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Northwestern salamander (*Ambystoma gracile*).

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CANADA

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SOME NOTES ON VANCOUVER ISLAND SALAMANDERS

by Richard Guppy, Wellington, B. C.

PACIFIC COAST NEWT Triturus granulosus.

Newts taken from breeding ponds during April apparently tried to return home rather than stay in new quarters. They were in full breeding trim, though none were mating, and females showed no signs of distention. But all seemed content at the moment with aquatic life.

I put two pairs into a pool in my garden. An hour later I found one of the males already ashore and making off. The other male had found an earthworm in the pool and was engaged in swallowing it. I therefore put one pair in a small tank with the top screened, the other pair I left in the pool. Next morning these latter two were gone. I did not notice those in the tank making any attempt to escape. Early in May, after about two weeks in the tank, I found both newts had climbed on to the rim of the tank where they could just squeeze under the screen cover. I removed them and left the tank unoccupied all summer, but no larval newts appeared.

In September I have found as many as fifty "efts" fully transformed, though small, and a dozen or more adults under scraps of bark around a small lake. All of the area on which they were found would be submerged when the lake reached normal winter level.

In common with other salamanders having aquatic larvae, newts seem to vary much in the time they remain as larvae. I have taken small immature specimens in the autumn and kept them through the winter, having them transform next spring.

Newts may occur at fairly high altitudes. I have seen them in a pond on Mount Becher at about 4000 feet and on Mount Arrowsmith at 5000 feet.

NORTHWESTERN SALAMANDER Ambystoma gracile.

If the concentration of spawn in ponds is a good indication, this species must be extremely abundant in the more

humid parts of Vancouver Island. Near Kennedy Lake in June, I saw what must have amounted to several hundred batches of spawn during a walk of a mile or so. Similarly on Cra-croft Island in Johnson Strait, I found a small sluggish stream which appeared to carry from one to a dozen balls of spawn in every one of its numerous pools. Around Port Hardy every suitable pool contains its quota of spawn. I saw no larvae, but they are nocturnal in habit, and I had no gear for dragging the ponds. Spawn remains in the water during the whole month of June, and was just commencing to hatch when I left at the end of the month. Samples which I took home with me were dead on arrival.

On several occasions I have noticed large larvae of A. gracile in pools on Mount Arrowsmith at an altitude of 5000 feet or more. They are usually hiding under stones, but can be picked up in the hand if turned out from concealment.

I have never seen any evidence of the presence of A. gracile at low elevation on southeastern Vancouver Island. The only exception is one transformed specimen found under a log, beside a lake on the lower slopes of Mount Benson, altitude possibly 1000 feet.

This individual is very dark grey with black mottling. Specimens from Mount Arrowsmith are similar in ground colour, but thickly peppered with very fine black spots.

Spawn from Mount Arrowsmith, at the end of July was still in an early stage of development. Again I failed to get this home alive. Two large larvae taken at the same time survived the journey with no apparent discomfort. These specimens, each about eight inches long, were at first kept in a five-gallon crock, half filled with water, with a grotto of rocks in which they could hide. They could always be seen on the move after dark, and readily picked up earthworms which were dropped into the water. After a short time I noted one specimen spending much time standing on "tiptail" on the rocks, so that its nose was against the surface. Its gills were decidedly smaller than those of its companion. In order to give them a chance to transform, I rigged a sort of terrarium, with a few inches of water, and a "beach" of stones and moss. Surprisingly, neither animal took advantage of the opportunity to get ashore. Instead they hid under stones in the water and remained out of sight day and night. On the approach of winter, since their water would easily freeze, I moved them to a covered wooden box sunk in the ground. In this I placed one large stone,

reaching just above the water level. As before, the salamanders remained out of sight and appeared to feed very little. On December 28th, after dark I found one salamander presumably the small gilled individual, with forepaws on the island and nose at the surface. It had lost its former wariness, and refused to submerge until I touched it. Next evening it was ashore on the island and did not try to escape into the water.

This salamander, when moved to another container without water, shortly died. Other animals of the same and different species confined with it, remained perfectly healthy. From its actions in trying to hide in the small wet patch at the bottom of its cage, it would appear that death was due to over-sudden change from its aquatic life. Yet it had freely come ashore, after 'thinking about it' for five months. It must be remembered that if left to its own devices, it would have been sealed under the ice in October. As the winter was extremely mild, these two salamanders were living under conditions very different from those which they had known earlier.

(This article will be completed in the September issue)
Ed.

