham. Numbers 11, 12, 13 and 14 are types of arrow-heads peculiar to the Copper Eskimos. Sketches made in Coronation Gulf. The first of the four has a steel head and a bone stock, the third is carved entirely from bone, with four barbs, two of which are rivetted on by native copper, and the second and fourth are of solid steel traded from the Great Slave Indians at a recent period. Numbers 15, 16 and 17 are ivory carvings.

artistic races than our own. This is noticeable every day in the Vancouver schools. The Japanese child is versatile. He has an impressionable mind. He can produce beautifully and accurately on paper what he has seen, and if he were faithful to his forefathers he would present a group of objects in a decoration with little sign of symmetry, which

is typical of oriental art, though he can also make a very fine formal design. The Eskimo has a similar faculty for accurate presentation, a graphic art, usually without symmetry, but he is so versatile, and comparatively too few in number to be influenced by traditional art, that he can be persuaded to do anything. The similarity in the temperaments of these two races is significant.

Of course, I am aware also that any hunting tribe must develop at least a crude naturalistic art, regardless of its origin. It is true that the struggle for existence, which continually called upon their two chief virtues of keen observation and skilful craftmanship, must have enabled the Eskimos to depict accurately the figures of igloos, men, walrus, seals, bear and reindeer (though not flowers, which is a higher and later type of this art) in their carvings and drawings, and it is just possible that this naturalistic tendency would have been buried under some more conventional, symbolistic art had their geographic situation been reversed and their social organization been changed. On the whole, however, it seems more satisfactory to accept the theory that the Eskimos have inherited the artistic sense and further developed it by their every-day pursuits.

Some people would immediately ask, "Well, what about the British Columbia Indians?" They are different in physique (there are exceptions) and temperament from the Eskimos, yet they more resemble the Japanese in features than any other American Indians. Their custom of using totem-masks, too, is very similar to that of the oriental, indicating a parallel in one branch of art, and favouring the theory that they, too, are of Asiatic origin and came across Bering Straits or by way of the Aleutian Islands. But the knowledge that they have very little naturalistic skill, in spite of the fact that they are chiefly a hunting race, eliminates this theory of origin. It suggests, too, that the American Indians came from somewhere else, perhaps South America, one division of which reached the North Pacific Coast and later met and mingled with Asiatic peoples who either had been wrecked on our shores or had migrated here on their own accord, or even some other wandering native tribe which had taken a circuitous route through Asia, picking up the oriental art on its way, and migrated to this coast. Thus the Indians came to acquire an art which is peculiar to the tribes of British Columbia and Southern Alaska. Totemic art, as we all know, certainly is not old.

The Eskimos distinguish themselves by their refined artistic sense. They reveal no barbaric love for brilliant colours, like the races to the south of them, though there is an abundance of colour in their land. The art of our coast Indians is not gorgeously repellent by any means, but years of civilization will not oust the squaw's desire for brilliant and clashing colours in her dress. The Western Eskimos can get bright cloth from the traders, but they do not want it, except for border designs. What they do buy is very soft and harmonious when made into wearing apparel. Neither do they daub their faces and bodies with paint, not because the abundance of clothing makes it impossible, but because their natures will not allow it.

Tattooing was common among the tribes several years ago, though the custom is fast becoming obsolete. Comparisons of this art show it to be superior to that of most native races, but even then it is very simple. Only the faces of the women and their arms are tattooed. There seems to be no definite universal explanation for this limited practice, though it possibly signifies maturity. The simple, radial design, shown in the photograph, is made by drawing a needle and a thread dipped in lamp-carbon under the epidermis, which leaves a blue mark behind.

Dancing masks have been introduced by the Coast Indians into the life of the Alaskan Eskimo. They are just as hideous as the Kwakiutl or Haida masks, but in some cases the Eskimos have improved on the idea and carved features which are distinctly human and hyperborean in character.

The best known graphic art of the Western tribes is ivory carvings. The work they have produced is remarkable when it is remembered that their tools in the old days—and even to-day in some parts—were very crude for such intricate work. The realistic figures of mammals are perfectly finished. The natives east of Point Barrow are not an ivory carving people, for walrus do not inhabit their shores. The most prolific and expert producers of this work are the Alaskan Eskimos—especially those on the Diomede Islands, where, with such a demand from traders for ivory carvings, the cliff dwellers have established a permanent occupation—the Aleuts and the Chukchis of Kamchatka Peninsula and farther north, who carve much of the old ivory and mammoth tusks dug from the cliffs. The mate of the Hudson's Bay Company's ship Baychimo has in his possession an excellent example of the Chukchis naturalistic art, which shows how impressionable is the mind of the hyperborean. In 1922, when the Company was trading in Siberia, the ship stopped at Southead, in the Gulf of Anadyr, for a short time. When she returned the following year a native presented the mate with a model done in ivory, fourteen inches long, of the Baychimo. It was complete even to the life-boats, and finely executed.

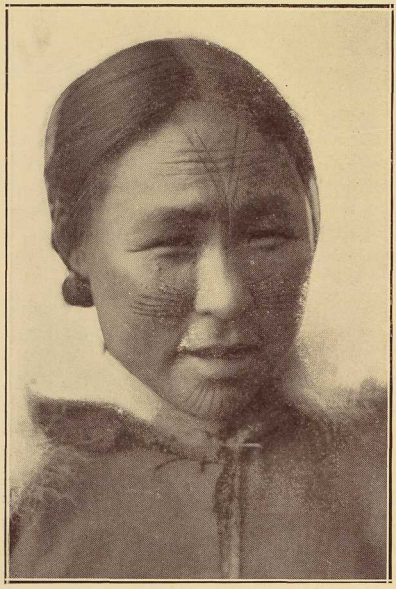


Photo by D. W. Gillingham

Young Copper Eskimo Woman with tattooed (blue) face. The designs found among the Aivillik natives of Hudson's Bay are better, the lines being doubled in each case and stronger than shown here.

Etching is not new to the Eskimo. He has practised it for a long time. His favorite pastime was recording incidents of his life by etching serially on a walrus tusk pictures of himself and the animals included in the story. His hunting expeditions he depicted from the start to the finish. Thus the tusk became a record of achievement done pictorially and not hieroglyphically, for the Eskimos originally had no written language. If you visit Alaska to-day an Eskimo will be only too willing to etch on a tusk a pictorial diary of your visit. In this work, by the way, no spirit figures are drawn, though occasionally the man in the moon will be represented by a human figure scarcely distinguishable from any other.

The Eskimos of Bering Sea shores are inveterate smokers. Obviously the habit was acquired from Asia and not from the American Indians, for the pipes, carved out of either wood or ivory and beautifully etched, have long stems with cylindrical, wide-rimmed bowls resembling those used by the oriental peoples. They vary considerably according to different localities in Alaska, but in the main the shape is the same. The designs etched in the ivory suggest oriental origin, for they are unknown east of Point Barrow, though the natives in the extreme north-east of the continent strangely have elaborate decorative designs on their clothing not unsimilar to those found on some of the western pipes and foot-gear. I shall refer to this later. Smoking

does not seem to have been known among the Copper Eskimos until recent years, when the vice was set going by the white traders. Possibly this is due to the lack of tobacco, for the Eskimos, in the early days, rarely wanted to come in contact with the Indians, who were their deadly enemies. Smoking even among the Bering Sea natives seems to be a comparatively recent habit.

The Copper Eskimos, though without ivory for practising the art of ivory carving, make some artistically shaped ladles, their chief utensils, out of muskox horn. In their large pots and seal oil lamps carved out of soapstone (Coronation Gulf has much of this workable material, so that the natives of that region have an eagerly demanded commodity for trading)) the lines are usually straight, though dignified and neat, without ornamentation of any kind. Pottery is not made by the Eskimos, probably because Arctic clay is not suitable. Traces of it, however, equally undecorative, have been dug up from Barter Island, between Herschel Island and Point Barrow, and from many islands in Bering Sea, indicating that the natives brought pottery with them from Asia long ago.

All the hyperboreans are master craftsmen in boat building. The most beautiful native canoe, the kayak, belongs to the Arctic. It is typical of a graceful art. Long, slender, seaworthy, fashioned out of spliced pieces of willow or driftwood so jointed that the craft gives to the movement of both the paddler and the waves, and enclosed with ugyuk (bearded seal) skin with a well-hole in the centre, the kayak is the acme of marine architecture. The designs are not constant, some of the Central Eskimos building kayaks shaped like a bow, with the tapered stern and bow curving skywards from the water. The most elegant craft of this type I have seen are made by the Copper Eskimos in Coronation Gulf. They are much lighter and more slender than those of the Alaskan natives (one of their kayaks is in the museum), for the Copper Eskimos portage their canoes many miles inland to the lakes to pursue caribou and geese, a method of hunting which demands a minimum of weight with a maximum of speed. The Aleut bidarkas (a Russian name for kayaks), ribbed with ivory or bone and a little heavy, are sometimes built with two and three hatches, a recent innovation.

Photo by D. W. Gillingham

Style of dress found among the Eskimos inhabiting the extreme western Arctic, though the fashion has been accepted by many Copper Eskimos. The two parkas on the left are made from caribou. The boy's parka is made from a blanket.

The Indians and the other native races universally use geometrical, decorative designs, composed chiefly of straight lines, squares and triangles—with the exception of

the unique "eye" and whale designs prominent in the art of the tribes along the northern coast of B. C.—on everything, from weapons to textile materials. The only instances we have of this conventional, decorative form being extensively used among the Alaskan Eskimos are on the borders and the arm-bands of their parkas (the patterns worked into their pipes and sometimes on their mucklucks are dissimilar), though the designs are not generally found among the primitive natives of Coronation Gulf and Victoria Land. (It seems that the only way to study the true hyperborean art is to stay with these primitive peoples who have not been influenced by more modern art, for in Alaska to-day it is hard to distinguish the original from the borrowed). In one of the illustrations of this article I have drawn four examples of border designs used by the Alaskan Eskimos. The beautiful parkas made of variegated reindeer skin, with the typical "walrus tusk" shoulder inserts, hood fringes of white fox or wolverine fur, and colored designs made from dyed buckskin or calico, are being copied by many of the eastern tribes, though the garments have to be sewn from plain caribou skin, for the Canadian Eskimos have no reindeer herds.

Canadian Government Photo

Man and woman in full Copper Eskimo dancing costume. The Central Eskimos' original gala costume is similar to this, though the woman's "atigu" has a "bib" in front. To-day many of the Central Eskimos have an extremely elaborately designed gala costume.

The original Copper Eskimo dress, still used by many primitive natives in the Canadian Arctic, is a long-tailed costume, cut short at the breast, of caribou skin handsomely "inlaid" with white fur taken from the throat of the animal, with a pair of breeches to match. The styles vary according to sex and locality. There is a noticeable lack of colour and border work in them all. The ceremonial costume is an elaboration of the standard dress, and sometimes a little colour is introduced, though I have never observed it on anything I have examined. (See photograph). The main point of interest about the truly primitive Copper Eskimo, who has been so much cut off from the world, is that he has neither originated nor borrowed the decorative, conventional designs which are seen so much on the western parkas.

The third type of dress is found among the Central Eskimo women, especially the Kemipitu and the Aivillik women of the western shore of Hudson's Bay. There the

ceremonial costumes are elaborately and effectively decorated with dyed buckskin, suggesting a general's state-tunic overdone with braid. The shoulder pads, hung with tassels, especially suggest a general's gaudy jacket. In Greenland a similar love of extreme ornamentation, not at all objectional but rather picturesque, is found, but the patterns are a little different, and hip-high, fancy-coloured boots are preferred to baggy breeches. The designs bear a close resemblance to those etched on the pipes of the Bering Sea natives, yet the two tribes are as far apart as England and Japan, and the Eskimos inhabiting the isolated regions west of Hudson's Bay do not practise the art and appear to be ignorant of its existence. We might gather from this that the designs are not original, but, being of type appealing to the Eskimos generally, were borrowed from other people with whom they had recently come in contact. The same might be said of the Central Eskimos' elaborate gala fashions in vogue to-day. They are obviously copied, though incorporated with their own original style of dress (which is similar to the Copper Eskimos', except that the upper garment has a "bib" falling from the breast) used in every-day life, and the elementary square, triangle and series-of-parallel-lines designs, which appear to constitute the formal, decorative art of all the half-civilized Eskimos. This gala dress is unique and striking, and reveals a high taste for patterns and a remarkable faculty for skilled imitation and harmonious combination of local ideas, but it cannot go down as an example of original Eskimo work.

On the whole, the hyperborean decorative design is so elementary and variable in its original form and so intermixed with exotic patterns in its more recent phases that its importance to formal art is questionable. And the graphic art is so naturalistic that it can scarcely be called representative at all, except in subject matter. The Eskimo has an industrial art and a costume style which alone stand out as unique. In the pictorial branches of his art he will not be confined to limits. He is individualistic. His art, like his life, is free. It is of the world. It springs from a temperament that is decidedly oriental, but which has not been influenced by ages of mass civilization and the moral bondage of its traditions to develop a distinguishable, naturalistic art such as the Japanese and the Chinese adhere to to-day.

Pictographs of the Similkameen Valley

(*Continued from Page 16*)

In a recent letter to the curator of the Museum, Professor Hill-Tout regards rock paintings, and carvings, as "partly totemic, and partly meemonic in character. We know that Indian boys and girls, undergoing their solitary preparation for the acquisition of a guardian spirit or personal totem, often recorded their dreams on rock faces, and many crude ideographs known to us appear to have originated in this way.

Still another explanation we received was that the paintings indicate the old trail along which the Indians used to travel. It seems fairly certain that rock paintings and carvings often served as sign-posts. The most exhaustive book on the subject is "Picture-Writing of the American Indians," by Garrick Mallery. (See Annual Report of the American Bureau of Ethnology, 1888-'89.) "Evidence is presented that the characters on rock pictures sometimes were pointers or 'sign-posts' to show the direction of springs, the line of established trails, or of paths that would shorten distances in travel. It has been supposed that similar indications were used guiding to burial mounds and other places of peculiar sanctity or interest, but the evidence of this employment is not conclusive." (Page 770.)

But the most interesting explanation of all concerned the "Place Where Justice Was Administered," and makes one feel that however much truth the above explanations may contain they are inadequate. Here again the story is set in the hazy past—"long time ago." The hero of the tale was Ashnola John's eldest brother. John died some years ago. A number of white men were coming up from the south. Possibly they were making for the Coast, travelling by the old Hope Trail. They were not likely to meet any white settlers in these early days (probably the early sixties). Some of the white men insulted a girl of the Ashnolas. The elder brother of Ashnola John went out to avenge the insult. The elder brother was murdered by the white men. Then all the Ashnolas went out together to avenge this double insult. They fell upon the white men at the "Place where justice was administered." The white men who escaped fled to the hills, but the Indians pursued them. Eventually one lone man escaped over the Hope trail. All the rest paid with their lives for the insults heaped on the Ashnolas.

Even with this story it is hard to interpret the markings on the Justice pictograph. Possibly the interpretation would be easier in the light of history, but many more details are necessary before the pictograph becomes wholly intelligible. Of course we cannot apply the historical method of interpretation to all the paintings. One is not necessarily a key to the rest, although its interpretation may throw much light on many. No single pictograph can be regarded as a "Rosetta Stone," giving a clue to the meaning of all the rest.

With this in mind the old paradox may be true that the secrets of the past are hidden in the bosom of the future. Let us not cease the search till the secrets of the past are laid bare. What Great-Heart said about Mr. Fearing is still worth quoting: "He loved much to see ancient things, and to be pondering them in his mind." It is a matter of much regret that faithful copies of some of the pictographs along the Princeton-Hedley road were not made before they became so faded.

"Help us to save the things that go;
We are the gleaners after time."

REFERENCES: In preparing the above article, much help has been received from the following people, and books: Mrs. Garland Foster, Mr. E. S. Robinson, Mr. T. P. O. Menzies, of Vancouver, B. C., Mrs. Allison, Mrs. A. E. Howse, Mrs. E. E. Hardwick, Mr. A. E. Howse, Mr. E. J. Thomas, of Princeton, B. C.

1. "Picture-Writing of the American Indians," by Garrick Mallery. See Smithsonian Institution, Bureau of Ethnology, Annual Report, 1888-89.
2. "The Thompson Indians of British Columbia," by James Teit (edited by Franz Boas, 1900).
3. "An Album of Pre-historic Canadian Art," by Harlan I. Smith (1923). Bulletin No. 37, esp. pp. 96-107.
4. "A List of Archaelogical Sites Near Yale, British Columbia," by Harlan I. Smith.
5. Letter re Pictographs to Mr. Menzies from Professor Hill-Tout.
6. "Among the curiosities of literature in connection with the interpretation of pictographs may be mentioned La Vèritè sur le Livre des Sauvages, par L'Abbé Domenech, Paris, 1861, and Researches into the Lost Histories of America, by W. S. Blacket, London and Philadelphia, 1884." (See Mallery, p. 767).
7. Photographic collections of Mr. Denys Nelson, Fort Langley, and Rev. J. Edward Rendle, Bella Coola, etc.

The Library Corner

READERS of Museum Notes will be interested in acquisitions to our library section, which is assuming proportions of considerable magnitude. The Museum is fortunate in being on the exchange list of many learned and scientific societies, nearly all of which publish valuable reports, monographs and scientific treatises. This exchange is made possible by having Museum Notes to offer in return, and forms a source of valuable literature hitherto unobtainable because of lack of funds.

It is proposed to devote a small corner of each succeeding number of Museum Notes to this important section of the Museum by listing, with suitable comment, the various outstanding works received each quarter. Those items of interest to our readers which the public library adds will also be mentioned. The following were received during the last three months:

1. "General Guide to the Durban Museum," by the Curator, E. C. Chubb. Third edition, 1928.

This guide is for use by visitors to the Museum, which, although in a city considerably smaller than Vancouver, and inhabited largely by non-English speaking peoples, takes a very important part in the life of the community. It has 20,000 feet of floor space and has especially fine collections of natural history, geology, anthropology and ethnology. The guide is appropriately illustrated with photographs of specimens taken by one of the staff. Being the principal seaport and largest city in Natal, South Africa, Durban has reason to be proud of its Museum.

2. "Yearbook of the Public Museum of the City of Milwaukee, 1926. Milwaukee, Wis., 1927."

This yearbook of nearly 200 pages covers the activities of the institution for the year. It consists of notes on the Museum's collecting expeditions as well as of special notes and news contributed by members of the staff and authorities in various fields. The whole is well printed and attractively illustrated on good paper. Unlike Vancouver, a large and well-appointed building houses the valuable collection, but the authorities are already considering larger quarters so that the services will not be curtailed. The work is edited by the Director of the Museum, Mr. S. A. Barrett.

3. "Pope and Dickinson: Amphibians and Reptiles of Wisconsin, and Smith: Ethnobotany of the Meskwaki Indians.

These two items are bulletins of the public museum of Milwaukee and are scientific treatises of considerable size and value. They form valuable lists in their respective fields for use by students and teachers of biology and others interested in natural science. This is a virgin field in British Columbia and one which the City Museum hopes it may enter before long.

4. "Indian Notes. Heye Foundation, Museum of the American Indian. New York. Vol. 5, No. 2, April, 1928."

This number of this valuable little series covers such interesting subjects as:

Some Indian ideas of property;
An historic Iroquois club;
The Algonquin at Golden Lake, Ontario;
Tracing the Pueblo boundary in Nevada,

and numerous other interesting phases of Indian art and culture. As usual, it is appropriately illustrated with photographs of specimens, which greatly adds to its attractiveness.

The public library reports adding "Industrial Art and the Museum," by Charles R. Richards. Mr. Richards is vice-president of the American Association of Museums, and is well qualified to discuss the subject of the museum and industrial art, which is becoming more and more important to our modern civilization. He traces the subject from its beginnings in the seventeenth century down through the various periods, with special reference to European Museums, showing the importance of introducing the element of beauty into the production of commodities whether hand-made or machine-made. The book is illustrated with pictures of various museums, and contains floor plans of various well-arranged buildings.

A rare and curious work has just been acquired by the public library, which, although spurious, is of interest to us, as it explains certain pictographs purported to have been drawn by an Indian chief of Canada. In reality, the pictographs were the drawings of a young German immigrant to the United States Somehow they found their way into the Arsenal library in Paris, there to be "discovered" by the Abbé Em. Domenech, who proceeded to explain their meaning with a very learned treatise which he succeeded in having published under the sanction of the Emperor of France. He called his work "Manuscrit pictographique Americain," and reproduced in facsimile the 228 pages of drawings. This was in 1860.

Thomas Field, in his "Essay Towards an Indian Bibliography," says of the work:

"The First Section is entitled "Notice of the Ancient American Manuscripts, and of The Book of the Savages." This unhappy work afforded a sensation to the literary world of Europe, not less unusual than universal. From every study, library, and bookseller's rooms arose a shout of laughter, that the soul of Rabelais might have envied. No Frenchman, since that ribald wit left the earth, has excited such a chorus of unextinguishable cachinnation. Unfortunately for the Abbé Domenech, the parallel between himself and Rabelais soon ceases, the world laughs not with him but at him. He has been the victim of an imposture so rank that we should wonder not less than we *admire* his self delusion, if he had not dragged so many considerable people into the same net."

"It would seem impossible, on the merest glance at the sprawling pictures, that any person in this matter-of-fact world could have arrived at any other conclusion regarding the MS. than that it was a child's drawing-book. But the eyes of a pale enthusiast looking for his destiny can see the history of a thousand years in the track of an ink-bedraggled fly. There is a persistence in self-delusion that carries the dupe on to his destruction. Besides, a French savant is ready to believe in anything except his God. Accordingly the Abbé Domenech wrote a treatise on the MS., which he declared to be the work of some Indian chief of Canada . . . . . Sufficient, however, is it for our mirth that the work was published only to discover that the MS. was either the work of some mischief-loving inventor, or of a sick child whiling away the hours of illness. Since then the Emperor, the Emperor's household, and Abbé Domenech have been industriously employed in destroying all the copies they can procure, consequently they are exceedingly rare."

Not satisfied with this "faux pas," the good Abbé proceeded to answer his critics by writing and publishing the next year "La vérité sur le livre des sauvages," which only led him deeper into the abyss from which he never recovered. The library is fortunate in securing these works, which are much sought after. The "Manuscrit" is a fine autograph presentation copy, and each volume contains interesting notes by Gilbert R. Redgrave, London, from whose library they came.

—E. S. R.

Dinoflagellates from British Columbia

with Descriptions of New Species.

Study from the Stations of the Biological Board of Canada

BY G. H. WAILES

June, 1928

PART II. WITH PLATES 4-6

KEY TO THE SECTIONS OF GENUS **PERIDINIUM**

Genus **PERIDINIUM** Ehrenberg.
Plate formula 4', 2 to 3a, 7", 5"', 2"".

Sub-genus **Archaeperidinium** Lebour.
Plate formula 4', 2a, 7", 5", 2"".

The first apical plate, 1' always diamond-shaped and the two intercalary plates meeting above the fourth precingular in marine forms (pl. VI., fig. 8), and either meeting or separated in freshwater forms (pl. VI., fig. 5).

Sub-genus **Peridinium** Lebour.
Plate formula 4', 3a, 5"', 2"".

This sub-genus contains a great number of species, many of which superficially resemble one another very closely but differ in the plate arrangement.

Jörgensen's division of the genus into groups and sections, as modified by Lebour, is given below.

Although apparently somewhat complicated, the sections fall into a very natural grouping; this is doubtless due to the phylogenic significance of the plate arrangement; it also reduces to two or three at most the number of species to which a specimen under examination can belong, provided the plate arrangement is correctly ascertained, which, however, is not always easy to do.

1. Group ORTHOPERIDINIUM.
   First apical plate (1') always four-sided.
   (a) Section Conica, plate 2a, touching 3", 4" and 5".
   (b) Section Oceanica, plate 2a, touching 4".
   (c) Section Tabulata, plate 2a, touching 3" and 4" or 4" and 5".
2. Group METAPERIDINIUM.
   A. First apical plate (1') five-sided.
      (d) Section Pyriformia, plate 2a, touching 3" and 4" or 4" and 5".
      (e) Section Divergens, plate 2a, touching 4". With hollow antapical spines or horns.
      (f) Section Humilia, plate 2a, touching 4" with solid antapical spines or horns.
   B. First apical plate (1') five or six-sided.
      (g)) Section Paraperidinium, plate 2a, touching 3", 4" and 5".

Description of New Species

Peridinium subpunctulatum sp. nov. Pl. V., figs. 6-9. Pl. VI., figs. 21, 22.

Cell small, epitheca conical with convex sides; hypotheca nearly semicircular in side view; ventral sulcus not reaching the antapex, with curved ventral plate on the left side; girdle nearly circular, slightly excavated; plate arrangement as in Section Tabulata.

Length and breadth equal, 48-58μ.

Localities: West coast of Vancouver Island; Cortes Island. Infrequent.

In fig. 8 the apex is inclined about 20 degrees ventrally, to show more clearly the arrangement of the dorsal plates.

Differs from *P. punctulatum* in the shape of the hypercone; the plate arrangement is similar in the two species.

Peridinium discoides sp. nov. Plate VI., figs. 25-28.

Cell small, depressed; epicone bluntly conical; hypocone disc-shaped with tapering sides, the lower edge rounded; girdle median, wide, left-handed, displaced about one girdle breadth; sulcus deep, widening towards antapex with prominent borders; plate arrangement as in sub-genus **Archaeperidinium**; intercalary striae present or absent; chain formation usual; cell contends dense, dark golden in colour, containing numerous refringent globules.

Diameter 32-42μ; height 23-32μ.

Abundant during the summer on the West Coast and Cortes Island; Departure Bay rare.

Usually found in twos and threes, also in chains numbering up to twelve individuals.

The plates are very difficult to distinguish, and can only be seen when the cells are empty.

Meunier (Microplankton de la Mer Flamande. 3. Plate 31, fig. 26, 1919), gives a drawing of it as *Peridinium* sp.; he failed to see the plate arrangement.

P. Decipiens (Pl. VI., fig. 1). a larger species, is somewhat similar in shape and habit; its plate arrangement has not hitherto been elucidated, and the writer also failed to do so. It was seen only in pairs placed base to base or solitary.

Gyrodinium lingulifera var. *minor* var. nov. Pl. VI., figs. 2, 3.

Type species *G. lingulifera* Lebour.

This small spherical dinoflagellate measuring 20 μ in diameter was placed under this name in the list of dinoflagellates given in Part I. Since then the drawing was submitted to Dr. Marie Lebour, and she suggests that it may possibly represent an immature Gonyaulax; as it occurred in only one gathering made near Nanaimo in December, 1926, and has not been found since then, the identification should await confirmation.

