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THE
FISHERIES OF THE ADRIATIC,
AND
THE FISH. THEREOF.

Third Fisherman.—Master, I marvel how the fishes live in the sea.

First Fisherman.—Why as men do a-land ; the great ones eat up the little ones.

I can compare our rich misers to nothing so fitly as to a whale ; 'a plays and tumbles, driving the poor fry before him, and at last devours all at a mouthful. Such whales have I heard on o' the land, who never leave gaping, till they've swallowed the whole parish, church, steeple, bells and all.

SHAKESPEARE, *Pericles*.

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FIUME FROM THE WEST.

THE
FISHERIES OF THE ADRIATIC
AND
THE FISH THEREOF.

A Report of
THE AUSTRO-HUNGARIAN SEA-FISHERIES,
With a detailed description of the Marine Fauna of the Adriatic Gulf.

By G. L. FABER,

HER MAJESTY'S CONSUL, FIUME.

WITH EIGHTEEN WOODCUT ILLUSTRATIONS AFTER DRAWINGS BY LEO LITTROW,
AND NUMEROUS ENGRAVINGS ON STONE.

LONDON:
BERNARD QUARITCH, 15 PICCADILLY.

1883.

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. . . . Away then, away,
We lose sport by delay,
But first leave our sorrows behind us ;
If Miss Fortune should come,
We are all gone from home,
And a-fishing she never can find us.

COTTON.

To CAPTAIN RICHARD F. BURTON,

Her Majesty's Consul for Trieste,

&c. &c. &c

MY DEAR COLLEAGUE,

As the execution of this work—or Report, as I shall call it—is due to your conception, encouragement, and, in a main degree, to your patient advice to a novice, in an art in which you excel, I venture to hope you will accept its dedication as a slight tribute of my high regard and personal devotion.

Your grateful friend and admirer,

G. L. FABER.

FIUME, September 30, 1882.

INTRODUCTION.



HAVING enjoyed the privilege of perusing the following pages before publication, I have great pleasure in complying with the Author's request to introduce his work with a few remarks.

The circumstance that the year of the birth of this work coincides with that of the Great International Fisheries Exhibition in London, cannot fail to attract a greater amount of attention than any words of mine could secure. For, although it relates to a district, the Fauna and Fishing interests of which are in great measure foreign to those of the countries in whose language it is written, it will be favourably received as one of the contributions which help to accomplish the very objects aimed at by the promoters of the International Exhibition. It will be found to give much practical information applicable to conditions in this country, and, therefore, valuable to those who have British Fishing interests at heart. Pisciculturists will have their attention drawn to the plan practised by Italians, viz., to rear fry of marine fishes, such as Red and Grey Mulletts, Flat-fishes, Eels, &c., in enclosed waters to a marketable size; a practice yielding direct and immediate profits, and advocated by myself for the last twenty years. To the great number of persons who annually leave these shores for the Mediterranean in quest of sport and

recreation, the present work may serve as guide to a field which hitherto seems to have been much neglected by them. And, finally, the Zoologist will be glad of finding in it a general review of the Adriatic Fauna with its singularly varied character, and of the agencies by which its distribution has been determined.

I trust that the Author will be amply repaid for the sacrifices he has had to make in the production of this work, by seeing its usefulness extend far beyond the limits to which its contents relate.

ALBERT GÜNTHER.

BRITISH MUSEUM, 24 *March*, 1883.

TO THE READER.



So far as I am aware, no comprehensive work has hitherto been published on the Austro-Hungarian Sea-fisheries.¹

Count Antonio Marazzi, Vice-Consul for Trieste, addressed in 1873, to the Italian Ministry of Foreign Affairs, a report on the subject, from the point of view of the Italian fishermen engaged in the East Adriatic fisheries.² Valuable information on the same subject was also prepared by Dr. Syrski for the Vienna Exhibition of 1873, and published by the Marine Section of the Austrian Ministry of Commerce.³ The following report, suggested by my learned colleague, Capt. R. F. Burton, Her Majesty's Consul for Trieste, is intended to treat the subject in a more general sense, and to pave the way for a comprehensive work.

The original plan has been considerably enlarged in the course of execution.

Inquiries into the nomenclature of fishes, local and popular, and their identification, have necessitated more serious studies of the fauna than was at first contemplated: this has led to a short description of the fauna and its chorology, which does not by any means aspire to scientific merits, and

¹ Dr. Carlo de Marchesetti's work, *La Pesca lungo le coste orientali dell' Adria*, has appeared since these pages were written, and I am indebted to this valuable contribution for a variety of information.

² *Bollettino Consolare* of July, 1873.

³ *Special Catalog der im Pavillon der Oesterr. Handelsmarine und Maritimen Etablissements ausgestellten Gegenstände.*

is given only as what it really is,—a study or rather a report. It must accordingly claim the privileges due to a work of the kind. My only excuse in presenting it to the reader must be the excellence and value of the investigations of Dr. J. R. Lorenz on the horizontal chorology of animal life in the Quarnero,—a work, which, although familiar to many Austrian and German readers, is not so generally known to my countrymen as it deserves. Hence the reason of the prominence I have thought fit to give to his observations.

The nomenclature of fishes has led to a systematic list (including the fresh-water fauna of the water-shed of the northern and eastern shores of the Adriatic), and to a partial list of invertebrates, as far as they have any value or possess local names. A systematic list of invertebrates would have been beyond the scope of this volume.

The list of fishes is compiled with the greatest care, and with a view of obviating, if possible, the almost inevitable mistakes, or inaccuracies, to which an unassisted student is liable. The classification was adopted from the learned Dr. Albert Günther's "Catalogue of Fishes of the British Museum." It has since been rearranged on the system of Dr. A. Günther's subsequent work "An Introduction to the Study of Fishes."¹ The list of the fauna is compiled on the authority of Günther, Lorenz, Canestrini, Grube, Nardo, Perugia, and Plucar; and the fresh-water fishes on the authority of Günther, Heckel and Kner, Bonizzi, Canestrini, Nardo, and Ninni. A systematic list is now in course of publication by Prof. M. Stossich, of Fiume: it will be a very valuable contribution to the investigation of the Adriatic fauna.²

The Italian nomenclature has been published by Canestrini, Grube, Naccari, Nardo, Martens, Olivi, Perugia, Plucar, and others; this has been subjected to careful comparison and revision as regards those names which are in use on these shores, and others have been added from personal information and inquiry. I am indebted to Dr. C. de Marchesetti, Director

¹ Edinburgh: 1880.

² *Bol. della Soc. Adriat. di Scienze Nat.* Trieste: 1879-81. (See Appendix, p. 258.)

of the Trieste Museo Civico di Storia Naturale, for the identification of various fishes and for other valuable information he has been kind enough to furnish.

The Croatian names are entirely new; they have not hitherto been published, and I have been at great pains to collect them from a variety of sources too numerous to catalogue.¹

I am indebted to Mr. H. Thierry and Mr. Bacarcić, of Fiume, for many of those in use on the Hungarian-Croatian littoral, and to Mr. C. I. Kovacević, late Harbour-master at Spalato, for those in use at his former post. Prof. Anton Korlević, Professor of Natural History at the Croatian Gymnasium at Fiume, has been good enough to revise the Croatian nomenclature, and Prof. Spiridion Brusina, Professor of Zoology at the University of Agram, has had the kindness *en dernier lieu* to correct and further extend the list. I am particularly indebted to these two gentlemen for their valuable aid.

In part of the text I have thought fit to introduce, where practicable, the more familiar English names of fishes, in order to render the text more intelligible.

The invaluable work of Forbes and Godwin-Austen, on the Natural History of the European Seas; "The Sea-fisheries," by E. W. H. Holdsworth, and "Die Bewirthschaftung des Meeres, mit Rücksicht auf den Adriat. Golf," by M. Anton Gareis, have in their turn furnished a variety of information. Nardo's work, "Sulla Coltura degli Animali acquatici nel Veneto Dominio," is my authority on the subject of the lagoon-fisheries.

In many instances I have quoted my authorities; but it would have been tedious to do so in every case, and I hope I may not be accused of

¹ Since writing these lines I have received, through the kindness of Prof. G. Kolombatović, his works entitled *Pesce della Acque di Spalato*. Spalato: 1881; and *Fische welche in den Gewässern von Spalato beobachtet und überhaupt im Adriatischen Meere registriert wurden*. Spalato, 1882: to these volumes I am indebted for a variety of information concerning the fauna of Spalato and the local Croatian nomenclature.

plagiarism on that account; my study does not profess to be more than a compilation of details derived from a variety of sources.

