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Moose habitat group, Provincial Museum.

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THIS MONTH'S COVER

Our cover this month is a photograph of a habitat group of moose done in the Provincial Museum in miniature. This group was prepared as an experiment to check the possibilities of presenting the large mammals in this manner instead of using full-size mounted specimens.

Probably the greatest problem in preparing an exhibit of this kind is to find materials that will substitute for the real thing and remain in scale. The spruce trees in a group where the moose are moose-size can be real spruces. Scaled down the problem is to find some plant growth that can be made to look like a spruce if it were this small. In this case certain species of heather with very tiny needles were treated to preserve the spruce-like characters and keep the foliage from falling off, spray-painted, and then made to look as nearly like spruces as possible. The tall dead snags are dried thistle-stalks, the brush and low bushes the very tip-ends of snowberry bushes.

The moose is the third-largest mammal on the North American continent being exceeded in size and weight only by the bison and occasionally by Grizzly, Alaska Brown, and Polar Bears. At the present time it is probably the most important big-game mammal in Canada; certainly more non-resident hunters come to Canada to hunt moose than any other large animal. Willow and aspen are the main food items of this species. In B.C. moose are found at and near timberline in summer, and in the lower valleys only in winter. Elsewhere across the North the moose tend to frequent the muskeg-edges and the vicinity of the slow meandering streams as these places are where the most abundant willow-growth is found. Though long-legged and strong they suffer much more from deep snows than from cold weather and as long as snowfall remains light show very little ill-effect from an otherwise severe winter.

Frank L. Beebe.

YOUR NEW PLANT SCIENCE BOOKThe Ferns and Fern-allies of British Columbia

by

T. M. C. Taylor

Illustrated by Mary Bryant

British Columbia Provincial Museum Handbook No. 12, 50¢.
154 pp., numerous line drawings, glossary and index to common names and synonyms.

This complete handbook contains authoritative information and detailed descriptions useful to both the amateur and professional.

The arrangement of the text has been made as simple as possible with full explanation of scientific terms in glossary.

Of recent years there has been a demand for some popular book of the ferns and fern-allies like Horsetails and Club-mosses of British Columbia. No doubt T.M.C. Taylor's book meets this need and also has stimulating interest in this interesting and attractive group of plants. This publication will enable more exact determination and increase our understanding of British Columbia ferns and fern-allies. The book gives a detailed description and discussion of each species based on the authors scientific knowledge with reference to their habitat, ranges and nomenclature.

The present work, however, brings together for the first time information concerning all of the ferns and fern-allies of British Columbia and a very successful effort has been made to include the pertinent data regarding them.

Finally, every species is illustrated by line drawings, both artistically and scientifically done by Mary Bryant.

A. F. Szczawinski.

OUR VICE-PRESIDENT GOES TO SEA

On the 20th of September, while visiting around Santa Cruz, California, we were very glad to be able to accept a kind invitation by Mr. L. M. McQuesten, the leader of the local bird group, to accompany some members of the biology class of the Santa Cruz High School on an ocean trip to see, if possible, blackfooted albatross.

We had slept the previous night with relatives at Mountain View, 47 miles distant, so we had to be up very early to rendezvous at the Santa Cruz Municipal Wharf at 7 a.m. However, this rather paid off, as we listened to the 5 a.m. news

from C.J.V.I. as we drove along, thus learning the results of the B. C. elections, and also had time to get a very fine breakfast at a drive-in on the outskirts of town.

Arriving at the dock, we located Mr. McQuesten, who introduced us to Capt. Malio Stagnaro, owner of the boat we were to go on. This was a very stoutly built craft, 65 feet long with an 18 foot beam, and of deep draft to alleviate the rolling of the big ocean swells.

Before leaving, the Captain provided everybody with anti-seasick pills, said to be 98% efficient.

The plan was to go twelve miles straight out to sea, which we did. Owing to only a slight northwesterly breeze, the sea was not at all rough, just a large ground swell. To us, unaccustomed to the open sea, balancing was rather tricky, and keeping one's binoculars on a particular bird difficult. Buckets full of herring were brought along to throw out to attract birds.

Besides Mr. McQuesten, there were a Mr. and Mrs. Anderson from Salinas, who had also come along to help the students with their identifications; and naturally, the bird knowledge of these three Californians made us look rather amateurish, with so many species we had never seen.

On the way out, leaving shore, we were interested in seeing two or three Heerman gulls, mixed with the other gulls.