Peridinium asperum sp. nov. Pl. VI., figs. 23, 24.

Cell of medium size, pentagonal in side view, slightly compressed; apex prominent; epicone with concavo-convex sides; hypocone truncate-conical with two divergent, acicular, winged spines set far apart at base; girdle premedian, right-handed, not excavated, with prominent lists; sulcus extending nearly to centre of base, left hand list terminating in small spine; first apical plate pentagonal; second intercalary plate touching third, fourth and fifth precingular plates; surface of theca densely spinous; contents dense; colour whilst living not seen.

Length 55-65 μ; spines 10-12 μ in length in addition; breadth 58-61μ, over lists 7 μ more; girdle 5 μ in breadth.

Barkeley Sound, off Village Island. Kyuquot.

Numerous in haul taken July 19th, 1926.

The arrangement of the dorsal plates and the winged antapical spines are similar

to those of *P. diabolus* Cleve; in ventral view it resembles *P. granii* Osten, both in general proportions and in having a pentagonal first apical plate. It thus combines the characteristics of sections CONICA and DIVERGENS.

It is placed here in section Paraperidinium, the diagnosis of that section being modified so as to include pentagonal and hexagonal first apical plates.

Peridinium cucumis sp. nov. Pl. VI., figs. 4, 5.

Cell of medium size, ovoid, smooth; epicone longer than hypocone; girdle left handed, with lists, displaced about one half girdle breadth; longitudinal furrow reaching to antapex, without lists; surface of theca with large circular punctulations. Fresh-water.

Length 48-50μ; breath 42-45μ.

Shaughnessy Heights, Vancouver.

This is the only recorded fresh-water species belonging to section OCEANICA in which plate 2a. touches only the fourth of the precingular plates.

Intercalary striae not observed.

ERRATUM: "Museum Notes" March, 1928, Vol. III. 1., Page 23, line 19. Group ORTHOPERIDINIUM should follow sub-genus **Peridinium**, line 31.

PLATE IV.

Figures.

1-4. *Peridinium depressum* Bailey. Figs. 1, 2. Ventral and dorsal views. Fig. 3. Right-side view. X 520. Fig. 4. A form with spreading antapical horns, approaching *P. saltans* Meunier. X 200.

5-7. *Peridinium oblongum* Aurivillius. Ventral, dorsal and left-side views. X 250.

8, 9. *Peridinium pentagonum* Gran. Ventral and dorsal views. X 250.

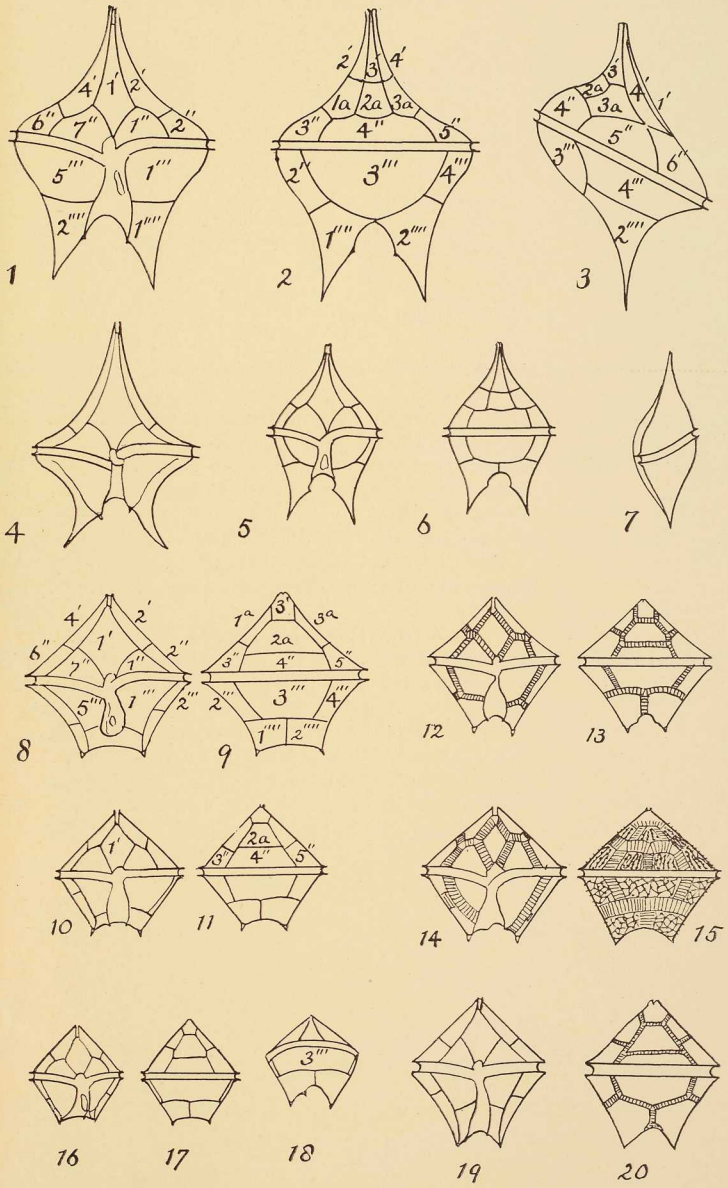
10, 11. *Peridinium obtusum* Karsten. Ventral and dorsal views. X 250.

12-15. *Peridinium leonis* Pavillard. In fig. 15 the fourth precingular plate has an abnormal intercalary band down the centre; in this figure two kinds of surface markings are combined for purpose of illustration. All X 250.

16-18. *Peridinium conicoides* Paulsen. Figs. 16, 17. Ventral and dorsal views. Fig. 18. Antapical dorsal view. X 250.

19-20. *Peridinium conicum* (Gran). Ventral and dorsal views. X 250.

PLATE IV.



G. H. Wailes del. ad nat.

PLATE V.

Figures.

1, 1a, 2. *Peridinium crassipes* Kofoid. Ventral and dorsal views. X 400. Side view of antapical horn.

3, 4. *Peridinium ovatum* (Pouchet). Ventral and dorsal views. X 400.

5. *Peridinium punctulatum* Paulsen. Ventral view. X 400.

6-9. *Peridinium subpunctulatum* Wailes. Figs. 6, 7. Ventral and dorsal views. Figs. 8. Apical views with axis inclined 20 degrees ventrally. Fig. 9. Antapical view. X 400.

10-14. *Peridinum pallidum* Ostenfeld. Fig. 10. Ventral view of epicone. Figs. 11, 12. Ventral and dorsal views. Figs. 13, 14. Ventral and dorsal views of a more pointed form, showing appearance of intercalary bands. X 350.

15, 16. *Peridinium divergens* Ehrenb. Ventral and dorsal views. X 330.

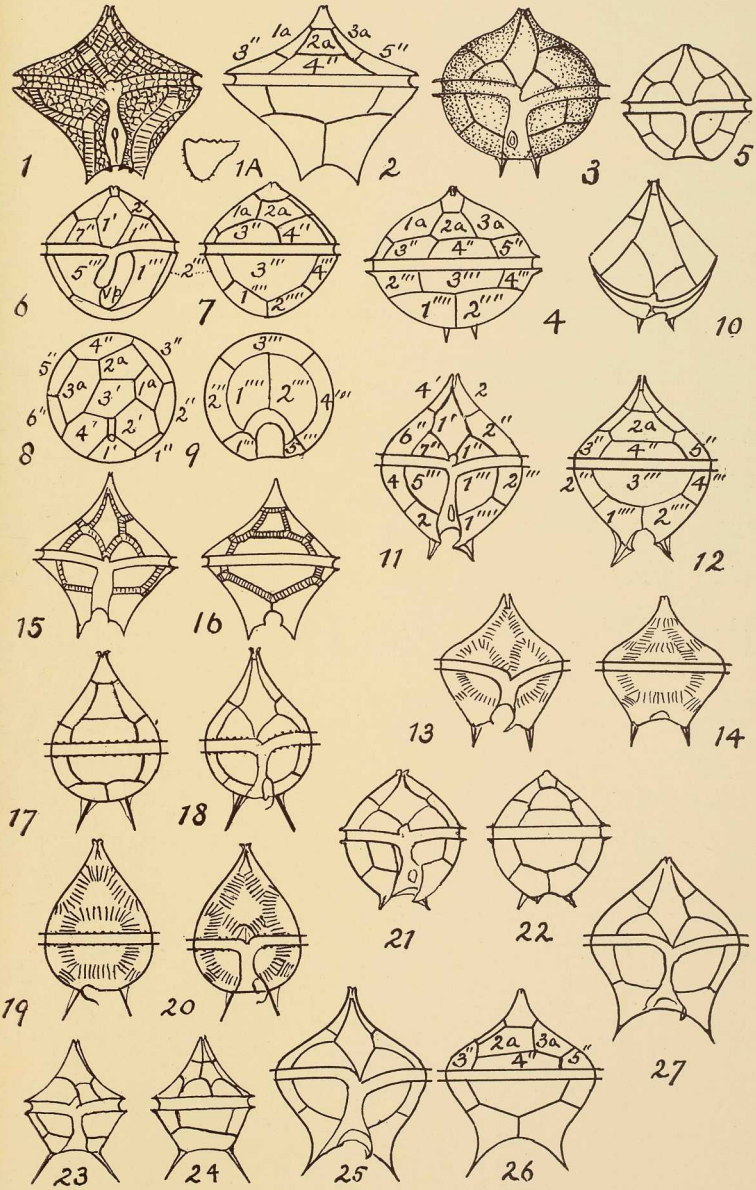
17-20. *Peridinium micrapium* Meunier. Figs. 17, 18. Dorsal and ventral views. Figs. 19, 20. Dorsal and ventral views, showing appearance of intercalary bands. X 530. Abundant most of the year on B. C. Coast.

21, 22. *Peridinium pellucidum* (Bergh) Schütt. Ventral and dorsal views. X 350.

23, 24. *Minuscula bipes* (Paulsen) Lebour. Ventral and dorsal views. Plates drawn in after Lebour. X 600.

25-27. *Peridinium granii* Ostenfeld. Figs. 25, 26. Ventral and dorsal views. Fig. 27. Ventral view of a more bluntly pointed form. X 530.

PLATE V.



G. H. Wailes del. ad nat.

PLATE VI.

Figures.

1. *Peridinium decipiens* Jôrgensen. Ventral view of a couple attached by the bases. From Camp Island. X 400.

2, 3. *Gyrodinium lingulifera* var. *minor* ? var. nov. Ventral view and transverse section. From Nanaimo X 665.

4, 5. *Peridinium cucumis* sp. nov. Ventral and dorsal views. From Vancouver. X 400.

6, 7. *Peridinium trochoideum* (Stein). Ventral and dorsal views. From Clayoquot Sound. X 530.

8, 9. *Peridinium avellana* Meunier. Dorsal and oblique ventral views. X 400.

10, 11. *Peridinium caudatum* var. *guildfordense* Playfair. Ventral and dorsal views. From Lake Nipigon. X 530.

12, 13. *Peridinium farôense* Paulsen. Ventral and dorsal views. From Camp Island. Plates after Lebour. X 530.

14, 15. *Peridinium triqueta* (Stein). Dorsal and ventral views. From Camp Island. X 530.

16, 17. *Peridinium brevipes* Paulsen. Ventral and dorsal views. From Camp Island. X 530.

18, 19. *Peridinium pellucidum* (Bergh). X 460.

20. *Peridinium avellana* Meunier. Ventral view. X 400. From Ucluelet near Amphitrite Point.

21, 22. *Peridinium sub-punctulatum* sp. nov. Ventral and dorsal views. From Camp Island. X 400.

23, 24. *Peridinium asperum* sp. nov. Dorsal and ventral views. From Barkley Sound. X 400.

25-28. *Peridinium discoides* sp. nov. Ventral, dorsal and antapical views and view of sulcus. Camp Island. X 400.

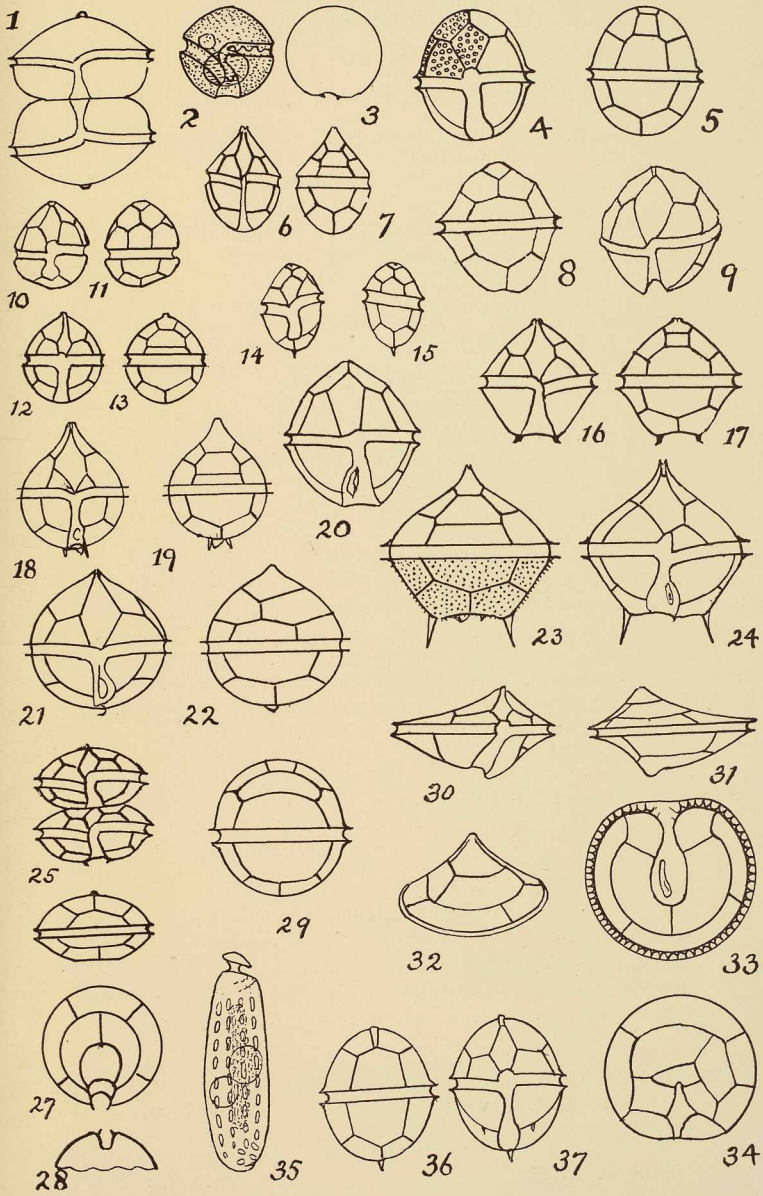
29. *Peridinium willei* Huitfeld-Kaas. Dorsal view. From Vancouver. X 400.

30-34. *Peridinium excentricum* Paulsen. Ventral, dorsal, dorso-apical, antapical and apical views. From Camp Island. X 400.

35. *Torodinium robustum* K, and S. Left-side view. From Camp Island. X 330.

36, 37. *Peridinium aciculiferum* Lemm. Dorsal and ventral views. From Lake Nipigon. X 400.

PLATE VI.



G. H. Wailes del. ad nat.

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OBJECTS OF THE
ART, HISTORICAL & SCIENTIFIC ASSOCIATION

To Maintain and Develop the Museum;
To Preserve the Early Annals of British Columbia History;
To Preserve Examples of Native Indian Arts and Crafts.

The Museum, top floor Public Library, Corner Hastings and Main Streets.
Open DAILY, except Sundays, from 10 a.m. to 5 p.m.

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Museum Notes

Vol. III., No. 3. September, 1928

EDITOR—STEPHEN GOLDER

Issued by the

Art, Historical and Scientific Association of Vancouver, B.C.

in the Interests of the City Museum.

VANCOUVER'S WATERFRONT IN THE 80'S; HASTINGS MILL WHARF

Sent post free to all members of the Association. Membership Fee, $1.00 per annum, payable in advance. Members also receive the Curator's Monthly Report. Applications for membership should be made to the Curator at the Museum. Single copies, price 25 cents.

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Museum Notes

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The First Art Organization in Vancouver

By Mrs. W. Garland Foster

THE first Art Association in Vancouver was formed in the year 1889. This seems to have been the result of a suggestion made to the late S. Gertrude Mellon by an old country relative who proposed a centenary celebration of the building, by Captain Meares in June, 1788, of the first fort at Nootka Sound, under the auspices of the East India Company. The Daily News-Advertiser of September 22nd, 1887, commented upon the suggestion and discussed the advisability of having some Historical society which should gather and preserve all records and information connected with the history of British Columbia. The matter was freely discussed for some time, and efforts to form some society of the sort were made from time to time. Through various ups and downs, there finally evolved the First Annual Exhibition, held by the Vancouver Art Association in the Art Gallery, Lefevre Block, Hastings Street, which continued for one week, October 6-11, 1890.

After this, the Art Association seems to have disappeared, but the Daily News-Advertiser, April 15th, 1894, contains this notice: "It is proposed to make an effort to revive the Art Association of Vancouver and also to enlarge its scope by the addition of an historical and scientific department."

In the October 10th, 1894, number of the same publication the thing has become an assured fact: "The rooms of the Art, Historical and Scientific Association were crowded last night upon the occasion of a very successful concert . . . . In two weeks the Lieut.-Governor will open the Art Exhibition." A copy of the programme on this occasion shows that the affair was prepared with some care, with evening programmes to add to the interest.

The local work is emphasized in the reports, the work of Lee Rogers and Will Ferris being specially praised. There is also mentioned an unusually fine collection of old China, Indian and other curious bronzes, with Japanese and Chinese work from various citizens.

In Lord Aberdeen's speech, on the occasion of the opening of the exhibition and the presentation of an address, may be found some remarks which still apply to the

Art Society

IN THE DUNN HALL

Granville Street

TO-NIGHT

TABLEAUX

FARCE—Breaking the Ice—
Capt. Shelby .... Mr. Bowley
Miss Marten ....Mrs. Buntzen
Recitation .....Selected..... A. Henderson

MUSIC

TUESDAY, 6th NOV.

Art Exhibition and Music

WEDNESDAY, 7th NOV.

Grand Promenade Concert

Under the direction of Prof. Theo. Martens

PROGRAMME—PART I.

1. Overture.....Reception ..R. Schleppegrell
2. Piece Descriptive..The Coachman..Fahrbach
3. Selection from Donizetti's Opera, Daughter of the Regiment..... .... Moses Tobani
4. Valse, Caprice..Lune de Miel.....Waldteufel
5. Call Me Your Dearest One.....Ziehrer

PART II.

6. Marche.....Des Flambeaux .....L. Brandt (Arranged by Theo. Martens)
7. Overture .....Tancredi..... ..Rossini
8. Violin Solo .....Concerto.....Mendelssohn Mr. Victor Austin
9. La Cinquantaine..Caprice..... E. Waldteufel
10. Grand Selection from Verdi's Opera Ernani ....Moses Tobani

November, 1894, Programme

City-By-The-Silver-Sea: "I will not refer in detail to any of the subjects alluded to in this address, except to say that, as suggested in the address, the beauty of these regions renders it specially incumbent upon all to do their best to promote a love of nature and a true admiration of the wondrous works of the Creator, and to develop any faculties we may possess for the cultivation of Art in its fullest sense. Of course the cultivation of Art is associated with the prevalence of peace. A place dedicated to the promotion of Art is a temple of Peace . . . ."

The first signature in the distinguished guest book of the Art, Historical and Scientific Association is that of Lord Aberdeen, followed by that of Lady Aberdeen, Lady Marjorie Gordon, and in a boyish hand of the Hon. Archie Gordon. On the reverse side of the page is found the signature of the next distinguished visitor, Li Hung Chang.

From the financial side the exhibition was not a success, in spite of the efforts of the committee to supply additional attractions in the way of concerts. From this time, however, the collections for the museum were carried on perseveringly. Although there was thus the two additional objects of the Association, it was for years after referred to as the Art Association. As late as 1901 it was still referred to by this name. The first contribution to the Art section of the Museum was made by T. Mower Martin, November 29th, 1898, who presented a specimen of his own work, "Mountains Near Banff," which still hangs in the Museum.

The Pioneers of Vancouver

By BLANCHE E. HOLT MURISON

To those who came with simple purpose true,
Who played a splendid game and played it through;
Who let no hazard dim their faith, nor foil
The Great Adventure of heroic toil;
Who builded to the pattern and design
That makes of human things—a thing divine.

This to their vision—and the high emprise,
That won an Empire under Western skies,
And in the crucible of Courage poured
The full content of all the unexplored.
Today—because they lived—Vancouver stands,
The flowers of their dreaming in her hands.

—Vancouver Province, March 7th, 1928.

Some Origins of Place Names of Greater Vancouver

BY DENYS NELSON

AUTHOR OF "YAKIMA DAYS;" "OLD FORT LANGLEY."

THE City of Vancouver as amalgamated ~~October 20th~~ January 1st 9, 1928, takes the shape of a triangle, bounded on one side by Burrard Inlet, on the other two by the Fraser River and the Municipality of Burnaby. The citizens instrumental in bringing about the union look forward to the time when Burnaby, too, will be part of the greater city.

Burrard Inlet was named by Captain Vancouver, R.N., "Burrard Channel" on June 13th, 1792, when he entered and explored the inlet. Later the name was changed to "Burrard's Canal," and later still to "Burrard Inlet." Sir Harry Burrard Neale, (1765-1840) was the eldest son of Lieut.-Col. William Burrard (1712-1780), the governor of Yarmouth Castle in the Isle of Wight. Burrard entered the navy in 1778 on board the "Roebuck." He succeeded to the baronetcy of his uncle on April 12th, 1791. On his marriage with Grace Elizabeth, daughter and co-heiress of Robert Neale, he assumed the name and arms of Neale by Royal license in 1795. He reached the rank of Admiral in 1830 and died at Brighton, February 15th, 1840, having no issue. (Vid. D.N.B., Vol. XI., p. 141. Also Walbran).

The Spaniards, Galiano and Valdez, entered the inlet June 23rd, 1792, calling it on their map "Canal de Sasamat," Indian name of the place, and in their text "Florida Blanca," indicative of their supposition that the stream they found flowing into it was the canal or river of their predecessors, mistermed "Blancho" by Vancouver and later called "Fraser River." (Bancroft, Brit. Col., p. 24.)

The second boundary, the Fraser River, is named after the explorer Simon Fraser, who descended to near the mouth, at Musquiam, in July, 1808. Fraser was born at Bennington, Vermont, the son of a United Empire Loyalist, descended from the titled family of Lovat. He joined the North West Company in 1792, and in 1802 became a partner. In 1805, at a meeting held at Fort William, the establishment of a post in the far west was decided upon, and Fraser was deputed to carry out the plans of the company. The river which now bears his name was then considered to be the Columbia river, or at least a branch thereof. After establishing posts at Fort St. James on Stuart Lake, Fraser Lake and Fort George, he finally made his way down the great river in the summer of 1808. He reached the mouth at the Indian village of Musqueam on July 2nd, 1808, and returned owing to the threatening attitude of the natives. He retired on the amalgamation of the Hudson's Bay Company in 1821, dying at St. Andrews, in the township of Cornwall, Ontario, April 19th, 1862, where a monument to his memory has been erected in the Roman Catholic cemetery by the Hudson's Bay Company. (Vid. Walbran. Also Morice, "Northern Interior of B.C.")

The river, while not actually seen by the Spaniards, was named by Eliza in 1791, owing to the reports of its existence from the Indians, "Rio Blanca," after the then Prime Minister of Spain, Don Josef Monino, Count of Florida Blanca. Duflot de Mofras states that the Indians called the river "Tacoutchi" (Walbran). In Work's Journal of 1824, the river is referred to as "Coweechin," which must refer to the Cowichin group of Indians to which the river Indians belong, being of the Halkomaylem division of that group. Of Salish linguistic stock, they speak of the river as the "Stalo," which means "The River." (Hill-Tout).

The third boundary of the new city is the municipality of Burnaby, which takes its name from the lake which is its central feature. Reference to Walbran will show that the lake derives its name from Robert Burnaby, commission merchant of Victoria, one of the leading men of that city for many years, the firm name being Henderson and Burnaby, established in 1858. Mr. Burnaby, through ill health, retired to England in 1875 and died in Lancashire in 1878. (Walbran). This is hardly sufficient, however, to show how a large body of water near to New Westminster came to be called after a Victoria merchant as early as 1860, as happened to be the case.

The explanation lies in the fact that Robert Burnaby was the son of the Rev. Thomas Burnaby of Galby Rectory, in Leicestershire, England, and came out to British Columbia with a letter of introduction from Sir E. Bulwer Lytton. The letter stated that Burnaby had been for seventeen years in the Comptroller's office of the Customs House . . . . that he was going to the Fraser River in partnership with a capitalist whose business he was going to manage . . . . that he was educated at St. Paul's school, was a good scholar, etc. All this recommendation secured for Burnaby the post of private secretary to Col. Moody, R.E., in his capacity of Commissioner of Lands and Works, which post Burnaby filled for a few months only. During the year 1859 he was with Moody, and in that time assisted in surveying the lands adjacent to New Westminster. He also drew the plans and sold the lots at Queensboro, the present New Westminster. A second sale of lots took place later, but in the meanwhile Burnaby had resigned his position and gone to Victoria to take up his post with the commission house. As early as 1860 Burnaby is found registering land in a private capacity. (Information from Judge Howay and R. Hosie, Prov. Archivist.)

The apex of the triangle just described is at Point Grey, with the base line from Barnet to Marpole. Starting at Barnet, a large lumber mill, the name derived from Barnet McLaren of Ottawa, whose interests built the first mill here; the spot may be noted as approximately the place where Captain Vancouver's party spent the night in 1792. The younger men of the party, delighted to be once more on land, slept on the shore, and, unaware of the tide so far from the sea, or still deluded by the idea that this was the river they had been seeking, to use Vancouver's words, "found themselves inconvenienced by the flood tide, of which they were not apprised until they were well nigh afloat; and one of them slept so sound that I believe he might have been conveyed some distance had he not been awakened by his companions." (Vancouver's Journal, Vol. ii., p. 192.)

Hastings Mill, which also gives its name to Hastings townsite and Hastings street in the city, is the most important landmark, now about to pass away. Captain Stamp owned a sawmill on Vancouver Island, which he transferred to Burrard Inlet in 1865 and established it where the Lumberman's Arch now stands in Stanley Park. This site proving unsuitable, the mill was moved to its present locality or thereabouts, and was re-organized in 1870 under the direction of Captain Raymur and R. H. Alexander, Sr.

