possible relationship of these patterns to pathological states.


**References**

1. CONN, H. J. *Biological Stains,* 5th ed. Geneva, N. Y.: Biotech Pub., 69 (1946).
2. BENNHOLD, H. *Ergeb. inn. Med. u. Kinderheilk.,* **42**, 273 (1932).
3. FASOLI, A. *Lancet,* **1**, 106 (1952).
4. DURRUM, E. L. *J. Am. Chem. Soc.,* **72**, 2943 (1950).
5. GRASSMAN, W., HANNIG, K., and KNEDEL, M. *Deut. med. Wochschr.,* **76**, 333 (1951).
6. SPERRY, W. M., and WEBB, M. *J. Biol. Chem.,* **187**, 97 (1950).
7. GOFMAN, J., LINDGREN, F., and ELLIOTT, H. *Ibid.,* **179**, 973 (1949).
8. DURRUM, E. L. *J. Colloid Sci.,* **6**, 274 (1951).
9. KUNKEL, H. G., and TISELIUS, A. *J. Gen. Physiol.,* **35**, 89 (1951).



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# *Comments and Communications*

## *Cochlearia officinalis* s.l. (Scurvy Grass) in Northernmost Alaska

THE recent paper by John H. Thomas, entitled "*Cochlearia officinalis arctica* in the Vicinity of Point Barrow, Alaska" (*1*), may be welcomed as a type of publication of which many more are needed; for commentaries on the habitat preferences, autecology, plant sociological relationships, life form, and other attributes of particular boreal plants can be of interest and value to many—including taxonomists, ecologists, and phytogeographers. Now that arctic opportunities are frequent and such facilities are afforded as those of the Arctic Research Laboratory at Point Barrow, it seems a pity that more critical and even more comprehensive accounts are not forthcoming. Thus, in the paper cited, there is offered no discussion of the taxonomic situation in *Cochlearia* in the region involved—perhaps wisely, in view of its complexity—though one would have expected that in the making of the prerequisite field observations, at least, there would have emerged some ideas about how the plants concerned should be treated taxonomically. Instead, it appears that Hultén's treatment (*2*), which recognizes only one subspecies in the vicinity, has been tacitly accepted; and, whereas there can scarcely be a better authority to follow in such matters, it should be noted that there does indeed seem to be more than one variety of *Cochlearia* in northernmost Alaska. Hultén himself says of the (only) two "races" which he recognizes there and to the south that "There is wide variation within the material and no sharp limit can be drawn between these types, but the tendency in very evident. Whether or not these two types can be further divided on account of other characteristics seems unclear." Thus a direct challenge has been ignored; and, whereas Thomas was perhaps being merely cautious in not taking up one of such proportions, it is to be hoped that others who have the opportunity in the future will tackle such problems. Arctic botany is fairly bristling with them.

I would like to put in a plea, also, for more biological and phenological data on arctic plants whenever they can be obtained. There seems little excuse, considering the ease and comfort of arctic travel and life nowadays, for our continued ignorance about such fundamental matters as dispersal and propagation. An example of what may usefully be accomplished along several of the lines involved is afforded by the two works on *The Structure and Biology of Arctic Flowering Plants,* published by Warming and Ostenfeld and their associates in 1912 and 1921 (*3*), but they deal with only a small proportion of the species inhabiting arctic regions and are mainly concerned with Greenland. Recently the tendency has been for cytological and other introspective lines of investigation to hold sway, and although they have their own fascination and undoubted significance, they should not be allowed to take the place of over-all biological study which, with precise taxonomy, must be included in the main foundations of our edifice of boreal botany. An example of our ignorance in allied connections is the persistent reference to *Koenigia islandica* as the only annual in the Arctic; it is by no means the only one and appears to be by no means always annual—at least according to my observations in the Far North, and particularly in Spitsbergen and the Canadian Arctic Archipelago.