UNDERSEA IRON ORE OF NEWFOUNDLAND

Discovery, Ownership, Tonnage, Grade.

The January General Meeting held on the 13th was addressed by Dr. Albert O. Hayes, his subject being "The Undersea Iron Ore of Newfoundland". He described in detail the oolitic hematite deposits of the great Wabana mine on Bell Island in Conception Bay which he visited first in 1911, and again in 1912 and in later years.

In 1915 the Geological Survey of Canada published his report on "Wabana Iron Ore of Newfoundland" as Memoir 78. In addition to the geological history of the deposit, he presented the results of field and laboratory investigations proving that the ore was deposited as marine sediments in Lower Ordovician time. Later publications dealt with the structural geology of the region.

The value of the iron ore was not realized until the early 1890's when the land property on Bell Island was

acquired by Messrs. Butler of Topsail, a village 16 miles west of St. John's, and 10 miles south of Wabana, where the mines are located. The Nova Scotia Steel and Coal Company Limited, purchased the holdings in 1893, and made the first shipment of ore on Christmas Day 1895.

As soon as it was learned by R. E. Chambers, mining engineer and director of the Company, that the ore beds continued northward under the water of Conception Bay, he leased 3 square miles of submarine area off the north shore of Bell Island, from the government of Newfoundland. In 1899 the then newly organized Dominion Steel and Coal Company bought a portion of the land holdings and the 3 square miles off shore. Before this deal was made however the Scotia Company had acquired 37 square miles outside the holdings disposed of to the Dominion Company.

These companies operated side by side for about thirty years when they were amalgamated, and the present owner is the Dominion Iron and Steel Corporation Limited of Sydney, N.S. and the mine is operated by a subsidiary styled Dominion Wabana Ore Limited.

About 60 million tons of ore have been mined, averaging in recent years about one and one half million tons annually. Conveyor belts to replace rail car haulage have been installed to hoist the ore up the two mile long slope from the submarine, and trucks, replace a track to transport the ore two miles to the shipping pier. The mine is now prepared to produce 10,000 tons daily. Steamers carrying 10,000 tons can be loaded in 4 hours.

There is an estimated 35 million tons of ore to the square mile in this submarine basin, but half of the ore must be left as pillars to support the overlying rock roof. The likely productive area is at least 70 square miles, making Wabana the site of the largest iron ore reserve known in Canada at present. It contains enough to last several centuries, mined at the rate of 10,000 tons a day.

The ore averages 51% iron, composed mainly of the oxide (hematite) the silicate (chamosite) and some carbonate (siderite). About 1% of phosphorus is present, derived from fossil brachiopod and trilobite shell fragments, and nodules of calcium phosphate, and other complex compounds, formed in the sea bottom muds during the accumulation of the ore beds.

Bell Island:

This island, in the southeastern part of Conception Bay, is 6 miles long in a northeasterly direction, and 2 miles

wide. The population in 1951 was 10,000. Except for a few fisherman, the people depend on the mine. Doubling the output of ore in 1953 will increase the number of miners.

The ore beds crop out for a distance of three miles along the north shore of Bell Island and dip to the north-west at an angle of 9 degrees. Three workable beds occur in the upper 400 feet thickness of sandstone and shale. The lowest of these beds has proved to be remarkably persistent. It is 14 feet thick at the surface outcrop, and where it is now being mined, two miles northward, it is over 20 feet thick. There is 1100 feet of rock and 600 feet of water over these submarine workings.

About one million tons per annum goes to the Company's furnaces at Sydney, and one and one-half million tons to England and Germany.

Geology:

Newfoundland was continuously covered by the ocean during the Cambrian period, and in succeeding Lower Ordovician time when the ore beds were formed, there must have been a shallow sea with extensive tidal flats. This epoch was about 400 million years ago. It took approximately 100 million years before that for a thickness of two miles of sea bottom muds which underlie the ore beds to accumulate. They are all shallow water deposits so that the basin sank as fast as it filled. The muds became compacted and indurated, then deformed in open folds by compressive earth movements. Only the downwarped portions are now preserved, and they are now mostly covered by the sea. Lateral compression of the earth's crust caused the downwarped trough to fracture, and along the east and west shores of Conception Bay, the older rocks were upthrust, thus limiting the ore to the northern area under Conception Bay.

The ore beds are laid down on strata which are ripple marked, and otherwise show evidence of shallow water sedimentation. The ore itself, as well as the enclosing strata, contain fossils of animals which when living occupied a near shore habitat. The fossils include brachiopods, trilobites, worms, and even tiny filaments of algae, revealed only under the microscope. Thus the ore appears to be in the same state except for induration as when it was formed.