This I have endeavoured to put together in a form such as I hope may recommend itself to the reader. Beginning with a topographical and climatic account of the Adriatic Gulf, the report—for such I must again call it—proceeds to give a description of the horizontal distribution of animal life in the Quarnero, and of the fauna generally; of the fisheries from an historical and legislative point of view; of the share taken in the Austrian fisheries by Italian fishermen; of the fishing districts and the produce of the fisheries, together with an account of the fishing craft and gear, such as nets, lines, and similar matters; the names applied to fishermen and different modes of fishing; the fish-market, and methods of cooking and curing fish; concluding with a systematic list of the fauna, with scientific, English, German, Italian, Croatian nomenclature, and with sundry details including statistics.

The plates and engravings will add much to the interest of this work. The latter are executed after drawings for which I am indebted to a friend, M. LEO LITTROW. They speak for themselves.

I am conscious of my shortcomings,—for the more one enters into the subject the more imperfect one's work appears,—and I must, therefore, again solicit the indulgence of the reader. My task is, however, fulfilled if I have the satisfaction of thinking that my report may lead to a more comprehensive work on the subject,—a work which at present is wanting.

In conclusion, I must express my thanks to Messrs. WYMAN & SONS for the trouble and care they have taken in preparing this book in its present shape.

FIUME, *September 30th, 1882.*

CONTENTS.

CHAPTER I.

THE FAUNA.

	PAGE.
Preliminary.—Topographical.—Tides.—Currents.—Temperature.—Saltness.—Professors Wolf and Luksch; their investigations in the Adriatic Gulf.—Haunts of fishes.—Investigations of the fauna in the Adriatic.—Dr. J. R. Lorenz; his work on the Horizontal Chorology in the Quarnero.—Zone I.—Zone II.—Zone III.—Zone IV.—Zone V.—Zone VI.—Zone VII.—Vertebrates.—Sedentary class.—Shore fishes.—Littoral forms.—Rovers.—Squatters.—Forms of the declivity and shallows.—Rovers.—Squatters.—Forms of the deep-bed.—Squatters.—Migratory forms.—Recapitulation.—Invertebrates, Articulates, and Radiates.—Characteristic species of the various zones.—Extended and limited distribution.—Boreal forms.— <i>Pisces</i> .—Fresh-water fishes.—Fishes which frequent the brackish waters.—Sea-fishes.	1

CHAPTER II.

HISTORICAL.—LEGISLATION.—THE CHIOGGIOTTI.

Historical.—State of the coast, political and economic.—Inland markets; fluctuations of the trade.—Trawlers.—Statistics.—Ice.—Salt.—Italian fishermen.—Legislation.—Privileges of the Italian fishermen.—Titles from which the fishing rights were derived under the Republic of Venice.—Treaty between Austria and Italy.—The Chioggiotti; their craft engaged in the Austrian fisheries; proceeds of their share in the fisheries.—Count Marazzi.—Professor Ninni.—Individual profit of the Chioggiotti.—Consul Revest.—Distribution of the Italian fishing fleet on the Austrian coast; value of craft and gear employed.—Total value of craft and gear at Chioggia and Pelestrina.—The Italian fisheries.—Italian fishing craft; ditto engaged in the Austrian fisheries; ditto engaged in the foreign fisheries.—Value of the Chioggia fisheries.—Imports and exports of fish at Venice.—Venetian fisheries.—Craft and crew.	40
--	----

CHAPTER III.

FISHING DISTRICTS.—SEASON OF FISHING.—PRODUCE.

	PAGE.
Fishing Districts.—Austria: Gorizia, Gradisca, Trieste.—Istria: Isola, Pirano, Salvore, Umago, Daila, Parenzo, Pola, Lussinpiccolo, Preluca.—Hungarian-Croatian littoral: Fiume, Buccari, Portoré, Segna.—Dalmatia; Zara, Sebenico, Spalato, Ragusa, Cattaro.—Dalmatian Archipelago.—Season of Fishing.—Descriptive part.—Produce.—Pisces.—Sharks, Rays, Sturgeons, Perch tribe, Sea-perches, Red Mullet, Sea-breems, Scorpions, Meagres, Sword-fish, Scabbard-fish, Hair-tail, Horse Mackerel, John Dory, Black-fish, Dolphins, Mackerel, Tunny, Star-gazers, Weevers, Anglers, Gurnards, Flying-Gurnards, Gobies, Dragonets, Band-fishes, Blennies, Spets, Atherines, Mulletts, Sticklebacks, Trumpet-fish, Suck-fishes, Lophotes cepedianus, Ribbon-fishes, Coral-fishes, Wrasses, Cod tribe, Ophidium, Fierasfer, Sand-eels, Macrurus, Flat-fish tribe, Scopelidæ, Cyprinodon, Gar-pikes, Flying-fish, Salmon tribe, Herring tribe, Eel tribe, Pipe-fishes, Sea-horses, File-fishes, Sun-fishes, Lampreys, Lancelot.—Mollusks.—Cephalopods, Bivalves, Univalves, Tunicates. — Crustaceans. — Echinoderms. — Actiniæ.—Sponges.—Red Coral....	62

CHAPTER IV.

THE FISHING CRAFT.

Description of craft.—Value of the same.	99
---	----

CHAPTER V.

THE NETS.

Process of making, tanning, and mounting. — Drift-nets; Trammel-nets; Circle-nets; Seine-nets; Trawling-nets; Hand-nets.—Fish-weirs and Ponds.—Snares.—Basket-traps.—Store-pots, &c.—Value of the fishing gear.	104
--	-----

CHAPTER VI.

LINE-FISHING.

Lines.—Hooks.—Implements of various kinds.—Prongs, &c.—Scares. —Bait.	130
--	-----

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FAUNA OF THE ADRIATIC.

	PAGE.
Mammalia	177
Reptilia	178
Fishes	179

Special Lists of Fishes :

A. Fresh-water Fishes	234
B. British Fishes which are common to the Adriatic Fauna	236
C. Five Fishes belonging exclusively to the Adriatic Fauna	237
D. Thirty-one Fishes which are only quite accidentally met with in the Adriatic	237
E. Fourteen Fishes which belong more especially to the Venetian Fauna	238
F. Forty-eight Fishes which belong more especially to the Dalmatian Fauna	238
G. Twenty-nine Fishes which have hitherto been caught only on the south coast of Dalmatia	239
H. Fishes which belong to the class of Minutaja, or Misto, <i>i.e.</i> , Fishes which are thrown together, and sold as one class	239
I. Table of the Fresh-water and Sea Fishes, showing the number of Species belonging to each Family	240

Invertebrata :

Mollusca	242
Crustacea	252
Echinodermata	255
Polypi	257
Mollusks of the Adriatic enumerated by Professor M. Stossich	258
Crustaceans of the Adriatic enumerated by Professor M. Stossich	259
Vermes of the Adriatic, enumerated by Professor M. Stossich	261

APPENDICES.

I. Alphabetical Index to the Scientific Names	262
II. Alphabetical Index to the English Names	265
III. Reference Index to the Italian Local and Vulgar Names of the Adriatic Fauna on the Austro-Hungarian Seaboard and Venetian Estuary	269
Key to the Pronunciation of Croatian Words	277
IV. Reference Index to the Croatian Local and Vulgar Names of the Adriatic Fauna on the Austro-Hungarian Seaboard	278

INDEX TO THE SYSTEMATIC LIST OF FISHES.

Sub-Classes, Orders, Families, and Genera.

Sub-Class I.—PALÆICHTHYES.

Order I.—CHONDROPTERYGII.

Sub-Order I.—PLAGIOSTOMATA.

A. SELACHOIDEI (*Sharks*).

Fam. I.—CARCHARIIDÆ *p.* 179

Group I.—Carchariina.

Gen. 4 Carcharias.

1 Galeus.

Group II.—Zygæniina.

Gen. 2 Zygæna.

Group III.—Mustelina.

Gen. 2 Mustelus.

Fam. II.—LAMNIDÆ *p.* 180

Group I.—Lamnina.

Gen. 2 Lamna.

1 Carcharodon.

2 Odontaspis.

1 Alopecias.

Group II.—Selachina.

Gen. 1 Selache.

Fam. III.—NOTIDANIDÆ *p.* 181

Gen. 3 Notidanus.

Fam. IV.—SCYLIIDÆ *p.* 181

Gen. 3 Scyllium.

1 Pristiurus.

Fam. V.—SPINACIDÆ *p.* 182

Gen. 1 Centrina.

2 Acanthias.

1 Spinax.

1 Echinorhinus.

Fam. VI.—RHINIDÆ *p.* 182

Gen. 2 Rhina.

B. BATOIDEI (*Rays*).

Fam. I.—TORPEDINIDÆ *p.* 183

Gen. 3 Torpedo.

Fam. II.—RAJIDÆ *p.* 183

Gen. 12 Raja.

Fam. III.—TRYGONIDÆ... p. 185

- Gen. 3 Trygon.
 1 Pteroplatea.

Fam. IV.—MYLIOBATIDÆ..... p. 185

- Group I.—Myliobatina.
 Gen. 2 Myliobatis.
 1 Rhinoptera.

- Group II.—Ceralopterina.
 Gen. 1 Dicerobatis.

