

THE BLUE CRAB (*Callinectes sapidus* Rathbun): EXTENSION OF ITS RANGE NORTHWARD TO NEAR HALIFAX, NOVA SCOTIA.—BY HARRY PIERS, Curator of the Provincial Museum of Nova Scotia, Halifax,

(Read 19 January, 1920.)

Callinectes sapidus, the Blue or Common Edible Crab of the Atlantic coast of the United States, and the only northern form of the genus, was, until 1895, known as *Lupa* (*Callinectes*) *hastatus* of Say. It is not the *Lupa hastata* of Desmarest, and therefore was assigned its present name by Miss Mary J. Rathbun in a paper on "The Genus *Callinectes*" (Proc. U. S. Nat. Museum, vol. 18, p. 349, Wash., 1895). It belongs to the family *Portunidae* (the swimming Crabs), which is distinguished by the last pair of pereopods (legs) being broad and flattened at the end, thus forming effective paddles for propulsion.

Range.—Up to now the most northern locality from which it has been recorded is Millpond, an inlet of Salem Harbour, Massachusetts, U. S. A., where a single individual was taken as recorded by C. Cooke in the *American Naturalist*, vol. 1, p. 52, 1867. It is occasionally found in Massachusetts Bay (Smith, Rept. U. S. Com. Fish and Fisheries for 1871-2, p. 548, 1874). It is common in bays and at the mouths of rivers from Cape Cod, Mass., to the northern extremity of Texas, and is especially abundant in Chesapeake Bay, where it is the basis of an extensive industry. Specimens have been taken also in the Bermudas, Jamaica, and Brazil; but outside of the region from Cape Cod to Texas it is of rare occurrence. Dr. J. F. Whiteaves makes no reference to it in his Catalogue of Marine Invertebrates of Eastern Canada, Ottawa, 1901, nor do any later writers mention its occurrence north of Salem Harbour. Dr. A. G. Huntsman of the Biological Board of Canada informs me that they have never obtained it in any of their investigations along the Atlantic coast, and he knows of no reference to its occurrence in Canadian waters. Mr. William MacIntosh, curator of the Museum of the Natural History Society of New Brunswick, St. John, tells me that he has no record of its having been taken along the New Brunswick coast.

Habitat.—It occurs on muddy shores and bottoms, down to deep water, and among eelgrass, being particularly abundant in bays and in the brackish waters of estuaries; and has even

been taken in fresh water contiguous to the coast. During the summer it is found in relatively shallow water; but retires in winter to greater depths. Adults are more often obtained in deep water; but the young, as well as some adults, come inshore to water only a few inches in depth.

Economics.—Next to the Lobster, this crab is the most important food crustacean of the United States, it being extensively eaten both in the hard- and soft-shelled stage, and is highly esteemed.* Any extension of its range is therefore of considerable general interest.

Occurrence on the Nova Scotian coast.—In the Provincial Museum of Nova Scotia, Halifax, when I took charge of it in 1899, was an old dried specimen of an adult female *Callinectes sapidus*, but without any data. As there were a few foreign crustaceans in the collection, I did not then consider its presence of any significance.

On 8th November, 1902, I purchased from a Miss Iceton, in the Halifax market, two specimens of the species, a male and an immature female, which had been found alive, cast up with kelp on the sand beach at Cow Bay, Halifax County, N. S., on 7th November, and which had been boiled and so turned red. A third one, an adult male, had been taken with the others, and was obtained for the Museum on the following market day. I requested the woman to look for more, and accordingly other specimens from the same place were obtained from her in November and December of that year, and in April and May, 1903; making in all fourteen specimens. One of them was alive when I received it, and the others quite fresh.

Two more specimens, a male and an immature female, were taken on 8th May, 1903, in what is known as the Lily Pond, a brackish lagoon, immediately behind the Cow Bay sand-and-gravel beach. This lagoon is now connected with the sea at high-tide by a narrow channel at the southwestern end of the beach. Up to about 1901 the water of this pond was fresh, being fed by a couple of brooks, and white waterlilies flourished there; but about that year a new outlet was broken through and since then the water has been brackish. The pond is

* "Soft-shelled" crabs are those met with two or three days after moulting, before the shell has become hard. The period between moults is from 15 to 25 days, according to whether the individual is young or approaching maturity. The usual period of life is about three years, and the number of eggs laid about 1,750,000.

shallow, and the bottom mostly sand, overlaid with decaying organic material.

