

Report of Dublin Dredging Committee, appointed 1857-58.

By Professor J. R. KINAHAN, M.D., M.R.I.A.

DURING the past year, the following districts, all in the immediate vicinity of Dublin, have been examined:—Killiney Bay, Bray Head, Kish Bank, South Strand, Dalkey Sound, Howth, Malahide, Lough Shinny, Bettystown, and considerable advance made towards the completion of the Report. The following numbers of species have been catalogued:—

Fishes, 60; Mollusca, including Polyzoa, 262; Crustacea, 105; Arachnida, 5; Echinodermata, 29; Hydrozoa, 60; Actinozoa, 17; Sponges, 10; and many Annelides not yet identified. Various untoward events prevented the Committee from carrying out fully the dredging arrangements which they had made at the commencement of the year. For the better perfecting of the Report, they have determined to allocate to the several Members of the Committee certain classes of animals as the special object of study, and have divided these as follows:—Professor Kinahan, M.D., Articulata and Sponges; Dr. Carte, Vertebrata; Dr. Wright, Mollusca; and Professor J. R. Greene, Echinodermata, Cœlenterata, &c. They propose also to include in their final report, as complete a list of the fishes of Dublin Bay as practicable, for which, as well as the further prosecution of their dredging researches, they would ask for a grant not exceeding £15 for the year 1858-59, the Committee consisting, as last year, of Professor Kinahan, Dr. Carte, Dr. Wright, and Professor Greene.

Report on Crustacea of Dublin District. By JOHN ROBERT KINAHAN, M.D., M.R.I.A., Professor of Zoology in the Department of Science and Art.—Part I. Decapoda Podophthalmata.

THE marine districts comprised in this Report consist of a series of open bays, into most of which a river-mouth enters; and of one or two extensive sand-banks which lie off the east coast of Ireland.

The chief stations are—Dublin Bay and the estuaries of the rivers Dodder, Anna Liffey, and Tolka; a long lighthouse pier separates this into sub-districts—the North and South Bulls. The South Bull is almost exclusively fine sand, containing great numbers of broken shells, being made up from the washings of a cliff of marine drift; an extensive strand, left dry here at low water, is dotted over with sand-pools, in which *Carcinus Mænas*, *Mysis vulgaris*, *Mysis Chamæleon*, *Palæmon squilla*, *P. varians*, *Crangon vulgaris*, *Gammarus locusta*, *Gammarus palmatus* and other species are found. A tidal stream called the Cockle lake, divides the bed of drift already spoken of from the strand proper; this at high tides is in many places from 2 to 3 fathoms deep, but is singularly destitute of crustacea; the bottom is a quick-sand.

Passing along from this station towards Kingstown Harbour, we meet several patches of *Zostera*, in which *Port. holsatus* is found in some numbers; having passed Kingstown, the bay becomes rocky, one or two *zostera*-clad banks, here called Mullet Grass, being interspersed among the rocks; one of these, near Sandycove, furnished me at low water with the followingspecies:—*Hippolyte varians*, *H. Cranchii*, *Pandalus leptorhynchus* (new species), *Mysis vulgaris* and *chamæleon*, *Crangon vulgaris*, *Crangon fasciatus*, *Apseudes talpa*, *Atelecyclus heterodon*.

Dalkey Sound, a narrow channel, separating Dalkey Island from the main land and from 3 to 10 fathoms deep, bounds the Dublin station. In the Sound, the following species occur:—*Portunus depurator*, *puber*, *holsatus* and *pusillus*, *Inachus Dorynchus* and *Dorsettensis*, *Hyas coarctatus*, *Eurynome aspera*, *Pirimela denticulata*, *Pinnotheres pisum*, *Ebalia Pennantii* and *Cranchii*, *Bernhardus Streblonyx*, *Thompsonii*, *Cuanensis*, *Ulidianus* and *Hyndmanni*, *Galathea Andrewsii*, *strigosa* and *squamifera*, *Palinurus vulgaris*, *Hippolyte varians*, *Thompsonii* and *pusiola*, *Pandalus annulicornis*, and many of the commoner species.