Order II.—GANOIDEI

Sub-Order I.—CHONDROSTEI.

Fam. I.—ACIPENSERIDÆ (*Sturgeons*) p. 186

- Gen. 7 Acipenser.

Sub-Class II.—TELEOSTEI.

Order I.—ACANTHOPTERYGII.

Divis. I.—ACANTHOPTERYGII PERCI-FORMES.

Fam. I.—PERCIDÆ (*Perch-tribe*)..... p. 187

- Group I.—Percina.
 Gen. 1 Perca.
 1 Labrax.
 1 Lucioperca.

- Group II.—Serranina.
 Gen. 1 Centropristis.
 1 Anthias
 4 Serranus.
 1 Polyprion.

- Group III.—Apogonina.
 Gen. 1 Apogon.

Group IV.—Pristipomatidæ.

- Gen. 3 Dentex.
 3 Mæna.
 4 Smaris.

Fam. II.—MULLIDÆ (*Red Mulletts*) p. 190

- Gen. 2 Mullus.

Fam. III.—SPARIDÆ (*Sea-breams*) ... p. 190

Group I.—Cantharina.

- Gen. 3 Cantharus.
 2 Box.
 1 Oblata.

Group II.—Sargina.

- Gen. 4 Sargus.
 1 Charax.

Group III.—Pagrina.

- Gen. 3 Pagrus.
 5 Pagellus.
 1 Chrysophrys.

Fam. IV. SCORPÆNIDÆ (*Scorpions*) p. 193

- Gen. 1 Sebastes.
 2 Scorpæna.

Divis. II.—ACANTHOPTERYGII SCIÆNI-FORMES.

Fam.—SCIÆNIDÆ (*Meagres*) p. 193

- Gen. 1 Umbrina.
 1 Sciæna.
 1 Corvina.

Divis. III.—ACANTHOPTERYGII XIPHI-FORMES.

Fam.—XIPHIIDÆ (*Sword-fishes*)..... p. 194

- Gen. 1 Xiphias.
 1 Histiophorus.

Divis. IV.—ACANTHOPTERYGII TRICHIURIFORMES.

- Fam. — TRICHIURIDÆ (*Scabbard-fishes, Hair-tails*) p. 194
 Gen. 1 Lepidopus.
 1 Trichiurus.
 1 Thyrsites.

Divis. V.—ACANTHOPTERYGII COTTOSCOMBRIFORMES.

- Fam. I.—CARANGIDÆ (*Horse Mackerels, &c.*) p. 194
 Gen. 1 Trachurus.
 1 Caranx.
 1 Seriola.
 1 Naucrates.
 3 Lichia.
 1 Temnodon.
 1 Capros.

- Fam. II.—CYTTIDÆ (*John Dorys*)... p. 196
 Gen. 2 Zeus.

- Fam. III.—STROMATEIDÆ (*Blackfish*)..... p. 196
 Gen. 2 Stromateus.
 2 Centrolophus.

- Fam. IV.—CORYPHÆNIDÆ (*Dolphins*) p. 196
 Gen. 2 Coryphæna.
 1 Brama.
 1 Schedophilus.
 1 Ausonia.

- Fam. V.—SCOMBRIDÆ (*Mackerel, Tunny, &c.*) p. 197
 Gen. 3 Scomber.
 4 Thynnus.
 2 Pelamys.
 1 Auxis.
 2 Echeneis.

- Fam. VI.—TRACHINIDÆ p. 198
 Group I.—Uranoscopina (*Star-gazers*).
 Gen. 1 Uranoscopus.

- Group II.—Trachinina (*Weevers*).
 Gen. 4 Trachinus.

- Fam. VII.—PEDICULATI (*Anglers*) p. 199
 Gen. 2 Lophius.

- Fam. VIII.—COTTIDÆ (*Bull-heads, Gurnards*) p. 199
 Gen. 1 Cottus.
 1 Lepidotrigla.
 6 Trigla.

- Fam. IX.—CATAPHRACTI (*Flying Gurnards*) p. 201
 Gen. 1 Peristethus.
 1 Dactylopterus.

Divis. VI.—ACANTHOPTERYGII GOBIIFORMES.

- Fam. I.—GOBIIDÆ (*Goby-tribe*) p. 201
 Group I.—Gobiina (*Gobies*).
 Gen. 22 Gobius.
 2 Latrunculus.

- Group II.—Callionymina (*Dragonets*).
 Gen. 6 Callionymus.

Divis. VII.—ACANTHOPTERYGII BLENNIIFORMES.

- Fam. I.—CEPOLIDÆ (*Band-fishes*)... p. 204
 Gen. 1 Cepola.

- Fam. II.—BLENNIIDÆ (*Blennies*) ... p. 204
 Gen. 14 Blennius.
 1 Cristiceps.
 1 Tripterygium.

Divis. VIII.—ACANTHOPTERYGII MUGILIFORMES.

Fam. I.—SPHYRÆNIDÆ..... *p.* 206
Gen. 1 Sphyræna.

Fam. II.—ATHERINIDÆ (*Atherines*,
or *Sand-smelts*)..... *p.* 206

Group.—Atherina.
Gen. 3 Atherina.

Fam. III.—MUGILIDÆ (*Mulletts*) ... *p.* 206
Gen. 6 Mugil.

Divis. IX.—ACANTHOPTERYGII GASTROSTEIFORMES.

Fam.—GASTROSTEIDÆ (*Sticklebacks*) *p.* 207
Gen. 2 Gasterosteus.

Divis. X.—ACANTHOPTERYGII CENTRISCIFORMES.

Fam.—CENTRISCIDÆ (*Trumpet fish*) *p.* 207
Gen. 1 Centriscus.

Divis. XI.—ACANTHOPTERYGII GOBIESOCIFORMES.

Fam.—GOBIESOCIDÆ (*Suck-fishes*) *p.* 208
Gen. 6 Lepadogaster.
1 Leptoptygius.

Divis. XII.—ACANTHOPTERYGII LOPHOTIFORMES.

Fam.—LOPHOTIDÆ..... *p.* 208
Gen. 1 Lophotes.

Divis. XIII.—ACANTHOPTERYGII TÆNIIFORMES.

Fam.—TRACHYPTERIDÆ (*Ribbonfishes*) *p.* 208
Gen. 2 Trachypterus.

Order II.—ACANTHOPTERYGII PHARYNGOGNATHI.

Fam. I.—POMACENTRIDÆ (*Coralfishes*) *p.* 209
Gen. 1 Heliastes.

Fam. II.—LABRIDÆ (*Wrasses*). ... *p.* 209

Group I.—Labrina.
Gen. 6 Labrus.
10 Crenilabrus.
1 Acantholabrus.

Group II.—Julidina.
Gen. 1 Novacula.
1 Julis.
2 Coris.

Order III.—ANACANTHINI.

Divis. I.—ANACANTHINI GADOIDEI.

Fam. I.—GADIDÆ (*Cod-tribe*) *p.* 212
Gen. 5 Gadus.
1 Merluccius.
2 Phycis.
1 Lota.
1 Hypsiptera.
3 Motella

Fam. II.—OPHIDIIDÆ *p.* 214

Group I.—Brotulina.
Gen. 1 Pteridium.

Group II.—Ophidiina.
Gen. 4 Ophidium.

- Group III.—Fierasferina.
Gen. 2 Fierasfer.
- Group IV.—Ammodytina (*Sand-eels, or launces*).
Gen. 1 Ammodytes.
- Fam. III.—MACRURIDÆ *p.* 214
Gen. 1 Macrurus.
- Divis. II.—ANACANTHINI PLEURONECTOIDEI.
- Fam.—PLEURONECTIDÆ (*Flat-fishes*)
p. 214
Gen. 2 Rhombus.
1 Phrynorhombus.
4 Arnoglossus.
1 Citharus.
2 Rhomboidichtys.
2 Pleuronectes.
9 Solea.
1 Ammopleurops.
- Order IV.—PHYSOSTOMI.
- Fam. I.—SCOPELIDÆ *p.* 217
Group.—Saurina.
Gen. 1 Saurus.
1 Aulopus.
- Fam. II.—CYPRINIDÆ (*Carp-tribe*) *p.* 217
Group I.—Cyprinina.
Gen. 2 Cyprinus.
3 Barbus.
1 Aulopyge.
2 Gobio.
- Group II.—Leuciscina.
Gen. 12 Leuciscus.
2 Paraphoxinus.
1 Tinca.
4 Chondrostoma.
- Group III.—Abramidina.
Gen. 1 Abramis.
2 Alburnus.
- Group IV.—Cobitidina.
Gen. 1 Nemachilus.
1 Cobitis.
- Fam. III.—CYPRINODONTIDÆ ... *p.* 223
Group.—Cyprinodontidæ carnivoræ.
Gen. 1 Cyprinodon.
- Fam. IV.—SCOMBRESOCIDÆ (*Gar-pikes, &c.*) *p.* 223
Gen. 1 Belone.
1 Scombresox.
2 Exocoetus.
- Fam. V.—ESOCIDÆ (*Pikes*) *p.* 223
Gen. 1 Esox.
- Fam. VI.—SALMONIDÆ (*Salmons*) *p.* 224
Group.—Salmonina.
Gen. 6 Salmo.
1 Thymallus.
1 Argentina.
- Fam. VII.—CLUPEIDÆ (*Herring-tribe*) *p.* 225
Group I.—Engraulina.
Gen. 1 Engraulis.
- Group II.—Clupeina.
Gen. 5 Clupea.
- Fam. VIII.—MURÆNIDÆ (*Eel-tribe*). *p.* 226
Group I.—Anguillina.
Gen. 2 Anguilla
1 Conger.
1 Myrus.
- Group II.—Ophichthyina.
Gen. 3 Ophichthys.
- Group III.—Murænina.
Gen. 2 Muræna.