Especially in the case of *Cochlearia* in the Arctic is there an unsolved mystery of the most intriguing nature, on which it might have been hoped Thomas would throw light or at least provide comment—the more so in view of the abundant representation, plasticity, and wide habitat tolerance of the complex in the vicinity. Following his wintering with the *Vega* expedition at Pitlekaj on the Arctic Ocean coast of eastern Siberia, Kjellman (*4*) reported, of an individual of *Cochlearia,* that it

> . . . commenced blossoming in the summer of 1878 but had not concluded its flowering period when the winter descended and put an end to its development. Consequently the floral system contained flower-buds in various stages of development, newly-opened flowers, faded flowers, and more or less ripe fruits. Of the rosette leaves there could be found only small and withered remains, but the upper cauline leaves were fresh and vital. In this condition the plant was overtaken by winter and exposed to its full rigour. One would assume now that this would have destroyed the plant, and that especially the tender flowering parts just developed would have been destroyed by frost and so rendered incapable of further development. But this was not the case. As the summer of 1879

started, the plant continued its development from the point at which it had been interrupted by the start of winter; the flowering-buds opened, and from the axils of the fresh upper cauline leaves developed new inflorescences. The . . . figure shows this remarkable specimen. [Kjellman also remarked that] There are few parts of the world which show such extreme winter climate as the spot on which the *Vega* expedition overwintered. The cold was very long-lasting and went sometimes below −46° C. The specimen in question grew upon the top of a rather high sand-hillock . . . exposed to the lasting and sharp north and north-east wind.[1]

Kjellman, who was an experienced and usually reliable observer, appears to have been chiefly intrigued with the fact that delicate plant parts could survive in spite of the absence of any superficial protection—e.g., by hairs—and a study of his statement and figure seems to leave little room for doubt that he meant precisely what he implied; namely, that "the young flower parts" survived the winter without injury (so far as he could see), and that "external protection is not necessary for vegetative parts of polar plants either."[1] (See also [*5*].) Kjellman does not actually state that the same flowers which opened in one summer could carry on and produce fruits the next year, although this appears to be implied and has since been assumed; indeed, it seems only fair to give him the benefit of the doubt (he was primarily a phycologist) and think, with Dr. Ehrendorfer, that his mention of "young flower parts" might have had reference to those which passed the winter in the bud. Such a phenomenon is approached, if not matched by the performance of many Amentiferae in cool-temperate regions, where the winter temperatures can fall quite as low as in the Arctic, and where the perennating buds are ready to burst forth at practically the first sign of spring. Numerous arctic instances are mentioned in the two volumes of *Meddelelser om Grønland* already cited (*3*).

Kjellman's observation was commented upon by his countryman Simmons, who remarked (*6*) that, in nearly four consecutive years in the Far North, he had never seen such an instance,

> . . . although I paid special attention to such individuals. I think it must have been a rather isolated case which Kjellman has observed, the more so as I have not found it in any other plant either. Flowers and inflorescences that have been surprised by the frost of the beginning of winter, would soon fade when they thawed, even though they appeared to be quite fresh. In some *Saxifraga* species this was often seen.

The same suggestion concerning *Cochlearia* was also commented upon by Braun (*7*), who "is of the opinion that a misrecollection must have taken place," and by the undersigned (*8*), who remarked that "Like Simmons . . . I have not in the area of the present treatise or any other part of the Arctic seen any evidence that plants that come into flower in the autumn can continue flowering and fruiting the next spring in the manner described by Kjellman. . . ." Sørensen, too (*9*), questions the validity of Kjellman's report, remarking that "According to my observations of the species in Greenland, the flowering main axis itself does not survive the winter, whereas lateral axes springing from its base may flower after wintering." Elsewhere (*9*) Sørensen described *Cochlearia* in northeast Greenland as "Least durable . . . most frequently hapaxanthic, having a lifetime of 3–5 years."