Killiney Bay, which succeeds this, and is bounded by Bray, is partly sand and part shingle and rocks; it calls for no detailed description. At Bray the Bray river enters and forms a mud bank in about 10 fathoms to the south of Bray Head; here, in the lobster pots, *Palæmon serratus* has been said to have been taken. Distant about 7 miles from Bray Head is a bed called the Scallop bed, part of the Kish bank, the water varying from 6 to over 25 fathoms. Here many rare and one previously undescribed species has occurred, such as *Crangon sculptus*, *Crangon Allmanni*, *Galathea Andrewsii*, all the *Bernhardi*, except *Prideauxii*, the two *Ebalias* already mentioned, *Acanthonotus testudo*, *Ampelisca typicus*, *Nephrops Norvegicus*.

The North Bull, owing to the influx of the three rivers already named, is chiefly mud passing into rock at Howth: this district has never been carefully explored, but the following species are often thrown upon the white sand, a bank similar to that already noted as the South Bull: *Corystes Cassivelaunus*, *Portumnus variegatus*, *Pilumnus hirtellus*.

Balscaddan Bay, Howth, is rocky; here *Amphitoe littorina* is common, *Hippolyte varians*, *Hippolyte Cranchii*, *Mysis vulgaris* and *chamæleon*, *Porcellana platycheles*.

Portmarnock Bay, which next succeeds, is chiefly sandy, slob banks occurring in parts. At Malahide a great muddy estuary, due to the influx of the Swords river, is found. This mud slob is separated from that at Rush and Lusk by the Burrow of Portrane, which is sandy like the two Bulls; to the north of this the coast becomes rocky till we get to Skerries, where three islands cause the formation of a bank, from which in 10 fathoms the late Robert Ball, LL.D., procured *Crangon trispinosus*, and *Diastylis Rathkii*.

From Skerries to the mouth of the Boyne the beaches are all sandy, and call for no special remark.

Two outlying stations, viz. Ireland's Isle, or Eye, near Howth and Lambay, which lie abreast of Portrane, have afforded many rarities; but never having personally examined them, I must defer particular notice of them till some future period.

The fluviatile districts afford us *Astacus fluviatilis*, *Gammarus fluviatilis*, besides Entomostraca in abundance. At the mouths of rivers many of the marine species ascend even into the fresh water; these are marked in the accompanying Tables as subfluviatile; they are *Crangon vulgaris*, *Mysis chamæleon?* and *vulgaris*, *Gammarus fluviatilis*, *Spheroma serratum*, *Orchestia lævis*, *Orchestia littorea*, *Corophium longicorne*, *Carcinus Mænas*.

The terrestrial species are at present recorded in greater numbers than in any other district, probably having been more sought after, all the genera, save *Platyarthus*, being represented here. The chief species wanting in the Dublin lists are those which frequent deep water, and which will probably be yet found when the deeper parts of the Bay are better searched. Mud burrowers are also absent, which will most certainly yet be found. It is intended to embody all remarks bearing on the peculiarities of the distribution of species in the last part of this report; at present I shall content myself

with a summary of the species belonging to the Decapoda found here, contrasting this with the numbers found in Great Britain generally, and also with those found in Ireland.

The exact habitat of several species recorded here is as yet a desideratum, although some of these are by no means rare as drift species; these are *Portumnus variegatus*, *Corystes Cassivelaunus*, extremely common; *Gonoplax angulatus*, drifted in at Portmarnock (supposed to inhabit mud banks near Knocknagin; for this note I am indebted to Charles Farran, M.D.); *Atelecyclus heterodon* (full-grown specimens), *Portunus arcuatus*, *Portunus corrugatus*, *Galathea nexa*, *Bernhardus Prideauxii*, *Palæmon serratus*, *Palinurus vulgaris*.

The following species have as yet been noted only on the Dublin coast:—*Crangon Allmanni* (also Belfast, August 1858), *Pandalus leptorhynchus*, *Iphimedia Eblanæ*.

The following has not occurred elsewhere in Ireland:—*Crangon trispinosus*; and many species, as *Crangon sculptus*, *C. fasciatus*, *Pirimela denticulata*, are of extreme rarity elsewhere.