Captain Raymur gave the mill the name Hastings, after his friend on the Island, Admiral Hastings, who commanded the British Squadron stationed at Esquimalt. To Hastings Mill a road was made from New Westminster, known as Douglas road, after Governor James Douglas, which passed between Burnaby and Deer Lake and reached the Inlet near the foot of the present Windermere Street. It was built by Thomas Spence, who also built Spence's bridge near Lytton on the Cariboo road. At this time there was only Hastings Mill on the south side of the Inlet and Moodyville, another sawmill settlement on the north shore. The Inlet was connected with New Westminster by the North road (built by the sappers and miners) and the Douglas road. A ferry connected the ends of these roads with Moodyville and Hastings Mill, whence ships sailed for Victoria and ends of the earth.

Coal Harbour was named very early in the history of the Inlet when Moberly was blazing trails for the gold seekers. At this early date coal deposits were found there.

Deadman's Island, a small piece of land adjacent to Stanley Park and at low water part of it. For years it has been the subject of litigation owing to attempts to commercialize the area. So far none of these attempts have been successful. Pauline Johnson, taking the Indian legends told her by Joe Capilano, has woven the Island into one of her Legends of Vancouver. (Q.V.). Pioneers state that the name as far as they know was given it because, in the days when the sawmill was located there, white men, sailors and others were buried there.

Brockton Point, named by Capt. Richards, who surveyed Burrard Inlet, after Francis Brockton, R.N., Engineer of H. M. S. Plumper, who was in the service from 1859 to 1879, and died in 1898.

The Lumberman's Arch was originally erected opposite the old News Advertiser office at the time of the Duke of Connaught's first visit. It was contributed to the celebration by the lumber firms of the city. The plans were in charge of G. P. Bowie, a well-known architect. He later went overseas with the B. C. Horse, was promoted from the ranks, and attained the rank of Major before being killed. The arch now stands as a monument to its designer.

Prospect Point is a descriptive name for that headland where the "lookout" is placed for shipping at the Narrows or "Lion's Gate," as it is called. At this point the famous steamer "Beaver" was wrecked, her battered hulk still lying at the bottom of the waters. She was the first steam vessel to plow the waters of the Pacific, coming to Fort Vancouver (Washington, U.S.A.) in 1837. Wrecked in 1888, she finally slipped into deep water in 1892. A monument is erected on the Point to commemorate the event, one of a series by the Historic Sites Board of Canada.

Siwash Rock was known to the Indians as Sqelc, which means "Standing Up." Their village was near to the point where now stands the Pauline Johnson Memorial. There are several legends of this unusual formation, but one told by the Capilano Chief has been woven into a beautiful classic by the author of Legends of Vancouver, whose ashes rest under the stone boulder overlooking the rock.

English Bay was the name adopted by Captain Richards of the survey of 1859. The name evidently was suggested by the meeting of the English with the Spaniards at Spanish Banks.

False Creek is a descriptive name for a creek which has no outlet, although giving promise of one. The Indian village which stood where the Reserve is located at the mouth of the creek was called Snauq.

Kitsilano Beach takes its name from the district referred to below. It was formerly known as Greer's Beach after Sam Greer, who owned the land and disputed the right of the C. P. R. to disposses him.

"Spanish Banks" was named by Captain Richards of the survey vessel "Plumper," in 1859, to commemorate the meeting of the Spaniards and English here in June, 1792. The Spanish vessels "Sutil" and "Mexicana," under Galiano and Valdez, were anchored here when Vancouver passed in his boats after his exploration of Burrard Inlet. (Walbran, Vancouver's Journal, vol. ii., pp. 209-211.)

Rounding Point Grey and ascending the Fraser River lies the Indian village of Musqueam at the foot of the cliff, and spreads away over the low lying alluvial lands deposited by the river. Judge Howay has shown that this is the scene of the end of the journey of Simon Fraser, where he turned back on July 2nd, 1808, having tide water. This is important inasmuch as Bancroft states that Fraser did not get below New Westminster, while Malcolm McLeod declared that Fraser did not get within 250 miles of the mouth. However, the Journal of Fraser, published by Senator Masson in 1889, shows how false such ideas are. At this point, near the present Musqueam village, he saw a fort or council house 1500 feet in length and 90 feet wide.

The other angle of the triangle that is Greater Vancouver will be found under the city sub-divisions. Within the triangle the new city comprises three amalgamated areas:

1. City of Vancouver;
2. Municipality of Point Grey;
3. Municipality of South Vancouver.

Taking the last first, the name is descriptive or geographical. The municipality, an extension of the original parent city, lies on the road to New Westminster and adjacent territory, which naturally became settled and populous at an early period.

The Municipality of Point Grey takes its name from the point which is its great natural feature. This in turn was named by Captain Vancouver in 1792 after George Grey of the Royal Navy. A full account of his career will be found in Walbran. In 1791 the point had been called "Punta de Langara" by Lieut. Eliza of the Spanish navy, a name which is perpetuated in the Langara Golf Links at the point, in a street name and in other ways.

The City of Vancouver, prior to amalgamation, comprised two townsites, Hastings and Granville, which became incorporated as the city of Vancouver on April 6th, 1886. In popular phraseology, the place is known as the "Terminal City," owing to its being the terminus of the Canadian Pacific Railway. By the Chinese it is said to be called "The City by the Silver Sea."

The terminus of the railway was fixed by statute at Port Moody, at the eastern end of Burrard Inlet, but it was soon recognized that the road could not end there, and it was to have been extended to the mouth of the Inlet. In the summer of 1884 the general manager of the company, William Van Horne, visited the province with the idea of locating the terminus. He is recorded as speaking of the location as Vancouver on Coal Harbour. (Vide, "West Shore," a magazine published in Portland, Ore., Sept., 1884.) Hastings townsite took its name from the sawmill on the Inlet, as already noted.

A survey of the present townsite of Vancouver City from Hastings Townsite to Stanley Park was made by George Turner of the Royal Engineers. A portion of the

area lying to the west of lot 196, Hastings sawmill property (Carrall Street), to the eastern boundary of lot 196, Brighouse property, was set aside by Col. Moody, R.E., as a government reserve. In the early 60's that portion of the reserve now bounded by Carrall Street, Hastings Street and Burrard Inlet, consisting of six blocks of lots, was surveyed as a nucleus of the townsite of "Granville," and lots therein were sold by the government. The change of name to Vancouver was made when the C. P. R. brought its terminus to the present location. (F. G. Richards, Victoria, vide Province, March 17th, 1924.)

The Granville in question was George Leveson Gower, second Earl (1915-1891). (Vide New Intern. Encyc.). At various dates he was secretary for the Colonies, which office he held in 1886.

The name Vancouver was suggested by Van Horne, and was accepted at a mass meeting of citizens after much discussion pro and con. This meeting was presided over by Malcolm MacLean, first mayor, and was held at the Sunnyside Hotel, a place better known as Gastown, owing to the loquacity of its proprietor, "Gassy" Jack Deighton.

In addition to the two townsites there was another real estate subdivision called "Liverpool," situated in the West End, comprising that part of the city from Burrard Street west to Stanley Park. The land was to be developed by a syndicate headed by David Oppenheimer. These were the plans of 1882, but the subdivision was absorbed by the City of Vancouver.

The area of Greater Vancouver is sectioned by four main roads or streets: Granville taking its name from the former townsite; Hastings, which has a similar origin; Cambie Street, named after the late Henry J. Cambie, C. P. R. engineer, who recently passed away aged over ninety years. Henry Cambie first saw the site of Vancouver in 1872, having been sent to ascertain the possibilities of the port as a harbour and terminal for a great railway. Later, he assisted in bringing this about and was in charge of the location of the main line of the C. P. R. from the coast to Griffin Lake; was chief engineer of construction through the Fraser Canyons from Yale to Lytton, and of the construction of the section from Savona to Shuswap.

4. Main Street, formerly known as Westminster Avenue, was re-named owing to the efforts of James Alexander Kerr, President of the "Main Street Improvement Association," which was instrumental in getting the avenue widened in South Vancouver from 60 to 80 feet. Since the publication of certain ironic books, some doubt has been cast on the suitability of the name for one of Vancouver's streets.

5. Kingsway, which branches off from Main Street at Mount Pleasant and connects with New Westminster by way of Central Park, had several names submitted at its naming. Because of the importance of the highway it received the name Kingsway.

Within the area of Greater Vancouver there are other subdivisions or districts of lesser importance than the municipalities. Grandview and Mount Pleasant are descriptive names. Shaughnessy Heights, a Canadian Pacific Sub-division and residential district, named by the railway company after Thomas George, First Baron, Shaughnessy, president of the Canadian Pacific Railway. He was born at Milwaukee, Wis., U. S. A., and learned railway administration with the Milwaukee & St. Paul and the Chicago, Milwaukee & St. Paul Railway between 1869 and 1882, after which he was identified with the C.P.R. Successively purchasing agent, assistant general manager, assistant to the president, vice-president and director, he became President in 1898. (New International Encyc.)

6. Kitsilano. At the time that the C.P.R. opened up this district and required a name for it, Jonathan Miller, formerly the first postmaster of Vancouver, approached Prof. Hill-Tout, the Indian scholar, for a name. The latter suggested this modification of an Indian word for title, corresponding to Capilano across the Inlet. Amongst the chiefs of the Squamish tribes there were some of higher rank than others. The Supreme Si'am of the tribe was known as te Kiapila'noq, which the white man has softened to Capilano. Next in rank to him came one of the Squamish chiefs from the Squamish river at the head of Howe Sound, and he, likewise, had his proper title, being known as te Quatsila'noq. The first syllable was softened to Kit and the final guttural omitted, making a very euphonious name, and was adopted for the new district.

7. University Hill. Several names were submitted for this sub-division, but, as it was contiguous to the University, the lands being part of the University endowment area, this seemed the most appropriate. Accordingly, Major H. L. McPherson decided upon this name.

8. Stanley Park was formally opened September 27th, 1888, with suitable celebration, including a ball in Hart's opera house on Carrall Street. Thirty thousand dollars had been expended upon it to that date. Sir Donald Smith had been one of the generous contributors to the Park fund, and was asked to name it. He in turn asked His Excellency the Governor General, Lord Stanley of Preston, to supply the name. He named it Stanley Park. In the following year, when Lord Stanley visited Vancouver, he drove around the park. It was at this time that the arch, at the southern end of old Coal Harbour bridge, so long a landmark of the park, was erected.

Kerrisdale was named after two maiden ladies, the Misses Kerr, who lived in the district about twenty years ago. (Mr. F. W. Peters, Gen. Offices, C.P.R.)

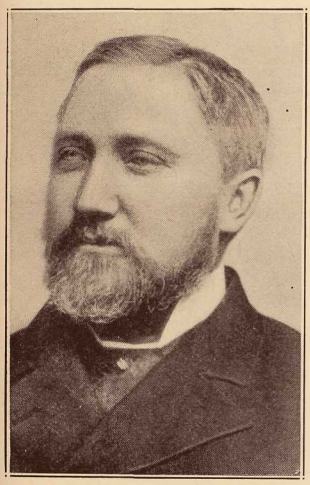
The original city centred around Powell Street, named after Dr. Powell, who was Superintendent of Indian Affairs. Cardero and Cordova are surviving names of old Spanish explorers. Captain Pender was sailing master of the Plumper. Abbott was the name of the first general superintendent of the C. P. R. Seymour was named after the only mainland governor this province ever had after a separate Government had been set up at Westminster. Much of Vancouver's early history will be found in these street names. Mr. J. A. R. Homer was a New Brunswick man, who came to the city in 1858, representing the Westminster district at Ottawa. Dr. Carrall, who represented the Cariboo in the Federal House, gave his name to a street.

Clark Drive and Park were named after a Toronto business man, who cleared five acres of land and presented it to the city for park purposes. Cambie Street is named for H. J. Cambie. Drake Street for a Victoria Judge. Harwood was the name of one of the Dunsmuir mines.

The First Mayor of Vancouver

By MRS. W. GARLAND FOSTER

THE long list of voters on Vancouver's municipal list to-day should remind its citizens of that first election when the list was under the thousand, but represented a hundred per cent. of the eligible. True in the year of our Lord 1886, in the month of April, women were not eligible except in rare instances, but the regulations of that day were considerably stretched to allow of every male member of the population exercising his franchise. A special order in council had been passed to permit the new city to hold an election after incorporation. By its terms, every man who owned a "cabin" or had a room or was paying five dollars a month on a lease was a voter.



MALCOLM A. MACLEAN

Those were the days! Leases were easy and the supply was soon exhausted. It was Vancouver's emancipation from mill village status, and she indulged herself to the full. The mill had heretofore been the centre of activity, and its officials were the leading men of business. So it happened that R. H. Alexander was the choice for mayor. But in offices, hotels, bars, or wherever these pioneers congregated—chiefly under the old maple tree beside the Sunnyside hotel—the question of an election became one of interest. Why not get the worth of the new status and have a contest? It was only a matter of putting up the right man and the voters could be found. The mill population immediately got leases for the mill shacks and incidentally their qualifications; but the opposition party went them one better, and hotel bedrooms were leased to their occupants against voting day. Neither side could ask too many questions. The choice of the town group fell upon Malcolm A. MacLean, a big-hearted, sturdy Highlander lately from Winnipeg, where he had a host of friends. He conducted a real estate office on what is now Abbott street and lived in the back shop, which was little more than a shack.

Public feeling ran high. Meetings were held nightly in front of the Sunnyside, with the speakers on the balcony, the audience under the old maple tree. Before the day arrived, excitement had reached a high pitch. When the final count was taken, Mayor MacLean won by seventeen votes. There was only one conveyance in town. This was a hack owned by A. W. Gold, of the Grotto. The supporters of the new mayor immediately harnessed themselves to this and took their hero around town. As the roads were still rough with stump roots, the ride partook of uncertain progress.

Later the defeated party filed protests as to results which had been gained on incomplete qualifications. But subsequent events settled this matter before it came to court.

Elected with Mayor MacLean were Alds. Robert Balfour, C. A. Caldwell, Peter Cordiner, Thomas Dunn, Joseph Dunn, Joseph Griffith, J. H. Humphries, Henry Hemlow, E. P. Hamilton, L. A. Hamilton and Joseph Northcott. Five of these men were born in the eastern provinces, chiefly in the Maritimes. To this council Vancouver owes the foundation of its institutions. It was this council which made application for the use of the Dominion Military Reserve, now known as Stanley Park; selected the first civic officials, of whom Chief Carlisle is still on duty.

But two months of office had passed for the new council when fire destroyed the youthful city. It was then that Vancouver's citizens knew how good had been the selection they had made for mayor. Immediately, the mayor and aldermen set to work to relieve the distress of the city. Winnipeg friends and others came at once to the rescue, and money and goods for relief were in hand. The mayor's own experiences in the fire were not light, and it was jokingly said, in spite of the sadness that hung over the city, that all the mayor had left was the mayoralty. The first night after the fire he and Thomas Dunn sought a little rest in a room at the Regina Hotel, the only place of the sort left, but they found every available space taken. It was a wet night, so they borrowed a shawl for the mayor and a table cover for the alderman and set out for the Princess Louise, which was tied up at Hastings Mill wharf, hoping to spend the night in some sort of comfort while she crossed to Port Moody and back. But again the sleeping quarters were all engaged, so they took what rest they could on top of the dining tables. As many people were sleeping in vacant lots, under any shelter, they thought themselves fortunate to have cover.

There were problems then requiring a firm hand in spite of the misfortune that had overtaken the city. One of the first was how to deal with some men who had looted liquor and had it on a raft in the Inlet. A special constable was sworn in, in the person of J. T. Abray, and, the men defying him to come and get them, he went out and did get them. That week, as the gaol had been burned, prisoners were chained to a telegraph pole on Water Street.

One of the first expenditures of the new council was a complete fire equipment. At the time of the fire there had been only a bucket brigade. Many exciting adventures in civic affairs took place during the two years Mayor MacLean was in office. By the second year, the population had doubled, bringing school problems as well as housing. The first through train arrived at Westminster that first year, and less than a year later Vancouver was the terminus. The board of trade was formed, the first bank of British Columbia was opened, followed by the Bank of Montreal and the Bank of Brtish North America. Surveys were undertaken to bring water from Capilano creek to the city. And once there were riots over Chinese workmen, which necessitated the Provincial Government taking control of the situation.

The duties that the mayor of this period had to meet were colossal, considering that funds were scarce even for civic necessities. Mayor MacLean had no entertaining allowance, but must entertain officials who visited the city in a manner befitting the greatness of Vancouver, and many came during those two years.

Vancouver's first mayor seems to have been a man with the true pioneer spirit, a man who turned his hand to anything that offered, and who never turned away a needy citizen. Although he lived quietly and took no credit for doing his duty in the days of Vancouver's trial, that he was much beloved by Vancouver's citizens is indicated

by the scenes which took place at his funeral on April 6th, 1895. To quote from "The Daily World" of that date:

"As was anticipated, an immense concourse of citizens gathered to pay a last tribute of respect to one who in life was universally esteemed. Elderly men, to some of whom had come the inevitable hardening that is born of buffetings with adversity and pioneer hardships, dropped a tear as they gazed at the face of him who always had a cheery greeting for his friends, and who was seldom heard to say a harsh word to anyone. The funeral was considerably delayed in starting owing to the exceedingly large number who wished to have a last glance at the face of the departed." His contemporaries invariably speak of Vancouver's first mayor as a "genial friend and an honest man."

The Lions' Gate

BY MRS. ALICE BREWER

ROARING they rushed from hot Earth's bursting heart,
Cleaving a way through rock and root and stone,
Mounted the heights, then breathless paused, apart,
Looked down on beauty until then unknown.
Mad waters in their wake below were stayed,
The Lions rested, and behold their gate was made.
Couched in high pomp upon the golden heights,
Brooding—aloof—as in an ageless past;
Stern, when illumined by the Northern Lights,
Smiling when Morn his thin, fair beams first cast.
Our portals watching for what is to be—
The Lions guard that gate eternally.
Those high twin peaks, mid glitt'ring isles of light,
From immemorial times have unmoved, seen
Wild storms; white glory of the starry night;
Sunshine like flaming scythes; frosts hard and keen.
Scanning the waters far below, like Fate,
They watch upon the heights and guard their gate.
The red man venturing with his first frail boat—
Strange craft with wheels astern—white sails aspread—
Now under-sea—now in the air afloat,
Parting the liquid azure overhead.
Immovable they see all things and wait,
Watching for evermore their far-famed gate.

—*Vancouver Province, May,* 1926.

The Library Corner

Several outstanding acquisitions have been made to the Museum Library during the past quarter. Chief among these are the Lectures of the Cawthorn Institute of New Zealand in three volumes and the Papers of the Hawaiian Historical Society.

The Cawthorn Institute, located at Nelson, N.Z., owes its being to the late Thomas Cawthorn, its founder and benefactor. Devoting its activities to scientific research somewhat after the nature of the Natural Research Council in Canada, the Institute has a staff of specialists consisting of chemists, entomologists and biologists. Throughout the year, world-famous scientists are invited to address the Institute, and these addresses are published. Among others might be mentioned "Biology in Relation to Agriculture," by Professor W. B. Benham; "The Coming of the Maori," by Te Rangi Hiroa; and "Electricity and Matter," by Sir Ernest Rutherford; thus building up a valuable body of scientific literature.

The Museum was fortunate in having His Honour Judge F. W. Howay of New Westminster represent it at the Sesqui-Centennial Celebration of the arrival of Captain James Cook, the discoverer of Hawaii in 1778. This was held from August 15 to 20, 1928, and was an affair of international importance. His Honour, after bringing the greetings of the Art, Historical and Scientific Association to the Hawaiian Historical Society, presented to the Society a photostat copy of the original Cook charts in the City Museum. He also gave an historical address on "Hawaii and the Northwest Coast of America," which was one of several given on that occasion by world famous historians; among others, Sir Henry Newbolt and Dr. F. A. Golder. The Society suitably reciprocated the Museum's gift with a set of their publications, which comprise a number of pamphlets bearing on the various historical aspects of their country, with particular reference to Captain Cook, his discoveries and death there.

The special catalogue of the fine graphic and applied arts and salon of photography of the Canadian National Exhibition is also worthy of mention. It ranges through British, Spanish and Canadian paintings; British and Canadian sculpture; British, Mexican and Canadian applied art; international graphic art and a splendid display of photography. It is priced and illustrated and gives names of artists and pictures, making it a valuable book of reference in this field.

Commander Pybus, R.N.R., presented "A Picture Book of Japanese Sword Guards," published by the Victoria and Albert Museum. This illustrates some very beautiful examples of these works of art, of which Captain Pybus has already given the Museum a fine collection.

Among other items the following were also received:

County Borough of Burnley. Townley Hall Art Gallery and Museum Report for year ending March 31st, 1928.

U. S. Department of the Interior. National Park Service. Yosemite Nature Notes, Vol. VII., No. 8, August, 1928.

Royal Astronomical Society of Canada. Journal, Vol. 22, No. 7, September, 1928.

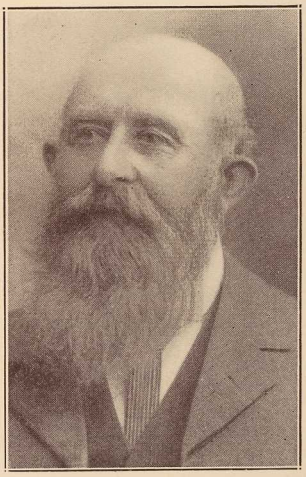
Queensland Museum Memoirs, Vol. IX., pt. 2, June, 1928. —E.S.R.

William J. Brewer, First Reeve of South Vancouver and One of the Earliest Vancouver Aldermen

Pioneer Farmer Here

BY NOEL ROBINSON

THERE lives on Victoria Drive, near its junction with Kingsway, a real pioneer, who, despite his 89 years, still insists occasionally upon mounting a ladder to see what is wrong with one of the roof gutters or taking an axe and chopping up some wood. More often, however, nowadays, William J. Brewer, first Reeve of South Vancouver and one-time alderman of Vancouver in the very early days, wears his black skull cap, sits by his cosy fire, puffs away at his very long pipe, and talks of the happenings of yesterday, while his fine old face lights up, and he will give a hearty chuckle over some especially good story. He is, perhaps, at his best when he goes right back to the beginning—not of the world, but the Brewer beginning—and recalls the old coaching days in England. Then it is that he will tell you of how, as a boy, he was a passenger upon the last coach—his father's—to run from Falmouth to Plymouth. His father operated these coaches from Truro, in Cornwall, where William Brewer was born, and young Will's greatest pleasure in those days was to get a ride. That last ride from Falmouth to Plymouth was something in the nature of a triumphal progress, according to the old man, for it was known to be the last, and they were royally entertained at every coaching house on the route. He does not remember whether the grown-ups were all sober at the close of that memorable journey. Upon a wall on his home on Victoria Drive hangs a very weathered, and not too easily distinguishable, painting of that veteran coach, one of those which marked the dividing line between the old and new methods of transportation.



WILLIAM J. BREWER

All of which has nothing to do with pioneering in Vancouver, but it will give the reader of these notes something of the atmosphere of this old boy, whom I have heard sing, in quite a good voice, some of the popular songs of those far away days, accompanying himself on his fiddle. Emigrating when still in his teens, Mr. Brewer spent several years working on farms in Australia. He came here by way of San Francisco as early

as 1870, so that he is one of the very earliest pioneers of Vancouver. South Vancouver, as it is now called, must have been a long way out in the forest when, in 1884, he made his first "buy" there, purchasing 26 acres from the provincial government. It was heavy work, rough clearing, and a man made every cent he earned in those days. But "Bill" Brewer, as he was often known, though not tall, was powerfully built and a "man of his hands," and he made good. First he built a huge barn.

CURIOUS SOUVENIRS: WONDERFUL FOUNDATIONS

Then he bought some land in the middle of what is now Vancouver, on the corner of Cordova and Carrall, where the Crown Paint Company's place is now located, and erected a wooden building upon it in which he and his partner lived until the fire on June 13th, 1886. On that memorable day he left his home, without a coat, to help fight the fire, and, when he returned, the building and all his worldly belongings—except, curiously enough, his beloved fiddle and his tall silk hat—had been destroyed. He still possesses these two interesting souvenirs of that day.

Following the fire he determined to settle finally upon his land in South Vancouver, and, with the assistance of labor which he employed, be built the house in which he has lived for 42 years. It was a very unusual house here for those days, being three-storey and with open fire-places, in fact very much along the lines of an Old Country farm-house. Much cedar is included in the building, and it says a lot for the durability of this remarkable wood that, only a year or two ago, when the cedar foundations had to be examined, they were found as sound as the day they were put in. Eventually he cleared the whole place, planted many fruit trees, added a flower and vegetable garden, and—well, until as late as 1920 that farm remained intact, one of the finest pieces of land and most beautiful spots in South Vancouver. Since then it has been cut up into town lots, but still the old home, its meandering rose garden, its vinery, its pretty lawns and outhouses remain much as they were.

AS REEVE AND ALDERMAN

The pioneer who carved this home out of the bush was the man who was elected the first reeve of South Vancouver, which is just about to be incorporated with the city. At that time South Vancouver included the municipality of Point Grey. It was organized by the authority of the Legislature in the spring of 1892, but, despite its huge area, it had few residents. The first election was held at the old school house close to the North Arm of the Fraser River, and the late James Tuttle, a pioneer settler of Richmond, and for several years reeve of that municipality, was returning officer. The first council consisted of William John Brewer, reeve; W. H. Rowling, Fitzgerald McCleery, Arthur M. Wilson, W. Kirby and James McRorie, councillors. All had to be settlers of the municipality. Mr. George Martin, later of Martin & Shannon, who came to this country from Weardale, England, in 1888, was the first municipal clerk. In fact he performed the duties of all the municipal officers, receiving $50 a month. Mr. Rowling had arrived in British Columbia from England in 1858 as a corporal of the famous Royal Engineers who founded New Westminster. He took up 160 acres near the junction of the present Marine Drive and Fraser Street, and a son was a member of a subsequent council. McCleery was a notable pioneer of Lulu Island.

Mr. Brewer, though a pioneer farmer in the wilds of South Vancouver, was much interested in Vancouver and erected quite a number of buildings in this city, including the brick building referred to earlier in these notes, upon his own land now occupied by the Crown Paint Company. This he parted with some years ago. He ran as aldermanic candidate in the first Vancouver civic election, but was not elected. However, he ran again for Ward Four in 1889 and was elected.