The place where all these specimens were obtained was at the southwestern end of the sand beach, near the present outlet of the Lily Pond, or Cow Bay Pond as it is sometimes called, about four-fifths of a mile southwest of the Mosher house. The two which were collected in brackish water were taken in the adjoining pond, close to the outlet, and therefore in the immediate vicinity of where the others were found in salt water.

Cow Bay itself is on the Atlantic coast, seven miles in a direct line east-southeast from the city of Halifax, in Halifax County, and lies between Hartling Point on the west and Osborne Head on the east. It has a long beach of sand and gravel, exposed to the full inward sweep of the Atlantic Ocean.* The locality is very scantily settled by farmers.

One male Blue Crab was obtained from Beazley and Henrion, fish dealers, of Halifax, who told me it had been taken at Cole Harbour, Halifax County, on 25th November 1902; but as Cole Harbour is about three miles northeast from Cow Bay, and it is the only specimen reported to have come from there, I think it very probable that it also came from the latter place. The dealer had purchased it from someone living in that district, and may have mistaken the name of the exact locality, as such details were of no interest to him.

All of the Cow Bay specimens were obtained in the Halifax market from one woman, who then lived in that district, and they were taken by her brothers. She told me that no one about Cow Bay to whom the crabs had been shown, had seen the species before. Since the spring of 1903, this woman has ceased coming to the market, and I have not since happened to note any of the crabs exposed for sale. I am therefore not in a position to state whether the colony still exists at Cow Bay, but there can be hardly any doubt that it does, as it seemed to be well established.

Besides the Cow Bay occurrence, I am only aware of this species having been once taken elsewhere in Nova Scotian waters. Mr. E. Chesley Allen, formerly of Yarmouth but now of Halifax, informs me that he identified a single adult specimen of *C. sapidus*

* For an account of Cow Bay beach and its pond, see McIntosh, Prof. D. S., A Study of the Cow Bay Beaches, Trans. N. S. Inst. Sc., vol. 14, pt. 2, p. 109, 1906.

which he obtained in a fish-market in Yarmouth. It had been taken on the shore at Sandford, just outside of the mouth of the Bay of Fundy, Yarmouth Co., six miles north-northwest of the town of Yarmouth, N. S., about the year 1921. No person of the district had met with the species before, and it is the only specimen Mr. Allen has noted in this province, although he has carefully examined the shore about Yarmouth for marine invertebrates. His specimen has since been lost. On the coast at Sandford there is, I believe, a lagoon or cove which is separated from the sea by a roadway.

Summary of specimens.—In all, seventeen specimens and the right cheliped of an eighteenth one, have been received by the Museum from the Cow Bay district, exclusive of the old female, without data, which we suppose must have been also collected here. Of the 18 complete specimens, 12 are males, immature and adult, varying in greatest width from 4.20 inches to 6.03 inches; and 6 are females, varying in width from 4.30 inches to 5.90 inches. Of the females, 2 are adults with the distinguishing broad, rounded abdomen, and 4 are immature specimens with wedge-shaped abdomens.*

Grouped as to months in which they were taken, we get the following result; April, 6 specimens (all male); May, 3, (2 males and 1 immature female); November, 6, (4 males and 2 immature females); and December, 2, (both females, immature and adult). These scant figures indicate that they may be most common in April and November. It is possible that during the more busy summer season they were not searched for. In the winter they no doubt retire, as elsewhere in their range, to the bottom in deeper and warmer water, but they are met with on shore as early as the later part of April and as late as 11th December. In Chesapeake Bay, Va. and Md., U. S. A., they are most abundantly taken in May or June, and in October or November.

Particulars of Nova Scotian specimens.—On the next page are given particulars of the eighteen complete specimens and one cheliped of *Callinectes sapidus* in the Provincial Museum:

* Unlike the case of the female, we have no criterion by which to distinguish adult males from immature ones, except so far as size and general appearance is indicative of age, unless one can make observations on sexual activity.