<p>Order V.—LOPHOBRANCHII.</p> <p>Fam.—SYNGNATHIDÆ (<i>Pipe-fishes</i>) <i>p.</i> 227</p> <p>Group I.—Syngnathina.</p> <p style="padding-left: 2em;">Gen. 3 Siphonostoma.</p> <p style="padding-left: 2em;">6 Syngnathus.</p> <p style="padding-left: 2em;">2 Nerophis.</p> <p>Group II.—Hippocampina (<i>Sea-horses</i>).</p> <p style="padding-left: 2em;">Gen. 2 Hippocampus.</p> <p>Order VI.—PLECTOGNATHI.</p> <p>Fam. I.—SCLERODERMI (<i>File-fishes</i>) <i>p.</i> 229</p> <p>Group I.—Balistina.</p> <p style="padding-left: 2em;">Gen. 1 Balistes.</p>	<p>Fam. II.—GYMNODONTES (<i>Sun-fishes</i>) <i>p.</i> 229</p> <p>Group I.—Molina.</p> <p style="padding-left: 2em;">Gen. 2 Orthagoriscus.</p> <p style="text-align: center;">—————</p> <p>Sub-Class III.—CYCLOSTOMATA.</p> <p>Fam.—PETROMYZONTIDÆ (<i>Lampreys</i>) <i>p.</i> 230</p> <p style="padding-left: 2em;">Gen. 3 Petromyzon.</p> <p style="text-align: center;">—————</p> <p>Sub-Class IV.—LEPTOCARDII.</p> <p>Fam.—CIRROSTOMI (<i>Lancelets</i>)..... <i>p.</i> 231</p> <p style="padding-left: 2em;">Gen. 1 Branchiostoma.</p>
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Recapitulation of fishes.

4	Sub-Classes.
10	Orders.
57	Families.
161	Genera.
382	Species.

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WOOD ENGRAVINGS.

√ FIUME FROM THE WEST	<i>Frontispiece.</i>
√ ARBE (ISLAND), QUARNERO	<i>to face page</i> 9
√ BRAGOZZI AT ANCHOR	17
/ CASTLE TERSATO, NEAR FIUME	25
√ LIGHTHOUSE OF PROMONTORE (ISTRIA)	33
√ BRAGOZZI AT ANCHOR, DRYING NETS	40
√ „ LEAVING PORT	49
√ „ RUNNING BEFORE THE WIND	57
√ TONNARA IN THE BAY OF PRELUCA	65
√ VOLOSCA HARBOUR (GULF OF FIUME)	73
√ ZOPPOLI AT BUCCARI	81
√ SCOGLIO S. MARCO, FROM THE ISLAND OF VEGLIA	89
√ BRAGOZZI FISHING	97
√ SEGNALE (BARREL-BUOY)	134
√ FIUME FROM THE EAST	141
SHIP-BUILDING OFF SCOGLIO S. MARCO	145
GULF OF BUCCARI AND CHANNEL OF MALTEMPO, FROM THE HEIGHTS OF BUCCARI.....	152
BUOY	175

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CHAPTER I.

THE FAUNA.

Preliminary.—Topographical.—Tides.—Currents.—Temperature.—Saltness.—Professors Wolf and Luksch; their investigations in the Adriatic Gulf.—Haunts of fishes.—Investigations of the fauna in the Adriatic.—Dr. J. R. Lorenz; his work on the Horizontal Chorology in the Quarnero.—Zone I.—Zone II.—Zone III.—Zone IV.—Zone V.—Zone VI.—Zone VII.—Vertebrates.—Sedentary class.—Shore fishes.—Littoral forms.—Rovers.—Squatters.—Forms of the declivity and shallows.—Rovers.—Squatters.—Forms of the deep-bed.—Squatters.—Migratory forms.—Recapitulation.—Invertebrates, Articulates, and Radiates.—Characteristic species of the various zones.—Extended and limited distribution.—Boreal forms.—*Pisces*.—Fresh-water fishes.—Fishes which frequent the brackish waters.—Sea-fishes.



THE Adriatic Gulf (*Mare Superum, Mare Adriaticum*) derives its name, according to most authorities, from the Venetian town of Adria, near Rovigo, once situate on the sea-shore, and a place of some importance; whereas nowadays it is a small village, lying twelve miles inland. Other authorities, again, attribute its derivation to the Neapolitan town of Atri, in the Abruzzo Ulteriore, once known by the name of Adria, or Hadria, and situate on the coast, now four miles distant from the sea. Its southernmost limit is marked by the Cape S. Maria di Leuca, the Promontorium Solentinum of old, on the west; and the Cape Glossa, or Linguetta, on the Albanian coast, on the east. Its narrowest breadth is 54 miles (60 m. = 1°), between Otranto and Cape Linguetta; its greatest breadth 120 miles, between the mouths of the Tronto and Spalato; its average breadth is about 96 miles; its length 425 miles; and its surface has a total superficial area of 2,500 square geographical miles.

What is generally understood as the eastern shore extends from Epirus to Venice, and comprises the Austrian-Hungarian seaboard in a total length

of 330 nautical miles in a straight line, and an extent of sea-coast of 2,840 miles, including the islands. It consists:—

1. Of the Dalmatian coast and islands, commencing somewhat north of Antivari, and extending to a point south of Carlopago, including the island of Pelagosa as the most distant island off the coast, and the islands of Arbe and Selve as the most northern limit.

2. Of the Hungarian-Croatian littoral, including Carlopago as southern and Fiume as northern limits.

3. The Austrian coast proper, including the peninsula of Istria, commencing at the northernmost head of the Quarnero Gulf, including the islands of the Quarnero, and the Trieste seaboard (*Küstenland*), extending as far as the Italian frontier, marked by the river Aussa and Cape Buso.

The eastern and western shores are essentially different from one another in their physical aspect. The western coast is exposed to the full fury of the S.E. (Scirocco) and N.E. (Bora) winds; the northern part is flat and low, and is studded with sand-banks and marshes; whereas further south it becomes iron-bound, and the entire coast is devoid of natural harbours. The eastern shore has, on the other hand, a very different character; a high coast-land much indented and studded with numerous islands and reefs (*scogli*),¹ which extend from Ragusa in the south to the Istrian shores in almost unbroken continuity,² thus forming a sort of natural rampart, or breakwater, against the fury of the winds and waves. The innumerable creeks and bays (*valli*),³ inlets and channels, which thus abound along the coast, are so many natural harbours, with deep water and good anchorage-ground, so that the coast of Dalmatia and Istria has not without reason been termed “a natural harbour from beginning to end” (*tutto*

¹ This term is often misapplied on the coast to the islands generally, as, for instance, at Zara, where the inhabitants of the islands are called *Scogliani*.

² The only interruption is at the promontory of Planca (*Slav.* Ploča), the wave-lashed Promontorium Diomedis of old.

³ The larger fjords are called *valloni*, and secondary basins (*mandracchio*) are artificially created, which extend out of the primary creeks in order to afford protection to small craft: these are known as *Dražice* (*Slav.*).

in porto), a circumstance which may account—though offering no excuse—for the covetousness with which the possession of this coast is viewed by the restless, ambitious, and ever-watchful neighbour to the west.

The eastern flank of Istria partakes of the characteristics of the Italian shores, being exposed alike to the fury of the Bora and the full force of the Scirocco, and is consequently much less hospitable than the western coast of the peninsula. There are other points of the Austrian-Hungarian seaboard, such as the Gulf of Trieste, the Channel of Maltempo or Morlacca (Quarnero), the Bocche di Segna further south, and the Bay of Vrulja (between Almissa and Macarsca on the Dalmatian coast), which are specially subject to the vehemence of the Bora, and thus form so many exceptions to the rule.