As the problem still remained obscure, during a visit to Point Barrow in mid-September 1948, when many plans for attractive future investigations in a wide range of biological fields of endeavor were discussed at the then newly established Arctic Research Laboratory, the writer suggested that this kind of study be followed as a small but worth-while side line, and even marked some plots and plants that might be suitable for watching if the snow that already covered them should remain until the following summer. But owing, presumably, to changes in personnel, little or nothing further appears to have been done; and concerning this complex, Thomas (*1*) merely notes that "*Cochlearia* is probably a biennial plant. The large number of dead plants among the living ones suggests this. Flowering may be delayed until the second year." Here again is need for clarification, in view especially of the last statement quoted in the preceding paragraph.[2]

In at least one case of another cruciferous plant the overwintering controversy may be considered as settled: In his valuable paper already cited (*9*), Sørensen indicates that *Braya humilis* in northeastern Greenland frequently does precisely what Kjellman is supposed to have claimed for *Cochlearia* at Pitlekaj. Thus Sørensen writes (*9*) that "*Braya humilis* occupies a unique position among all the seminiferous species of the area in that inflorescences or infructescences at any stage of development may survive the

[1] Free translation (kindly checked by F. Ehrendorfer) from the authorized German version *Aus dem Leben der Polarpflanzen* in A. E. Nordenskiöld (Ed.), *Studien und Forschungen, veranlasst durch meine Reisen im hohen Norden.* Leipzig, 458 (1885).

[2] By the time the above notes had been drafted, it had become evident that they were more critical than had been intended. The criticisms seemed constructive, however, and so copies of the typed version, instead of being scrapped, were sent to John H. Thomas and to Ira L. Wiggins, the present scientific director of the Arctic Research Laboratory, Point Barrow. The former explained (*in litt.*) that his available time at Point Barrow had been limited, but generously concluded: "I am certain that the advice you put forth in your paper will be of help to those who have the good fortune to botanize in Arctic Alaska in the near future." Dr. Wiggins wrote: "By all means publish the paper on *Cochlearia!* Such things stimulate other workers to better and greater efforts." Dr. Wiggins in another letter written early this year remarked concerning *Cochlearia* that "Last summer I did watch the plants that grew in this area, and I found no evidence that any . . . that had been flowering in the late summer of 1950 had come through the winter in a flowering condition and continued to flower from buds that were almost ready to open in 1950! I very strongly doubt the accuracy of Kjellman, at least in the light of what I've seen here at Point Barrow in three seasons. Even where the plants have lain in swales or along the margins of ravines and therefore well covered with snow during the winter months, the plants from the previous year look pretty sick when the snow disappears and do not grow nearly as well as those that had barely reached the rosette state the previous year. I'll continue the observations this spring, however, and see if any added information can be obtained on this controversial plant."

winter and continue their development in the succeeding growth season;" and, later on:

Within the families *Saxifragaceae, Caryophyllaceas, Cruciferae,* and *Rosaceae* we find the most pronounced power of resistance in floral organs in a fairly advanced phase of development, associated with different degrees of aperiodicity. In accordanee with this, the flowers of the early spring are essentially constituted by these families. The only species within these families—and within the flora of Northeast Greenland as a whole—in which floral and fructifying organs in any stage of development have been found to be capable of wintering without suffering any damage, and of continuing and completing the development after wintering, is *Braya humilis.* And it is not only capable of doing so, but the phenomenon occurs so frequently that it may be recorded as normal to the species.

Such plants are probably well covered with snow in winter (*10*). Sørensen suggests that *"Braya Thorild-Wulffii* and *Draba crassifolia* evidently possess a power of wintering in highly developed stages similar to that of *Braya humilis,"* but emphasized again in his "Results and Conclusions" that "The only species in which all the floral and fructificative stages have been found with certainty to continue their development entirely uninjured after the wintering is *Braya humilis."* This species is widespread in Alaska, although apparently it is not known from the vicinity of Point Barrow. It would be interesting to determine whether its behavior is similar in the Territory, and whether other species are able to emulate its feat, even if *Cochlearia* cannot.