ACCESSION NUMBER	SEX	AGE	LOCALITY	DATE	CARAPACE	
					LENGTH	GREATEST WIDTH
Old specimen	Female	Adult	Nova Scotia (?)	Not known.	Ins. 2.25	Ins. 4.65
1073	Male	.....	Cow Bay, Hfx. Co., N. S.	7 Nov. 1902	2.55	5.26
1073	Female	Immature	" " " " "	" " "	2.35	5.09
1077	Male	.....	" " " " "	" " "	2.75	6.03
1078†	"	.....	" " " " "	14 " "	2.50	5.36
1098	"	.....	Cole Har. (?), Hfx. Co., N. S.	25 " "	2.36	5.14
1099	Female	Immature	Cow Bay, Hfx. Co.	27 " "	1.96	4.30
1125	"	.....	" " " " "	11 Dec. "	2.18	4.82
1126	"	Adult	" " " " "	" " "	2.52	5.90
1811	Male	.....	" " " " "	24 Ap. 1903	2.46	5.30
"	"	.....	" " " " "	" " "	2.46	5.12
"	"	.....	" " " " "	" " "	2.64	5.70
"	"	.....	" " " " "	" " "	2.46	5.26
"	"	.....	" " " " "	" " "	2.31	4.74
"	"	.....	" " " " "	" " "	2.28	4.73
(Right cheliped)	?	.....	" " " " "	" " "	.....	.....
1815	Male	.....	" " " " "	1 May "	2.73	6.00
1820	"	.....	Cow Bay Lily Pond, Cow Bay	8 " "	1.98	4.20
"	Female	Immature	" " " " "	" " "	2.00	4.35

All specimens were obtained from one person, except the "old specimen" and No. 1098.

† Alive when received.

12 males: average length, 2.457 ins.; average width, 5.237 ins.

6 females: average length, 2.210 ins.; average width, 4.852 ins.

2 adult females: average length, 2.39 ins.; average width, 5.28 ins.

Males vary in size from the smallest (No. 1820), 1.98 ins. in length, 4.20 ins. width, to the largest (No. 1077), 2.75 ins. length, 6.03 ins. width.

Females vary in size from the smallest (No. 1099), 1.96 ins. length, 4.30 ins. width, to the largest (No. 1126), 2.52 ins. length, 5.90 ins. width.

Largest immature female is No. 1073, 2.35 ins. length, 5.09 ins. width.

All of these specimens agree fully with descriptions and figures of *Callinectes sapidus*. The following notes on the colour were made from Acc. No. 1078 (male), which was alive when received, and No. 1077 (male) which was quite fresh, and represent fairly well the colouration as found here, which agrees generally with that of more southern specimens:

Colour.—Carapace greenish-olive, passing into olive-green on posterior margin. Tips of teeth on anterior margin of carapace and of lateral spines, reddish. Underparts generally white. Legs (periopods) pale olive-green and blue; their callosities and spines red. Upper part of chelae ("pincer-claws") dirty olive-green; inner side of same, a fine cobalt blue.

In Chesapeake Bay, U. S. A., 36 adult females had an average width of 6.117 inches, and they are known to attain a width of 7 inches; and the average width of adult males is there probably about 6.5 inches at least, while they are known to grow to a width of 8.5 inches.* As our two adult females (with rounded abdomens)

* Churchill, E. P., Life History of the Blue Crab, Bull. Bur. of Fisheries, vol. 36. 1917-18, p.101. Wash., 1919.

only measure 4.65 inches and 5.90 inches, and the males are all 6.03 inches or less in breadth, we are led to the conclusion that our Nova Scotian individuals undergo their final moult and so attain maturity at a smaller size than do those of the more favourable southern coast. This is as might be expected on the extreme northern extension of the geographical range, where suitable food may not be so abundant, and the torpid winter condition may be slightly longer, as this crab becomes sluggish when the temperature of the water falls below 50 degrees.