In Dublin Bay, as will be seen by reference to Table B, Appendix, have been recorded fifty-nine species of Decapoda out of the ninety-one positively recorded in Ireland. These represent thirty genera,—the genera wanting here being *Maia*, *Pisa*, *Achæus* (?), *Polybius*, *Thia*, *Nika* (?), *Alpheus*, *Athanas*—all genera of the south and west; *Munida*, *Gebia*, *Calocaris*, *Callianassa*, genera of deep sea or mud-burrowers, and *Cynthilia*, *Macromysis*, *Vaunthompsonia*, *Iphinoe*, and *Cyrianassa*, genera as yet but little understood and easily overlooked. *Pasiphaë* is the only genus which has not been met elsewhere in Ireland; its occurrence in Dublin is doubtful (vide Appendix, Table A).

Of the thirty-two Irish species not recorded in Dublin and not belonging to the genera here noticed, *Xantho rivulosa* and *tuberculata*, *Portunus carcinoides* and *marmoreus*, *Pinnotheres veterum*, *Hippolyte Mitchelli*, *Palæmon Leachii*, *Mysis Griffithsii* (?), are probably western and southern. *Inachus leptochirus*, *Crangon bispinosus*, *Bernhardus Forbesii*, inhabitants of deep water, and *Crangon spinosus*, a northern species; *Bernhardus lævis* and *Achæus Cranchii* have been reported to me, but I hesitate to insert them at present.

As compared with the numbers given as British, it must be borne in mind that among the latter are included many whose specific value is doubtful; at the same time we could scarcely expect that all the northern or southern species which occur around the coast of Great Britain, should ever be found here. Of most of the species recorded here, I have procured specimens in ova, from many of which I have succeeded in hatching the zoes; these, should time permit, I would propose to notice in the concluding portion of my report, when I come to speak of the development of the group generally.

Lists of the genera, families, and species are appended.

APPENDIX.

TABLE A.—Tabular view of Genera of British Crustacea Podophthalmia, showing distribution of genera in Dublin as contrasted with the whole of Ireland and with Great Britain and the Sarnian provinces.

Families and Genera.	Dublin.	Irish.	Not found in Great Britain.	British and Sarnian.	
EUBRANCHIATA.					
Brachyura.					
Maiadæ.					
Inachus	2	3	.....	3	
Maia .....	.....	1	.....	1	
Pisa .....	.....	1	.....	2	
Hyas	2	2	.....	2	
Leptopodidæ.					
Achæus .....	.....	1	.....	1	
Stenorhynchus ...	1	1	.....	2	
Lambridæ.					
Eurynome	1	1	.....	1	
Cancridæ.					
Pirimela	1	1	.....	1	
Cancer	1	1	.....	1	
Xantho	*(1)	3	.....	3	*Very doubtful, <i>X. florida</i> .
Eriphidæ.					
Pilumnus	1	1	.....	1	
Portunidæ.					
Portunus	6	8	1*	9	* <i>Portunus carcinoides</i> .
Platyonychidæ.					
Carcinus.....	1	1	.....	1	
Portumnus.....	1	1	.....	1	
Polybius.....	.....	1	.....	1	
Thiidæ.					
Thia .....	.....	1	1	1*	Channel Islands.
Corystidæ.					
Atelecyclus.....	1	1	.....	1	
Corystes	1	1	.....	1	
Gonoplacidæ.					
Gonoplax	1	1	.....	1	
Pinnotheridæ.					
Pinnotheres	1	2	.....	2	
Grapsidæ.					
Planes .....	.....	.....	.....	1	Not Irish.
Leucosiadæ.					
Ebalia	2	3	.....	3	
Anomoura.					
Dromidæ.					
Dromia .....	.....	.....	.....	1	} Not Irish.
Lithodidæ.					
Lithodes.....	.....	.....	.....	1	
Paguridæ.					
Bernhardus	6 (1*?)	8	.....	9	* <i>B. Prideauxii</i> very doubtful.
Paguristes .....	.....	.....	.....	1*	* <i>Pag. Dilwynnii</i> not Irish.
Porcellanidæ.					
Porcellana	2	2	.....	2	
Galatheidæ.					
Galathea	3	8	.....	9	
Munida .....	.....	1	.....	1	

Table A (continued).