So it will be seen that the veteran ex-reeve and alderman has "done his bit" as public man as well as pioneer during his long residence. By a happy circumstance he figures in the historic Maple Tree picture, which was taken by Harry T. Devine shortly before the Great Fire, and is seen there talking to the late George Byrnes, at that time a well-known Victoria auctioneer. Like a good many of the pioneers, Mr. Brewer has experienced the downs as well as the ups of life here, but nothing can dampen his enthusiasm for Vancouver, his interest in world affairs, or his patriotic attitude towards the Empire. He had passed four score years when he could still, if requested to do so, show visitors the steps of the old-world "Polka Mazurka" and the "Varsovienne." There's the pioneer spirit for you!

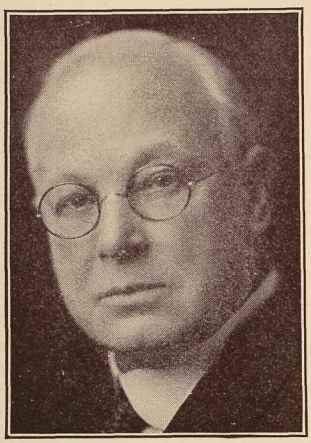
Former Vancouver Mayors

1886-1887—M. A. McLean. 1888-1891—D. Oppenheimer. 1892-1893—F. Cope. 1894—R. A. Anderson. 1895-1896—H. Collins. 1897—W. Templeton. 1898-1900—J. F. Garden. 1901—T. O. Townley. 1902-1903—T. F. Neelands. 1904—Dr. McGuigan. 1905-1906—F. Buscombe. 1907-1908—A. Bethune. 1909—C. S. Douglas. 1910-1911—L. D. Taylor. 1912—Jas Findlay. 1913-1914—T. S. Baxter. 1915—L. D. Taylor. 1916-1917—M. McBeath. 1918-21—R. H. Gale. 1922-1923—C. E. Tisdall. 1924—W. R. Owen. 1925-1928—L. D. Taylor.

S. L. Howe, First Reeve of Point Grey

By MRS. W. GARLAND FOSTER

In "Bleak House" there is an old sailor who "never praised his wife because discipline must be observed." Perhaps some such motive influences us when dealing with our contemporaries. Sometimes, however, there is wisdom in giving a man a meed of praise during his lifetime, especially when the work he has done has resulted in good to the community.



S. L. HOWE

S. L. Howe, the first Reeve of Point Grey, is admitted by his contemporaries to have been a man of unusual vision, and, had his suggestions in the matter of municipal ownership been acted upon, the cost of supplying parks and public property to this district would have been small. Mr. Howe was born in Ontario and came to Vancouver in 1897, engaging in the drug business. When the municipality of Point Grey was separated from Vancouver's hinterland, it was natural that S. L. Howe should be chosen as its first Reeve, for at that time he was, perhaps, the largest property owner in the municipality, as to-day he is the third highest. At that time Point Grey had only fifty-four registered voters, and this included all those living in the district, whether property owners or not, women as well as men. In this election, for the first time in Vancouver, women had the municipal franchise.

When the new council of Point Grey got down to business on the evening of January 13th, 1908, the new Reeve reiterated in his inauguration address the points which he had outlined in his campaign for the future development of the municipality:

1. No sectional feeling would be encouraged;
2. The public utilities should belong to the people;
3. The introduction of a system of trunk roads would be begun;
4. Local improvements were to be under the frontage tax system;
5. Consistent with revenue and required development, economy would be practised;
6. No liquor licenses would be issued in Point Grey.

He further stated that "The importance of the municipality which we have the honour to represent as its first council would be hard to estimate, lying as it does alongside the great city of Vancouver, which is destined to become the Liverpool of Canada and the metropolis of the Canadian Pacific coast for all time to come, and whose fast growing population will soon overgrow the boundaries and quickly convert this municipality

into a thickly settled and most beautiful residential district." A prophesy which, seeming at that time a fairy dream, is now an accomplished fact.

Many amusing episodes developed over getting the municipality divided from its parent district, some of which required tact and executive ability on the part of the new executive. For instance, when the municipality was defined, the legislative act provided that each part should assume its proportion of the financial liabilities which had attached to the old district. No mention was made of the working plant, except that it was to be the property of the municipality in which it was to be found on January 1st. At the time it was in use in Point Grey, and the supposition was that it would belong there. However, before January 1st it was removed mysteriously to South Vancouver, much to the consternation of the new municipality, which had visions of paying for plant which it would not own.

Mr. Howe served his municipality from 1908 to 1909. In 1928 he again became active in public affairs, when he successfully contested the constituency of Richmond-Point Grey for the Provincial Legislature. In the first cabinet of the Tolmie government, he became Provincial Secretary.

First Opera House Opened February 9, 1891

IT WAS a great night when the old Vancouver Opera House was opened. When the C. P. R. held its first sale of Vancouver lots it promised to erect an opera house and hotel and naturally selected sites for them in the West End, where most of its property was located. The company carried out its agreement to erect the hotel early in the city's history, but considerable delay occurred before the construction of the opera house commenced, and some purchasers of property even talked of legal proceedings to compel the company to carry out its agreement. However, in 1890 the company let the contract for its construction to Thos. Tompkins of Brockville, Ont.

Although ordinary chairs had to be used in place of the regular seats, the opera house was duly opened on February 9, 1891, with a gala performance by the Emma Juch English Grand Opera Company, the bill for the opening night being Wagner's "Lohengrin," with "Il Trovatore" at the matinee performance next day and "Carmen" in the evening.

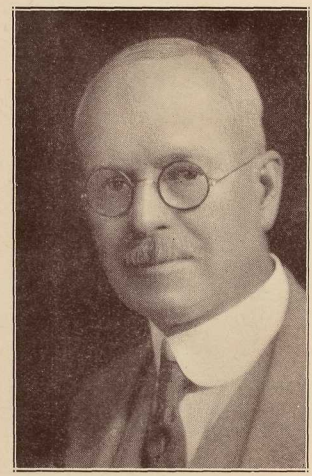
Though, of course, there was no annoying amusement tax in those days, the prices were rather high; even compared with the present scale, and were as follows: Orchestra chairs, $3; next two rows, $3; rest of lower floor, $2.50; balcony, first two rows, $2.50; rest of balcony, $2; gallery, $1. In the old opera house there were six private boxes in three tiers on each side of the house, each capable of seating five or six persons, and for these the charges were $15 and $20 each. For the matinee half the above prices were charged.

—Sunday Province, April 19th, 1928.

Mayor L. D. Taylor

BY NOEL ROBINSON

QUITE recently I was engaged one night writing the obituary notice of Louis D. Taylor, seven times mayor of Vancouver, when the prospect of his worship's demise, following an aeroplane accident, seemed imminent. Now it is a recognized fact in the newspaper world that the surest way to help a man to recover is to prepare the story of his life and death. But, anyway, in the case of L. D. Taylor, one might have realized that, with the prospect of a mayoralty contest ahead and some real fighting, he would not have allowed such a trifling matter as an aeroplane propeller to write "Finis" to his career.



L. D. TAYLOR AT PRESENT DAY.

It is, perhaps, appropriate that this last mayor of Vancouver—and the twenty-first—should be utterly dissimilar in type from the first chief magistrate, Mayor McLean, about whom you have just been reading in these notes, for do we not live in an absolutely different age from that in which Vancouver first struggled in the birth-throes of municipal life? McLean, an able, rugged, sterling type, of which Scotland has bred so many, was just suited to grapple with those early pioneer problems, which had been rendered more acute through the fire which had eliminated the city in 1886. Mayor Taylor, on the other hand, born and bred on the other side of the International line, is rather the politico-civic type. Though an old man, he is a man very much of this generation, very alive to municipal development, but equally alive to the advantage which may be taken of the undercurrents which run through municipal and political life, and not averse, upon occasion, to "playing to the gallery," as, for instance, in his famous "full dinner pail" campaign. Incidentally, he has probably been the hardest working mayor Vancouver has known. David Oppenheimer, one of the earliest mayors, and the one by whom all old-timers swear, was also a very hard worker.

L. D. Taylor—such a study in contrasts—has, more or less, run Vancouver as chief magistrate for double the number of years of any previous mayor. He has also, without doubt, had a greater experience of the "slings and arrows of outrageous fortune" than any other mayor of this city, and, for this very reason, he has, probably, been able to enjoy the position of mayor in a greater degree than any occupant of that office.

PREPARES FOR ROYALTY

Here is a summary of his life. A man must have a date to be born on, and, though his worship will probably deny any date which makes him appear older than he desires—for he is as particular as a woman about his age—the election will be over when these

lines appear and his age will have ceased to influence the issue one way or the other. He was born at Ann Arbor, Michigan, eight years before the commencement of the Civil War. That will give those of you who are interested, and who cannot remember the date, an opportunity to fix the date of the Civil War in your memories—Pelmanism, association of ideas. He has a warm affection for the place of his birth and has often returned there for a holiday.

He was educated in the public schools of Ann Arbor. Emigrating to British Columbia over thirty years ago, his first experience was at Revelstoke in the employ of the C. P. R. as trucker. Later he went to Calgary, where he worked in the baggage department as porter. Following this he came to Vancouver and entered the service of the Daily Province shortly before 1900. He was soon in charge of the circulation department. It was during this period that the Duke and Duchess of York (now King George and Queen Mary) visited the city, and Louis Taylor took charge of the decoration of the streets and some other of the preparations—his first experience of public work in the city.

COMMENCES RUNNING FOR MAYOR

At this time the now defunct Vancouver World, which had for seven years previously been owned by Mrs. Sarah McLagan, widow of its founder, J. C. McLagan, was running, and in 1905 Mr. Taylor and Mr. Victor (now Brigadier-General) Odlum entered upon a newspaper enterprise which required a good deal of courage—purchasing this paper. The partnership was dissolved a year later, and for the next nine years Mr. Taylor ran The World "on his own" with varying fortunes. It was during this time—in 1909—that he first ran for mayor and was defeated. He ran again in 1910 and was elected mayor that year, and again in 1911. The late James Findlay defeated him in 1912, but in the same year he contested as a Liberal the Rossland division for the provincial house and was defeated by Lorne Campbell.

Mayor Taylor ran again in Vancouver in 1914, but was defeated by Mr. T. S. Baxter. In 1915 he won. The following year he was unable to qualify and left for Fort George, where, for a year, he ran a newspaper. For several years after his return to Vancouver he ran oil trade publications and contributed letters to the papers on municipal matters, and then in 1925 he ran for the mayoralty again and was elected, and again in 1926 for a two-year period.

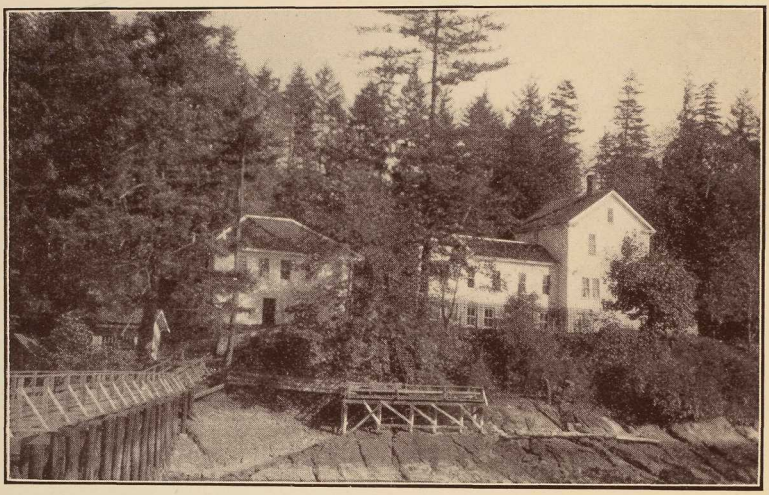
A NATURALIZED CANADIAN

At the time of his early mayoralties, Mayor Taylor's position was one of very great influence, and the high-water mark of his career in this important civic position was the year in which he ran the World newspaper, and the city, and built the World (afterwards the Tower, and now the Bekins) building, which was at that time said to be the tallest office building in the British Empire. It was during that period that he advocated Single-Tax in season and out of season on both sides of the line, and was sometimes known as "Single-Tax Taylor." He claims that many of the largest buildings in Vancouver were erected as a direct result of the operation of "Single-Tax" in the city.

Mayor Taylor has been associated so long and so intimately with the municipal development of Vancouver, which has now culminated in the amalgamation of South Vancouver and Point Grey—a consummation which he himself has been chiefly instrumental in bringing about—that it would be invidious to pick out any particular enterprise which has owed its inception to him. He is an American who has become a naturalized Canadian. Without sacrificing a natural affection for his native land, he has developed a stronger affection for his adopted country. Anyone who knows L. D. will aver that the flaming red tie, which is supposed to denote his tendency towards Socialism, has been an oriflamme without significance in practice.

The Dominion Pacific Biological Station

BY T. P. O. MENZIES



The Dominion Pacific Biological Station, situated on the north shore of that very lovely spot called "Departure Bay," on the east side of Vancouver Island, some four miles from the historic city of Nanaimo, is probably hardly known to the vast majority of people, and, should the mysterious name of "Biology" be mentioned, he or she most probably would answer, "Oh, yes!" out of politeness, but would be really little the wiser as to in what manner they were even remotely connected with such a name.

It is here, however, under the Directorship of Dr. W. A. Clemens, that an endless research goes on to discover the why and wherefore of all sea life, tracing the life histories of fish, prawns, crabs, clams, etc., their food, and the ever-changing state of their growth. The permanent staff is engaged throughout the year upon important economic problems requiring year-round observation and intensive study. There come to the station also for varying periods doctors and professors from all over Canada, to carry out researches, for our Pacific waters present unique and complex conditions and contain exceedingly varied and abundant form of life.

The researches carried out are various. Some have to do with fish scales, for the age of many fish is accurately arrived at by the careful checking up of the number of rings on the individual scale, similar to the method used when calculating the age of a tree; with the migrations of salmon; with the racial and environmental differences in trout; with the spawning of herring; with the seeming mysterious movements of pilchards.

Others are concerned with the microscopic life of the ocean. If a special small net is towed behind a boat, after a time there will be found in the bottom of the net a dense mass of material which has been filtered from the sea, and to which the name "plankton" is given. This consists for the most part of minute plants and animals, and this is the

food of practically all young fish, of some adult fish and of very many other marine animals, such as clams, oysters, barnacles, sea-anemones, jelly fish, worms, etc. Without plankton the sea would be comparatively barren of life. Still others have to do with the physico-chemical conditions of the water; the chemical make-up of marine forms of life; the physiological workings of the organs of fishes.

All these studies are made possible because of the splendid facilities of the Station with its well-equipped biological and chemical laboratories, well stocked library, and the trim motor vessel fitted and available for marine research.

Museums of other cities send their artists and technicians to the Station for the collection, preservation, photographing, modelling and painting the plant and marine life of the Pacific. In the Museum of the Station are assembled preserved specimens taken from time to time from the sea, and here also are Aquaria containing living fish, sea anemones, starfish, crabs, limpets, etc.

The great value of these Biological Stations is now gradually being realized, and much credit is due to the untiring energy and research of these highly-trained scientists, who seek to unravel the mysteries of the ocean and advance in a practical way with their discoveries the knowledge required to protect and conserve our wonderful and valuable harvest in the sea.

It was here that the writer was privileged to spend a few days, enjoying the courtesy and hospitality of Dr. W. A. Clemens, a visit full of wonder and interest.

DUNSMUIR STREET

"PERHAPS the most notable name on Vancouver's streets is that of the late Mr. Robert Dunsmuir, that sturdy Scot, who, from a Hudson's Bay factor, became a great capitalist and coal miner, leaving a fortune of over seven million dollars and making of himself the first worker to pile up a million on the soil of British Columbia. Strange to say, Mr. Dunsmuir mined his first coal at Prince Rupert. That mine did not amount to much, because, before it was fully developed, coal was discovered at Nanaimo. An Indian named Samet, later known as the Coal Tyee, when shown the black piah (fire) stone of Prince Rupert, grunted his disgust and said: 'Huh, hyu chicamin stone, all same Nanaimo'; and sure enough Samet was right and Dunsmuir secured the land, built the Esquimalt and Nanaimo Railway, and developed the coal mines, as everyone knows."

Vancouver Streets—Daily Province, April 6th, 1907.

THE FIRST THROUGH TRAIN

THE 23rd day of May, 1887, will ever be a memorable one for Vancouver; for then a new impetus was given to business, the people took fresh courage and the city began to grow in earnest. Its onward progress thereafter was by leaps and bounds. Quoting from the Victoria Colonist, May 23rd, 1887:

"Queen's weather ushered in the day long looked for by Vancouverites, the blending of the Occident with the Orient, the final accomplishment of the great transcontinental line of railway from the Atlantic to the Pacific. The first train from the Royal City arrived early this morning, bringing a large excursion party—ladies predominating."

Botanizing on Mt. Liumchium, B. C.

BY FRED PERRY

A party, consisting of members of the Burrard Field Naturalists' Club, climbed Mount Liumchium from Cultus Lake on July 10th. The botanical finds were very interesting and are worth recording.

The margins of Cultus Lake gave them that rare orchid Epipactis gigantea. Henry's Flora notes that it is recorded from Osoyoos, B. C. The woods just above the lake revealed another rare orchid, namely, Cephalanthera oreganum; the only other record from B. C. was made by Mr. Glendenning from Agassiz, B. C. That rare saprophylic pyrola (Pyrola aphylla) was also found, as well as Cimicifuga elata (Bugbane), Mount Cheam being the only locality recorded for it by Henry's Flora.

The alpine mat herbage disclosed Polygonum bistortoides, the alpine knot weed, uncommon in the Rockies, while on the rocks just above the mat herbage Eriogonum subalpinum, commonly called "woolly knees," was found. At 6,500 feet, on a wet northern exposure, that beautiful Saxifrage, Saxifrago oppositifolia, occurred in association with that interesting stonecrop, Sedum integrifolium.

Lloydia serotina was also recorded. An interesting fact about this plant is that Gerrard, in his "Herbal" states that he walked from London to Mount Snowden to get a look at this, one of the very few arctic lilies.

On the top of the ridges, limestone outcroppings were common, and some extraordinary associations were observed. Phacelia leptosepala, Hydrophyllum capitatum, Oxotropis monticola, Brataegus brevispina, Lomatium Martendalei var augustatum, Phacelia sericea, Anemone Drummondii, Botrychium lunari, Botrychium ramosum and Luina hypoleuca. All of the above plants were within a few feet of each other. No doubt the presence of the limestone would explain the cause of such a grouping, for the rapid disappearance of the water through the limestone would tend to create a partial dry area.

By the shores of a little lake, Stenanthium occidentalis, or Mountain Bells, was found in profusion.

Altogether, we collected some of the most interesting and rare plants. Their recording deserves notice, and "Museum Notes" is a fitting place for it.

In 1886 there was but one public school in Vancouver and it consisted of but one small room, which, however, was large enough to accommodate the entire school population of the young city. In 1907 the number had increased to fifteen, twelve of which are substantial brick buildings.

Fresh-Water and Marine Protozoa from British Columbia

with Descriptions of New Species.

Study from the Stations of the Biological Board of Canada

BY G. H. WAILES

September, 1928.

A few words may not be out of place indicating briefly what the Protozoa are and how their study is of interest to others besides specialists.

The **Protozoa** are termed unicellular animals in contradistinction to the **Metazoa**, that is, all those higher animals that are built up of numerous separate cells.

The **Amoebae** are usually regarded as the lowliest form of Protozoa; if we examine one under the microscope, we see a small colourless drop of semi-fluid material progressing by a series of wave-like flowings, the margins either rounded or prolonged into blunt finger-like or into spear-shaped projections, according to the species at which we happen to be looking.

Although primitive, these creatures are by no means simple organisms; the colourless material, which is protoplasm, contains various kinds of minute granules, together with a comparatively large nucleus; the animal is endowed with the ability to seek and select its food, secretes the necessary digestive fluids, breathes by absorbing oxygen from the water, multiplies by simple fission or with separation of chromidia, and, to adopt Herbert Spencer's definition of life, the Amoeba is able to adapt itself to its environment.

Many of the Amoebae living in fresh-water do not exceed half the thickness of a cigarette paper in diameter, and the majority are not more than five or six times larger, although some may be just visible to the naked eye, attaining to a length of about one-fiftieth of an inch.

A little higher in the scale are those Amoebae that provide themselves with a shell or test, in much the same manner as does a caddis-worm.

Near Vancouver a very remarkable example occurs of how a naked Amoeba may develop into a "house" building species. An universally distributed species, *Amoeba radiosa,* was found by Penard to be protected sometimes by a sparse sprinkling of minute sand grains over its surface; this he named *variety granulifera* (Amoeba granulifera [Pen.] Wailes); both this species and the variety occur in a pool situated between the summits of Grouse and Dam Mountains, but associated with them was a form which carried this protective process a step further, making a compact spherical covering of sand grains for itself; it was named *Amoeba granulifera* var *sphaerica* Wailes (plate 7, fig. 43); to all intents and purposes it is a testaceous Rhizopod belonging to the order Conchulina.

Being the most primitive of living animals, the Protozoa have received much attention from those interested in speculations as to the source of life on this planet.

Thus the Protozoa have both a philosophical and a biological interest, and persons to whom they are merely a name and who have no interest in either point of view are still liable to have their lives profoundly affected by them, for although the organisms mentioned here are not harmful, there are numerous kinds parasitic in man and beast that are the cause of grave diseases.

The literature on the Protozoa is very voluminous; the original descriptions of most of the species recorded here will be found in the works of F. Stein (1859-1867), W. Saville Kent (1881) and A. C. Stokes (Trenton Nat. Hist. Soc. J. 1888).

All the illustrations to this article are drawn from B. C. specimens; some have not been redrawn (for publication) since they were first described by the above-named authors.

A convenient monograph of the fresh-water flagellates is by Pascher and Lemmermann in Die Susswasser-Flora (Hefte 1 and 2, 1914). Species first described by the writer will be found in the Annals and Mag. of Nat. Hist. (1X, 16 and 20, 1925 and 1027), from whence some of the illustrations are taken.

The record of *Stentor auricula* S. Kent is interesting, as it seems to be the only one since it was first described (1881); doubt has been expressed as to whether Saville Kent had not a species of Folliculina under observation, but the B. C. specimen was undoubtedly this Stentor; it had the typical beaded nucleus of the Genus.

A list by the present writer of "The fresh-water Rhizopoda and Heliozoa found in British Columbia" appeared in "Contributions to Canadian Biology" (N.S. Vol. 2, No. 20, 1925), published by the Biological Board of Canada; illustrations of most of which will be found in the monograph published by the Ray Society, London. (Cash and Hopkinson Vols. 1 and 2; Wailes and Hopkinson Vols. 3, 4 and 5, 1905-1921) and in the works of Dr. E. Penard.

The Rhizopoda recorded here are additions to the above list; figures of species not on plates 7 and 9 will appear in the next number of "Museum Notes," plates 11 and 12.

A list of the "Tintinnidae from the Strait of Georgia," a family belonging to the Ciliata, with a figure of each species by the present writer, appeared in the above-mentioned volume of "Contributions to Canadian Biology."

A list of other species of the Protozoa with figures will, it is hoped, be published in the near future in "Museum Notes."

The records of species noted here are largely from the vicinity of Nanaimo, and the writer wishes to express his thanks to the Biological Board of Canada for the facilities placed at his disposal at their Pacific Biological Station, Departure Bay, B. C.

The following are the descriptions of **new species** and **varieties** found in B. C.

Species marked "M" are Marine.

Dimensions are given in microns (μ); 1000 microns equal one millimetre; 25.4 millimetres equal one inch.

Sub-class CILIATA

Cothurnia compressa var. *flexa*. var. nov. Pl. VIII., fig. 8.

Similar to type but having the aperature bent over to one side at nearly a right angle.
Dimensions—Length 87-100μ; breadth 32-36μ.
Habitat—Marine; On algae, Departure Bay.

Acineta minuta sp. nov. Pl. IX., figs. 12, 12a, 12b.

Lorica small, triangular or semicircular in side view, compressed; animal filling the lorica; pedicel very short; tentacles about 5 in number in each of two fasicles; epizoic on Copepoda.

Dimensions—Length 23-30μ; breadth 20-30μ; length of pedicel 5-6μ.

Habitat—On copepoda, Departure Bay.

Paracineta crenata (Fraipont).

Syn. *Acineta crenata* Fraipont;
Acineta saifulae Mereschk.

Paracineta crenata var *gracilis* var. nov. Pl. IX., fig. 9.

Lorica elongate, ellipsoidal with everted aperature, about three times as long as broad, exterior with a few (4) transverse annulations regularly disposed on the anterior portion; pedicel about twice as long as the lorica; animal when active extending beyond the aperture; nucleus placed centrally; one large and one smaller contractile vacuole, the larger one placed posteriorly.

Dimensions—Length of lorica 110μ; diameter of lorica 35μ; diameter of aperture 22μ; length of pedicel 200μ; diameter of pedicel 4μ.

Habitat—Marine. On hydroids, dredged from 25 fathoms. Porlier Pass.

Paracineta mystacina var *oviformis* Var. Nov. Pl. IX., figs. 20, 32.

Body of animal completely filling the lorica, except the pedicellate portion, the tentacles emerging either from a more or less circular opening in the anterior part of the lorica or irregularly from the anterior moiety of the body that may extend beyond the lorica; animal as in type.

Dimensions—Length 40-55μ; diameter 35-50μ; length of pedicel 10-45μ.

Habitat—In association with the type.

Vaginicola nigra. Sp. nov. Pl. VIII., figs. 26, 27.

The loricae occurred numerously on clam shells; they are thick walled, black and flexible, with a somewhat rough surface; being in a dried condition, the animals were not preserved.

Dimensions—Length of lorica 200-220μ; breadth 100-115μ; diameter of aperature 20μ.

Habitat—Marine. William Head, Strait of Juan de Fuca, B. C. (collected by Dr. O'Donoghue).

Sub-class RHIZOPODA

Order **AMOEBINA.**

Amoeba granulifera (Pen). Var *sphaerica* Wailes. Pl. 7, fig. 43.

M. *Striolatus tardus* Schaeffer. Pl. 11, figs. 14, 15.

Order **RETICULOSA.**

Biomyxa vagans Leidy Pl. 11, fig. 7.

M. *Allogromia ovoidea* Rhumbler. Pl. 9, fig. 33.

Order **CONCHULINA.**

Pyxidicula scutella Playfair. Pl. 7, fig. 39.
Nebela columbiana Wailes. Pl. 7, fig. 41.
Nebela bipes Carter. Pl. 7, fig. 45.
Hyalosphenia minuta Cash. Pl. 7, fig. 40.
Pareuglypha reticulata Penrad. Pl. 7, fig. 44.

Platoum repandum Wailes. Pl. 7, fig. 42.
Arcella dentata Ehrenb. Pl. 11, fig. 10.
Centropyxis stellata Wailes. Pl. 11, figs. 20-22.
Corythion acutum Wailes. Pl. 11, fig. 19.