The tides¹ are inconsiderable, the normal rise and fall being only $1\frac{1}{2}$ foot, and only one ebb and flow in 24 hours; the spring tide is 2 feet in excess, thus giving a maximum of 5–6 feet. The greatest ebb is in February, the greatest flood in September; they are also affected by the winds, the Bora depressing, whilst the Scirocco swells, the waters. The currents (*Correnti*) are numerous, and keep the water in constant circulation, thus acting as modifiers of the effects of climate, and influencing by their agency the diffusion of submarine life.

There is a constant current along the eastern or Dalmatian coast in a northerly direction, returning along the western or Italian coast in a southerly direction; this current is necessarily subject to local influences, such as the interposition of islands, which neutralise its effects, without, however, seriously affecting its course. It does not affect the water in greater depths than 3 to 4 fathoms, and it is generally met with 6 or 10 miles from the shore, according to the formation of the coast. Beyond that point the sea is often very rough, without any visible cause, a phenomenon which has

¹ *It.* Maréa. At Venice, the tides, which are called there by the names of *Cevènte* and *Dosana*, do not, as a rule, exceed a few inches, excepting under the influence of a strong Scirocco wind, when the waters are known to rise 1–4 feet beyond the average limit, overflowing the dikes, inundating the town, and damaging the fishing-ponds (*valli*).

hitherto received no satisfactory explanation; these waves are called *Ligazzi*.

The mean temperature of the air is between 59° and 73° F., that of the water being between 66° and 71° F., and it has been found that, as a rule, the temperature of the water decreases from the coast-line outwards, as also from the surface downwards, this decrease being greater in summer than in winter. This rule is, however, somewhat modified by local influences, such as the influence of the land and the outward atmosphere, as also the prevalence of submarine sources. Thus, it has been ascertained that layers of water, which are in contact with the land, are subject to alterations of temperature altogether independent of this theory, having both a higher temperature in summer, and a lower temperature in winter, than similar layers of water further outwards.

Again, the surface waters are subject to the influence of the temperature of the atmosphere, hence the changes are more sudden than in lower depths; thus, in winter, the surface waters may become colder than the deeper layers, and even, as a rule, it will be found that the temperature in winter (February) is almost alike in all depths, the difference being only $1-2^{\circ}$ F.; at the same time the temperature does not appear to fall below 45° F. in any zone, even in winter.

The greatest difference in the various zones is met with in summer, when the surface waters reach 77° F., and exceptionally, when under the direct influence of the sun's rays, or the proximity of the land, even more, whereas the lower zones retain much of their winter freshness. Thus in 10 fathoms the temperature never exceeds 72° , in 20 fathoms 66° , and in 30 fathoms 61° .

The mean temperature of the air in winter is from 40 to 32° F., which is that of the British Isles and both coasts of the British Channel; but the waters retain during winter much of the warmth acquired during the summer heats, and their temperature is higher than that of the air in autumn and winter; and lower in spring and summer.

The slower influence of changes of the temperature of the air on the lower zones has the effect that, excepting in summer, warmer layers of water

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the subject of four reports,¹ which may be recommended to the attention of those whom the subject may specially interest. Suffice it here briefly to recapitulate the principal conclusions.

1. The greatest influx of sweet water in the Adriatic is found on the Austro-Italian coast between Grado and Ravenna.

2. A current of sweet water flows from the north-west basin towards south-east; the further it proceeds south, the nearer it skirts the Italian shores, and the more it affects the deeper layers of water, thus bringing them into circulation.

3. A line drawn from Trieste to a point 20 miles south of Cape Promontore (the apex of the Istrian triangle) gives a uniform depth of 20–22 fathoms.

4. Increase of temperature towards the south-east; in the north higher temperature outwards, and in the south higher temperature nearer the shore (thus showing the influence of the proximity of the land).

5. Between Brindisi and Aulona the greatest depth is 270 fathoms (512 mètres), and the ground temperature 14° centigrade ($11^{\circ}\cdot 2$ Réaumur). This temperature is not lower than, shortly before, on the same line nearer Brindisi, in 61 fathoms. The summer temperature of the water off Punta d'Ostro, in 100 fathoms, is $13^{\circ}\cdot 4$ cent.; Ancona—Tremiti, 73 and 60 fathoms, $13^{\circ}\cdot 2$ – $13^{\circ}\cdot 4$ cent.; Quarnerolo, 40–50 fathoms, $13^{\circ}\cdot 1$ $12^{\circ}\cdot 7$ $13^{\circ}\cdot 1$ cent. The greater coolness of the water in the Quarnero is due to the influence of the ground-springs.

6. Lower temperature and higher degree of saltness on the eastern than on the western coast; increase of temperature the more one proceeds south.

7. In the Dalmatian channels lower degree of saltness and higher temperature in the upper layers than on the Albanian coast.

8. The Gulf of Fiume, the Segna Channel, and the Quarnerolo show the lowest temperature of water in the whole northern basin of the Adriatic, which fact is probably due to the abundance of fresh-water springs bursting

¹ "Berichte an die königliche Ungarische Seebehörde in Fiume, über Physicalische Untersuchungen im Adriatischen Meere." Fiume: 1878.

forth from the sea-bed. The water is also colder than at similar depths elsewhere; thus, on the Dalmatian coast, nowhere less than $13^{\circ}5$ cent.; opposite Ragusa, in the high sea, in 125 fathoms, $13^{\circ}9$ cent.; Lissa, in 60 fathoms, 14° cent.; Channel of Brazza, in 40 fathoms, $13^{\circ}8$ cent.; whereas, in the Gulf of Fiume, in 30 fathoms, 12° cent., and even 11° cent.; off Arbe, in rather deeper water, 10° cent.; and near Segna, $9^{\circ}7$ cent., this being the approximate temperature of the sweet-water springs at Fiume.

9. In the Gulf of Fiume and Channel of Segna the surface-waters have a smaller proportion of salt, owing to the Fiumara and other torrents; the greatest amount of saline matter is found in 30 fathoms, below which again there is a decrease, owing to the submarine springs. The increase from the surface downwards is very rapid.

10. The high sea contrasts with the foregoing conclusions (No. 9), by higher temperatures, and higher degree of saltness in deep waters.

11. In the Gulf of Trieste the highest temperatures are to be met with throughout, owing to the shallowness; lowest degree of saltness on the surface, and below 5 fathoms a relatively high degree of saltness, showing that the supply of sweet water from the Po and other water-courses does not mix with the sea water, but remains upon the surface.

12. The variations of the temperature in deep water, which is impervious to the direct effect of light or radiation, are necessarily slow, for the simple reason that such effect can only make itself felt by degrees. The fact, however, of such variations taking place on days when the sea has been calm for some time past, seems to point at the influences of *vertical currents*, on the theory of Dr. Carpenter, created by the evaporation of the surface waters, bringing forth an increased percentage of saltness, greater specific gravity, and consequent tendency downwards. This motion is further increased by the influence of the ground-springs, whose lighter waters naturally tend to the surface, thus creating a current upwards, and necessarily a corresponding current downwards, by which means the warmer surface waters are brought to the lower depths, thereby influencing their temperature.¹

¹ The results of these valuable investigations have been recapitulated in a publication:

It has been shown what great variety the shores of the eastern coast present in their physical characteristics; owing to the protection afforded by the islands, and the innumerable creeks, inlets, and channels, fjords and bays. The same variety may be noticed in the formation of the bed of the Adriatic. Towards the middle it is composed chiefly of mud (*fango*), but near the coast it changes from shingle or sand to the limestone rock, which forms the steep declivity of its shores. The fissures and crevices furnish the favourite lurking-places and resorts of many of the *sedentary* class of fishes, on the waving fields of *zostera*, which afford protection to myriads of invertebrates, and over which many kinds of fish love to hover, either in search of food or in order to seek protection from pursuers.

There are no large sand-banks, but this is in some wise compensated for by their number. Between the shallow banks and the rocks are deep hollows, where the temperature of the water remains low. These afford a favourite resort to many kinds of fish, which there seek protection in summer from the hot rays of the sun.

Thus, each variety of fish has abundant choice for its particular predilection. Those of the *sedentary* class, which are bound to a particular locality, either by temperature, depth, comparative saltness of water, or nature of bed or food, and have their fixed habitations, or places of refuge, amongst the crevices of rocks, or amongst the *zostera*, tangles, or sea-weed, on the precipitous slopes forming the sea-coast, or the bed of the sea, or on the plateaux or sand-banks. Also those amongst the class of *shore fishes* which are always on the move in search of prey, shunning, as a rule, the light of day. Each kind has its particular fancy in the choice both of its lurking-places, where it rests by day, on the watch for any prey that may pass within reach, and for its hunting-grounds, which it frequents by night, some

“Physicalische Untersuchungen im Adriatischen und Sicilisch-Ionischen Meere während des Sommers, 1880.” Von den Akademie Professoren Julius Wolf und Josef Luksch. Wien: Gerold. 1881. The maps appended to this work were exhibited at the Geographical Congress at Venice, 1881, for which the authors received the gold medal. A reference to this work is recommended to those whom the subject may specially interest.



