BUCCINUM HYDROPHANUM HANCK.

A HIGH-ARCTIC RELICT IN THE TRONDJHEM FJORD

BY

O. NORDGAARD

DET KGL NORSKE VIDENSKABERS SELSKABS SKRIFTER 1917. NR. 3

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During a dredging excursion to the outer part of the Trondhjem fjord in the summer of 1917 we obtained a peculiar *Buccinum* which I immediately judged to be specially interesting. The find was made at Gjeitneset, opposite to the wellknown dredging-station of Røberg, at the inner end of the channel between Røberg and Agdenes. The dredge was working at a depth of 400—200 m. At these depths, quite oceanic physical conditions prevail, with a temperature of 6—7° C. and a salinity about 35 ‰. Under such circumstances we should expect to find only southern or boreal animals, not arctic ones. At the same locality were also seen well developed specimens of *Lima excavata* FABR., which species does not belong to the arctic fauna. On examining the said *Buccinum*, however, I found it to be the species *hydrophanum* HANCK. Only one specimen was obtained.

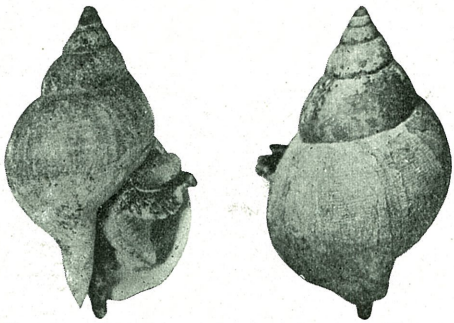

Fig. 1. *Buccinum hydrophanum* HANCK.
From Gjeitneset in the Trondhjem fjord, ca. 300 m., 6/6 1917.

Fig. 1 shows the appearance of the specimen obtained. Total length 39 mm., length of the aperture 24 mm., length of the spire 20 mm. The form should, I presume, be referred to var. *tumidula* G. O. SARS.

I give here some references for the occurrence of the species.

On the Norw. North Atl. Exp. 1876—1878, *B. hydrophanum* was obtained at the following stations:[1]

[1] HERMAN FRIELE, Mollusca I, *Buccinidæ*, p. 31, tab. 3, figs. 20—23.

Station	Lat. N.	Long.	Depth m.	Temp. C°	Bottom
18	62° 44′	1° 48′ E.	753	÷ 1,0	Clay
124	66° 41′	6° 59′ E.	640	÷ 0,9	Coarse clay
164	68° 21′	10° 40′ E.	836	÷ 0,7	Sabulous clay
192	69° 46′	16° 15′ E.	1187	÷ 0,7	Sabulous clay
200	71° 25′	15° 41′ E.	1134	÷ 1,0	Clay
223	70° 54′	8° 24′ W.	128	÷ 0,6	Dark-grey Sabulous clay
251	68° 6′	9° 44′ E.	1159	÷ 1,4	Clay
267	71° 42′	37° 1′ E.	271	÷ 1,6	Clay, stones
326	75° 31′	17° 50′ E.	225	1,6	Clay
338	76° 16′	17° 49′ E.	267	÷ 1,1	Rocky
357	78° 3′	11° 18′ E.	229	1,9	Clay
363	80° 3′	8° 28′ E.	475	1,1	Clay
366	79° 35′	11° 17′ E.	112	÷ 2,2	Clay

The typical form occurred at stations 251 and 366, var. *elata* was commonly found at moderate depths and var. *mørchi* was obtained at stations 18, 124, 164, 192, 200.

On the Michael Sars exp. 1900, *B. hydrophanum* was taken at the following localities:[1]

Stat.	Lat. N.	Long.	Depth	Temp. C°
7	63° 6′	2° 64′ E.	910	÷ 1,07
10	64° 53′	10° 0′ W.	600	÷ 0,69
13	66° 42′	26° 40′ W.	550	0,11
25	Jan Mayen		100	÷ 0,40
26	Jan Mayen			
62	74° 15′	16° 50′ E.	250	2,10

On the «Armauer Hansen» expedition 1914, the same species was obtained at st. 4, 62° 15′ Lat. N., 0° 15′ Long. E., d. ca. 800 m., temp. ÷ 0,23° C. According to JAMES GRIEG[2], 4 specimens

[1] HERMAN FRIELE, Mollusken der ersten Nordmeerfahrt des Fischereidampfers «Michael Sars» 1900 unter Leitung vom Herrn Dr. JOHAN HJORT Berg. Mus. Aarb. 1902, Nr. 3, S. 6.

