

REPRINTS OF RARE PAPERS ON MOLLUSCA

THE GRADUAL DISPERSION OF CERTAIN MOLLUSKS
IN NEW ENGLAND.

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The rapid dispersion of Mollusks as observed in certain species, is of great interest in connection with the general distribution of species from certain centres.

The rapid invasion of large areas, by species not known to have occurred there before, may account for the wide distribution of species through certain geological horizons where their progenitors in earlier deposits are not known. The sudden appearance of species throughout large geological areas has always been held as a strong point by those who argue against the doctrine of derivation.

In a long study of the Mollusca of New England for the past twenty-four years I have observed many changes going on in the distribution of certain species which indicates a much more rapid invasion of areas than had before been supposed. Not only do we see this rapid introduction of forms from other centres, but some species of mollusks vary greatly in their relative scarcity and abundance, when observed over considerable lapses of time.

In my little work entitled 'Observations on the Terrestrial Pulmonifera of Maine,' forming the first part of the Journal of the Portland Society of Natural History, published in 1864, I commented on this change in the relative scarcity and abundance of certain species as compared with the observations made by Dr. J. W.

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Mighels, a careful and enthusiastic worker in the same field. His paper was published in the Proceedings of the Boston Society of Natu-

ral History in 1843, and was entitled 'Catalogue of the Marine Fluviatile and Terrestrial Shells of the State of Maine' (Bost. Jour. Nat. Hist. Vol. IV. p. 308). The following is a brief extract from my paper above mentioned. The lines in quotations being taken from Dr. Mighel's paper, while the contrasts as observed by me are printed in italics.

Mesodon albolabris. 'Solitary.' *Great abundance.*

Anguispira alternata. 'Abundant.' *Not abundant, except on islands.*

Hyalina indentata. 'Appears to be rare.' *Not rare.*

Hyalina electrina. 'Rare.' *Quite common.*

Conulus chersina is more abundant than his words would seem to indicate.

Strobila labyrinthica. 'Found sparingly.' *Common all over the State.*

Pupillas and *Isthmias.* Were noted as found sparingly by Dr. Mighels. Most of the species are quite common.

Zoogenetes harpa. Is now abundant in several parts of the state, and particularly about Portland. Mighels did not find it at the time of the publication of his catalogue.

Succinea avara. Mighels mentions only one locality. It is now common all over the state.

Helisoma bicarinata. 'Not aware that it is abundant anywhere.' *Exceedingly abundant.*

Ancylus rivularis. 'Found in plenty.' *One of our scarcest shells.*

Radix ampla. This species was found in great abundance when first discovered in Eagle Lake in the northern part of the state, in company with *Physa ancillaria.*

In company with Mr. John M. Gould I visited this lake in 1859 and a most careful search revealed only a few dead specimens of *R. ampla*, and not a vestige of *Physa ancillaria.* Mr. Fuller has since discovered the shell on the shores of Lake Sebago.

Dr. C. B. Adams first described a species of land snail known as *Pupilla badia*, as occurring in Vermont. The shell differed very slightly from a European species, *P.*

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muscorum, and as such Adams' species is now recognized, though I have already pointed out some slight differences in the two shells. Since Adams' discovery of the species, in this country, it has been found on certain islands in the Gulf of St. Lawrence, as well as in New York State. In the year 1862, Mr. Charles B. Fuller found it in Maine, near Portland. In some localities near that city, known to have been examined by early collectors without meeting with it, it has been collected by thousands. At Oak Island, Chelsea, a famous collecting ground of Dr. Gould, Dr. Binney and others, no evidence of the existence of this species there is recorded. In the year 1860, Prof. W. C. Cleveland found it in the greatest abundance. In this case it can be positively asserted that the species has been introduced within twenty years. The collectors of Salem and Lynn had failed to observe its occurrence in Essex County. Last summer I discovered the species in great abundance on Lowell island in Salem harbor. From these evidences it is quite certain that this minute land shell is being distributed with considerable rapidity.

It will be found that, as in the case of plants, the land species of mollusks are being widely distributed through railway traffic. I have often found, at Portland, minute land shells clinging to firewood that had been brought from the interior of the state.

The remarkable rapidity in the diffusion of *Littorina litorea* is of special interest in this connection. This well-known European species was first observed on this continent by Mr. Willis, of Halifax, N. S., many years ago. Since that time, it has been rapidly and widely diffused along the coast of New England.