ARBE.

preferring well-overgrown declivities or zostera meadows, whilst others seek the rocky shores, or the creviced precipices, according to the nature of their food, tarrying, nevertheless, in the vicinity of their favourite resorts, and hovering about within given limits, both horizontal and vertical.

The sea water proper of the Adriatic, in respect of the degree of saltness, is about the same as the Atlantic under the tropics, so that southern forms prosper.¹

But it has been shown that, similar to the lochs of Scotland and the fjords of Norway, the salt water is often intermingled with fresh water, arising from the limestone springs, which abound especially in the Quarnero, so that the surface waters may be fresh, or nearly so, whilst the depths are as salt as in mid-ocean.

This circumstance alone accounts for the prosperity of single colonies of otherwise foreign, and even northern forms, though not affording an explanation of the question how they came there.

The depth of the Adriatic is for the most part moderate; the depth of the Quarnero varies from 20 to 40 fathoms, and only at points it reaches 60; proceeding south, it increases to 80 to 100 fathoms near the islands of Zuri, Incoronata, and Scoglio Pomo; from Pomo, the course of the greatest depths is south-east, and near the island of Meleda the bed has not been reached at 500 fathoms.

In the great variety of physical characteristics here enumerated we find so many factors in favour of a high development, and furnishing the requirements for the most opposite attributes of submarine animal life. Thus it is that the Adriatic offers an extensive field for the investigations of the student of natural history, and is justly appreciated on this account by naturalists from all parts of the world.

Nevertheless, the fauna of the Adriatic has not been subject to a thorough and systematic investigation like many other seas, such as the Ægean, the

¹ The affinity between the Mediterranean and Japanese faunas has been pointed out by Dr. Gunther, the number of genera common to these two faunas being larger than that of the genera common to the Mediterranean and the opposite American coasts.

shores of Nice, &c., &c., although partial researches have furnished a variety of valuable information which constitutes an important instalment towards the fulfilment of the more comprehensive task of an exhaustive work. Foremost amongst such researches must be mentioned the able and painstaking work of Dr. J. R. Lorenz¹ on the Quarnero.

These interesting investigations refer to the horizontal distribution of animal and vegetable life in the Quarnero, on the theory of Professor Forbes, demonstrating that marine animals and plants have their zones of depth, just as plants have their regions of altitude.

As no systematic account of the horizontal distribution, or *chorology*, of animal life in the Adriatic has yet been published, this must be considered a most valuable contribution to the inquiries on the subject of its fauna, on which subject so much remains to be done, and it may not be out of place here to give a short account of the general results of this work as regards the chorology in the Quarnero.

Dr. Lorenz has found the following distinct zones:—

ZONE I.—THE SUPER-LITTORAL ZONE, characterised by the one very poor species of Algæ, *Catenella*; and the fauna facies,² *Ligia Brandtii*, and other animals, which neither live in the water nor proceed more than a few feet from the immediate border of the sea.

ZONE II.—THE LITTORAL ZONE, divided into the EXPOSED LITTORAL ZONE, between high and low-water marks, and, when influenced by the wind, two feet above, or $1\frac{1}{2}$ foot below the normal tide-marks—altogether a maximum range of $5\frac{1}{2}$ feet. This is the region of green sea-weeds, characterised by the Algæ, *Ulvæ* (sloke plants), *Enteromorpha*, and *Cladophora* in

¹ "Physicalische Verhältnisse und Vertheilung der Organismen im Quarnerischen Golfe." Wien: 1863.

² *Facies* is the representative species of any particular zone, so that, as Professor Forbes observes, the *facies* of the inhabitants of any given region of depth is so marked, that the sight of a sufficient assemblage of them from some one locality can enable the naturalist to speak at once to the soundings within certain limits, without the aid of line or plummet.

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also *Arenicola branchialis*, a species of lug-worm, which, together with the *Nereis*, are caught by fishermen for bait.

ZONE III.—THE SUBMERGED LITTORAL ZONE, extending from low-water mark to a depth of 2 fathoms; average temperature of water 59° F., subject to rapid changes; characterised by forty species of Mollusks, ten Crustacea, six Annelides, four Echinoderms, four Polyps, three Amorphozoa.

This is the region of the corallines, more especially of the pretty calciferous sea-plant *Corallina officinalis*, which marks its appearance just below low-water mark; these are often overgrown by dense *Cystoseira*, forming the most prevalent and striking facies of this region. Another prevalent facies is that of the waving meadows of *Zostera*, or grass-wrack, which grows on sand or mud. This mass of vegetation is interwoven by Diatomaceæ, of which fifty-nine species, belonging to twenty-six genera, belong exclusively to this region. At a depth of 4 to 10 feet commence the Nullipores, coral-like vegetables, simulating minerals in figure and consistence, and furnishing a favourable spawning-ground for fishes; they grow in vast quantities, and assume many strange modifications of form, sometimes expanding into small cabbage-heads, but mostly assuming the appearance of coral. Nullipore ground is very necessary to the development of animal life, as it harbours a number of forms which are scattered by its destruction; hence the value attached to its preservation. On rocky shores are found several species of the Polyp *Actinia*, chiefly *A. viridis*; more rarely *A. aurantiaca*, *A. rhododactylos*, *A. bimaculata*: *Echinus lividus* adheres to the rocks, *Bonellia viridis* lies in crevices; *Purpura maculosa*, *Trochus fragarioides*, *T. tessellatus*, *Patella cærulea*, *Chiton siculus*, *Spondylus aculeatus* just below the surface on Algæ, as also the crustaceans *Grapsus varius* and *Palæmon squilla*.

On corallines are found *Conus mediterraneus*, *Murex cristatus*, and different species of *Trochus* (*T. Laugieri*), all shells of varying beauty. Here and there appears the Echinoderm *Asteracanthion glacialis*, common to the Boreal and Celtic regions, sometimes as much as 7 to 8 inches long, often left dry by the receding tide and anxiously clinging to the rocks. *Asteracanthion tenuispinus* is found less frequently.

Animal life increases where the rocks are covered with hard, brittle and useless sponges, which first make their appearance here, and are so far characteristic of this region as to form the facies of *littoral Spongieta*. They are of three species:—1. *Sarcotragus spinosulus* (which harbours some Annelides, such as *Lumbriconereis Nardonis*, *Polynoë squamata*, *P. elegans*); 2. *Geodia placenta* (which, besides the aforementioned Annelides, supports *Nereis Costæ* in large numbers, and *Saxicava arctica* and *S. Guerini* embedded in the sponge), resembling the *Tethya lynceurnium* in its texture, and 3. *Reniera calyx*.

On coasts sheltered from the full force of the prevalent winds, Bora and Scirocco, on the surface of rocks covered with Algæ, are found elegant Bryozoæ, such as the dark *Lepralia Heckelii* and a bright red *Cellepora*; adhering to the rocks, *Haliotis tuberculata*, a shell extending as far as Guernsey, which is its most northern limit, *Patella cærulea*, *P. vulgata*, *Chiton siculus*, *Fissurella gibba*; species of *Trochus*, *Murex*; *Arca barbata*, *A. lactea*, *Lima squamosa*, *Spondylus gadæropus*. Underneath the rocks several nudibranch sea-snails seek shelter, such as *Doris Villafranca*, a beautiful dark blue snail with golden, white, and light blue lines, also *D. argus* and *Elysia splendida*, a snail of exquisite beauty found and described by Dr. Grube,¹ and displaying the most brilliant colours (it is in many respects similar to *Acteon Hopei* of Verany).

Inside the rock swarms of *Lithodomus lithophagus*, also *Galeomma turtoni*, *Venerupis Irus* are to be found. The Crustaceans *Eriphia spinifrons* and species of *Sphæroma* likewise hide here, also a number of Annelides, such as *Sabella*, *Terrebella*, *Eunice*, soft sea-worms of various lengths which inhabit the rocks, *E. sanguinea*, for instance, attaining a length of 2 feet and more, *Polynoë*, and sporadically *Bonellia viridis*.

Nullipore ground affords protection to *Serpula aspera*, *Eupomatos uncinatus*, *Terrebella corallina*, *T. spiralis*, *Eulalia macroceros*, *Polynoë areolata*, *P. clypcata*, &c., besides several Crustacea. Foremost amongst the latter are *Palæmon squilla*, *Galeomma turtoni*, *Chiton cajetanus*, together with

¹ "Ein Ausflug nach Trieste und dem Quarnero," p. 86. By Dr. A. E. Grube. Berlin: 1861.

Saxicava artica and the *Lima*, a kind of scallop, which constructs for itself a comfortable nest in and by means of the coral-like weeds. Such are the characteristic forms.

Where broken rocks rest upon sand or shingle, gravel or mud, grows the sponge *Ancorina verruca*. Under similar conditions is found an enormous limivorous Annelide of extreme beauty, *Sabella Spallanzanii*, which attains a length of as much as $16\frac{1}{2}$ inches, and appears in groups, resembling submarine palms or tree-ferns.