Families and Genera.	Dublin.	Irish.	Not found in Great Britain.	British and Sarnian.	
Macrourea.					
Gebidæ.					
Gebia		1	.....	2	
<i>Axius</i> .....		.....	.....	1	Not Irish.
Calocaris		1	.....	1	
Callianassidæ.					
Callianassa.		1	.....	1	
Scyllaridæ.					
<i>Arctus</i> .....		.....	.....	1	Not Irish.
Palinuridæ.					
Palinurus	1	1	.....	1	
Astacidæ.					
Homarus	1	1	.....	1	
Astacus	1	1	.....	1	
Nephrops	1	1	.....	1	
Crangonidæ.					
Crangon	5	8	2*	8	* <i>C. Allmanni</i> , <i>C. Pattersonii</i> .
Nika		2	.....	1	
Palæmonidæ.					
Alpheus		1	1*	2	* <i>A. affinis</i> . Guernsey.
<i>Autonomea</i> .....		.....	.....	1	Not Irish.
Athanas		1	.....	1	
Hippolyte	4	5	.....	15*	*All the doubtful species are included.
Pandalus	2	2	1*	3	* <i>P. leptorhynchus</i> .
Palæmon	3	4	.....	4	
Pasiphæidæ.					
Pasiphaë	1	1	.....	1	
Panæidæ.					
<i>Penæus</i> .....		.....	.....	1	Not Irish.
ANOMOBRANCHIATA.					
<i>Stomapoda</i> .					} Not found in Ireland.
<i>Squillida</i> .					
<i>Squilla</i> .....		.....	.....	2	
Schizopoda.					
<i>Euphausidæ</i> .					
<i>Thysanopoda</i> .....		.....	.....	1	Not Irish.
Mysidæ.					
Cynthilia		1	.....	1	
Mysis	3 (1?)	4	.....	7	
Macromysis		1	.....	2	
Diastylidæ.					
Diastylis	1	1	.....	1	
<i>Cuma</i> .....		.....	.....	2	Not Irish.
Vaunthompsonia		1	1*	2	* <i>V. cristata</i> .
<i>Eudora</i> .....		.....	.....	1	Not Irish.
Iphinoë		1	.....	1	
<i>Bodotria</i> .....		.....	.....	1	Not Irish.
Cyrianassa		1	1*	2	* <i>C. longicornis</i> .

The first column gives the number of species found in Dublin; the second the number certainly known as Irish; the third contains those which, while found either in Ireland or the Channel Islands or both, are as yet unknown in Great Britain; whilst the column marked British is intended to show the

number of species found on the shores, &c. of Great Britain, Ireland, and the Channel Islands. The families and genera not yet proved to be represented in Ireland are *italicized*. The following summary shows the contrast between these several districts as regards the number of species and genera.

TABLE B.—Summary of number of species and genera.

Districts.	Eubranchiata.			Anomobranchiata.		
	Macroura.	Anomoura.	Brachyura.	Stomapoda.	Schizopoda.	Aploopoda.
Dublin	19	11 (1?)	25 (1?)	.....	3 (1?)	1
Ireland	30	15	36	.....	6	4
Not found in Great Britain	} 4	.....	2	.....	.....	2
British		47	20	40	2	11	9
Totals :—						
Species, Irish	91.	Dublin	59.	British	129.	
Genera, Irish	47.	Dublin	30.	British	58.	

The following is a detailed list of the species found hitherto in Dublin:—

TABLE C.—Species of Crustacea Podophthalmia inhabiting Dublin Districts.

* Common. ** Very common. † Rare. ‡ Very rare. L. local.