Conclusion.—We thus see that at this northern locality on the Atlantic coast of Nova Scotia, in latitude $44^{\circ} 37'$, there is a remarkable and apparently well-established and comparatively numerous colony of this important species of crab, which previously had never been recorded from Canadian waters, or even from further north than Salem Harbour, Mass., situated in latitude $42^{\circ} 30'$, nearly four hundred miles to the southwest. It seems truly remarkable that this crab has not been found in the Bay of Fundy, except the single specimen from Sandford, Yarmouth Co., or even on the coast of Maine.* It would be interesting to know if it occurs in suitable localities elsewhere along our Nova Scotian Atlantic coast, or whether at Cow Bay and Sandford, we have isolated colonies whose origin may have been casual individuals, or even a single egg-bearing female, borne northeastward on the Gulf Stream and thence straying to our shore. This current has brought many unexpected marine visitors from the south. Such accidental crustacean wanderers, if cast upon a favourable part of the coast, where suitable food occurred, could multiply and establish themselves. The marked swimming ability of the family to which the Blue Crab belongs, may lend strength to such an explanation of the origin of such colonies here, should subsequent observations indicate that the species does not occur in the intervening area between Nova Scotia and Massachusetts.† Nothing at present indicates that the Cow Bay colony and the Sandford individual are the survivors of an occupation which once extended unbroken up to this latitude.

* See Rathbun's List of Crustacea of New England, 1905.

† W. P. Hay (Life History of Blue Crab, Rept. U. S. Bur. of Fisheries, 1904, p. 401, Wash., 1905) says the species is one of great activity and considerable power of endurance. It progresses through the water by a sculling motion of the broad hind legs, and under ordinary conditions it moves slowly, its efforts apparently being to keep afloat while it is borne along by the current. In this way it might easily go adrift and be carried northward by the set of the Gulf Stream.

Previous references to these specimens.—It may be mentioned that in notes on interesting accessions published in the Report on the Provincial Museum for 1902 (appended to the Report of the Department of Mines), Halifax, 1903, page 5, I briefly referred to our first specimens as "several Blue Crabs (*Callinectes sapidus*), new to this province, taken at Cow Bay"; and in the report for 1903 (Halifax, 1904, page 6), stated that in that year "a number of Blue Crabs (*Callinectes sapidus*) have been obtained from Cow Bay and Eastern Passage, showing that this species has an established habitat in the province." This reference to the Eastern Passage I cannot now explain, as that locality is not given for any of the specimens recorded in our accession-book or on the labels, and it is without doubt a mistake, although at the time of then writing I must have had some reason for thinking that the species also occurred near the sandy Eastern Passage, an arm of Halifax Harbour, which adjoins Cow Bay to the westward.* As these brief records were buried in the before-mentioned reports, it seems well to draw attention more formally to such an interesting and unexpected extension of the geographic range of an important economic species.

Summary.—1. The Blue Crab (*Callinectes sapidus*) occurs as a fairly numerous colony at Cow Bay, on the Atlantic coast of Nova Scotia, seven miles east-southeast from Halifax, and possibly at immediately adjoining favourable localities. A single specimen has also been taken at Sandford, Yarmouth County, at the mouth of the Bay of Fundy. It occurs in both salt and brackish water, but apparently rarely in the latter.

2. No previous records are known of its occurrence to the north of Salem Harbour, Mass., and the question naturally arises whether in Nova Scotia we have merely isolated colonies established by casual drift individuals borne northward by the Gulf Stream and cast upon our shore; or whether, less likely, they are the survivors of a continuous occupation which once extended this far north. Further search should be made to

*Since writing the above, I have met the woman from whom I obtained the Cow Bay specimens of this crab which are in the museum. She had been a Miss Icton of Cow Bay, but is now Mrs. Soward of Purcell's Cove, N. W. Arm. She assures me that all the Blue Crabs I obtained from her were taken at the southwestern end of Cow Bay beach, near the outlet of Cow Bay Pond, about 4/5 mile southwest of the Mosher house. She has never heard of any having been taken in the Eastern Passage or elsewhere

discover if the species exists elsewhere on our coast to the southwestward of Halifax, from which region, with the exception of Sandford, it has so far not been reported.

3 Inhabitants of the districts where it was found, had not noted the species before, which, although not evidence of much weight, tends to increase the probability that it had been introduced by natural agencies within comparatively recent years.

4. Individuals from Nova Scotia seem to mature when of a slightly smaller size than do those of more southern regions, but this is not sufficiently pronounced to be at all varietal.

Provincial Museum. Halifax, N. S.,
12th December, 1919.