Order **HELIOZOA.**

Raphidiophrys pallida Penard. Pl. 11, figs. 3-5.
Acanthocystis penardi Wailes. Pl. 11, fig. 9.
Acanthocystis pantapoda Penard. Pl. 11, figs. 1, 2.
Acanthocystis chaetophora (Schrank). Pl. 11, fig. 6.
Acanthocystis chaetophora var, simplex Wailes.
M. *Heterophrys marina* H. & L. Pl. 7, fig. 35.
M. *Acanthocystis brevicirrhis* Perty. Pl. 7, fig. 34.
M. *Acanthocystis spinifera* Greeff. Pl. 7, fig. 36.
M. *Acanthocystis pelagica* Ostenfeldt. Pl. 11, fig. 8.
M. *Wagenerella borealis* Meresch. Pl. 9, figs. 26, 26a.

Order **RADIOLARIA.**

M. *Protocystis tridens* Borgert. Pl. 9, fig. 39.
M. *Protocystis tridens* forma. Pl. XII., fig. 40.
M. *Protocystis aurita* Wallich, f. Pl. 9, fig. 40.
M. *Dicthyophimus historicus* Jorg. Pl. 9, fiigs. 41, 42.
M. *Hyalaspis* sp.
M. *Phormacantha hystrix* Jorg.
M. *Acanthometron pellucidum* J. Müller. Pl. 9, fig. 44.

Order **PROTOMONADINA.**

Family CHOANOFLAGELLATA.

Mononsiga globosa S. K. Pl. 7, fig. 7a.
Mononsiga steinii S. K. Pl. 7, figs. 1, 1a.
Mononsiga consociata S. K. Pl. 7, fig. 4.
Mononsiga ovata S. K., Pl. 7, figs. 6, 6a, 16, 16a.
Mononsiga robusta Stokes. Pl. 7, figs. 3, 3a.
Codosiga botrytis (Ehrenb). Pl. 7, fig. 12.
Codosiga pyriformis S. K. Pl. 7, fig. 14.
Salpingoeca amphoridium J-Clk. Pl. 7, fig. 7.
Salpingoeca campanula S. K. Pl. 7, fig. 13.
Salpingoeca fusiformis S. K. Pl. 7, fig. 5.
Salpingoeca gracilis J-Clk. Pl. 7, fig. 18.
Salpingoeca lagenella Stokes. Pl. 7, fig. 2.
M. *Salpingoeca infusionem* S. K. Pl. 7, fig. 15.
M. *Salpingoeca marina* J-Clk. Pl. 7, figs. 9, 10.
M. *Polyoeca dichozoma* S. K. Pl. 7, fig. 21.
M. *Codonoeca costata* J-Clk. Pl. 7, fig. 20.
M. *Codonoeca gracilis* Calkins. Pl. 7, fig. 17.

Family BICOECACAE.

M. *Bicoeca pocillum* S. K. Pl. 7, fig. 8.
Bicoeca lacustris J-Clk. Pl. 7, fig. 19.
Diplomita socialis S. K. Pl. 7, fig. 29.
Stylobryon petiolatum Duj. Pl. 7, figs. 22, 22a.
Monas sociabilis H. Meyer. Pl. 7, fig. 11.

Family CHRYSOMONADINAE.
Derepyxis urceolata (Stokes). Pl. 9, figs. 10, 10a.
Chrysopyxis bipes Stein. Pl. 9, figs. 35, 35a.
Dinobryon utriculus Stein. Pl. 9, fig. 14a, Pl. 12, figs. 1, 2.
Dinobryon cylindricum var *palustre* Lemm. Pl. 12, figs. 12-14.
Dinobryon bavaricum Imhof. Pl. 12, figs. 6, 7.
Dinobryon divergens Imhof. Pl. 12, fig. 3.
Dinobryon divergens var *angulatum* Chodat. Pl. 12, figs. 4, 5.
Dinobryon sertularia Ehrenb. Pl. 12, figs. 15-18.
Dinobryon sociale Ehrenb. Pl. 12, figs. 10, 11.
M. *Dinobryon balticum*. Pl. 12, figs. 8, 9.
Hyalobryon ramosum Lauterbom. Pl. 12, fig. 20.
Synura uvella Ehrenb. Pl. 12, fig. 39.
Dendromonas laxa S. K. Pl. 7, fig. 28.
Dendromonas virgaria Weisse. Pl. 7, figs. 23, 24, 25.
Spongomonas discus Stein. Pl. 7, fig. 33.
Spongomonas intestinalis Cienk. Pl. 7, figs. 32, 32a, 32b.
Phalansterium digitatum Stein. Pl. 7, fig. 30.
Anthophysa vegetans (Müller). Pl. 7, fig. 27.
Rhipidodendron huxleyi S. K. Pl. 7, fig. 31.

Sub-class CILIATA

Family VORTICELLIDAE.
F. & M. *Corthurnia crystallina* (Ehrenb. Pl. 8, figs. 10, 11.
M. *Cothurnia gracilis* S. K. Pl. 8, fig. 1.
M. *Cothurnia innata* O. F. Müller. Pl. 8, figs. 2,3.
F. & M. *Cothurnia imberbis* Ehrenb. Pl. 8, figs. 12, 13, 14, 19, 20.
M. *Cothurnia nodosa* C. & L. Pl. 8, figs. 15, 16.
M. *Cothurnia patula* From. Pl. 8, fig. 7.
M. *Cothurnia lata* Kellicott. Pl. 8, figs. 17, 18.
M. *Cothurnia compressa* C. & L. Pl. 8, figs. 4, 5, 6.
M. *Cothurnia compressa* var *flexa* Wailes. Pl. 8, fig. 8.
Cothurniopsis annulata (Stokes) Pen. Pl. 8, fig. 9.
Pyxicola constricta Stokes. Pl. 8, fig. 41.
Vaginicola longicollis (S.K.) Pl. 8, figs. 23, 24, 25.
Vaginicola decumbens Ehrenb. Pl. 8, figs. 21, 22.
M. *Vaginicola nigra* Wailes. Pl. 8, figs. 26, 27.
Ophridium sessile S. K. Pl. 8, fig. 47.

Sub-class ACINETARIA

Family PODOPHRYIDAE.
Podophyra fixa Müller. Pl. 8, fig. 29.
Podophyra mollis S. K. Pl. 8, fig. 28.
Sphaerophyra magna Maupas. Pl. 8, fig. 30.
Sphaerophyra pusilla C. & L. Pl. 8, fig. 31.
M. *Trichophyra* sp. Pl. 12, fig. 28.
M. *Actinolophus pedunculatus* F. E. Schulze. Pl. 9, figs. 27, 30, 31.
M. *Ephelota coronata* Wright. Pl. 8, figs. 32, 33.
M. *Ephelota gemipara* (Hertwig). Pl. 8, figs. 42, 45, 46.
M. *Ephelota plana* Wailes. Pl. 8, figs. 34, 35, 37.

Family ACINETIDAE.
M. *Acineta tuberosa* Ehrenb. Pl. 9, figs. 4, 5, 6.

M. *Acineta foetida* Maupas. Pl. 9, figs. 7, 8.
M. *Acineta laevis* Dons. Pl. 9, fig. 13.
M. *Acineta minuta* Wailes. Pl. 9, figs. 12, 12a, 12b.
M. *Paracineeta patula* (C. & L.). Pl. 9, figs. 1, 2, 10, 11.
M. *Paracineta parva* Sand. Pl. 9, fig. 14.
M. *Paracineta livadiana* (Mereschk). Pl. 9, figs. 16, 17, 18, 18a.
M. *Paracineta crenata* var *pachytheca* Collin. Pl. 9, fig. 3.
M. *Paracineta crenata* var *gracilis* Wailes. Pl. 9, fig. 9.
M. *Paracineta limbata* (Maupas). Pl. 9, fig. 15
Paracineta mystacina (Ehrenb). Pl. 9, figs. 21, 22, 23
Paracineta mystacina var *oviformis* Wailes. Pl. 9, figs. 20, 32.
Paracineta mystacina var *longipes* (Meresch). Pl. 9, fig. 19.

Family OPHRYODENDRIDAE S. K.

M. *Ophryodendron belgicum* var *stellatum* Wailes. Pl. 8, figs. 38, 48.
M. *Ophryocephalus capitatum* Wailes. Pl. 8, figs. 35, 43, 44.

Order **HETEROTRICHA.**

Family STENTORINAE.

M. *Stentor auricola* S. K. Pl. 9, fig. 29.
M. *Stentor multiformis* O. F. Müller.
Stentor polymorpheus Müller. Pl. 12, fig. 38.
Stentor caeruleus Ehrenb. Pl. 12, fig. 37.
M. *Folliculina ampulla* O. F. Müller. Pl. 9, figs. 36, 36a, 37.
Folliculina boltoni S. K. Pl. 9, fig. 43.

Sub-class FLAGELLATA

Urceolopsis sabulosa Stokes. Pl. 12, fig. 30.
Urceolopsis cycostoma Stein. Pl. 12, fig. 31.
Urceolopsis natans Wailes. Pl. 7, fig. 26.

Sub-order **Silicoflagellatae.** (Marine).

Distephanus speculum Ehrenb. Pl. 7, fig. 38.
var *regularis* Lemm. Pl. 7, figs. 37, 37a.
var *octonarius* (Ehrenb.) forma. Pl. 12, fig. 33.
Dictyocha fibula var *longispinum* Lemm. Pl. 7, fig. 46.
Ebria tripartita Borgert. Pl. 11, figs. 23-25.

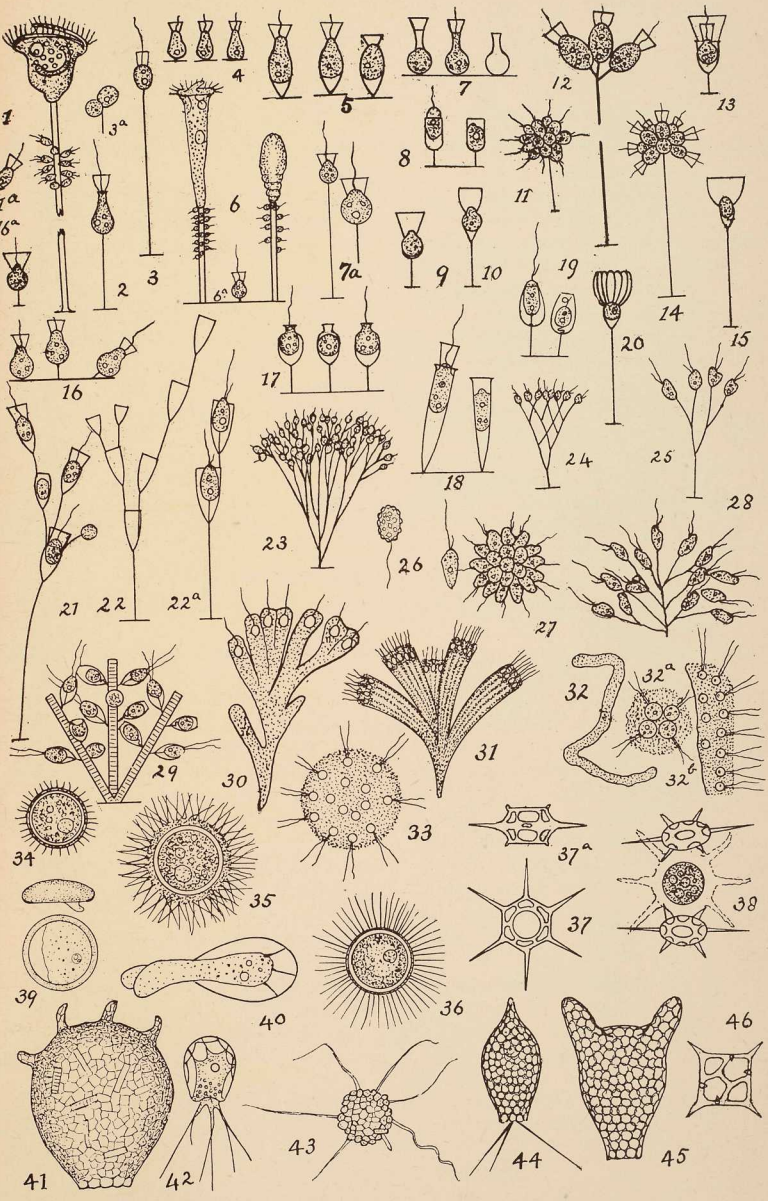
Incertae sedis. (Marine).

Radiospermum textum Meunier. Pl. 8, figs. 39, 40.
Trochiscia clevei Lemm. Pl. 9, fig. 38.
Trochiscia moebiusi Jorg. Pl. 9, fig. 45.
Trochiscia dictyon (Jorg). Pl. 1, fig. 64.
Trochiscia multispinosa (Moeb.) Pl. 12, fig. 36.

NOTE.—*Radiospermum textum* is the ovum and case belonging to an unidentified species.

The above species of *Trochiscia* are spined ova (*ova hispida*) of unknown origin. The genus *Trochiscia* belongs to the *Chlorelleae* family of algae; a number of spined spherical organisms have been wrongfully included in it. The name is retained for the species in our list as they are so best recognised until their origin can be traced. Spined ova are not uncommon.

PLATE VII.—*Description Overleaf.*



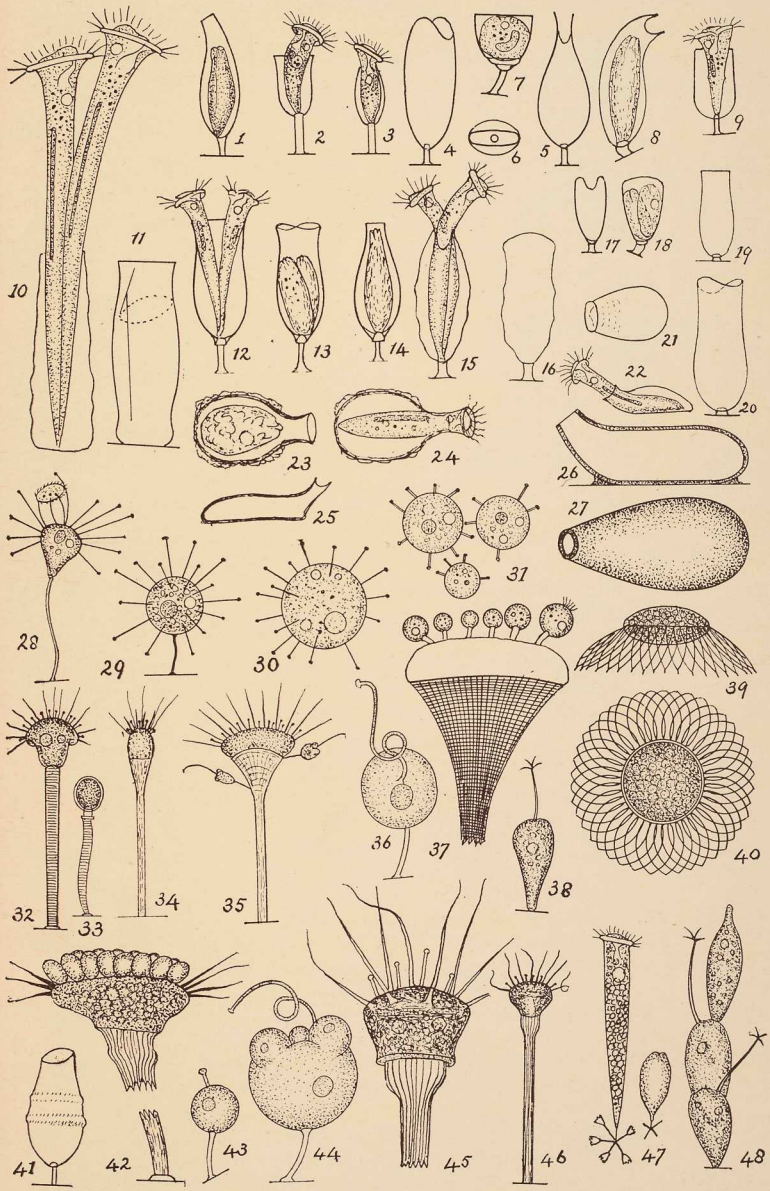
G. H. Wailes del. ad nat.

PLATE VII.

1, 1a.	*Monosiga steinii* J. Clk. Fig. 1. Group of zooids attached to pedicel of a *Vorticella nebulifera* X 200. Fig. 1a. Single zooid X 500. Newcastle Island Lake.
2.	*Salpingoeca lagenella* Stokes. Wellington Lake. X500.
3, 3a.	*Monosiga robusta* Stokes. Fig. 3a. A zooid during division. Elk Lake. X250.
4.	*Monosiga consociata* S. K. Wellington Lake. X500.
5.	*Salpingoeca fusiformis* S. K. Wellington Lake. X500.
6, 6a.	*Monosiga ovata* S. K. Zooids attached to pedicel of *Epistylis* sp. X150. 6a single zooid X250. Abbotsford.
7.	*Salpingoeca amphoridium* J. Clk. Newcastle Island Lake. X500.
7a.	*Monosiga globosa* S. K. Wellington Lake, X400; detached zooid X500.
8.	*Bicosoeca pocillum* S. K. Marine. False Narrows Reef, Nanaimo. X500.
9, 10.	*Salpingoeca marina* S. K. False Narrows Reef. X500.
11.	*Monas sociabilis* H. Meyer. Fixed colony. Wellington Lake. X300.
12.	*Codosiga botrytis* Ehrenb. Wellington Lake. X500.
13.	*Salpingoeca campanula* S. K. False Narrows Reef. X500.
14.	*Codosiga pyriformis* S. K. Wellington Lake. X300.
15.	*Salpingoeca infusionem* S. K. Gabriola Pass. X500.
16, 16a.	*Monosiga ovata* S. K. Fig. 16. Three zooids with pedicels of various lengths. Wellington Lake. Fig. 16a. Individual from Gabriola Pass. X500.
17.	*Codonoeca gracilis* Calkins. Gabriola Pass. X500.
18.	*Salpingoeca gracilis* J. Clarke. Newcastle Island Lake, Departure Bay. X500.
19.	*Bicosoeca lacustris* J. Clk. Extended and contracted zooids. Hoggan Lake, Gabriola Island. X500.
20.	*Codonoeca costata* J. Clk. Gabriola Pass. X500.
21.	*Polyoeca dichotoma* S. K. Gabriola Pass. X500.
22, 22a.	*Stylobryon petiolatum* Duj. Fig. 22 showing formation of a colony with two immature cups. Fig. 22a. Two active zooids. Elk Lake. X500.
23, 24, 25.	*Dendromonas virgaria* Weiss. Fig. 23. A dense colony. X125. Fig. 24. Small colony. X200. Fig. 25. Commencement of a colony. X500. Newcastle Island Lake.
26.	*Urceolopsis natans* Wailes. Stanley Park Lake. X400.
27.	*Anthophysa vegetans* Mull. Free-swimming colony with enlarged view of single zooid. Lulu Island. X500.
28.	*Dendromonas laxa* S. K. Tacoma, Washington. X400.
29.	*Diplomita socialis* S. K. Elk Lake. X350.
30.	*Phalansterium digitatum* Stein. Stanley Park. X200.
31.	*Rhipidodendron huxleyi* S. K. Newcastle Island Lake. X150.
32, 32a, 32b	*Spongomonas intestinalis* Cienk. Fig. 32. A colony. X80. Fig. 32a. Commencement of a young colony. X400. Fig. 32b. Portion of a mature colony. X200. Elk Lake.
33.	*S. discus Stein.* Colony from Stanley Park Lake. X250.
34.	*Acanthocystis brevicirrhis* Perty. In plankton from the Strait of Georgia. X300.

(Continued on page 37)

PLATE VIII.—*Description Overleaf.*



G. H. Wailes del. ad nat.

PLATE VIII.

1. *Cothurnia gracilis* S. K. Departure Bay. X200.

2, 3. *C. innata* O. F. Müller. Departure Bay. X200.

4, 5, 6. *C. compressa* C. and L. Broad and narrow side views and end view of empty lorica. Gabriola Reef. X200.

7. *C. patula* From. Forma. Departure Bay. X200.

8. *C. compressa* var *flexa* Wailes. Departure Bay. X200.

9. *Cothurniopsis annulata* Stokes. Newcastle Island Lake. X300.

10, 11. *Cothurnia crystallina* Ehrenb. Fig. 10. Two extended animals in one lorica. Wellington Lake. Fig. 11. Empty lorica showing operculum open with contractile filament attached; closed position shown by dotted line. Departure Bay. X200.

12, 13, 14. *C. imberbis* Ehrenb. Various forms of lorica. Departure Bay. X200.

15, 16. *C. nodosa* C. and L. Nanoose Bay. X200.

17, 18. *C. lata* Kellicott. Broad and narrow views of individual attached to a Copepod. Departure Bay. X200.

19, 20. *C. imberbis* Ehrenb. Fig. 19. The usual freshwater form found in B. C. Newcastle Island Lake. Fig. 20. A marine form. Departure Bay. X200.

21, 22. *Vaginicola decumbens* Ehrenb. Broad and narrow side view. Wellington Lake. X200.

23, 24, 25. *V. longicollis* S. K. Wellington Lake. X200.

26, 27. *V. nigra* Wailes. Broad and narrow views of test attached to a polyzoan (*Lepralia bilabiata*). William Head, Vancouver Island. X200. (Collected by Dr. O'Donoghue).

28. *Podophyra mollis* S. K. Active individual with a captured ciliate. Wellington Lake. X200.

29. *P. fixa* Müller. Newcastle Island Lake. X300.

30. *Sphaerophyra magna* Maupas. Hoggan Lake, Gabriola Island. X300.

31. *S. pusilla* C. and L. Newcastle Island Lake. X300.

32, 33. *Ephelota coronata* Wright. Fig. 32. Active individual. Fig. 33. Encysted individual. Departure Bay. X50.

34, 35. *E. plana* Wailes. Narrow and broad side views of active individual, the latter having two *Ophryocephelus capitatum* attached to it. False Narrows Reef. X25.

36. *Ophryocephelus capitatum* Wailes. X300.

37. *Ephelota plana* Wailes. Distal end of pedicel with six buds attached to empty membrane of animal. Departure Bay. X100.

38. *Ophryodendron belgicum* var. *stellatum* Wailes. Gabriola Pass. X200.

39, 40. *Radiospermum textum* Meunier. Broad and side views. Plankton. Departure Bay. X300.

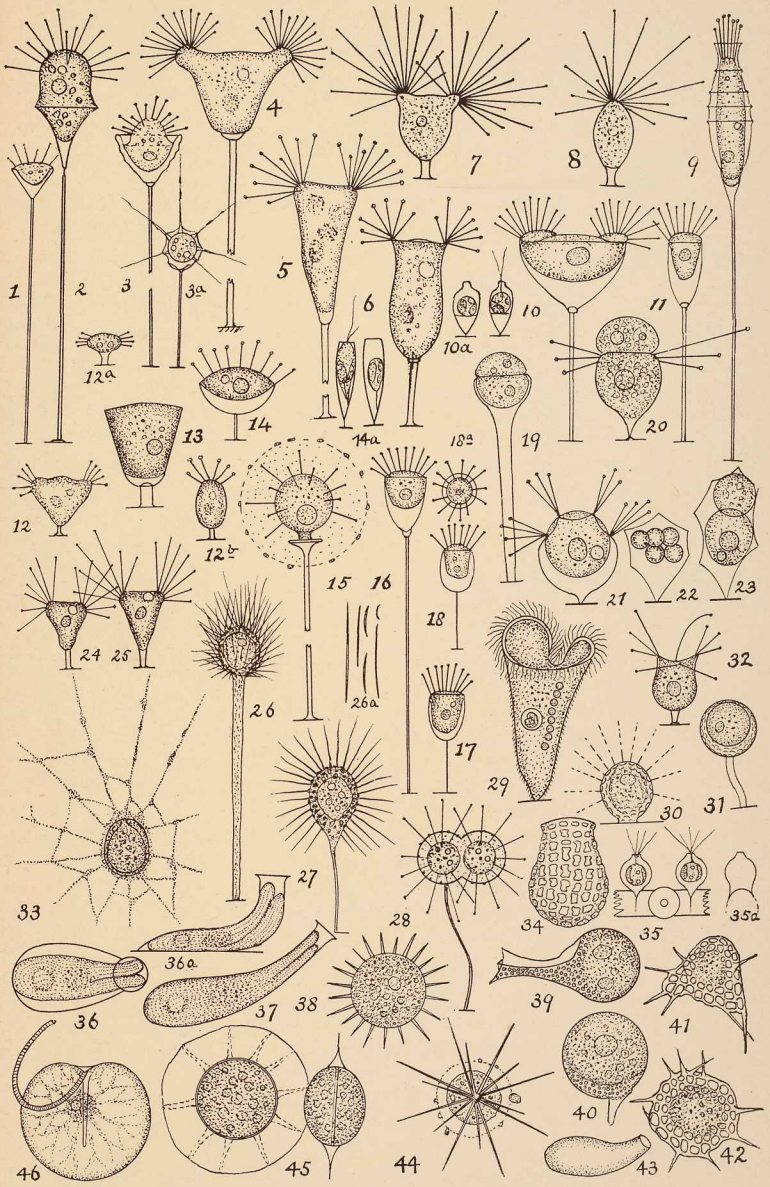
41. *Pyxicola constricta* Stokes. Lulu Island. X250.

42. *Ephelota gemnipara* Hertwig. Active individual with numerous buds. Departure Bay. X50.

43, 44. *Ophryocephalus capitatum* Wailes. Fig. 43. Young individual. Fig. 44. Showing formation of buds. False Narrows Reef. X300.

(Continued on page 37)

PLATE IX.—*Description Overleaf.*



G. H. Wailes del. ad nat.

PLATE IX.

1, 2. *Paracineta patula* C. & L. Fig. 1. Individual from Porlier Pass. X150. Fig. 2. Animal projecting beyond the lorica; pedicel with constricted neck. Departure Bay. X200.

3. *P. crenata* var. *pachytheca* Collin. From Porlier Pass. X150.

3a. *Acineta lappacea* Stokes. X500.

4, 5, 6. *A. tuberosa* Ehrenb. From Departure Bay. Figs. 4 and 6. X150. Fig. 5. X200.

7, 8. *A. foetida* Maupas. Broad and narrow side views of active individual. On alga, Hammond Bay. X200.

9. *Paracineta crenata* var. *gracilis* Wailes. From Porlier Pass. X200.

10, 11. *P. patula* C. & L. Broad and narrow side views of active individual, with a wide and shallow lorica. Departure Bay. X150.