In 1870, Mr. Fuller found a few specimens in Portland harbor, and about the same time at Kennebunk in Maine.

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It is now found in great abundance along the coast of Maine.

Before the year 1872, it had never been observed in Salem harbor. On the shore of South Salem, a place where I had repeatedly collected, only a single specimen was found in the spring of 1872. It is now one of the most common shells in the harbor of Salem, and actually swarms in countless numbers in all the inlets in the vicinity of Salem.

Professor Verrill, in a note to Silliman's Journal, for September, 1880, records his observations in regard to its diffusion, from which we quote the following:

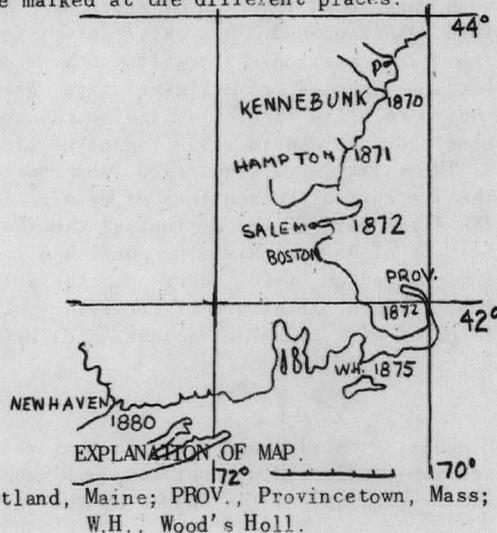
'In 1873, it was collected in abundance at Saco, Me., by the U.S. Fish Commission, and was found sparingly at Peake's island Casco Bay. In 1872, it was very rare at Provincetown, Mass., but in 1878, it was common there. In 1875, it was collected by the writer at Barnstable, Mass., on the shores of Cape Cod Bay, in large quantities. In 1879, it had become exceedingly abundant at Provincetown. In 1875, our parties found two specimens only on the southern shores of Cape Cod at Wood's Holl, but in 1876, it was found to be common there, and is now very abundant. The first specimen, found so far westward as New Haven, was obtained here by Mr. E. A. Andrews and by J. H. Emerton. It is at present exceedingly abundant at Newport, R. I.'

In 'Science News' for April 15, 1879, Mr. Arthur F. Gray comments on the occurrence of this species on the New England coast and gives a large number of places where it has been collected.

He first found it in Massachusetts, at Danvers, in the spring of 1872. He also mentions that Prof. J. W.

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Chickering, jr., found it at Hampton beach, N. H., in 1871. The following rude map illustrates the gradual dispersion of this species from Maine southward, with the year of its occurrence marked at the different places.



In 1872, it was observed simultaneously at Salem, Mass., and Provincetown on the end of Cape Cod. This Cape seemed to form a barrier for some time to its passage south, and after rounding the Cape, its progress was much slower. Its occurrence at Wood's Holl being observed in 1875, and only the past year had it got as far as New Haven.

A study of the ocean currents north of Cape Cod, which have a southerly course, will account for the rapid dispersal of this mollusk from Maine to Provincetown, Mass.; while the currents which set easterly south of

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Cape Cod will account for its slower dispersion along the Connecticut shores.

It seems somewhat remarkable that this mollusk, for so many years an inhabitant of Nova Scotia and the Bay of Chaleur, should have been so long finding its way to the State of Maine. As far back as 1855, I received specimens of this species from Bathurst in the Bay of Chaleur.

The conditions are evidently very favorable for its existence along our shores, for it has increased in countless numbers, and the species seems to be fully as robust, and oftentimes exceeding in size its relatives in Europe.

Mr. Gray calls attention to the fact that this species, known under the common name of

'periwinkle,' forms an abundant supply of food to the poorer classes in Great Britain and Ireland, and there is no reason why the poorer classes here should not avail themselves of a mollusk so easily obtained.

Believing that, in past times as at present, the dispersion of forms took place in similar ways, it is interesting to look ahead to a time when the present mud and sand of the shores shall have been converted and consolidated into stratified rocks with the species entombed in a fossil condition. We may imagine a future Barrande finding material for an onslaught on the derivative theory by pointing to the abundant occurrence of this species in a narrow bed of rock of the same horizon and occurring over hundreds of miles of territory, when the beds just below reveal no vestige of this large and vigorous species.

(FIGURE)

Littorina litorea, Linn.

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