NICHOLAS POLUNIN
*Gray Herbarium of Harvard University*
*Cambridge, Massachusetts*

**References**

1. THOMAS, J. H. *Rhodora,* **54**, 40, 42 (1952).
2. HULTÉN. *Kgl. Fysiograf. Sällskap. Lund, Förh.,* N. F. Avd. 2, **41**, (1), 815 (1945).
3. WARMING, E., *et al. Medd. Grønland,* **36** (1912); **37** (1921).
4. KJELLMAN. In A. E. Nordenskiöld (Ed.), *Studier och forskningar, föranledda af mina resor i höga Norden.* Stockholm (1883–84).
5. SCHIMPER, A. F. W. *Plant Geography upon a Physiological Basis.* New York: Oxford Univ. Press, 39–41 (1903).
6. SIMMONS. *Report of the Second Norwegian Arctic Expedition in the "Fram" 1899–1902, No. 2.* Oslo: 99 (1906).
7. BRAUN. *Neue Denkschr. Schweiz. Naturforscher Ges.,* 48 (1913).
8. POLUNIN, N. *Natl. Museum Canada Bull. No. 92,* 226 (1940).
9. SØRENSEN, T. *Medd. Grønland,* **125**, (9), 248, 109, 249 (1941).
10. PORSILD, M. P. *Ibid.,* **58**, 84 (1920).

## Northernmost Record of the Whale Shark

*Rhineodon typus,* the greatest of the sharks (av length, 30–40 ft, but reaching to about 60 ft), is a fish native to the three tropical oceans, from which it does not depart except in such outflowing warm currents as the Gulf Stream. In the western Atlantic it is found especially in the Caribbean Sea–West Indies region, in the Gulf of Mexico, among the Florida Keys, in the Straits of Florida, particularly in the region of Havana, and also between Florida and the Bahamas. Until quite recently it had never been noted above the southern tip of Florida, although a dead one came ashore at Ormond, just above Daytona, in 1902. This is the earliest record in Florida waters and, indeed, in the western Atlantic. A specimen was later captured off Miami in 1932, however, and others were noted off the Bahamas some time later (in the Gulf Stream). But, up to 1934, no whale shark had ever been reported from the Atlantic coast of Florida above Miami (25° 46′ N Lat.).

On June 6, 1934, a message was received at the State Museum in Raleigh, N. C., that a whale shark was ashore in Southport Harbor, 4 miles above the mouth of the Cape Fear River, 320 miles farther north than Ormond.[1] H. H. Brimley, of the North Carolina State Museum, set out at once for Southport to obtain the skin if possible, but he reached there only to find that the 50-ft specimen had unfortunately been almost dismembered, so that the skin could not be preserved. This specimen is the first to be put on record on the western Atlantic coast of the U. S. north of southern Florida. The latitude of the locality is about 33° 55′ N. Mr. Brimley put this specimen on record in the *Journal of the Elisha Mitchell Scientific Society* (Aug. 1935). But this record was not due to stand long.

On August 9, 1935, a 31.5-ft Rhineodon blundered into a pound net off Fire Island at Lat. 40° 35′ N and was captured—a second capture north of Florida and 460 miles north of the Cape Fear River occurrence. The full story of this capture and all the records thereof may be found in an article entitled "Rhineodon at New York's Front Door" (Gudger, *Natural History Mag.* [Feb. 1936]).

It was brought into Islip on the southern shore of Long Island, and there I saw it on the floor of a fish-house. It was 31.5 ft long, 4 in. less than 4 ft across the inside of the mouth from angle to angle of jaws, and the spread of the lunate tail was 9 ft. It was truly colossal, the most gigantic thing I had ever seen come out of the sea.

Carried to Fire Island by the Gulf Stream to a parallel of latitude almost touching the southwest corner of New England, it would surely be Rhineodon's "Farthest North" in the western Atlantic. But again this record has been broken.

In the New York *Times* of June 6, 1951, there is a four-paragraph note entitled "Liner *Veendam* Attacked by Whale Shark at Sea"—345 miles off Nantucket Light. But the title is erroneous. The *Veendam,* steaming into a small school of whale sharks, collided with a Rhineodon lumbering across the track of the incoming steamer and broke its back. This great shark was rammed by the steamer in about Lat. 42° 02′ N, Long. 62° 50′ W. This is about the latitude of Cape Cod, Mass., and 380 miles due east thereof, and is 1284 miles (18° 35′ of Lat.) north of the Tropic of Cancer and of the waters between Florida and Cuba. This occurrence is the whale shark's northernmost ob-

[1] Distances are given in statute miles.