Where the position is sheltered, and the shingle, being undisturbed, is covered with a fine coating of sea-weed, are found the shell-framing Annelide, *Spirorbis pusilla*, and the Crustaceans *Sphæroma serratum*, *Amphitoë Prevostii*, and *Gammarus Olivii*. This is the only locality in which appears the large black periwinkle (*Littorina litorea*).

Where there is dense vegetation, with or without sponges, the genera *Caprella* and *Idothea*, *Acantonyx lunulatus*, are characteristic; also the beautiful little univalves *Rissoa*, wonderfully varied in colour and form. Myriads of *Cerithea* are to be found amongst the grass-wrack, besides *Buccinum*, the bivalve *Modiola costulata*, species of *Trochus*, and a number of Annelides, foremost amongst which *Nerine vulgaris*.

Cystoseira or Sargassum-tangles harbours the characteristic facies of *Pisa Gibsii* and *Mitra Savignyi*, and on the branches of the tangles creeps the Annelide *Euphrosyne myrtosa*, amongst many other similar species.

On shingle and loose rocks, exposed to the heaviest roll of the waves, appear *Sipunculus nudus* (the *Syrinx* of Forbes), the bivalve *Mya arctica*, and *Heterocirrus saxicola*, a soft and very delicate Annelide discovered and described by Dr. Grube,¹ to whom it owes its name: it is found in narrow channels of the hard limestone, probably worked by its own industry.

On coarse sand appear *Venus decussata*, *V. aurea*, *Buccinum reticulatum*, *Cardium edule*; on fine sand, *C. tuberculatum*.

Where the sand, or mud, is covered with dense *Zostera*, animal life is still more numerous, and is characterised by several species of *Buccinum*, the

¹ "Ein Ausflug nach Trieste," &c., pp. 47, 66.

Echinoderm *Asteriscus ciliatus*, *Phasianella pulla*, *Cerithium vulg.*, *Trochus Biasoletti*, and *Cyclonassa nerithea*, a curious little whelk resembling a nerithea in shape, creeping on the sand and burrowing in it.

In shallow and sheltered creeks, whose muddy bed is covered with *Valonia*, is found a numerous variety of small Crustaceans, viz., *Gammarus scissimanus*, *Amphitoë guttata*, *Cymodoce pilosa*, *Sphæroma Furinii*.

Loam or red clay bed is rare, and affords little attraction to animal or vegetable life; the characteristic species are *Gebia litoralis*, *Scobicularia piperita*, and species of *Sphæroma* and *Amphitoë*. This is a favourite site for the propagation of the sand-smelt (*Atherina hepsetus*) and various species of grey mullet (*Mugilidæ*); in the month of April the young fry is caught by the million in the Bay of Dobrigno, and transferred to the lagoons of Venice and the *valli chiuse* (fish-ponds), where they are reared as nourishment for other fishes.

On black muddy ground, composed of decaying animal and vegetable matter, and in the shallows of sheltered bays, the characteristic Annelides are *Cirratulus Lamarckii*, not found elsewhere, also species of *Clymene*, *Glycera alba*, hitherto known only in Norwegian and Danish waters; the Mollusks *Cerithium scabrum*, *Natica pulchella*, *Trochus canaliculatus*, *Venus nitens*, *V. læta*, *Psammobia vespertina*, &c., also prevail here.

ZONE IV.—THE SUB-LITTORAL ZONE, extending from 2–10 fathoms; average temperature 57 to 59° F., subject to slow changes; pressure at 6 fathoms 2·13 atmospheres; the variations of the temperature are only slightly less than those of the surface waters; effect of waves, slight. This is the region of the sea-flags, or tangles, lying beyond the lowest ebb, which are overgrown by dense *Cystoseira*. The number of Algæ is very much reduced, as also the prevalence of the different species, only forty-four species belonging to eighteen genera being found here. On the sea-shrubs live a quantity of Mollusks, Actiniæ, and Ascidians. Characteristic are four Crustaceans, one Annelide, ten Mollusks, two Echinoderms, one Polyp, and one sponge. The latter is the *Aplysina aërophoba*, a remarkable yellow sponge which grows on craggy rock-inclines, mostly covered by more, or less, dense

Cystoseira, shining like smooth yellow leather whilst immersed, but changing to dark green when exposed to the air; it is peculiarly characteristic of depths of 5 to 6 fathoms. The *Spongia Quarnerensis* is also found adhering to the tangles.

Here abound the Crustacean *Galathea squamifera* and the univalves *Aplysia depilans*, *Buccinum ascanias*, *Cerithium vulg. var. gracile*, and most characteristic of all are the Annelides *Lumbriconereis quadristriata* of Grube. In shallow waters on bare rock, or shingle, appear the bivalve *Pinna squamosa*, the Ascidians *Cynthia microcosmus* and *C. papillosa*, a large species in form somewhat like the common species, but of extreme beauty from the effect of its colour; its tough skin is thickly overset with disks of the brightest scarlet; it is known here by the name of *Limone di Mar*, or sea-lemon.

The Polyp *Actinia bellis* here attains its maximum development, the sea-urchin *Echinus brevispinosus* also appears, and amongst the rocks is found the common lobster, *Homarus marinus*.

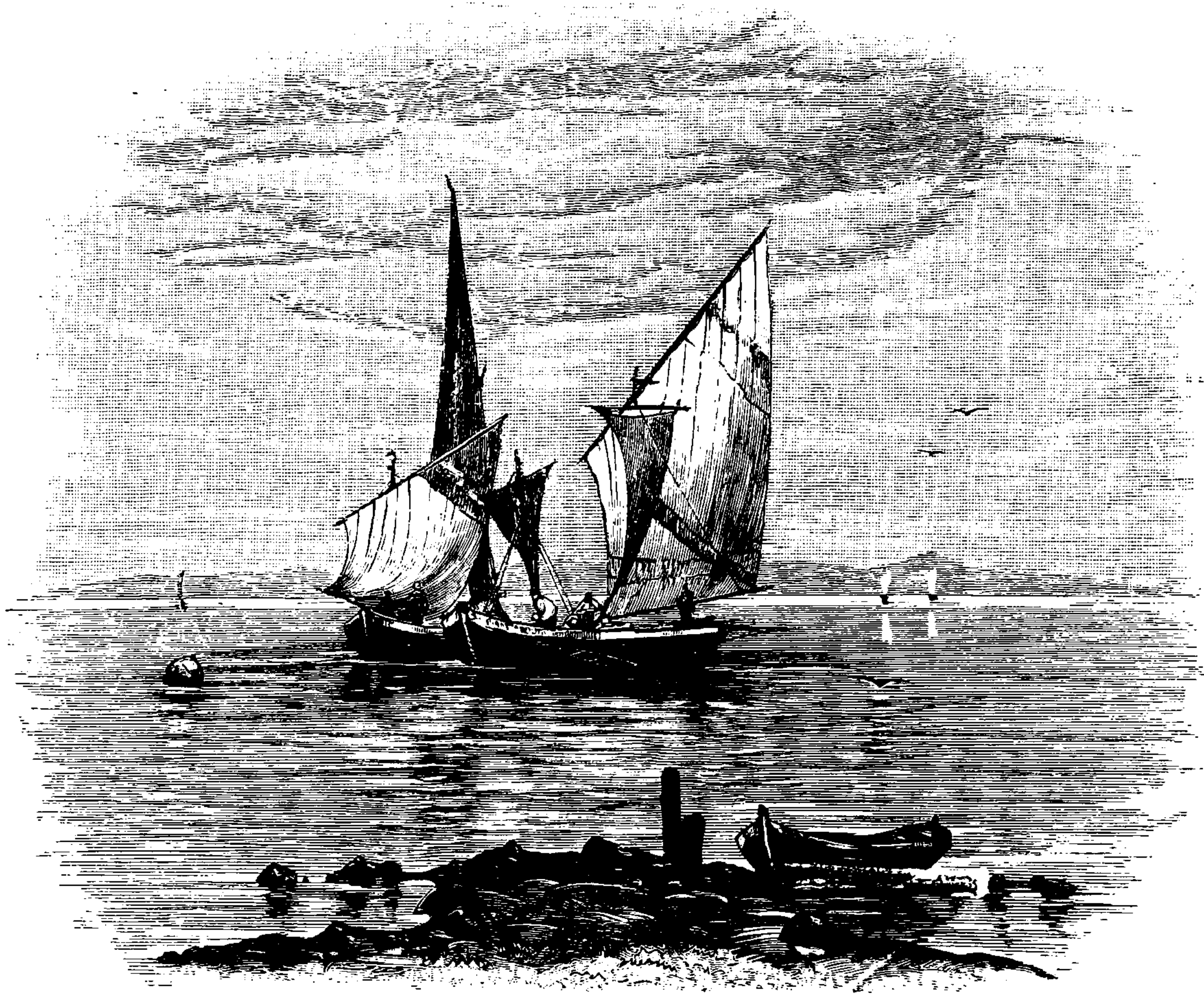
On clean sand is found the elegant crab, *Gonoplax rhomboides*, also the bivalve *Cytherea chione*, and the Echinoderm *Astropecten aurantiacus*, which, however, only attains to its maximum of development in the next region. On clean clay beds appear *Venus verrucosa*, *Modiola barbata*, *Cardium exiguum*, different species of *Pectines* (*P. sulcatus*, *P. jacobæus*, *P. polymorphus*), and *Echinus microtuberculatus*.