No albatross were seen (Mr. McQuesten said this was the first "miss" in five trips) but that was more than compensated for by seeing 25 or so of the rare New Zealand shearwater, only a very few times previously reported from the California coast.

Other birds seen were sooty shearwater, pink-footed shearwater, California murre, brown pelican, northern phalarope, common tern, western gulls and one pomarine jaeger.

All good things must come to an end, and so about 9 a.m., the prow of the good ship "Stagnaro No.3" was turned shoreward and we were back on the dock soon after 10 a.m.

Along the beach near the end of the dock were seen marbled godwits, willets, greater yellowlegs and sanderlings, while perched beside a nearby pond was a black pheobe.

The seasick pills? Well, they had proved 94% efficient, for out of the fifty on board three had been sick, but there was another whose name we did not catch who came within an ace of reducing the efficiency to 92%.

P.M. Monckton.

THE A. O. U. MEETING: SEPTEMBER 1956

As no doubt many members are aware, the American Ornithological Union holds one meeting every year. In the early history of the Union this was always held in one of the larger eastern cities in the United States, but in recent years it has periodically come west, and this year the 74th meeting was held at Denver, Colorado. This is a 'must' to attend with many of the older members who have been regular since joining. It is a recognized opportunity to meet together.

The chief object of the meeting is to elect officers and for the presentation of papers, which takes three days; as a winding up there are field trips.

The meetings convened at the Denver Museum on two days and one day at the University of Colorado at Boulder, where the banquet was held, at which, I believe, there was a record attendance of over 275. Boulder is well worth a visit, the building being designed after Italian architecture. Denver Museum is outstanding. I doubt if any other museum has the equal of the panoramic pictures of two of the extinct North American birds, the passenger pigeon and Carolina parrot, as well as one of the whooping cranes, each case containing several specimens. As well, there are small cases of habitat groups covering the State, so there is no excuse if the Denver people do not know their birds, past and present.

Thirty-eight papers were given, many being illustrated. These covered a wide range - breeding biology, re-discovery of supposed extinct species, ecological and distributional history of North American bird groups, etc. Some very interesting papers, presented by Dr. Udvardy of U. B. C. of which fossil birds and migration were perhaps the most important. The committee of management this year provided a booklet with an abstract of the different papers so that one knew something of what was coming and had a record to refresh the memory afterwards.

Dr. Stuart Henderson of Yorkton, Sask., was the only other Canadian to give a paper on the birds of Fort Carlton in the years 1827, 1858 and 1956; and the only other one to deal specifically with British Columbia was that by Dr. Pitelka on the timing of moult in Stellar jays of the Queen Charlottes, suggesting that this is timed to a summer food supply rather than to the breeding cycle.

The subject matter of papers was not limited to North America. A very interesting one dealt with the rare horned

coot of Chile, much larger than our bird, and the only bird which builds its nests of stones, forming a little island from 18 to 36 inches in height in a shallow part of a mountain lake, some of which have been estimated to contain 1½ tons of pebbles. On the top is added algae to receive the eggs. Fossil birds have been mentioned and we had a description of a gigantic bird with a wing spread of 14 to 16 feet. Another paper dealt with the past history of the loons going back to the late Eocene.

The excursions were, as usual, very enjoyable. On Saturday we went by car to the top of Mt. Evans, over 14,000 ft. the road going to within 200 feet of the summit. Ptarmigan are to be seen there, but elevation and *anna domini* kept me from looking for them, and our car was not lucky in seeing any from the road. We made a stop at a lake some 2000 feet from the summit - lots of pipits and a weasel had its headquarters opposite to where the car was parked. It was surprising to see a red-tailed hawk at this elevation - no doubt migrating. Also to learn that a dipper had been seen.

Both going and returning stops were made at likely places for birds, and one saw again some of our summer birds. At another place several Townsend solitaires collected to feed on berries. Generally speaking there did not appear to be much bird life about, but this is the usual impression when looking for it from a car.

On Sunday we visited some reservoirs to see waders and ducks. At the first was a fair collection of waders including some avocets. A prairie falcon had been there before us so what birds there were left were soon on the move. A large reservoir visited had lots of ducks, but the water was low so that the birds were far from our view-point. I did notice some Bonaparte gulls there - one would have expected Franklins. At another small pond we disturbed a number of night herons. Fortunately here were some trees, which provided a very desirable shelter for lunch. The temperature was 92 degrees. Another quite large reservoir had some white pelicans, a large species of cormorant and ducks, but again they were too far off for identification. A small party of western grebe caused quite an excitement. All the country we went through was flat and much consisted of cattle ranches where we saw conditions not much different from the days when the buffalo would have been there. Apart from the reservoirs there was little bird life.