12, 12a, 12b. *Acineta minuta* Wailes. Figs. 12, 12b., broad and narrow side views of active individual. Fig. 12a. Young individual. Departure Bay. On Copepod. X300.

13. *A. laevis* Dons. From Departure Bay. X250.

14. *Paracineta parva* Sand. On worm tube from Gabriola Pass. X500.

14a. *Dinobryon utriculus* Stein. X500. Generally distributed.

15. *Paracineta limbata* Maupas. From Departure Bay. X300.

16-18, 18a. *P. lividiana* Meresch. Figs. 16, 18. X200. Fig. 17. X150.

19. *P. mysticina* var. *longipes* Meresch. Animal dividing. Newcastle Island Lake. X125.

20. *P. mysticina* var. *oviformis* Wailes. Individual dividing. Newcastle Island Lake. X300.

21, 22, 23. *P. mysticina* Ehrenb. Fig. 21. Active animal showing tentacles emerging through openings in lorica. Fig. 22. Lorica containing spores. Fig. 23. Completion of process of division. Wellington Lake. X300.

24, 25. *Podophyra cylopum* C. & L. On copepod from pool near Little Mountain, Vancouver. X300.

26, 26a. *Wagenerella borealis* Meresch. Fig. 26. Individual dredged from ten fathoms in Departure Bay, attached to alga. X100. Fig. 26a. Varieties of the spines. X150.

27. *Actinolophus pedunculatus* Meresch. Active individual with pseudopodia. displayed. Collected on alga at low tide, Departure Bay. X150.

28. *Paracineta limbata* Maupas. Two individuals apparently the result of division.

29. *Stentor auricola* S. K. Collected on float, Departure Bay. X100.

30, 31. *Actinolophus pedunculatus* Meresch. Fig. 30. Active individual almost sessile; on filamentous diatom. False Narrows Reef. X150. Fig. 31. Individual retracted. Gabriola Pass. X200.

32. *Paracintta mysticina* var. *oviformis* Wailes. Active individual on Mougeotia sp. Newcastle Island Lake. X200.

33. *Allogromia ovoidea* Rhumbler. Active individual. Departure Bay. X150.

(Continued on page 37)

34. *Tintinnus sp.* Test from Sproats Lake. X100. (Collected by C. J. Berkley.)

35, 35a. *Chrysopyxis bipes* Stein. Fig. 35. Three individuals attached to a filament of *Zygnema stellaris*. Fig. 35a. Side view of lorica showing filaments by which it is attached. Stanley Park, Vancouver. X500.

36, 36a, 37. *Folliculina ampulla* O. F. Müller. Figs. 36, 36a. Short-necked, light-coloured variety. Fig. 37. Long-necked, dark-coloured variety. Clark Reef, Departure Bay. X100.

38. *Trochiscia clevei* Lemm. Plankton. X150.

39. *Protocystis tridens* Borgert. Plankton. X 200.

40. *Protocystis aurita* Wallich. Plankton. X200.

41, 42. *Dicthyophimus histricosus* Jorg. Side and end views. Plankton. X150.

43. *Folliculina boltoni* S. K. Lorica from Sproats Lake. X125. (Collected by C. J. Berkley.)

44. *Acanthometron pellucidum* J. Müller. Plankton. X200.

45. *Trochiscia moebusi* Lemm. Broad and narrow side views. Plankton. X150.

46. *Noctiluea scintillans* Macartney. Plankton. X75.

PLATE VII.—(Continued from page 32)

35. *Heterophrys marina* H. and L. From weeds near the shore in Departure Bay. X400.

36. *Acanthocystis spinifera* Greeff. Abundant in the plankton of the Strait of Georgia during early autumn of 1925, since then scarce; occurs sparingly on the West Coast. X300.

37, 37a. *Distephanus speculum* var *regularis* Lemm. Broad and narrow views of empty lorica. X400.

38. *D. speculum* Ehrenb. Formation of a resting spore with its hyalin investment. Departure Bay. X300.

39. *Pyxidicula scutella* Playfair. Broad and side views of an active individual. Stanley Park Lake. X500.

40. *Hyalosphenia minuta* Cash. Active individual progressing on its side. Harrison Lake. X300.

41. *Nebela columbiana* Wailes. Broad side view of empty test. Cortes Island. X150.

42. *Platoum repandum* Wailes. Stanley Park Lake. X500.

43. *Amoeba granulifera* var. *spherica* Wailes. Stanley Park Lake. X500.

44. *Pareuglypha reticulata* Penard. Active individual from Hoggan Lake, Gabriola Island. X300.

45. *Nebela bipes* Carter. Empty test. Harrison Lake. X200.

46. *Dictyocha fibula* var. *longispina* Lemm. Plankton. Departure Bay. X200.

PLATE VIII.—(Continued from page 34)

45, 46. *Ephelota gemnipara* Hertwig. Fig. 45. Upper portion of an active individual. X50. Fig. 46. A smaller specimen complete X25. Departure Bay.

47. *Ophridium sessile* S. K. One of a group, extended and contracted. Stanley Park Lake. X150. (Mucus investment not shewn.)

48. *Ophryodendron belgicum* var. *stellatum* Wailes. A series of three individuals. Gabriola Pass. X200.

The Art, Historical and Scientific Association of Vancouver, B. C.

BOARD OF DIRECTORS FOR THE YEAR 1928

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LIFE MEMBERS

Life Membership is conferred by the Association "for service", or may be obtained on payment of the sum of $25.00 (Constitution and by-laws, Art. 3, S. 3.)

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Mrs. R. C. Campbell-Johnson
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OBJECTS OF THE
ART, HISTORICAL & SCIENTIFIC ASSOCIATION

To Maintain and Develop the Museum;
To Preserve the Early Annals of British Columbia History;
To Preserve Examples of Native Indian Arts and Crafts.

The Museum, top floor Public Library, Corner Hastings and Main Streets.
Open DAILY, except Sundays, from 10 a.m. to 5 p.m.

Curator: Mr. T. P. O. Menzies.

Phone, Sey. 7515. Free Admission.

Museum Notes

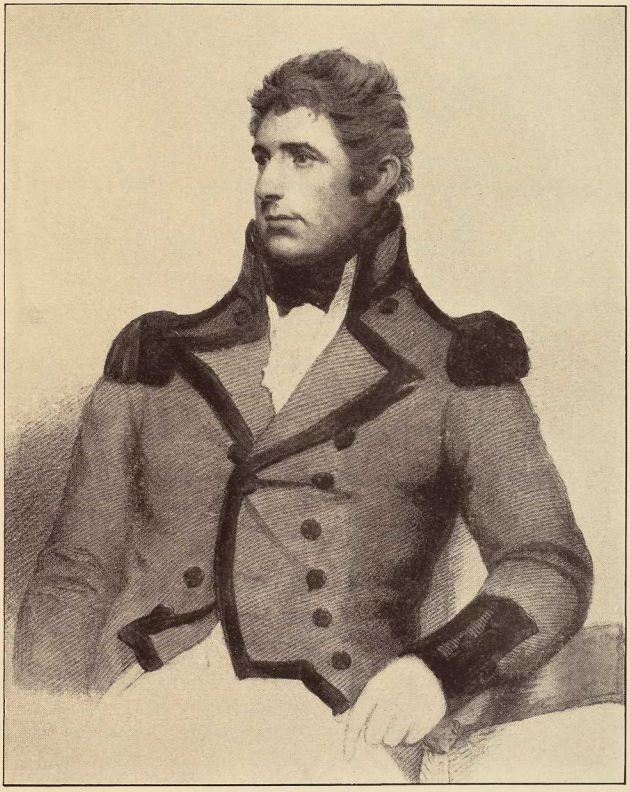
Vol. III., No. 4. December, 1928

Editor—Stephen Golder

Issued by the

Art, Historical and Scientific Association of Vancouver, B.C.

in the Interests of the City Museum.



Sir Harry Burrard-Neale, Bart.

This portrait is reproduced from a coloured engraving drawn by W. Evans, engraved by J. B. Lane, and published 3rd August, 1822, by T. Cabell, Strand. The original painting is by Sir Wm. Beechey, R.A., and at that date was in the possession of Earl St. Vincent. Another portrait, painted by Matthew Brown, presumably at a later date, is reproduced in Meany's "Vancouver's Discovery of Puget Sound."

Museum Notes

Permission to reprint any of the articles in "Museum Notes must be obtained from The Art, Historical and Scientific Association, Vancouver, B. C.

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The Art, Historical and Scientific Association

Year 1928

PRESIDENT'S ADDRESS

Ladies and Gentlemen:

In meeting you on this, the 35th, anniversary of our Society, I am happy to give you a favorable report on the business of our Association during the past year.

We have to thank the City Council for its appreciation and support, also for the valuable assistance and advice rendered at the Board table by Alds. Bennett and E. W. Dean.

The Association has to thank Mr. and Mrs. J. W. Weart, and Mr. and Mrs. Frederick T. Schooley for the hospitality extended at their homes to the meetings of the Association, and the pleasure it gave the whole Society to hear the valuable and interesting addresses by Mr. Fred Perry on "Mount Garabaldi and Its Beauties," and His Honor Judge Howay on "Captain Cook's Sequi Centennial Celebrations at Hawaii," and Mr. E. S. Robinson on "The Cultural Necessities of a City."

The Burrard Field Naturalist Club have been most active during the year in making collections for the Museum. Fortnightly meetings have been held at the City Museum, at which many valuable papers have been read, for which we thank them. It is hoped to get these papers published in MUSEUM NOTES when funds will permit.

MUSEUM NOTES. The Association is greatly indebted to the following ladies and gentlemen for their active and most generous assistance in donating articles: Mrs. W. Garland Foster, Mr. G. H. Wailes, Mr. Denys Nelson, Mr. J. W. Eastham, Mr. Noel Robinson, Mr. Donald Gillingham, and Mr. Stephen Golder. Mr. T. Evans, of Evans & Hastings, the publishers, is entitled to our thanks for the excellence of the production, which has received highly complimentary remarks from such high authority as the President of the Royal Microscopical Society of England

We regret the death of Mr. Campbell Sweeney, an old and valuable member, who has lately passed away.

I ask the Board to show their hearty appreciation of the valuable and indefatigable services rendered to the Museum by the Secretary and Curator, Mr. T. P. O. Menzies. I would also include in this commendation Mr. Henry Nelson, the Assistant Curator, for the excellent work that he has done during the past year.

COMDR. HENRY PYBUS, R.N.R.

CURATOR'S ANNUAL REPORT, 1928

To the President, Directors and Members:
Ladies and Gentlemen,—

Today officially concludes the 35th year of the activities of this Association, and I now wish to record some of the year's achievements.

The Directors of your Association have held eleven meetings, and the majority of the Board were present at each meeting. The signed attendance book shows the following:

Comdr. Henry Pybus, R.N.R., President	7
Mrs. J. W. Weart, 1st Vice-President	11
Mrs. Frederick T. Schooley, 2nd Vice-President	10
Mrs. A. J. Pilkington, Honorary Treasurer	9
Mrs. W. H. Lyne	5
Mrs. W. Garland Foster	10
Mr. Stephen Golder	11
Capt. The Hon. W. J. Watson-Armstrong	6
Comdr. Chas. Eddie, F.R.G.S.	4
Col. G. E. Kidd, M.D.	10
J. W. Eastham, B.A.	6
C. C. Perry, Esq.	1
Col. W. S. Buell, Military Institute	2
John Bennet, Esq., Alderman	4
E. W. Dean, Esq., Alderman	5

"MUSEUM NOTES". The quarterly publication of MUSEUM NOTES continues to meet with a favorable reception, and many flattering letters have been received. The Association is much indebted to the following ladies and gentlemen for the many articles that they have so generously donated: Mrs. W. Garland Foster, Mr. G. H. Wailes, Mr. J. W. Eastham, Mr. Denys Nelson, Rev. John C. Goodfellow, Mr. Stephen Golder, Mr. Noel Robinson, Mr. E. S. Robinson, and Mr. Donald Gillingham.

On the scientific side, the articles prepared by Mr. G. H. Wailes are attracting international notice amongst marine biologists.

VANCOUVER MILITARY INSTITUTE. Through the activity of Major J. S. Matthews a great amount of material of military interest has been collected and added to the growing collection.

OUTSTANDING DONATIONS. The Art section has been enriched by the gift of a fine piece of white marble sculpture, the work of Mr. Charles Marega, a distinguished member of this Association, the subject being a replica of the death mask of Pauline Johnson, the well-known poetess and princess of the Mohawk tribe of Indians.

A large collection of Polynesian curios, collected by the late Capt. Gardner Johnson, was presented to the city by Mrs. Gardner Johnson.

Four excellent models of well-known sailing ships have been acquired during the year, as follows:

Cutty Sark, full-rigged ship, by Capt. H. A. Pigott;
The Golden Hind, sloop of war, by Capt. H. A. Pigott;
Vancouver Belle, schooner, by Capt. Harvey Copp;
White Wings, barquenteen, by Capt. Harvey Copp.

These models depict ships well-known throughout the world, and are of great interest to the youth of Vancouver.

NUMISMATIC SECTION. This section has been greatly added to during the year. Two sets of the new silver currency of Great Britain were received from the Royal Mint, London, England.

PHILATELIC SECTION. The frequently changed series of stamps depicting the various countries, lent through the courtesy of Mr. Stephen Golder, are a constant source of interest to the many collectors of postage stamps.

FORT LANGLEY. Jointly with the Native Sons of British Columbia, Fort Langley, many members of this Association celebrated the 101st anniversary of the Old Fort Langley at "Derby," on the banks of the Fraser River, at a basket picnic on Sunday, August 29th, on the farm of Mr. James Houston. His Honor Judge F. W. Howay addressed a large and representative gathering below the flag-staff, giving an interesting resume of the early days of the province. The old Hudson's Bay flag was hoisted by Mr. Jason Allard.

SOCIAL RECEPTIONS. On Wednesday, the 11th of April, 1928, Comdr. and Mrs. Henry Pybus held a reception at their home, which was largely attended. Mr. Fred Perry gave an interesting address on "Mount Garabaldi and Its Beauties."

On Friday, the 19th of October, 1928, Mr. and Mrs. J. W. Weart were "at home" to the Association in the Connaught Rooms of the Hotel Georgia, at which His Honor Judge F. W. Howay gave a description of the Hawaiian Islands, from which he had lately returned, having represented Canada at the sequi-centennial celebrations in honor of the famous navigator, Captain Cook.

On Thursday, the 6th of December, 1928, Mr. and Mrs. Frederick T. Schooley invited all the members to a reception at their home, at which Mr. E. S. Robinson, the City Librarian, gave an address on "The Cultural Necessities of a City."

BURRARD FIELD NATURALISTS. During the summer months this very active club has had field parties. As a result of these parties, a vast amount of material has been collected, which is being classified and mounted for the City Museum. During the winter months, meetings are held every fortnight, at which valuable papers are read, and it is hoped to publish these articles when funds and an opportunity occur.

PACIFIC BIOLOGICAL STATION. The Marine Biological Section has been greatly added to through the courtesy of Dr. Wilber A. Clemens, the Director, and Mr. G. H. Wailes, who has been most energetic in securing specimens, also the collection of colored models of fish, the work of Mr. R. Good, has been added to with many beautifully mounted specimens.

HISTORY OF VANCOUVER. Mrs. W. Garland Foster has been actively collecting and filing a great amount of material and getting ready for the preparation of a History of Vancouver.

PRESS. The friendly assistance given by the Press to the City Museum, with its frequent articles and notices during the year, is very much appreciated.

PUBLIC LIBRARY. The courteous and active assistance given by Mr. E. S. Robinson and his entire staff has been of great value, especially in the gradual building up of a Museum Reference Library, which is already of great service to the Public Institute lectures. On November 2nd, Mr. J. W. Eastham, B.A., represented this Association at the Vancouver Institute, the subject of his address being "Edible and Poisonous Mushrooms," which was illustrated with lantern slides.

ARCHAEOLOGICAL SECTION. Acting under a friendly suggestion made by Sir Arthur Keith, President of the Royal College of Surgeons, London, it is suggested

that this Association shall take an active hand and each year undertake a small amount of field work, making a systematic research through one of the many known ancient shell heaps to be found locally. During the past year a small amount of field work was accomplished through this Museum at the request of, and financed by Dr. Charles Hose on behalf of Sir Arthur Keith, and the following extracts from his letter indicate that the results were of considerable interest:

> "The people whose remains you have found interest me very much, and I hope Miss Tildesley will publish an account of them."

Miss Tildesley also writes as follows:

> "So that you may know how the other Museum stands, which, with your own, has a prior claim, I asked Mr. Joyce, head of the Ethnological Department of the British Museum, what he had from the shell mounds of British Columbia. He replied 'practically nothing'."

and again:

> "Vancouver has an Art, Historical and Scientific Association which must include some men and women of accurate and observant minds, whose imagination would be fired by a field work so closely bound up with Art, with History and with Science. It is fortunate, also, in having as a citizen a man who is one of the chief authorities on the archaeology of British Columbia as far as it is yet known, and has himself led the way in archaeological investigation. With Prof. Hill-Tout to advise upon such work and to elucidate the significance of any finds intelligently recorded, etc. . . . ."

DONATIONS. A monthly list of donations received has been mailed to all members, and, as you are all aware, comprises a large and varied assortment of many thousands of items which have come in singly or as collections from 267 different sources.

ATTENDANCE. The number of adult visitors to the City Museum and Art Gallery for the last three years is as follows:

1926	69,235
1927	76,088
1928	79,243

The advance in numbers of visitors over last year was 3,155, making an approximate monthly total of 6,600 for the year. These figures show a marked increase in the public interest and are most gratifying and encouraging.

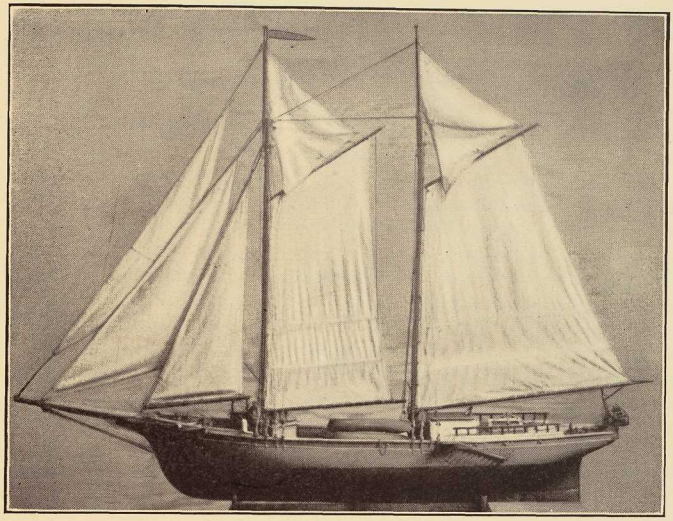
But of far greater importance is the interest shown by the children, who patronize the Museum in almost embarrassing numbers, and many school classes now avail themselves of the opportunity afforded to bring their nature study classes. The Museum welcomes all children at all times.

STAFF. It was with great regret that the services of Mr. E. G. Johnstone were lost to the Museum through ill health. His interest, however, has not flagged, and he is a constant and always welcome visitor. The Association is very fortunate in securing the services of Mr. H. L. Nelson, who takes a whole-hearted interest in the welfare of the Museum.

Trusting that this Association is satisfied at the progress made, and thanking the Board of Directors for their able and courteous consideration and assistance.

I am, yours truly,

T. P. O. MENZIES,
Secretary and Curator.



MODEL OF VANCOUVER BELLE

Vancouver's First Schooner, Built on False Creek By the Late Capt. Harvey Copp

By NOEL ROBINSON

A FEW years ago, in the basement of his handsome home on Victoria Drive, a veteran mariner, nearing eighty years of age and almost blind, might have been seen day after day working away upon the model of a schooner. Despite the physical disability which had deprived him of the use of one eye and so seriously impaired the sight of the other that he had to keep his face within less than a foot of his work all the time, that work was a labor of love, for he was re-creating the Vancouver Belle, the original of which—the first schooner to be launched in this city—he had built here in 1887, the year of Queen Victoria's Diamond Jubilee, and the year in which he had arrived in Vancouver from St. John, New Brunswick. That model, lent by the Vancouver Pioneers' Association, to which Captain Harvey Copp left it when he died, is now one of the prized exhibits of the Museum. It is built to scale, half an inch to the foot, and perfectly constructed in every detail. It was constructed on False Creek. The original was 96 feet long, with a 19-foot beam and a depth of 8 feet 6 inches.

Captain Copp, when engaged in the task of building her all those years ago, little dreamed that he was to own the Belle for such a brief period, or that she was going to lead him into one of the many adventures of a very adventurous career, but so it proved. The Vancouver Belle, which, according to that mine of marine history, Lewis and Dryden's "Marine History of the Pacific Northwest," was "pronounced by every sea-going man good enough to go 'round the Horn," made one uneventful sealing trip into the Behring Sea. Then, in 1892, Captain Copp took her sealing to the Behring Sea again. According to the authority quoted, he was captured with 700 skins aboard by the Russian man-o'-war Zabraka, twenty miles off Copper Island, on July 12, and was taken with her crew to Petropailovski, Siberia.

The foregoing would imply that the Vancouver Belle was poaching in Russian waters. Captain Copp denied this, and, in proof of the truth of his statement, it may be stated that, many years later, he was awarded substantial compensation by The Hague Tribunal—for the Belle, being a fine schooner, was never returned. After a number of interesting experiences and some adventures, the skipper and his crew, who had been prisoners, were returned to Vancouver on the Rosie Olsen. A somewhat similar experience befell Captain Alec. McLean—equally well known in this port and all along this coast as "The Sea Wolf." In the latter case, however, the redoubtable Alec. was poaching—he admitted this to me upon one occasion in conversation. When the Russian warship put a shot across his bows as a signal to heave-to, he jammed his helm down hard and endeavored to ram the Russian vessel amidships. This foolhardy action was typical of him. He feared neither man nor devil. He did not succeed in his attempt, but he ripped off a long stretch of her gunwale. He, too, and his vessel, were taken to Siberia.

His Honor Judge F. W. Howay happens to have in his possession a diary of the first voyage of the Vancouver Belle to the sealing grounds (written by Harvey D. Copp, one of Captain Copp's sons), which he picked up at a second-hand bookstore. From this we gather that she carried upon that occasion a steward, fourteen sailors, seven hunters, the captain and himself.

So much with reference to the Vancouver Belle, of the building of which Captain Copp was always proud, though he had built and skippered to many parts of the world and owned many a big ship out of St. John before ever he came to Vancouver, as well as steel ships off the Clyde in the years which followed his departure from this port before he settled down to spend the evening of his life here.

A word in memory of this, one of Vancouver's most picturesque and esteemed mariners, before closing. It is doubtful whether any seafaring man who ever lived here had experienced quite such a long and varied career as the late Captain Copp. His father was both a mariner and a farmer near St. John, where the son was born in 1842. As a lad Harvey worked both on the farm and in the shipyards. He took to the sea like a fish takes to water, and was only in his twenties when he commanded his first sailing ship on a voyage to England. Among the ships which he built and owned in those years when the shipyards of New Brunswick and Nova Scotia were always resounding to the music of hammer and saw, the most notable were the Earl Granville and General Wolsey. Many years later, on the Clyde, he superintended the building of the steel ships, Catherine and Mary Park, and sailed them, as he had sailed so many of the wooden ships, to every part of the world, trooping in no less than three wars, the Boxer Rising, the Russo-Japanese War, and the South African War.

In the wonderful diary which he kept in several volumes, and through which I have pored with him many an evening—I know no other diary like it—he kept the record

of all these voyages, the adventures which befell him, the thoughts which occurred to him upon men and things—for he was much of a philosopher—and the verses which he was prompted to write from time to time. He was great company those evenings, even to the last, when he was almost stone deaf, for his powers of conversation were far above the average, his memory well-nigh perfect, and his sense of humor a treat. Straight as a die in his dealings, fresh complexioned, blue-eyed, sturdy, patriotic, jovial, he was typical of that Devon stock from which he sprang several generations back. We shall not see his like again.

Sir Harry Burrard-Neale, Bart

By J. W. EASTHAM

"The shores of this channel, which, after Sir Harry Burrard of the Navy, I have distinguished by the name of Burrard's Channel . . . ."—*Vancouver's Voyage 2nd ed. (1801), Vol. 2, p. 193.*

This is the original reference to what is now called Burrard Inlet, and was entered in Vancouver's Journal on Thursday, the 14th day of June, 1792.

Harry Burrard was born 16th September, 1765, the eldest son of Lt.-Col. Wm. Burrard. Entered the navy 1778; present at the reduction of Charlestown, 1780, and took part in the capture of the French frigate Magicienne off Boston, 1781. In 1783 returned to England, acting-lieutenant of the Perseverance. In 1785 was in the Europa in the West Indies, Vancouver being a fellow officer in this ship. Served in several vessels in the next few years, including the Victory, Lord Hood's flagship. In 1790 promoted commander of the Orestes, engaged in the preventive service. On 12th April, 1791, on the death of his uncle, Sir Harry Burrard, he succeeded to the baronetcy. Post-captain 1793. In 1795, in consequence of his marriage to Grace Elizabeth, daughter and co-heiress of Robt. Neale of Shaw House, Wilts, he assumed, by royal license, the name and arms of Neale. In the years immediately following, he held several commands and assisted in the capture of several French vessels. In 1801 appointed to command the royal yacht Royal Sovereign. In June, 1804, made a Lord of the Admiralty, but in July of the same year returned to the yacht. In 1805 was again on active service in command of the 98-gun ship London. Rear Admiral 1810, and from 1811-14 commanded a squadron on the coast of France. Vice-Admiral 1815; Commander-in-Chief in the Mediterranean 1823-26, a post which at that time carried with it nomination as a G.C.M.G. In 1824 forced the observance of the treaty of 1816 on the Dey of Algiers. Admiral 1830. In 1833 offered the command at Portsmouth, but declined, as the offer was conditional on his resigning his seat in the House of Commons.

Died at Brighton 15th February, 1840, being succeeded in the title by his brother, the Rev. Geo. Burrard, rector of Yarmouth (Isle of Wight). His widow died in 1855 at the age of 83.

A handsome obelisk was erected to his memory on Mt. Pleasant, opposite the town of Lymington, of which he was Lord of the Manor, and which he represented in Parliament for forty years.

(*Authorities*: *D. N. B.*: *Walbran; Meany*).

The Stamps of The Treaty Ports of China and Formosa

By STEPHEN GOLDER.

First of all let me express my indebtedness to Mr. C. A. Howes for his wonderful little work on "The Stamp Designs of Eastern Asia."

