

mediate. If hand charts are desirable it is expedient to reserve one chart for each of the great divisions of physics, dynamics, molecular physics, acoustics, heat, light and electricity. I attach such a chart of names bearing on the history of dynamics, in which the main coordinates only have been indicated, as the smaller divisions should be in a subordinate color. It shows, for instance, the dearth of interest in such subjects in the middle of the sixteenth century and toward the beginning of the seventeenth century, except on the part of a few men of irrepressible genius, as well as the terrific general onslaught which occurred with the beginning of the nineteenth century.

To make the chart more useful the chief date in each life should be indicated by a crossline (not shown), as for instance in case of Newton, the date of publication of the "Principia," of the "Optiks," etc.

I am writing this note with the hope that somebody will undertake the work seriously and with some degree of completeness. It seems to me clear that available wall diagrams of this kind would not only enliven the work of the teacher of a forbiddingly difficult subject, but would suggest the vast array of profound investigation to which the physics of the present day owes its assurance and trenchancy.

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SPECIAL ARTICLES

ON THE OCCURRENCE OF THE LITTORAL BARNACLE *CHTHAMALUS STELLATUS* (POLI) AT WOODS HOLE, MASS.

To one acquainted with the world-wide distribution of this barnacle, it would seem rather superfluous to call attention to its presence in any specific locality. It is a rather curious fact, however, that this abundant and almost cosmopolitan species seems to have hitherto escaped the notice of those who have listed the New England fauna. Neither Gould ("Invertebrate Animals of Massachusetts," 1840), nor Verrill ("Invertebrate Animals of Vineyard Sound," 1873), nor Miss Rathbun ("Fauna of New England: List of the

Crustacea," 1905) have included this barnacle among the New England species, though certain far less common forms are listed by each of these writers; and the only reference of which I am aware to its occurrence on the Atlantic coast of North America is contained in Darwin's "Monograph of the Cirripedia," in which he refers to "some specimens attached to oysters sent to me by Professor Agassiz, from Charlestown" (p. 457). It would seem more than possible that *Charleston* is here intended, for on a previous page (456), Darwin includes "Southern United States (Charlestown)" among the localities from which *Chthamalus stellatus* is recorded. I am informed by Miss Rathbun that no specimens of this barnacle from New England are known to be contained in the U. S. National Museum collections. Through the kindness of the curator, Mr. C. W. Johnson, I have examined specimens of this species (varieties *communis* and *fragilis*), contained in the collections of the Boston Society of Natural History. The locality has not been recorded, however, and there is nothing to indicate whether or not the specimens came from New England waters.

The author was first led to look for this species at Woods Hole during the present summer, when he found it to occur in considerable numbers on Penzance Point, along the shore of Woods Hole passage. Further search has revealed its presence on the piles of piers at Woods Hole, New Bedford and Vineyard Haven, and on rocks at Nobska Point, Nonamesset Island, and the shore of Buzzards Bay near Woods Hole. It is probable, indeed, that its local distribution is very general. At the last named point this species seems to be particularly abundant. It extends considerably higher up on the boulders than does *Balanus balanoides*, with which, however, it is associated at a lower level. It thus occurs at points which must be uncovered by the tide for the greater part of the time. In local waters, so far as I have seen, *Chthamalus* never grows in such dense clusters as does *Balanus balanoides*, and indeed it appears unable to compete very successfully with the latter in its proper zone.

Like its associate, it is a strictly littoral form and probably does not extend below tidal limits.

Chthamalus stellatus was first described by Poli in 1795 from specimens taken on the coast of Sicily. It is so abundant on some parts of the French coast that Pruvot¹ recognizes a "Chthamalus zone" as one subdivision of the littoral zone. The same species is common upon the southern coast of England, being "in parts, even more numerous than the *Balanus balanoides*," according to Darwin. The other localities listed by Darwin include points as remote from one another as Ireland, China, Oregon, the Red Sea and the Rio Plata. Gruvel² likewise includes Iceland and Patagonia, so that the species may truly be regarded as cosmopolitan.

It is surely difficult to explain how this barnacle has been so long overlooked upon our own Atlantic shores. It is hard to believe that the present species has been habitually confused with *Balanus balanoides* by the long succession of field naturalists and systematic zoologists who have exploited the shores of New England for over a century. These men erred rather in the direction of discovering too many new species than in ignoring well-established ones. An alternative explanation is that *Chthamalus* has only recently invaded New England waters, just as we know that various other species have done within recent years. The mollusk *Litorina litorea* and the actinian *Sagartia luciae* are doubtless the most striking local examples of this phenomenon, though we have strong evidence for a few other cases. From the comparatively small size of the local examples, and their unworn appearance, as compared with the older specimens of *Balanus balanoides*, the writer was at first tempted to think that the immigration had only reached local waters during the present season. He has, however, found a few specimens on stones which had been collected three years ago.

The local examples, in large part at least, seem to belong to the variety "*fragilis*" of

Darwin, as did the specimens received by the latter author from "Charlestown" (=Charleston?). A characteristic of this variety is the smooth, delicate appearance of the valves, referred to above as distinguishing local specimens. At Woods Hole, I have found few having the rugosity, the weathered aspect, or even the whiteness of *Balanus balanoides*. Our local representatives of the species are so much darker in color and so much smoother in appearance than the associated *Balanus* as to be plainly distinguishable from the latter, even at considerable distance. Thus the confusion of the two, said to have been commonly made by English collectors, seems incredible here.³ The largest specimens which I have seen have not exceeded 10 mm. in diameter at the base.

Not being a specialist in the difficult group of Cirripedia, I grant freely the possibility that I have made an error in my *specific* determination. The species in question is, however, a *Chthamalus* in any case, and *C. stellatus* is the only one hitherto listed from the North Atlantic. The interest of its discovery in local waters would not be lessened, but rather increased, if it were shown that we had to do with another member of the genus.

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THE SEVENTH INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY

THE Seventh International Congress of Applied Chemistry convened in the Great Albert Hall, London, on May 27 last under the patronage of the King of England.

The vice-patron, the Prince of Wales, accompanied by the Princess, presided. In opening the congress he spoke of the pleasure experienced by His Royal Highness, King Edward VII., in having the congress meet in London and his own appreciation of the significance of the passing of the "rule-of-thumb" period in modern civilization, the close relationship between science and commerce and the important bearing such conferences had in promoting the peace of the world. His remarks were greeted with cheers from the diplo-

¹ *Archiv de Zoologie Experimentale et Générale*, Tome V., 1897.

² "Monographie des Cirrhipèdes," p. 201.

³ Of course the two genera are distinguished by much more fundamental characters than mere appearance.