The next annual meeting will be held in Pennsylvania, possibly at Cape May, at the beginning of Sept. 1957.

Theed Pearse.

FOSSILS

by J. H. Whitehouse

The mention of Fossils to the ordinary person brings up a picture of an elderly gentleman wearing very thick glasses examining a specimen with a hammer in one hand and a magnifying glass in the other, and calls forth some facetious remark about which is the fossil. However, fossils can be very interesting, and there are good reasons why they should be studied, as we shall see.

You are all aware that there are several kinds of rocks, known as sedimentary, igneous, and metamorphic. The only one that we shall talk about this evening is the sedimentary, as it is from this rock that fossils are discovered and perhaps recovered and reconstructed as museum specimens for future study.

When rocks of any sort are exposed on the surface of the earth, sun, air, rain and frost singly or together work upon them and eventually break them down into soil. The contrast is shown by a view of the mountains of the Moon where there is no atmosphere. Heat and cold are not enough to break them down, so they stand high and sharp to us today. It takes oxygen in the air and water that falls as rain to really break up the rocks and carry away the pieces. In high mountain regions, where temperatures are subject to sudden change, freezing is an active cause of the breaking up of rocks, in tropical lowlands, where there is little change of temperature, chemical action by water, oxygen and various acids, proceeds at a steady pace. In short, rocks are ground up or dissolved in the course of time and carried away. Streams carry what is now sand, silt or clay to lower levels. Somewhere in its course, the stream stops running so fast and gradually drops its load, the slower it runs the finer material it carries, until eventually only the minerals dissolved in the water is carried into the sea.

As we approach the mouth of a river, we find each successive bed of sedimentation is composed of the same sized particles, this applies everywhere, in valleys, lake beds, or on the sea floor, wherever they accumulate, and in each deposit there is a horizontal layering which is called Stratification. Sedimentary rocks are formed as these deposits become thicker and thicker and by pressure and other means cement themselves into solid masses, sometimes thousands of feet in thickness.

Much of the North American continent is mantled by

sedimentary rocks now raised again from the sea floor where they were first laid down on the older rocks and form the real crust of the earth. There are several kinds of sedimentary rocks, but three will serve our purpose, sandstone, shale and limestone, in all of which fossils are found. By the manner in which sedimentary rocks are formed, by deposition or layering, it must follow that some foreign substances will be preserved as rocks when the sediments are solidified. These may include, remains of animals, plants and shells, often surface markings are preserved showing ripple marks, raindrop dents, or the footmarks of animals made millions of years ago. Such are fossils and are a characteristic of sedimentary rocks.

The geologist uses them as a guide to tell him the age of the rocks, whether a formation is one million or a hundred million years old. The study of fossils is known as Paleontology. Fossils in the Cretaceous:

We will try now to show what fossils have taught us about life in Cretaceous Period. The chart shows that the Cretaceous occurred about the middle of the Mesozoic era and lasted about 65,000,000 years. It is usually divided into two parts, the Upper Cretaceous, and the Lower Cretaceous, in North America but some European geologists divide it into three parts, but we will hold to the older form and look upon it as one long geological period.

The name derived from the Latin creta, chalk, was first applied to the immense formations of chalk that form the sides of the English Channel formed during the period. It was named in 1822 and although it is known there are other and greater deposits, such as the Greensand the name has been allowed to stand and is accepted the world over. It is not possible to go into the geology of the period in one short evening, so we will just mention that the Cretaceous was a continuation of the Jurassic and was in the beginning at least still dominated by Reptiles.

The Dinosaurs still retained the leading place among the land reptiles perhaps the most singular development was among the herbivorous ornithisian branch, in the ceratopsia (horned face) found in the Upper Cretaceous of the West. Superficially they resembled the rhinoceros but some of them had twice the weight of an elephant. The skulls were enormous and extended backward over the neck and shoulders in a protective capelike flange, added to this was a sharp parrotlike beak, and in Triceratops a stout horn on the nose, a pair of large pointed horns on the top of the head, and a row of projections around the edge of the cape. Though having the largest head of the reptile race, the brain cavity was very small, and the animals

were doubtless stupid and sluggish.