These Treaty Port stamps, or Chinese locals as they are usually called, used to be listed in the recognized catalogues. Stanley Gibbons dropped them many years ago, the Scott Stamp and Coin Company retaining them until 1908 or 1909, and Kohl's and Bright's catalogues contain most of them still. They came under the ban of the short-lived Society for the Suppression of Speculative Stamps, but so did many other issues which, nevertheless, survived, and some of which profited thereby. There is no doubt that in several cases—two or three notoriously so—the stamps of some of the Treaty Ports were issued and in many cases multiplied for the benefit of collectors rather than for the necessities of the postal service. But, after all, persons most to blame were the speculative dealer and the unwary collector; for stamps are printed to supply a demand, and, failing the demand, the supply will cease.

Notwithstanding all this and everything else that can be said against them, the fact remains that these stamps represented and secured actual postal services, in some cases to a very considerable extent, and in all of them, even the most notorious, to certain extent. When they were attached to a letter or parcel, or newspaper, such letter and parcel, or newspaper became available for transport, and the stamp was accepted not only at the port of issue, but at all the other ports and at Formosa as a voucher, proving the payment of the fee required for the postal service rendered.

The stamps of Shanghai were issued by a Municipality, and have always been recognized and catalogued. There is no real difference between them and those issued by other ports, except in degree. The real reason for these other issues was the fact

that the Municipality of Shanghai was unable to issue stamps to their agencies in other ports when the subscription system was abolished on January 1st, 1893.

The fact that many stamps and values were printed and issued in excess of those required for postal service is a fact to be taken into consideration in an examination into the merits of these issues, but it does not make them cease to be a genuine postal issue if their use secured actual postal services.

And after all it is not necessary to bar the issues of all the Treaty Ports, because the postal authorities of one or more of them issued more stamps than were necessary in the hope that stamp collectors would become purchasers as well as those who required them for postal purposes.

The stamps of Hankow, Kewkiang, Chinkiang, and Amoy were issued by the municipal authorities, those of Chefoo, Ichang, Foochow, and Nanking by local committees, and those of Chung-king and Wuhu by private individuals, but all of them, in a greater or less degree, and more particularly Hankow, Amoy, Foochow, and Chinkiang, were legitimate and bona fide postal issues actually required and actually used to secure postal service.

Some of them, while originally a genuine issue, were subsequently printed and sold for revenue raising or speculative purposes.

It has now, however, been conclusively proved that the Treaty Port stamps were genuinely used to secure postal services, and they are justly entitled to claim admission to the ranks of collectable and recognized stamps.

There are in existence ample quantities of entires or covers genuinely used and postmarked to justify the claim. The issue of these stamps dates from the 31st December, 1892, when the subscription system was abolished, and ceased on the 2nd February, 1897, when the Chinese Imperial Post came into operation, and all local stamps were suppressed.

Up to January, 1893, Shanghai had agencies of her local post at most of the ports, and stamps were not required except for new subscribers, but on the 1st January, 1893, the subscription system was abolished and stamps had to be used by everybody. The agencies could not supply the demand, and the local authorities naturally said, "Why not supply our own?" Hence the issue of the Treaty Port stamps erroneously called Chinese locals.

Captain Herbert R. Oldfield, LL.B., late Honorary Secretary of the Royal Philatelic Society, London, says: "Although I can understand an objection to the inclusion of any Locals at all in a postage stamp collection upon the ground either that they were not issued under the authority of the Governments of the country concerned or that they only covered a limited area within the country itself, I fail to see how any fair-minded and unprejudiced person who would himself include in his own collection such Locals as the Postmaster's stamps of the United States, the Municipal stamps of Shanghai, etc., etc., can reasonably contend that these Chinese Locals and the stamps of Formosa ought to be excluded from collections and the catalogues."

I take it that the objections made to these stamps are based on the above grounds, and also upon the ground that they have been made the subject of speculation, for I hardly think anyone will seriously care to argue, in the face of the evidence which has been adduced, that they were unnecessary. Let us take this speculative objection under the two headings under which it naturally falls—inside and outside. "Inside" implies speculation on the part of the producer. "Outside" implies no overt act or connivance on the part of the producing authority, but rather an attempt by purchasers to corner or secure supplies which will eventually be released and sold for their sole profit.

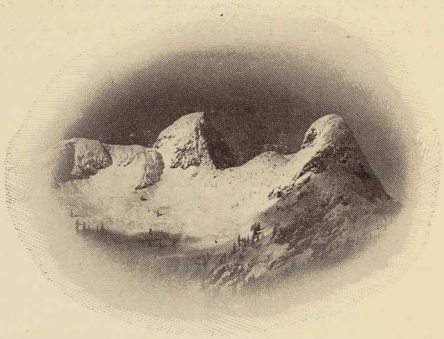
As regards outside speculation, I imagine few will be found to condemn and to bar from collections stamps in respect of which the sole grounds of complaint is that this has taken place. They are obviously entitled to rank higher than stamps which are technically known as "remainders."

It is agreed, I believe, that there was no inside speculation as regards the stamps of, at any rate, Hankow, Amoy, Chefoo, Foochow, and one issue of Chung-king, all of which were produced and required for postal purposes and were not offered to speculative purchasers or sold for collecting purposes only. Indeed, I am disposed to think that only three of the ports were actually guilty of inside speculation; two certainly, namely Kewkiang and Wuhu, and one probably, namely Nanking, although I should not like to assert that Chinkiang could produce a clean sheet. On the other hand, if speculation inside or outside is to bar an issue so far as collectability is concerned, why do we find stamps listed in the catalogues where this has taken place to a very considerable extent?

As far as the Treaty Ports and any other stamps are to be judged, I sumbit that the real test of their collectability as postage stamps is found in the answer to the question, "Did they or did they not secure genuine postal services, and did their use actually frank mail matters at both the despatching and receiving offices?" You must, of course, lay proper stress upon the word "genuine," so that cases where the postal services were only colourable or trifling and where the real object was only the sale of a fraudulent article are not included.

Judged by this standard, I think most collectors will agree that the Treaty Ports stamps are collectable either as an adjunct to China or as a group by themselves.

(A fine assortment of these stamps, collected by our President, Commander Henry Pybus, R.N.R., during his long sojourn on the China Coast, is now on exhibition in the Museum).



Hunting Fossils In The Bad Lands of Alberta

By DONALD W. GILLINGHAM

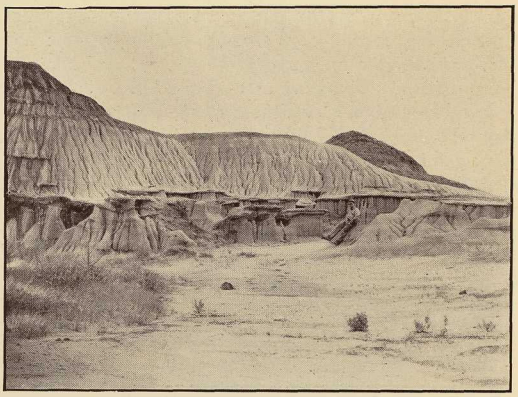
NEARLY every country has its graveyard of prehistoric reptiles. The "bad lands," where the remains are found, originally were the confluence of sluggish rivers and the cradle of great swamps and lakes of the Cretaceous period, in the sands of which dinosaurs and other reptiles frequently were trapped or drowned and their hulks, together with those of the natural-dead, gradually buried by silt. As the bone cells decayed and washed away they were replaced by silica or lime or often iron contained in the water, and millions of years later—36 million, according to more recent, and alarming, estimates, though, as one doctor of paleontology at the

WE FOUND A HEAP OF PETRIFIED WOOD

University of British Columbia said, "measuring geological ages with a yard stick is like trying to measure the distance between here and Japan with a row of nickles"—and millions of years later were revealed for the benefit of science. They were exposed by the rivers that ate through the weakest belts of land, and by the rain-torrents which rushed unabsorbed down the clay and sandstone banks, undermining the slopes and carving them into ridges and knolls and buttes which we know as the "bad lands" of the world.

People may wonder why dinosaurs were confined to those few areas containing the present day "bad lands." The truth is, they were not. They were as numerous and as widely distributed as the commonest animals of our age. The fact that their remains are found so plentifully in the "bad lands" is due to unusually favorable conditions for the preservation of bones. In the humid regions their skeletons rapidly disintegrated, and in regions immediately adjacent to the "sand pits" they became scattered about like buffalo bones on the twentieth century prairies.

In Alberta there are three regions of "bad lands." The first covers a territory of some dozen miles along the banks of the Red Deer River, near the mining town of Drumheller, and is known as the Edmonton series; the second reaches eight miles or more along the same river farther south, starting from Steveville, a tiny but romantic town of doubtful prosperity, and comprises the Belly River series; and the third occupies an indefinite area along Milk River, a few miles north of the American boundary.



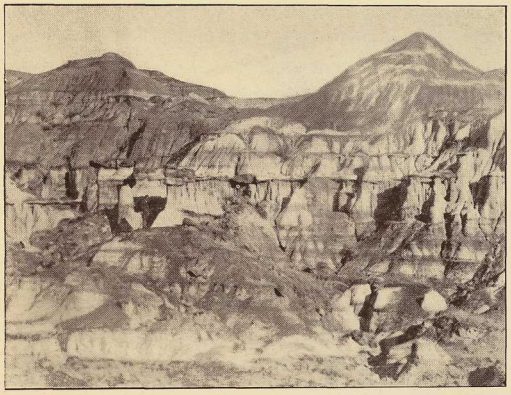
A FOREST OF "MUSHROOMS" SPROUTED FROM THE CANYON FLOOR

Of the three the Steveville or Belly River series of "bad lands" has proven the most prolific for paleontological research. In it have been excavated within the last sixteen years some of the most perfect specimens known to science of the duck-billed dinosaurs (Trachodontidae), measuring over thirty feet in length and standing ten feet at the haunches, the armoured dinosaurs (Stegosauridae), the horned dinosaurs (Ceratops), all herbivorous, including the Stracosaurus or spiked dinosaur with its three-foot nasal horn, and the Chasmosaurius, which had a head and neck shield four feet long but was itself not much larger than a domestic cow, and then the savage carnivorous dinosaurs (Theropoda), which had tiny forelimbs but huge hind limbs armed with formidable ten-inch claws, and jaws stuck with six-inch fangs. All these have been excavated, to say nothing of the Plesiosaurs, crocodiles, turtles and fishes.

Unfortunately, the "bad lands" surrounding Drumheller, by reason of their accessibility to tourists and their fame as the "Dinosaur Bone Yard—the name is branded in red on all road maps—have been combed time and again for curios and stripped of even the fragments of fossils, a condition which makes this series as repellent to a sensitive and virile young student as the north pole must now be to an ambitious explorer.

Last fall, in company with Mr. Travers Newton of Lomond, Alberta, who had become as keenly interested as I in the search for fossil remains and had put his car and his time at my disposal, I had the opportunity to visit the Steveville "bad lands" after a somewhat fruitless and disappointing reconnaisance of the Drumheller country. Though my travelling days were limited, I was determined to spend at least forty hours around Steveville, for the rumour had reached me that Mr. Charles Sternberg of

Ottawa, who, with his father, for sixteen years has been successfully excavating dinosaur remains in Alberta for the National Museum of Canada, the British Museum, the American Museum of Natural History, and other institutions, was then at Steveville preparing for shipment the results of three months' work—nine specimens of the duck-billed dinosaur. As it happened, we arrived just two weeks too late to meet this noted fossil hunter. Our disappointment was profound.



THE SIDE OF THE COULEE WAS WEIRDLY CARVED

You will find the following record of our trip to the "bad lands" a strange mingling of science, description and impressions which is inevitable with one who recoils from the thought of being "dry." Enrolled as a scribe of popular science, I find myself squirming under the pressure of two evils, the evil of being too inclusive scientifically, and the evil of being too enthusiastic narratively. But on with the story.

In order to conserve most of the sunlight for field work, we drove to Steveville by night. When, finally, we reached the Red Deer River and the car purred along the prairie trail that skirted the uncertain gash of black, emotions ran wild within us. Somewhere below—down there—through the window—was the labyrinth of buttes and canyons, the tomb of ancient monsters. We could see nothing but a great blackness, but in it our imaginations carved an inferno of rugged hills that went beyond possibility.

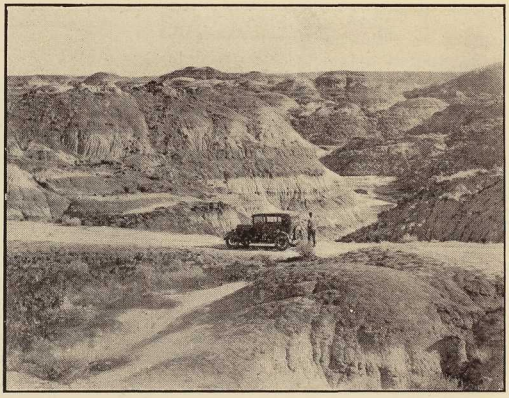
A quick turn to the left, and our headlights swept down a steep road that wound towards the bottom of the valley. As we descended carefully, with brakes complaining, black mounds like hay cocks poked upwards into the starlit sky and dwarfed us in their shadows.

There seemed to be little more to the village than a store and a few houses, including a roadhouse, in which we found lodging for the night. We had a long talk with the proprietor of the place, from whom we gleaned much information about the "bad lands." He brought out for our examination several fossils which his children had gathered and then handed us a book by Charles Sternberg entitled "Hunting Dinosaurs in the Bad Lands of the Red Deer River." The author's enthusiasm, manifest in every page, was contagious, and half the night I lay in bed reading in an attempt to consume the entire volume before we started our own explorations.

When the sun tentatively fingered our window next morning, we arose, shivering in the frosty air, and, with the excitement of children anticipating the contents of a Christmas stocking, looked out upon a world which had been but a great and mysterious darkness before. Close by we saw two buttes horizontally streaked with chocolate-colored clay, a green slope of grass, and beyond a fringe of naked cottonwoods mirrored in a river as placid as a lake at dawn, which flowed into the low, broad mouth of a canyon that was pearl grey with morning shadows. And out of the misty shadows into the suffused warmth of the rising sun reached the fantastic heads of knolls and ridges and pyramids, a serene weirdness which invited exploration.

We breakfasted in a hurry and then drove to the prairie above the village. We followed its jagged edge until we reached the head of a coulee which overlooked the whole expanse of "bad lands," where we left the car and exposed our feet to torture from the spiked cactus. For the first time we could fully appreciate the vastness of the scene. It stretched from beneath us and far away, like a sea that had been frozen in the flash of a second. Nothing but a meaningless jumble of dark fissures and bald, furrowed heads, with a peep of green tableland here, a glint of the river there, then more fissures and more heads filmed with the greyness of distance and finally flanked by a suggestion of a serrated wall which was the continuation of the plain west of the river. It was as if we stood on the brink of a graveyard which had been upheaved by the wrath of some subterranean god and the bones exposed for the temptation of unscrupulous research.

The buttes were composed of sandstone as hard as flint, which made climbing with unshod feet a precarious task. They were stratified with silver sandstone, then ironstone, then gray and brown clays and more sandstone tending to yellow in colour. It

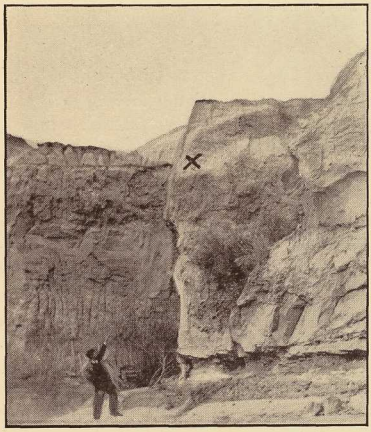


WE DROVE THE CAR ALONG AN ABANDONED RAILWAY GRADE

seems illogical, but the farther one climbed out of the bottom of the rivulet-eaten coulees the more fruitful became the search for fossilized bones. Off hand one would think that the deeper one penetrated into the chasm of the earth the more likelihood there would be of discovering dinosaur remains. But we found, after careful examination, that there was a definite level for fossils, and that level was usually very close to the tops of the ridges under layers of crumbling ironstone. In fact, the location of the

first discovery, the hind limb of a duck-billed dinosaur, was less than ten feet below the present level of the prairie. One surface of the limb was lying exposed in the sandstone, but the fragmentary condition of the bone made its removal impossible. Close to this were pieces of fossilized wood, which we collected for the museum.

We spent the morning in exploring the western outlets of Dead Lodge Canyon and adjacent coulees. Our collecting case became weighted with fossils. In one pocket of silver sandstone, some twenty feet below the plateau, we came across a fair specimen of ammonite, and in a large ravine, the walls of which were fluted and hung with "icycles" of sandstone like the decorative scheme of some great opera house, we dug out a large section of the hind limb of a duck-billed dinosaur. The bones of the carnivorous and herbivorous dinosaurs, by the way, can be distinguished by their weight. The latter are heavy and solid while the former are comparatively lighter and "pithy" in the centre. And here I should like to record an interesting observation which we will leave for more competent men to explain. There was a noticeable difference in the petrification of bones taken from the Edmonton series, Drumheller, and those taken from the Belly River series, Steveville. In the first locality the actual bone and wood cells had been replaced and often enclosed by lime and silica, but here there was little sign of such replacement, only the outer shell of the bones of carnivorous dinosaurs being filled with iron. The centre portions appeared to be in a natural state of preservation and not petrified.



SEVERAL BONES OF A DINOSAUR PROTRUDED FROM THE BANK

Among other things—including a huge redwood knot—we picked up many pieces of beautifully sculptured and varnished turtle shells, the remnants of creatures which had been from seventeen to twenty-four inches in diameter. Our greatest discovery, however, was that of two bones projecting from a bank of sandstone at the river's edge, over three hundred feet below the prairie. Thorough examination convinced us that a dinosaur skeleton lay entombed there, which possibly had escaped the notice of searchers in Mr. Sternberg's party. Limited time—it requires two or three weeks to excavate a dinosaur, the bones having to be treated with shellac and a preparation of

burlap dipped in plaster to keep the fragments intact—and inadequate equipment, however, made us reluctantly continue our search for smaller prizes.

In the afternoon we explored the northern entrance to Dead Lodge Canyon. Here the carved buttes took on more grotesque shapes and formed a maze of passages and ravines the equal of which we had not seen before. Out of granite-hard floors of clay surrounding mounds of silver sandstone sprouted forests of "toadstools" and tapering pillars. The strange smoothness of these formations reminded one of a nightmare.

It was one of these hard surfaces of clay that we came across the shape of a ten-foot creature outlined by its own crumbling vertebrae. We gathered as much of the vertebrae as possible, after making a sketch of the whole thing. So far, I have not been able to have the remains identified, but it would be no surprise to find that they belonged to a prehistoric sturgeon.

Darkness came swiftly upon us while we worked among the sentinel columns and mounds, and we were forced to flee down the coulees before the guiding light in the west was snuffed entirely.

Our exploration had to be interrupted for a day and a half while we made a rush trip south and west to Brooks, Bassano and Lomond, but on our return we again dived into the chaos of plowed land. This time, however, we were on the west side of the river. A grey plain, thick with sagebrush and greasewood, reached from the river to the outlying buttes and ridges, which retreated and piled in hopeless confusion against the wall of the prairie. An abandoned railway grade climbed up through the very heart of the "bad lands," and we were able to urge the car three miles along this unique scenic "highway." It was like driving through Grand Canyon.

Our first hunt around the skyline of the knolls, in the face of a chilling wind, rewarded us with nothing more than a few fragments of bones, but finally, after following up a trail of scattered vertebrae, we found at the apex of the miniature slide several carnivorous dinosaur teeth, one of which was perfectly preserved. Twenty feet away was a pile of chips and slabs from a fossilized log, which seemed to have been split open for firewood. One big piece, weighing about 140 pounds, we managed to take out to the car after staggering with it over ridges and down into ravines. It is now in the museum.

Before sundown we returned to the village. Andrew Shaw, ferryman at Steveville, had told us of a layer of hardened clay on the bank of the river which was rich in fossil leaves, and to this we went, armed with crowbars and hammers. As soon as we found the correct level we pried off slab after slab of shale in which were imprisoned fossil leaves in compact masses, leaves of both coniferous and deciduous trees. It was evident that the shale deposit had been the back-wash of a river into which leaves had been carried. Silt had gradually covered them and formed about them a hard case which, when the leaves eventually disintegrated, became a mould into which filtered sediment that solidified into the exact counterpart of the original leaves. The culmination of our search came by dislodging a two-foot square slab of grey shale containing grape leaves run through by the brown vine itself and a few tiny brown nodules which, after hearing the report that Mr. Sternberg had excavated from the Edmonton beds a cluster of grapes, and on the knowledge that film-like fossils of jelly-fish have been found, we hoped would prove to be grapes. This slab is now in the museum, but the nodules have yet to be identified.

The car was loaded down like a truck when we reluctantly said good-bye to Steveville and the great chasm of "bad lands" and turned our headlights into the north for the first lap of our long trip home.

Some Recent Phases and Trends In Anthropology

By CHARLES HILL-TOUT, F.R.C.S., F.R.A.I., Etc.

JUST 70 years ago three epoch-making papers were presented and read before the Linnean Society in London. Two of these were those of Charles Darwin and Alfred Russel Wallace, in which the doctrine of organic evolution was first set forth. The third was a paper by Dr. Prestwich, one of the noted geologists of that time, on the antiquity of man.

Prior to that period it was very generally believed, even by men of scientific attainments, that man had been on the earth only about 6000 years.

In the 17th century a certain Archbishop of Ireland, named Usher, by calculating the ages of the biblical patriarchs and the historical events of the Jewish people, estimated that the creation of the world and man upon it had taken place about 4000 B. C.

In the same century Dr. John Lightfoot, a vice-chancellor of Cambridge University, and one of the most erudite scholars of his time, also quite solemnly made a similar calculation and arrived at the conclusion that Creation took place at the hour of 9 in the morning on the 23rd day of October, exactly 4004 years before the birth of Christ.

These were the generally accepted views down to 1858.

The evidence presented by Dr. Prestwich at that memorable meeting made it abundantly clear to the Society that man had been on the earth for a far longer period than the calculations of Usher and Lightfoot made out. It was conclusively shown that man had been a contemporary of the early Pleistocene mammals, which were known to have long since become extinct.

From that period down to the present time evidence of man's antiquity has come in from all sides, and now today we can trace him back very definitely, by means of his skeletal remains and by his artifacts, far beyond the whole Pleistocene period into the earlier Tertiary.

Our evidence of his presence in the Tertiary extends now beyond the Pliocene, the last phase of this period, well into the Miocene. This evidence, until quite recently, according to accepted geological estimates, gave man an antiquity of from two to three millions of years.

Today that antiquity must be pushed back several millions of years farther into the misty past.

The discovery of radio-active substances in the earth's crust, and the definite rate of their disintegration and transmutation into less radio-active or inert substances, has given us a remarkably reliable time gauge. We have learned by this means that the age of the earth is very much greater than was formerly estimated.

To the 100 million years given us by Sir Geo. Darwin at the beginning of the century there must now be added, at least, one billion 400 million years more, making a total of fifteen hundred millions.

This enormous extension of the earth's age has, as one can readily see, also deeply affected the age of man. Under the earlier views of the earth's age the whole Tertiary period was estimated at about five million years. Today it is calculated to cover a period of at least 50 million years.

In the same way the Pleistocene comes under this time extension and, from being about 50 thousand years, must now be estimated at from 500 thousand to one million years.

Instead, then, of about two or three million years, the antiquity of man must be estimated today as not less than 20 to 30 million years.

What an astounding change and increase! In 1858 only 6000; in 1928, a bare three-score years and ten later, from 20 to 30 million!

As one contemplates this tremendous stretch of time and remembers that man has lived under what we call civilized conditions only for about ten thousand years at most—a truly negligible portion of his life history—one cannot help being forceably struck with the exceedingly slow progress and upward advance he made throughout that long period until quite recent times. The rapid progress which has taken place during the last 100 years makes this age-long stagnation of his seem the more remarkable.

It is as if man had suddenly awakened from a long slumber, and the dammed-up energy he was slowly accumulating during that period of inertia was now finding vent in endless directions and activities. One cannot help wondering where this late-acquired activity will ultimately lead him.

Besides this stupendous expansion of the age of man, several other important events have of late years aroused the general interest of anthropologists. Three, at least, of these deserve passing mention.

The first is the recent discoveries in India of contact between that country and Mesopotamia in the third and fourth millennia B. C. Cuneiform scripts and other objects have been unearthed in several places in India; and on the other hand evidence of Indian contact has been found in the ruins of ancient Babylonia.

In the opinion of Sir John Marshall, Director General of the Indian Archaeological Survey, the excavations which have been made at Mohenjodaro and at Harappa unmistakably show that there was much in common between the civilizations of the Indus and of Babylonia, and that there must have been close inter-communication between the two countries, probably maintained partly by sea and partly by land across the Persian plateau.

How far this ancient Indus culture extended over what is now India remains yet to be proved. It is known to have extended up the Indus valley to the Punjab and westward into Baluchistan, but whether it extended eastward into the Ganges valley is not yet clear. It is pretty certain, however, that it formed part of the far-flung ancient culture of Europe and Asia, which extended from the Adriatic to Japan, but had its principal centres in the great river valleys of the South.

A unique and highly interesting find was made at Harappa in the course of the excavations. This was a copper model of a two-wheeled cart. As far as we know, this is the oldest example we have of a wheeled vehicle, older than the picture of a chariot recently found at Ur in Babylonia, and older by a thousand years than the

first known use of the wheel in Egypt. Seals similar to those found at Ur have come to light at Mohenjodaro, and their age has been estimated at from 3500 to 2500 years B. C.

These and similar archaeological investigations in recent years have forced home upon some of us the deepening conviction that racial and cultural contacts among the ancients were more frequent and extended than we have been in the habit of supposing; and the theory of cultural diffusion, so long out of fashion, has received substantial confirmation and support from these investigations. Many of our archaeological authorities are inclined today to the view that the ancient centres of civilization all had a single origin; and that the spread of culture was by diffusion and borrowing rather than by indigenous, independent development. Where that original centre was has yet to be determined.

Another event of importance and interest in the anthropological world is the discovery in various parts of the globe of new remains of Neanderthal man. The territory now known to have been occupied by this race of palaeolithic men is, roughly, all Europe south of a line drawn from southern England to the northern limits of Belgium and thence over Germany and Poland to the Crimea, with parts of Africa and Asia Minor.

The most interesting recent find of Neanderthal man was made at Gallilee, in Palestine. Abundant evidence of his presence in prehistoric times was found there.