The Cambro-Ordovician sediments were laid down on older rocks of Precambrian age. Much iron is found in these, and some of it may have been brought to the Ordovician sea in solution by the rivers of that time. Volcanoes are known

to have been active in Newfoundland in Ordovician time, and these may have added to the iron supply. Deposits of the same age with the same fossil content are known and mined in Wales and at Caen and Cherbourg in France. Others holding fossils typical of their time of formation are found in North America and Europe. They too provide large reserves. Their origin is associated with the sea. Bacteria and algae are known to aid in the precipitation of iron oxide, but the whole story is not yet known. It is a fascinating field of research, and from time to time students devoted to such studies will add to our knowledge of the origin of such deposits.

A zone of oolitic pyrite overlying the lowest hematite bed adds another mystery. This sulphide of iron is replete with fossil graptolites. These hydroids, when living, were carried to all parts of the world ocean, floating with seaweed. The total absence of oxides in the sulphide zone, and the presence of the remains of open ocean types of life indicates that for some time deeper water obtained. The sea bottom must have sunk relative to the land. But it filled up again before the next higher ore bed formed. The pyrite is widespread over the whole area mined, but no repetition of a similar sulphide horizon has been found.

Dr. Hayes explained that Wabana is an Indian word meaning "Place where daylight first appears".

He was accorded a hearty vote of thanks for his very informative address, which was illustrated by lantern slides.

George E. Winkler.

Mr. Bruce Irving, now residing on South Pender Island, has lately left Carmanah Point Light Station on the West Coast of Vancouver Island, where for six years he was light-keeper in charge. While there he maintained his interest in the out-of-doors, particularly in birds, and recorded many observations of value. Some of these have been kindly submitted for publication in the "Victoria Naturalist"; the first instalment appears in this issue.

Ed. G.C.C.

BIRDS AT CARMANAH POINT

By E. Bruce Irving.

Having watched the birds come and go for six years at Carmanah Point on the west coast of Vancouver Island I feel that it is proper to submit a list with a few notes in connection with the rarer or more interesting species observed there.

Carmanah Point Light (elev. 175 feet) is situated on the Canadian entrance to Juan de Fuca Strait. It stands in an acre of cleared land heavily overgrown with salal and salmon-berry, and with an elevation of 125 feet on the front, falling off to 100 feet inland. The clearing is roughly square on a north-south diagonal line, and is bounded on the northern sides by dense brush, alder, hemlock and spruce and on the sea sides by a steep bluff. It is heavily covered with underbrush and a sprinkling of spruce, with alder trees on the western extremity.

Starting at the eastern corner of the station we have the residence looking over the bay to Bonilla Point and Cape Flat-tery. (It is from this building that most of the birds are spotted, using 7 x 50 binoculars and generally at breakfast time). Working around clockwise we have the engine rooms on the south point; the tower with a small lawn on the seaward side; the old residence with a small flower garden to its front, and a small sunken vegetable garden in the west corner; and finally a hen-house and chicken-run at the rear on the north corner.

In the north corner also is the telephone lineman's shack with a crabapple tree behind it. There are some apple trees and logan vines in the garden and a thick growth of salmon berry and some spruces between it and the beach.

Two miles to the east at the other end of the bay is Bonilla Point and near it is the mouth of the Carmanah River. Some six miles to the west is Clo-oose Village, with the Cheewhat River on this side.

The whole coast is very rugged; dense forest and underbrush extend right up to the beach line making it almost impossible to travel in either direction except along a foot path following the telephone line.

Owing to partial deafness I have had to rely entirely upon my eyes; but by keeping a sharp lookout whenever leaving a building, and deliberately looking at favoured haunts of the birds likely to be moving, I have been surprised by the

number of birds seen.

It might be worth mentioning here that there are, undoubtedly, more species moving than the casual observer realizes. Apart from this fact very few people know what to look for or are capable of recognizing birds which they do see.

My observations were made along the shore from Carmanah River to the Indian village of Clo-oose, chiefly at the Light Station on Carmanah Point. In two or three cases birds were reported to me from Clo-oose, and so noted.

Since I did not come off duty until one a.m. I was never up at dawn - hence undoubtedly I must have missed a lot of the early birds. For one of the peculiarities of the migrating bird seemed to be the uncertainty of his length of stay. Some, literally, just gave the place the "once over" and kept going - others would go at the end of a few minutes rest only.

When out fairly early during the period of southern migration, which seems to start at the beginning of August, I noticed many families feeding quietly, which were gone completely by mid morning.