[2] Evertebratfaunaen paa havdypet utenfor «Tampen». Berg. Mus. Aarb. 1914, nr. 3, p. 14.

were taken, all being referred to var. *tumidula* G. O. SARS[1]. The largest specimen measured 60,5 mm.

The only Norwegian fjord where *B. hydrophanum* lives in any quantity is the Varangerfjord[2]. C. DONS has kindly informed me that in Tromsø museum there are some few specimens from Vardø and Vadsø, taken at a depth of 100—200 m. The largest specimen in the collection is 45 mm. long.

Several specimens of *B. hydrophanum* were collected by the 2. Norw. Arctic Exp. in the North American Polar Archipelago, at depths about 8 to 6 m.[3]. JAMES GRIEG states (l. c. p. 33) that the varieties *tumidula* and *elata* occurred. The largest specimen of *elata* had the following dimensions: L. 70,5 mm., b. 35,5 mm., aperture 32 mm. From Greenland are recorded, besides the typical form, several varieties by POSSELT and AD. S. JENSEN[4].

According to DAUTZENBERG et H. FISCHER[5] the species was obtained on the expedition of Prince ALBERT I in 1898 at Spitsbergen and east of Iceland. Var. *tumidula* G. O. SARS and var. *mørchi* FRIELE were taken in the Icefjord and var. *elata* FRIELE north of Spitsbergen.

As to distribution, I may cite DAUTZENBERG et FISCHER (l. c. p. 136): «La distribution géographique de cette espèce boréale s'étend des côtes arctiques de la Sibérie à la mer de Kara, la Nouvelle-Zemble, la Terre de François-Joseph, la côte septentrionale de la presqu'ile de Kola, le Finmark, le Spitzberg, Jan Mayen, le Groenland, la détroit de Davis et le banc de Terre-Neuve Habitat bathymetrique: 4 à 1186 m.» To this may be added: The cold area of the Norwegian Sea and the North American Polar Archipelago. *B. hydrophanum* has now also been found as a relict in the Trondhjem fjord.

B. hydrophanum has been observed by P. A. ØYEN[6] in quaternary deposits of the Trondhjem district, viz. at Ørlandet at the entrance of the Trondhjem fjord, and at Nidaros brick-field in

[1] Mollusca Regionis Arcticæ Norvegiæ, p. 263, tab. 25, figs. 5, 6.
[2] J. SPARRE SCHNEIDER, Nogle bemærkninger om hysens næringsforhold, tillige et bidrag til kundskaben om Vardøhavets skaldækte mollusker. Tromsø Mus. Aarsh. 16 (1893), p. 16.
[3] JAMES GRIEG, Brachiopods and Molluscs. Rep. 2. Norw. Arct. Exp. 1898—1902. Nr. 20, p. 32—33.
[4] Conspectus Fannæ, Groenlandiæ. Brachiopoda et Mollusca, p. 207—210, tab. 2, figs. 13, 14, 15.
[5] Résultats des campagnes scientifiques, fasc. 37, p. 133—136. Monaco, 1912.
[6] Kvartærstudier i Trondhjemsfeltet, III. D. kgl. n. vid. selsk. skr. 1914, nr. 6, p. 444.

the town of Trondhjem. W. C. BRØGGER[1] records the species from the older *Yoldia*-clay in southern Norway. The following varieties occurred: Var. *elata* FRIELE, var. *fusco-rufescens* POSSELT et JENSEN, var. *texturata* POSSELT et JENSEN. Specimens of *elata* measured 75—80 mm.

Hence we may conclude that the said species was of quite common occurrence in Norwegian waters during the glacial period, when the physical conditions of the sea were similar to those of high-arctic waters at the present time. The fact that this species has lived in the Trondhjem fjord since the glacial period also points to a great power of endurance. Under normal conditions, the thermo-biological minimum for the species has up to the present been found to be $\div$ 2°,1 C., and the thermo-biological maximum 2°,1 C., but in the Trondhjem fjord it is living at a temperature between 6 and 7 degrees. It is worth noting that *B. hydrophanum* has shown a great power of variation.

From the English Crag the species is noted by F. W. HARMER[2], who records var. *tumidula* G. O. SARS from Waltonian and Little Oakley.

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[1] Om de senglaciale og postglaciale nivaaforandringer i Kristianiafeltet, p. 44.

[2] The Pliocene Mollusca of Great Britain, Part I, p. 103, pl. 9, fig. 9. London, 1914.