One of the most arresting and, at the same time, most perplexing points of interest about Neanderthal man is his place and period of origin and his apparently abrupt disappearance after the advent of the Aurignacians or Cro-Magnon people in Europe. If one may form any conclusion from abundance of skeletal material, then Europe would seem to have been his original home, as, up to the present, this is the region in which most of his remains have been found. We know he belongs to a relatively distant past, and dates back at least 50 thousand years. He co-existed with a large series of animals long since extinct, such as the woolly mammoth and the woolly rhinoceros, the cave lion and cave bear, the old ox and bison, and other ancient forms. He seemingly disappeared in Europe about 25 thousand years ago.

Regarding him physically, Neanderthal man is remarkable, chiefly for his ape-like characteristics. He possessed a fair-sized skull, the main features of which were, besides unusual thickness of bone, a low vault and retreating, depressed forehead with abnormally developed eyebrow ridges closely resembling those of the gorilla, a large, heavy lower jaw with a receding, dog-like chin.

Altogether he was a very ape-like creature in appearance.

This specimen of ancient man, when he first came to our notice, was thought to be in the direct line of our ancestry. Few anthropologists so regard him today, and it is generally conceded that he lies outside the direct lineage of modern man.

The remarkable physical differences between him and his immediate successors, the Cro-Magnons, make it impossible for us to regard the latter as having sprung from him. A greater contrast could nowhere be found between two peoples. No finer race than the Cro-Magnons has ever lived on this earth. They were of magnificent physique and possessed a brain capacity considerably greater than that of any modern race. They appeared abruptly in Europe about 25 or 30 thousand years ago. It is generally thought that North Africa was their earlier home, as they showed marked negroid affinities. With their advent the Neanderthal type of man seems to have suddenly disappeared.

Interest in Neanderthal man has recently been aroused anew by an attempt to restore him to his earlier position as a direct ancestor of the Cro-Magnon race and of modern man. Dr. Hrdlicka, in his Huxley memorial lecture in England last year, sought to prove that there was no great break between Neanderthal man and his successors, the Cro-Magnon race; that if we possessed a larger amount of skeletal material from this period we should be able to find sufficient transitional characters to show they were racially connected. In these views he stands quite alone, and I venture to think will continue to do so, and Neanderthal man, with his strong ape-like characters, will continue to be regarded as one of those types of man that peopled the earth in the dawn of human history. We have knowledge of several of these types, and from a study of their skeletal remains we are irresistably led to the conclusion that when man was, so to speak, in the making, Nature turned out a number of different types of him. Which of these stands in the line of modern man's direct ancestry, or whether that ancestor has yet been discovered, has yet to be determined.

The third event of importance which has recently aroused world-wide interest in anthropological circles is the frank repudiation by Prof. Fairfield Osborn of views respecting the descent of man, which he has spent a life-time in advocating, and which are the views commonly held by anthropologists everywhere.

These views were succinctly expressed by Sir Arthur Keith in his presidential address before the B. A. A. S. last year, and I cannot do better than quote his words. He said: "All the evidence now at our disposal supports the conclusion that man has arisen . . . . from an anthropoid ape not higher in the scale than a chimpanzee."

Prof. Osborn now dissents from this conclusion and claims we must go farther back in the phylogenic history of man than we have been accustomed to do if we would find man's animal ancestor; to a period before the evolution of the apes. Man and the apes, according to the view he now advocates, have no common line of descent, and man's remote ancestor never was a member of the ape family. The two branches of the primate order separated far back in Oligocene times, the line that was to become man taking one direction and the line that was to produce apes taking quite another. We can best gather his new views from his own words. A few weeks ago, in an address before the New York Academy of Medicine, he spoke thus: "About three years ago I was a firm believer in the anthropoid-ape theory of ancestry . . . . and felt that the anthropoid-ape theory was quite established. A year later, however, I went into the central desert of Asia, in Mongolia; there I came under the influence of a new environment—a desert or semi-arid environment—and it flashed across my mind that this must have been the primitive home of man; that anthropoid-apes could not have existed here. From that time to this the idea has been growing upon me, and last April, at the bicentenary meeting of the American Philosophical Society, I stated that I personally had abandoned the anthropoid-ape theory, and I advanced the opinion that man has a long line of Dawn Man ancestors, and that the other older theory rests upon a large amount of evidence which undoubtedly proves the *kinship* of anthropoid-apes to man, but does not prove *the ancestry of man through an anthropoid-ape*." He thus seeks to make a radical distinction between kinship and direct ancestry.

One has to admire the frankness and courage of Prof. Osborn in abandoning a theory he has so conspicuously and strenuously advocated throughout his life, but I am venturing to think he will have great difficulty in establishing his new theory and securing its acceptance by other anthropologists. One of his most active opponents is his own colleague and disciple, Dr. Gregory. The mass of evidence in support of the older theory is so overwhelmingly against his new views that I do not see how it can

ever be set aside. The numerous common anatomical similarities alone would seem to more than offset all the evidence he offers in support of his new theory. In this connection, Keith has enumerated as many common characters shared by the anthropoids and man as 396 in the chimpanzee, 385 in the gorilla, 272 in the orang, and 188 in the gibbon.

Then, again, man and the anthropoids share alone a long list of common ailments and diseases unknown to other animals. The common blood-test, too, seems wholly without rational explanation unless we postulate a common ancestry and descent for both man and ape.

But the most formidable evidence is that we draw from the biogenetic law of recapitulation. If man and the apes are not related by a common ancestor, then why do the young of both apes and man share, both before and after birth, so many features in common and go through so many phases alike? Why is the head-form, for example, of all the young apes so human-like in its contours? The farther back we can go in the phylogenic history of the apes the stronger do these likenesses become. No one can view the head-form of the Taung's skull without being struck by its remarkable human-like appearance and contours. Prof. Elliott Smith has this to say of it: "The form of the forehead, the absence of the salient eyebrow ridges, the features of the jaw and teeth, the shape of the nose and orbits, the slenderness of the cheek-arches and the harmonious proportions of head and face, all suggest the inference that this unmistakeable ape reveals an early stage of the refinement which eventually led, ages later, to the attainment of human status." This mineralised skull of an immature ape was taken from a limestone formation in South Africa, which dates from the upper Miocene epoch, and is consequently more than twice as old as Eoanthropus of Piltdown fame, known to us as the Dawn Man.

Prof. Osborn contends today that our human ancestors were not arboreal in their habits, but evolved in a treeless desert or plain. The apes, on the contrary, developed in a forest country and are essentially climbing animals. As against the view that man developed in a treeless region and never learned to climb like the monkeys and apes, it may fairly be asked why do human infants exhibit, immediately after birth, the same grasping powers in the forelimbs as the tree-living young monkeys and apes do? It is common knowledge that human infants will sustain their own weight by grasping a rod in their hands for some seconds, or, in the case of some negro infants, for even some minutes. It is necessary in the life of the young monkeys and apes that they should be able, as soon as they are born, to hold onto and grasp the hair of their mothers' bodies as they swing from bough to bough or tree to tree; and the ability of the human baby to sustain its own weight immediately after birth—a trick it loses a few days later—seems certainly to point to a time when man was a tree-dweller.

Arraying the evidence in favour of a common ancestry for apes and man against the evidence, Prof. Osborn offers for his new theory of separate descent, I cannot help thinking he will have to produce far stronger arguments than any he has yet set forth before his theory will find a very wide acceptance and displace the one generally accepted, and which he himself so ably helped to establish.

ERRATA.—The date of amalgamation, as printed in the September issue of the Museum Notes, page 5, Vol 3, should have read January 1st, 1929.—Ed.

The Library Corner

December, 1928.

The outstanding addition to the Museum library during the last quarter of 1928 was a complete fyle of the Annual Reports of the Field Museum of Natural History of Chicago. These cover the years 1900 to 1927, and are replete with illustrations of paintings and exhibits of the various departments. Accounts of the accessions through field expeditions, gifts and exchanges make interesting and valuable reading matter. This Association is greatly indebted to the Field Museum for this splendid donation, and is pleased to have this opportunity of giving notice to its appreciation.

From the Biological Board of Canada comes "Contributions to Canadian Biology," being studies from the Biological Stations of Canada, new series, Vol. II., Nos. 15 to 22. These contain three articles by Mr. G. H. Wailes on various aspects of marine life found in B.C. waters.

The Chase National Bank of New York has published an attractive brochure describing a selection of coins used in a scheme of decoration for the Architrave in the new Chase National Bank Building. This selection ranges from the earliest known coins of Greek origin down to the latest issues of the American government. Complete descriptions and illustrations make this booklet a handy guide.

Other additions are as follows:

Spolia Zeylanica, ed. by J. Pearson, covers the Zoology and Geology of Ceylon.

The Observer's Handbook for 1929, published by the Royal Astronomical Society of Canada.

Art Gallery of Toronto. November Bulletin and Catalogue of an exhibition of paintings lent by the Phillips Memorial Gallery, Washington.

Milwaukee Public Museum. Bulletin, December, 1928.

Liverpool Free Public Museum. Seventy-fifth Annual Report.

Leicester City Life. Monthly Journal, October, 1928. —E.S.R.

Crabs and their Young

By G. H. WAILES

PLATE X.

Crabs, like all other crustaceans, are developed from eggs; the eggs of crabs are carried under the body, the tail, which is broad in the female crab and tightly tucked in under the shell, serving to hold them in place; in some species the large claws are used to help make them more secure. When the eggs are ripe (fig. 1), they are laid in the water and hatch out as pre-zoea (fig. 2), or this process may take place in the mother's brood pouch. The little "pre-zoea" are about one twenty-fifth of an inch in length, the size varying in different species; they swim freely in the water and very soon make their first moult and become the "first zoea" (fig. 3); after a few days these find their parchment-like skins too tight for them, and they moult a second time, growing larger whilst the new skin is forming (fig. 4); in the edible crab this process is repeated five times until the last zoea stage is reached (fig. 7); then a great change suddenly occurs at the sixth moult which produces the "megalopa" (fig. 8). These are usually about one-quarter inch in length, measured over the spines, although on the West Coast of Vancouver Island large shoals of these occur, consisting of individuals half an inch in total length.

The next and last larval moult produces small crabs about one-eighth of an inch in width that resemble the adult form (fig. 9); they are then about one month old; the changes to and from the megalopa stage are so great that only by tracing the process stage by stage can the species be identified, but when once this is done and accurate drawings are made or specimens preserved of the various stages, the larval forms can be recognized when met with in the plankton. Few of the early stages of crustaceans found on the North Pacific coast have yet been identified.

Nearly all the marine crabs spend their lives either on the beaches or on the floor of the sea, with only limited migratory movements, but the young zoea float and swim freely in the water and may be dispersed over wide areas by the tides and currents before they finally settle down as small crabs; incidentally, in the meanwhile, a large proportion of them afford an important and welcome article of diet to numerous fishes and other creatures. In this way, overcrowding of limited areas is obviated, and the species is widely dispersed until stopped by adverse conditions.

The young of river crabs leave the protection of the mother as perfectly formed little crabs, the helpless zoea thus being saved from the danger of being carried out to sea.

Land crabs migrate annually to the seashore, where they deposit the eggs or zoea in the water, although in the province of Behar and in the interior of Tasmania they occur so far from the sea as to preclude the possibility of their migration thither.

The presence of long spines and feathered setae or hairs on the young larvae is a provision to assist them in floating in the water. The zoea of the Hermit Crab, Pagurus (shown on plate III., fig. 1 of Museum Notes, December, 1927), have these spines greatly developed. The zoea of some Oceanic species are simply a mass of spines radiating in all directions; examples of these were found by the Challenger expedition. The spines may also act as a protection against small predacious foes.

PLATE X.

Figures

1-9. Showing the development of the British edible Crab, *Cancer pagurus* Linneus, from the egg. After Lebour.

1. The ripe ovun, with the eyes of the larva plainly visible.

2. The first stage called the Pre-zoea.

3. The first zoea stage.

4-7. The following four zoea stages:

8. The Megalopa stage.

9. The first young crab stage produced from the moult of the megalops.

10-14. Showing the development of the crab, *Rhithropanopeus harrisi* Gould, from the first zoea stage. After Connolly.

10, 10a. Fig. 10. The first zoea. Fig. 10a. Telson (tail) of same enlarged.

11. Second zoea, dorsal view.

12, 13 Third and fourth zoea stages.

14. Megalopa stage.

Acknowledgments are due to Dr. Marie V. Lebour for permission to reproduce her drawings, which appeared in "Fishing News," Aberdeen, 20th August, 1927.

Dr. C. J. Connolly's drawings are reproduced from the "Contributions to Canadian Biology," 1925; published by the Biological Board of Canada.

All the figures are one-half the size of the originals.

PLATE X.

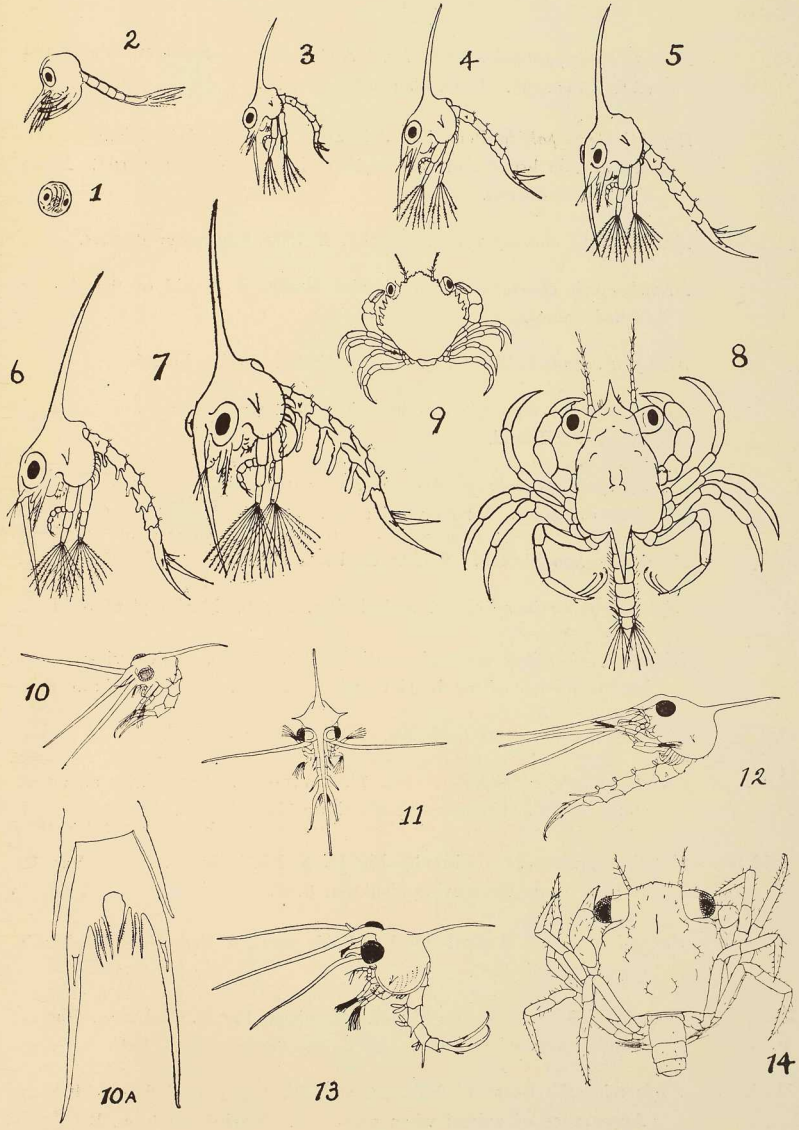


PLATE XI.

Figures

1, 2. *Acanthocystis pantapoda* Pen., Fig. 1 X 600. Fig. 2. Spine much enlarged (After Penard). From Vancouver district.

3-5 *Raphidiophrys pallida* Pen., Fig. 3 X 250. Figs. 4 and 5. Spicules much enlarged, in broad and narrow side views. (After Penard). From Vancouver district.

6. *Acanthocystis chaetophora* (Schrank). X 150. Vancouver district.

Acanthocystis chaetophora var *simplex* Wailes is devoid of the shorter forked spines.

7. *Biomyxa vagans* Leidy X 150. (After Cash). Cortes Island.

8. *Acanthocystis pelagica* Ostenfeldt. X 400. From off the west coast of Vancouver Island.

9. *Acanthocystis penardi* Wailes. X 300; with enlarged view of the two kinds of spines. Vancouver district.

10. *Arcella dentata* Ehrenb. X 150. Oral and side views. Abbotsford, B. C.

11. *Diplopeltopsis minor* Lebour. Apical view. X 400. Marine plankton, B. C.

12. *Diplopeltopsis minor* var *occidentalis* Wailes. X 400. Apical view, showing the absence of the first intercalary plate 1a. Marine plankton, B. C.

13. *Dinophysis tripos* Gouret. X 300. Marine plankton, B. C.

14, 15. *Striolatus tardus* Schaeffer. Fig. 14. Contracted. Fig. 15. In an active state. X 250. From sea beach, Cortes Island, B. C.

16-18. *Ceratium macroceros* (Ehrenb) Fig 16. X 200. Fig. 17. X 50. Fig. 18. X 150. From the marine plankton, B. C.

19. *Corythion acutum* Wailes. Oral and side views X 500. From the beach, Cortes Island, B. C.

20-22. *Centropyxis stellata* Wailes. Fig. 20. Side view. Fig 21. Oral view. Fig. 22. Another type of aperture. All X 38. Cortes Island, B. C.

23-25. *Ebria tripartita* Borgert. Figs. 23. and 24.. Types of skeleton. Fig. 25. Appearance of animal when preserved. Marine plankton, B. C.

PLATE XI.

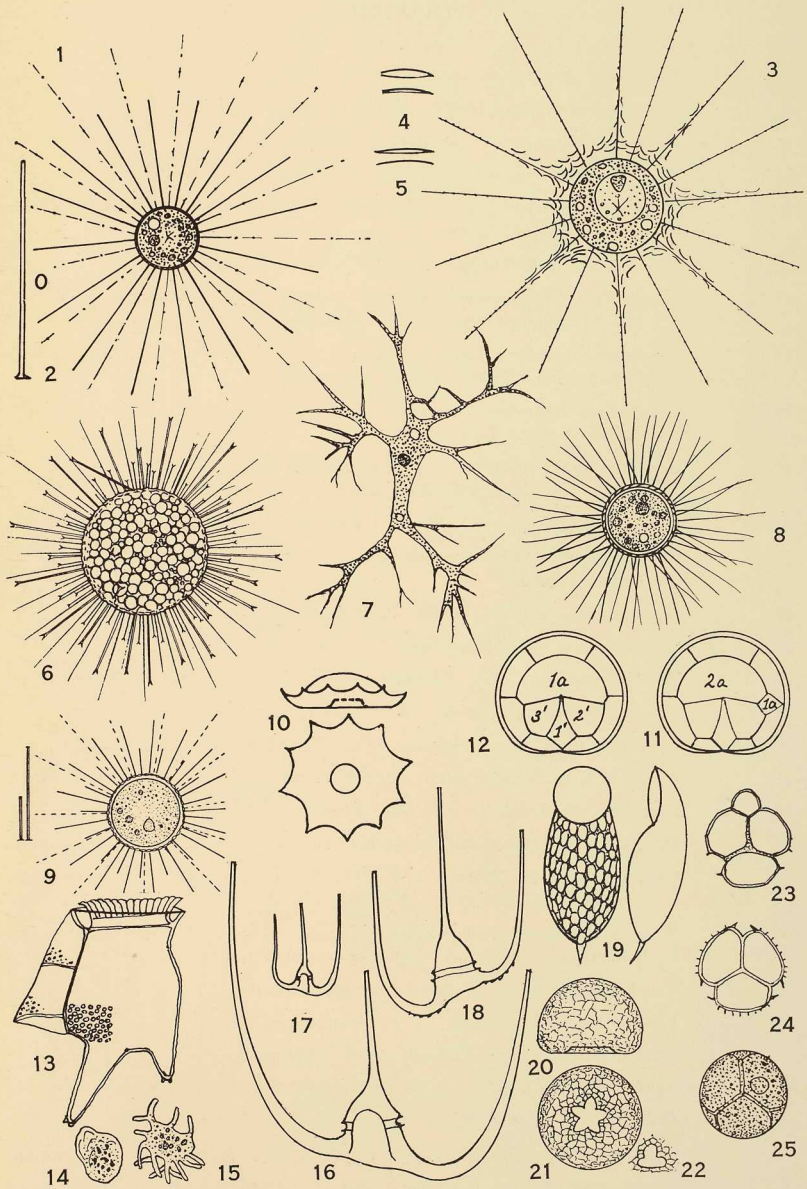


PLATE XII.

Figures

1, 2. *Dinobryon (Epipyxis) utriculus* Stein. X 500.

3. *Dinobryon divergens* Imhof. Typical form of cell. X 250.

4, 5. *Dinobryon divergens* var *angulatum* Chodat. Fig. 4. X 175. Fig. 5. X 300.

6, 7. *Dinobryon bavaricum* Imhof. Fig. 6. X 375. Fig. 7. X 180.

8, 9. *Dinobryon balticum* Schutt. Fig. 8. X 75. Fig. 9. X 250. From brackish water, Kyuquot Sound.

10, 11. *Dinobryon sociale* Ehrenb. Fig. 10. X 150. Fig. 11. X 600.

12-14. *Dinobryon cylindricum* var *palustre* Lemm. Fig. 12. X 225. Fig. 13. X 325. Fig. 14. Another type. X 425. Vancouver Island.

15-18. *Dinobryon sertularia* Ehrenb. Fig. 15. Colony, encysted X 205. (After West). Figs. 16-18. Various types of cells. X 250.

19, 20. *Hyalobryon ramosum* Lauterborn. Fig. 19. Two zooids X 500. Fig. 20. Colony X 150. Vancouver.

21, 22. *Ceratium fusus* (Ehrenb). Individual with abnormally forked hypercone spine. Fig. 21. X 450. Fig. 22. X 170. Nanaimo, B. C.

23. *Ceratium pentagonum* Gourret. X 200. West coast of Vancouver Island.

24, 25. *Gymnodinium multistriatum* K & S. Ventral and antapical views. X 250. Cortes Island.

26. *Gymnodinium articum* Wulff. X 500. Cortes Island.

27. *Gymnodinium rhomboides* Schutt. X 500. Cortes Island.

28. *Trichophyra* sp. X 250. Plankton, West coast.

29. *Distyocysta elegans* Ehrenb. X 250. West coast plankton.

30. *Urceolopsis sabulosa* Stokes. X 375. Stanley Park, Vancouver, B. C.

31. *Urceolopsis cyclostoma* Stein. X 375. Stanley Park, Vancouver, B. C.

32. *Exuviella apora* Schiller. X 600. Plankton, Barkley Sound.

33. *Distephanus speculum* var *octonarius* (Ehrenb) Forma. X 150. Clayuquot.

34. *Ceratium lineatum* (Ehrenb). X 275. Showing an abnormal bifurcation of the right-hand spine. Kyuquot.

35. *Trochiscia brachiolatum* (Moeb.) forma. X 400. Marine plankton, in which the type with Y-shaped spines also occurs.

36. *Trochiscia multispina* (Moeb). X 400. Nootka.

37. *Stentor coerulens* Ehrenb. X 50. Vancouver, B. C.

38. *Stentor polymorpheus* Ehrenb. X 45. Nanaimo.

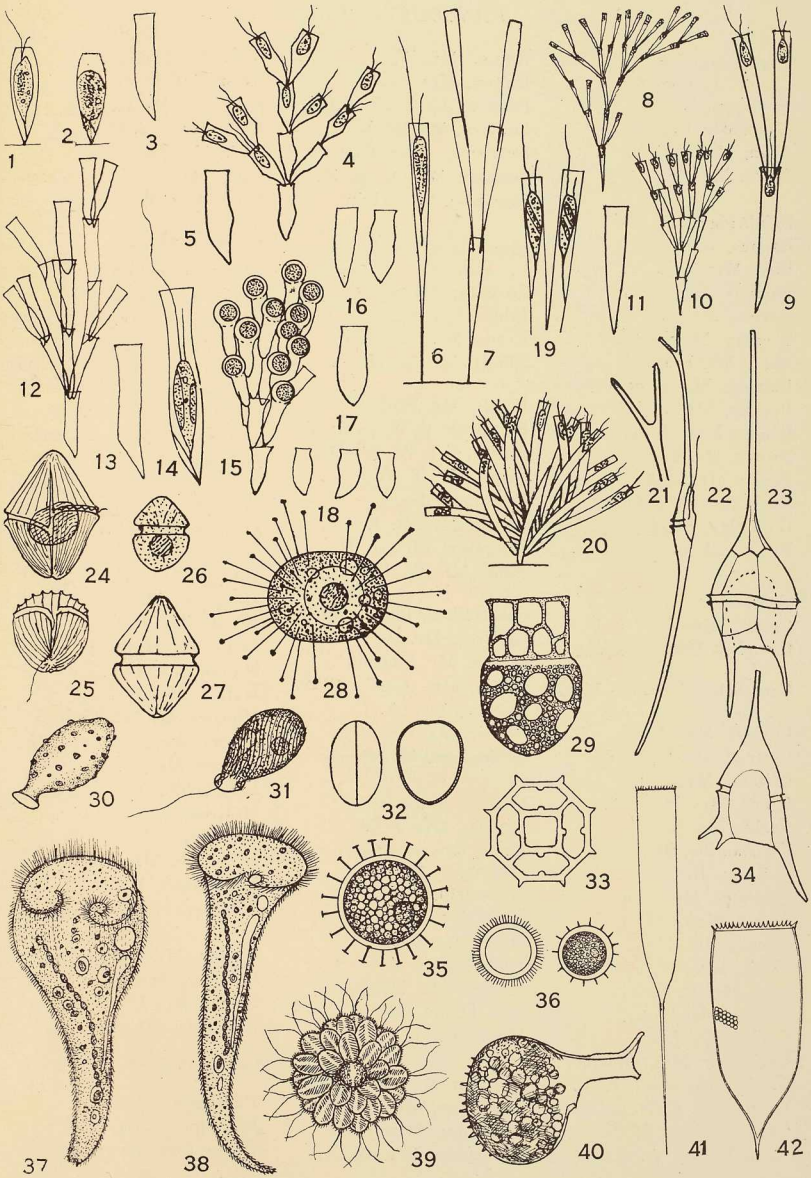
39. *Synura uvella* Ehrenb. X 250. Abundant in ponds and lakes.

40. *Protocystis tridens* Borgert. forma. X 200. West coast plankton.

41. *Cyttarocylis denticulata* var *gigantea* (Brandt). X 100. Quatsino Sound.

42. *Cyttarocylis edentata* Brandt. X 210. Quatsino Sound.

PLATE XII.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ART, HISTORICAL & SCIENTIFIC ASSOCIATION

To Maintain and Develop the Museum;
To Preserve the Early Annals of British Columbia History;
To Preserve Examples of Native Indian Arts and Crafts.

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