Some rested three or four hours, some as many days; but a full day was usually the maximum, except with fly-catchers.

During migration it is quite a common occurrence to have birds resting on the footboard of the Light - more especially in dirty weather.

Birds following the coast could stay low along the beach and miss us entirely, by flying along the bluff sides; but many actually came onto the Station either to rest or to feed.

Just what birds passed inland I would not know, because the brush was too thick to scramble through. Two or three trips up the Carmanah River convinced me it held nothing of interest, and the few times I managed to get up the Cheewhat by canoe and by wading really added little to the list of birds.

Geographically the station was ideally situated; and the fact that there was an acre of cleared land, containing nearly every variety of bird food, adjacent to the sea and in the most awful jungle undoubtedly accounts for the number of birds seen. Others must have passed. But even at Clo-oose not so many species were noticed - and along the beach and trail many just passed as shadows. The

light - dull grey sea and sky - made identification by colour very haphazard.

SEA BIRDS: The numerous sea birds have been ignored, but the four following seem worthy of note:-

Black-footed Albatross: In August, 1947, two carcasses were picked up on the beach at Clo-oose, and a few days later another was found a few miles further north. Local fishermen and coast-wise sailors state these are common a few miles off shore.

Shearwater: On the afternoon of July 24th, 1951, several thousand were seen to come across from Cape Flattery, in an endless stream; and, about two miles off shore they turned off either east or west to follow the coast line of Vancouver Island. The majority went up the coast.

We had these birds in local waters every summer.

Tufted Puffin: A very dead carcass was found on the beach on January 5th, 1949. This was the only one heard of until Aug. 3rd and 13th, 1952 when some living birds were seen close under the Light. One of the observers then remarked he had seen puffins at Fiddle Reef only a short time before.

These birds are said to have been very common on the coast in the vicinity of Clo-oose some 40 years ago. They appear to be gradually disappearing.

Fork-tailed and Boreal Petrel - come across from Flattery on misty or rainy nights and fly around the Light. Exhaustion often drops them to the ground, where they become an easy prey to the cats, or else they settle on the foot boards of the Light - and may or may not manage to fly home. In Feb. 1950, we took two, unhurt, shortly after sunrise, which after a rest managed to fly out of sight at least. The same month we caught an unhurt Kittiwake, which also recovered and took off for parts unknown.

Swans pass up and down, and yearly winter on Cheewhat Lake and at the head of the Nitinat.

Canada Geese are seen on migration, in greater or lesser numbers depending on the winds. At about Carmanah they very often change course - some keeping straight down our coast, some crossing and following the American side, and some flying down the outside of the continent from Flattery. Undoubtedly a few hang about locally.

Black Brant come and go with the seasons - though there are very good grounds to suppose some remain all the year round. White fronted and Lesser Snow Geese seem to pass right over, and keep flying. There was one day we must have had several thousand Canadas and "Specklebellies" resting well out in the

Bay between Bonilla Point and Carmanah Light. Flight after flight came down and pitched, rested and went on south.

The duck list: mallard, baldpate, pintail, green-winged teal, blue-winged teal, wood duck, canvas-back, ring-necked, the scaups, common golden-eye, butterball, harlequin, the 3 scoters, ruddy duck, the 3 mergansers.

Sandhill Cranes are occasionally seen.

Wilson's Snipe: Individuals have been seen actually on the beaches, in the grassy pieces near timber and fresh water, whilst migrating. Some have been noted in the Indian Village of Clo-oose and on the "meadows" in the Cheewhat basin, not to mention in a small swampy piece about twenty feet square near the Lighthouse lower vegetable garden!

The balance of shore birds are what might be expected along any part of that coast. I have a distinct impression that they are getting fewer every year. Presumably all birds come in cycles, in a manner of speaking, but one year only did I see Dunlin; and Black bellied Plover were constantly on a certain beach one year, a few times another year - and that was all seen of them!