Among the carnivorous dinosaurs, the fiercest of all was Tyrannosaurus Rex, the King of giant saurians, who roamed the western plains late in the Cretaceous. The mounted skeleton in the American Museum in New York stands 18 feet high and is 47 feet in length - the largest flesh-eating land animal known to have existed. The teeth were large and sharp, like blades, the jaws enormous, and the bite must have been very powerful. One's imagination can run riot on a battle between Triceratops and Tyrannosaurus. Probably end in a feast for the bystanders on both carcasses.

Few of the great amphibious sauropods lived on into the Cretaceous. Armoured dinosaurs were still present, while ornithopods flourished. Their characteristic Cretaceous types were the duck-billed dinosaurs which possessed a broad horn covered beak, in general appearance like that of a duck. In some of them, odd crests and helmet shaped projections were formed from the bones of the skull.

The Flying Animals made so distinct an advance in specialisation that Williston regards them as having come to excel all other vertebrate animals. Some attained a wing span of 25 feet, but the bones were hollow and very light so that the largest of the pterodactyls (Pteranodon) did not weigh more than 30 pounds, some of the genera were so formed it is doubtful whether they could stand on their feet alone. The Cretaceous forms were all short tailed and for the most part toothless, though the toothed forms persisted for a while. They soared widely over the epi-continental seas in search of food.

Snakes made their appearance in the latter part of the period but they were small.

Crocodylians underwent a marked change in the early part of the period, developing into the modern style of gavials and crocodiles.

Mammals of the Cretaceous were still as in part of the Jurassic a small and inconspicuous part of the fauna. They had, however, progressed greatly since the previous period, for we find among the Cretaceous forms, not only the ancestors of the marsupials, including the opossums and most of the living mammals of Australia but also the first of the placental mammals, which were to occupy a dominant position in the land life of the future.

In the Sea the Ichthyosaurs and Plesiosaurs which had dominated the Jurassic sea lived on into the Cretaceous.

(to be continued in next issue)

BIRD NOTES

Mr. Jack Todd advised us that two pair of wood ducks had nested on Prospect Lake this year, one with seven young and the other with nine. On September 12th we saw five wood duck on Lost Lake.

During the latter part of August eleven western bluebirds were seen on Cedar Hill Cross Road opposite the Uplands Golf Course. For some years now at least one pair of these diminishing birds have nested in this vicinity and remained through the winter. This year it would appear that they had raised two broods, as this flock was composed of five immatures and four just able to fly, and, as far as we could tell by their dull plumage at that time, two adults. Each time we saw them they were accompanied by Audubon warblers. This association of bluebirds and warblers continued for at least six weeks, as they were still all together on October 15th, but by this time some of the bluebirds had completed their moult and were in beautiful colour.

During the first week in May a pair of mourning doves appeared in the garden of Mr. & Mrs. Jackson on the Cedar Hill Cross Road with the apparent intention of nesting in one of the numerous oak trees there, but too many crows came around and the doves left the locality, though one of them was seen about half a mile away a few weeks later. The only other record for this year was one bird near Island View Beach road on September 15th.

On June 23rd two pair of crossbills were seen at the home of Mr. & Mrs. W. L. Taylor at Towner Park, Deep Cove, and it was evident that they had nested in one of the tall firs surrounding the property. Almost any day during this summer they could be seen drinking at an ornamental pool on their lawn. On September 15th we saw a flock of eleven, seven of the number being immatures. They were quite tame and would come down to drink close to where we were standing.

Walking along the shore by the Victoria Golf Club on the evening of September 18th, we saw a flock of about twenty-five terns wheeling, flashing their wings and diving in their own inimitable fashion. For about two weeks after that, especially during the foggy days, terns could be seen from Clover Point to Smugglers Cove, occasionally accompanied by the parasitic jaegers, as on two or three occasions while watching the terns, we saw these jaegers harrying them, and it was wonderful to see the maneuvers of these birds as one of them tried to retain his catch of fish while

the other tried to make him disgorge it.

Seventeen turkey vultures were seen at Sooke on September 30th. This is the only migration of these birds that has been reported this fall, save one lone vulture at the Uplands on October 21st.

On September 29th fifteen Vaux swift were seen for about an hour at the corner of Hunt and Noble Roads, north of Cordova Bay.

A party of bird watchers in the Finnerty Road area saw two hermit thrush on October 16th. These elusive birds migrate regularly through this area and sometimes remain all winter, but they are not often seen.