Name of Species.	Ratio of occurrence.	Zone of distribution.	Remarks.
<i>Inachus Dorynchus</i>	*	Coralline.	
— <i>Dorsettensis</i>	†	Coralline.	
<i>Hyas araneus</i>	**	Littoral—Laminarian.	
— <i>coarctatus</i>	**	Laminarian—Coralline.	
<i>Stenorhynchus phalangium</i>	**	Littoral—Coralline.	
<i>Eurynome aspera</i>	*	Coralline.	
<i>Pirimela denticulata</i>	‡	Do.	One specimen only.
<i>Cancer pagurus</i>	**	Littoral—Laminarian.	
<i>Pilumnus hirtellus</i>	†	Laminarian—? littoral.	
<i>Portunus puber</i>	**	Littoral—Laminarian.	
— <i>corrugatus</i>	‡	Littoral ?	One young specimen.
— <i>arcuatus</i>	‡	Do. ?	Do.
— <i>depurator</i>	*	Laminarian—Coralline.	
— <i>pusillus</i>	**	Laminarian—Coralline.	
— <i>holsatus</i>	*	Do. Do.	Rather local.
<i>Carcinus mænas</i>	**	Littoral—Laminarian.	
<i>Portumnus variegatus</i> .....	*	.....	Never dredged.
<i>Atelecyclus heterodon</i>	†	Littoral	Only young met.
<i>Corystes Cassivelaunus</i>	*	Littoral	Never dredged.
<i>Gonoplax angulatus</i>	†L.	Littoral	Never dredged.
<i>Pinnotheres pisum</i>	**	‡Laminarian—Coralline.	
<i>Ebalia Pennantii</i>	†	Coralline.	
— <i>Cranchii</i>	‡	Do.	Obtained by R. Ball, LL.D.
<i>Bernhardus Streblonyx</i> ...	**	Littoral—Coralline.	
— <i>Prideauxii</i>.....	‡	.....	A single dead specimen.
— <i>Thompsonii</i>	*	Coralline.	
— <i>Cuanensis</i>	**	†Laminarian—Coralline.	

Table C (continued).

Name of Species.	Ratio of occurrence.	Zone of distribution.	Remarks.
Bernhardus Ulidianus	**	†Laminarian—Coralline.	
— Hyndmanni	**	Do. Do.	
Porcellana platycheles	*L.	Littoral—Laminarian ...	Extremely local.
— longicornis	**	Littoral—Coralline.	
Galathea squamifera	†	Laminarian	Never dredged.
— Andrewsii	**	Coralline, &c.	
— strigosa	†	Laminarian	Never dredged.
Palinurus vulgaris	‡	Laminarian and Coralline.	
Astacus fluviatilis	*	Fluviatile.	
Homarus vulgaris	**	Laminarian	Never dredged.
Nephrops Norvegicus	**	Coralline, &c.	
Crangon vulgaris	**	Littoral—Laminarian	Also subfluviatile.
— Allmanni	*	Coralline.	
— sculptus	*	Do.	
— fasciatus	†	Laminarian.	
— trispinosus	†	Coralline	Robert Ball, LL.D.
Hippolyte varians	**	†Littoral—Laminarian — ‡Coralline.	
— Thompsoni	*	Laminarian—Coralline.	
— Cranchii	*	Littoral—Laminarian.	
— pusiola	**	Laminarian—Coralline.	
Pandulus annulicornis	**	†Laminarian—Coralline.	
— leptorhynchus	‡	Laminarian	One specimen.
Palæmon squilla	**	Littoral—Laminarian ...	Never dredged.
— serratus	‡	Coralline	Do. do.
— varians	*	Littoral—Laminarian.....	Do. do.
Mysis Chamæleon	**	Littoral—Laminarian.....	Also subfluviatile.
— vulgaris	**	Do. Do.	Do. do.
— ? .....	...	Laminarian	Sandy cove.
Diastylis Rathkii	†	Coralline	Robert Ball, LL.D.

Xantho florida is stated also to have occurred, but needs confirmation; it may possibly occur in Lambay Island.

On River Steamers, their Form, Construction, and Fittings, with reference to the necessity for improving the present means of Shallow Water Navigation on the Rivers of British India. By ANDREW HENDERSON, A.I.C.E., M.S.A., F.R.G.S.

[A Communication ordered to be printed entire among the Reports.]

1. *Comprehensive Objects aimed at.*—The object of this paper is to offer some suggestions for the improvement and extension of steam navigation on the Ganges, Burhampootra, and Irrawaddy, in the east, and on the Indus and the Punjab rivers on the west, now forming the river boundaries of England's empire in India; the coasts and harbours affording a desirable field for maritime enterprise, and the employment of British shipping. The valleys, deltas, and upper affluents of those rivers extend many thousand miles through some of the most populous and fertile regions in the world, the whole route from east to west traversing the most ancient sites of civilization and channels of trade, there being a probability that the navigation of the Indus