The final instalment of the "Birds of Carmanah" will cover the land birds, and will appear in the next issue of the "Naturalist" (September)

Irresistible Life

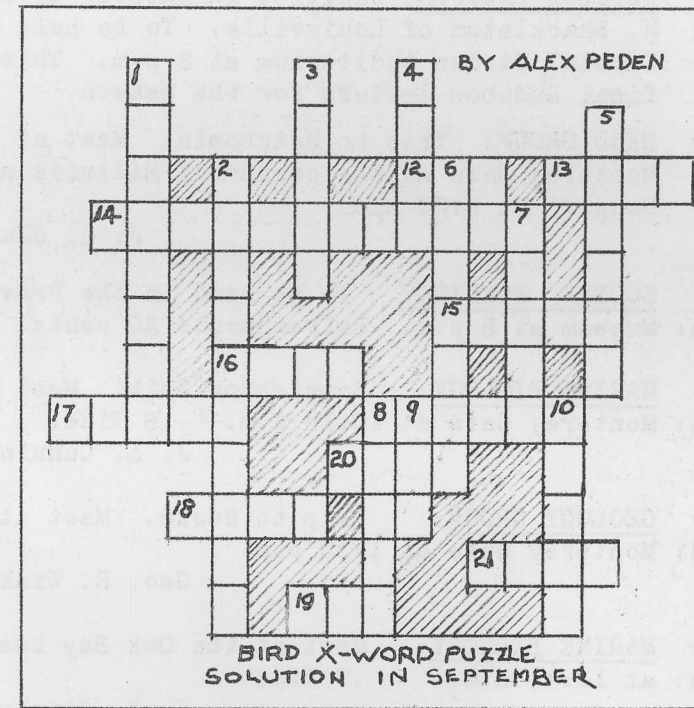
Except for some stuffed birds in the secondhand stores the town end of Johnson Street has little to interest a naturalist. Number 525 is a particularly gloomy and unoccupied store. Peering through the dirty windows one can, however, see quantities of very flourishing bracken, the floor having been removed. The building must be fifty to seventy years old and the space under the old floor averaged a foot in depth. There is no open land around the store, so it seems remarkable that even bracken can have survived for so long. No other plant life was visible.

Katherine Sherman.

JUNIOR PAGE

Editor: Alex Peden. Phone G.7518

BIRD CROSS WORD PUZZLE --



- | | |
|-------------------------------------|---------------------------|
| 1. Plover. | 12. Bird of prey. |
| 2. Duck, named because of its head. | 13. Mud-hen. |
| 3. Long-legged fish-eater. | 14. Commonest gull. |
| 4. Eater of eggs. | 15. Hell-diver. |
| 5. "hee" at end. | 16. Meadow----- |
| 6. Common duck. | 17. Looks like a penguin. |
| 7. Fly in a "V". | 18. Small gull-like bird. |
| 8. Blue grouse | 19. Cheeky bird. |
| 9. Male swan | 20. Has a necklace. |
| 10. Bigger than a crow. | 21. Small bird. |
| | 8. Skunk head. |

Ask for your exhibit in Junior case if you lent anything.
The last meeting is April 25.

NOTICE OF MEETINGS

Saturday BOTANY TRIP: The field meeting scheduled for
 May 2nd: this day unfortunately had to be cancelled.

Friday AUDUBON LECTURE: Oddities in Nature, by Walter
 May 8th: H. Shackleton of Louisville. To be held in the
 Crystal Garden Auditorium at 8 p.m. This is the
 final Audubon lecture for the season.

Saturday BIRD GROUP: Trip to Metchosin. Meet at the
 May 9th: Monterey Cafe at the corner of Hillside and
 Douglas at 9:30 a.m.

J. O. Clay.

Tuesday SOCIAL EVENING: To be held in the Provincial
 May 12th: Museum at 8 p.m. Refreshments 20 cents.

Friday MARINE BIOLOGY: Saanichton Spit. Meet at the
 May 15th: Monterey Cafe at 10:15 a.m. .8 Tide.
 J. A. Cunningham.

Saturday GEOLOGY GROUP: Trip to Sooke. Meet at the
 May 23rd: Monterey Cafe at 1:30 p.m.
 Geo. E. Winkler.

Saturday MARINE BIOLOGY: Meet at the Oak Bay boathouse
 May 30th: at 10:45 a.m. .7 Tide.
 J. A. Cunningham.

Saturday BOTANY GROUP: Meet at the Mount Douglas Park
 June 6th: picnic grounds at 2:15 p.m.
 John Nutt

Saturday MARINE BIOLOGY: Meet at the Breakwater at
 June 13th. 10:30 a.m. .9 Tide.
 J. A. Cunningham

Saturday BIRD GROUP: Boat trip to Bare Island. Meet at
 June 27th: the Monterey Cafe at 9 a.m. Accommodation limited
 to 20 people. All those wishing to take this trip
 please register with Mrs. Sherman - phone G.9482.

J. O. Clay.

Anyone who will have car accommodation for passengers and
 anyone requiring transportation for any of the above field
 trips, please get in touch with Mrs. Sherman.

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