The recent storms have piled some of the Oak Bay beaches high with seaweed, and last week-end we saw feeding here about one hundred black turnstones, four Aleutian sandpipers, two Hudsonia curlews and one red-backed sandpiper.

A.R.D.

MUCH TRAVELLED BIRDS

Recently while reading a copy of the "Scottish Field" I came across an item concerning a Wilson phalarope having been seen in a pond near the Forth Bridge. As this bird, whose weight averages $2\frac{1}{2}$ ounces summers in the Rocky Mountains and winters in South America, its presence in Scotland is a mystery which puzzles ornithologists.

It is known that more birds have flown from America to Europe than have reached here from the other side, as the prevailing winds are in favor of our birds, but Peterson lists 21 species which have crossed to America from Europe, and in Victoria we have at least one species that can generally be seen here every winter which hails from the other side - the European Widgeon.

G. E. Soulsby.

JUNIOR NATURAL HISTORY PAGE

Bruce Crawford - - - Editor

THE SIAMESE FIGHTING FISH by Waldon Davis.

The Siamese Fighting Fish is a member of the Anabantid family. They are distinguished by the presence of an auxiliary breathing organ shaped like a ladybrinth(?) which is the reason these fish are often referred to as Ladybrinth Fishes. This organ permits the fish to breathe atmospheric air as well as using their gills.

Some of the Anabantids are rough customers and the Betta Splenders (Siamese Fighting Fish) are no exceptions. The male is quite pugnacious to other fish although he never picks a fight with another species than his own. When two males are placed together they will fight until one or the other is badly beaten or dead. In Siam these fish are placed on exhibition where a battle is staged and bets wagered as to the outcome.

Breeding this fish is not too hard a task and whatever pains are taken in doing so are usually richly rewarded. To accomplish this it is best to condition the pair in separate tanks. It is best to feed them on live food such as daphnia, cyclops and mosquito larvae until the female is quite rounded and the male shows that he is ready to spawn. It is very important that the female is ready for spawning for if he is ready he will be anxious to get started and if the female refuses she is liable to be badly beaten or even killed.

When the two fish are ready for spawning, place them in a tank with a glass partition. The male will try frantically to reach the female. At this time the glass partition should be carefully removed in such a way that the nest is not broken up. When this is done the male Betta will again try to reach the female. When this is done the male will rush ferociously at the female trying to get her under the bubble nest.

(Continued next month)

FIELD OBSERVATION: On my summer holidays I was looking out the window at the bird bath. When all of a sudden a flock of crows flew down upon it. There were about twenty of them. They all tried to have a bath at once but it did not work so they had to wait their turn. Our poor garden: it really took a beating that day.

NOTICES OF MEETINGS1956

Saturday ANNUAL FUNGUS FORAY (Weather Permitting)
 Nov. 3rd: Meet at Monterey Cafe at 1:30 p.m., proceed
 to Thetis Lake.
 Leader: Professor C. W. Lowe.

Tuesday GENERAL MEETING
 Nov. 13: Provincial Museum at 8 p.m.
 Subject: "Mexican Geology and a New Volcano"
 Speaker: Dr. H. Sargent of the Department
 of Mines.

Friday, AUDUBON SCREEN TOUR
 Nov. 23: Oak Bay Junior High School at 8 p.m.
 Subject: "Cypress Kingdom"
 Speaker: Alexander Sprunt, Jr.

Saturday BIRD GROUP
 Nov. 24: Meet at Monterey Cafe at 9:30
 or the Black Swan, Elk Lake at 10:15
 Leader: Mr. J. O. Clay.
 (Bring Sandwiches)

THE JUNIORS thank the following speakers:
 (Feb. 14 to October 9th)

From the V.N.H.S., Mr. J.O. Clay on 'Birds'.

Miss M. C. Melburn, 'Wildflowers'.

Mrs. G. Soulsby and Mrs. P.M. Monckton, 'Birds'.

Mrs. G. Soulsby 'May 15th party'.

From the Provincial Museum, Dr. G. C. Carl, 'Amphibians'.

Mr. C.J. Guiguet, 'Mammals'.

Mr. A. Hardy, 'Insect mounting'.

Mr. F. L. Beebe, 'Hawks: Falconry'.

From the B.C. Game Office. Mr. Don Kiers,
 'Game Conservation'.

* * * * *

The new check list of birds for the Victoria district is
 now available, and can be obtained at the Provincial Museum.
 The price is ten cents.

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