The oyster, *Ostrea edulis var. cristata*, is rarely found in the Quarnero, but otherwise abounds in this region, chiefly at Val Cassione, on the island of Veglia.

Black clay supports a number of Foraminifers, such as *Miliola obesa*, *Rosalina varians*, and *Acervulina inhærens*.

The *Zostera* fields swarm with animal life, the most characteristic of this region; most prevalent amongst these are *Sicyonia sculpta*, *Palæmon rectirostris*, *Leucotoë denticulata*, and *Ilia nucleus*; also the Annelides *Serpula echinata*, and *Aspidosiphon Mülleri*.

Forms found in the littoral zones, such as *Idothea appendiculata*, *Lysianassa spinicornis*, *Trochus pyramidatus*, here attain their maximum of development.



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Cardium echinatum, *C. lævigatum*, the sea-urchins *Echinus brevispinosus*, and especially the enormous *E. melo*, which presents the characteristic facies, occupy rocks covered with loose gravel, or grit.

Polyps of the *Gorgonia* genus, such as *G. verrucosa*, *G. Bertoloni*, first appear in 15 fathoms, and increase in number with the depth.

Where *Cystoseira* grows on rock, or loose stones, or broken shells, the crustaceans *Pisa armata*, *Porcellana platycheles*, *Atelecyclus heterodon*, *Ethusa mascarone*, *Inachus thoracicus*, are particularly characteristic. They are joined by *Xantho floridus*, *X. rivolosus*, *Pagurus maculatus*, *Pilumnus hirtellus*, and *Galathea strigosa*, which here attain to their maximum. *Stenorhynchus phalangium* here commences to appear and increases with the depth; *Portunus longipipes* is on the decrease.

The characteristic Annelides are *Euphrosyne mediterranea*, *Eulalia viridis*, and *Polyopthalmus pictus*, the latter a remarkable one described by Quatrefrages (the *Nais picta* of Dugès).¹

Under similar conditions appear the Mollusks: *Fusus rostratus*, *Cardium exiguum*, and *Turbo rugosus*; on the tangles, *Chiton Rissoë*, and *Fissurella græca*; on the branches *Doris tuberculata*, a Celtic form, *Aplysia marginata*, *Fusus syracusanus*, *Mitra ebenus*, *Cerithium pulchellum*, *C. minutum*, *Rissoa Bruguieri*, also the bivalve *Anatina pusilla*. Besides these many species of *Trochus*, *Cerithium*, and *Rissoa* are found, characteristic of the littoral zone; they disappear in the course of this region.

Where *Sargassum* grows scattered on gravel, or grit, and loose stones, life is still more varied. Inside the stones dwell *Saxicava Guerini*, *Anceus forficularis*, and attached to the outside of stones are *Serpula contortuplicata*, *S. aspera*, *Pomatoceros tricuspis*, and *Spirorbis pusilla*, which cease here. The Polyps *Cyathina striata*, *Actinia carciniopados*, and *A. bellis*, likewise appear in their company.

The Ascidian *Phallusia intestinalis*, whose mantle is invariably incrustated with *Modiola discrepans*, adheres to stones (Philippi cites this as the ordinary

¹ Quatrefrages, "Annales des Sciences Naturelles," iii. série, tome xiii., 1850, p. 8; and Grube, "Ein Ausflug," &c., p. 49.

appearance of this small bivalve); also *Tethya lyncurium*, a species of sponge rendered firm by containing numerous needles of flint throughout its substance, extending to Celtic waters.

The Crustaceans *Lambrus angulifrons*, *L. massena*, *Dromia vulgaris*, *Ethusa mascarone*, *Eurynome scutellata*, *Maja verrucosa*, are here characteristic.

Annellides are less abundant. The most characteristic are *Cerebratulus spectabilis*, *Meckelia annulata*, and a beautiful violet *Eunice*, new to the European fauna, discovered and described by Dr. Grube:¹ it is similar to the *E. violacea* of Oersted, though only half its size, viz., $2\frac{1}{2}$ inches long.

The characteristic species in this zone are the univalves *Fusus rostratus*, *Ovula spelta*, and *Dentalium entalis*, a Boreal species; the bivalve *Solenensis*; the sea-urchin *Schizaster canaliferus*; the star-fishes, *Asteriscus verruculatus*, *Asteracanthion glacialis*, *Alecto mediterranea*; and the cucumbers *Holothuria tubulosa* and *Cucumaria doliolum*.

The Polyyps *Gorgonia verrucosa* and *G. Bertoloni* rise amid the Cystoseira and Sargassum in the form of shrubs, whose withered branches are often entirely covered with the cherry-red-coloured *Sympodium coralloides*. These, again, are varied by *Tubularia larynx*, *T. ramosa*, *Lepralia tetragona*, and *Filograna implexa*, which either grow amongst the tangles, or are interwoven with, or cling to, their branches.

More numerous than elsewhere appear the snails *Doris cærulea*, of a beautiful violet tint, *Æolis Bellardii*, *Pleurobranchus* species, and *Tylodina citrina*, a species of a sulphur-yellow colour.

Clean gravel and coarse sand harbour most of the foregoing species, but in fewer numbers. The most characteristic form of this locality is *Venus verrucosa*, both as regards abundance and development. The bivalve *Tellina donacina* has a wide horizontal extension, and it is found here in the company of a quantity of Annellides, especially *Borlasia* species, *Meckelia annulata*, besides a beautiful green *Phyllodoce*.

On clay-bed covered with scattered *Dictyomenia*, the number of groups

¹ See "Ein Ausflug nach Trieste," &c., by Dr. A. E. Grube, p. 61. Berlin.

of the Ascidians *Phallusia cristata*, and more especially *P. mammillata* entwined with *Dictyomenia*, are most characteristic. Quantities of *Turritella communis* and *Aporrhais pes pelicani* here first make their appearance, whilst the bivalves *Corbula nucleus* and *Pecten inflexus* seem to be limited to this region, and form one of its principal facies. The Capanus, or Dry-rot-worm, *Teredo navalis*, the "calamitas navium," or the scourge of vessels, as it has been called, is found in sunken pieces of wood, and is especially prevalent at Sebenico. Lastly may be noticed the Annelides *Aphrodite hystrix*, *A. sericea*, the Crustacean *Portunus plicatus* and species of *Ophiolepis*.

Some species descend here from the former region, such as *Lambrus angulifrons*, *Portunus Rondeletii*, &c.; the Echinoderms *Asteracanthion glacialis*, *Astropecten aurantiacus*, *A. platyacanthus*, and *Echinus microtuberculatus*. But they disappear entirely in the course of this zone; *Astropecten aurantiacus* is at its height of development here.

Last of all may be mentioned on loam-beds the sponge *Esperia massa*, and other yellow and red sponges; also the Echinoderms *Echinaster sepositus*, *Ophioderma longicauda*, *Astropecten pentacanthus*, and *Cucumaria pentactes*: the latter has a northern extension.

ZONE VI., forming the lowest declivity of the shore-incline, and a great part of the bed of the Gulf, including a number of channels and larger bays, extending from 20 to 45 fathoms' depth, in which respect, as also to some extent also in character, it corresponds with Professor Forbes' *coralline zone*. Rocky precipice, whose base consists to a great extent of stone fragments and *débris*; bed chiefly loam, or clay; springs from the limestone rock below, influencing the degree of saltness, and the temperature of the water; influence of light reduced to a minimum, but the difference between day and night still perceptible; pressure at 30 fathoms, 6.35 atmospheres; absolute quiescence of waters; change of temperature slow, and the difference between the extremes 16–18° F.

The characteristic forms of the Mediterranean flora vanish, and there remain for the most part only general Atlantic, Celtic, and Scandinavian.

The vegetation decreases markedly below this point, and is only represented by some species of *Dictyomeniæ*, which reach down to 50 fathoms, and are characteristic of these depths. The characteristic fauna comprises three Crustaceans, two Annelides, fourteen Mollusks, three Echinoderms, three Polyps, and four Sponges.

At the bottom of the shore-incline, formed by stone *débris*, and more seawards, on loam or sand-beds, amongst the mostly distorted forms of *Cystoseira*, which still grow here and there, and heaps of broken fragments of shells, which have accumulated in course of time—the most characteristic forms are the Annelide *Onuphis tubicola*, the bivalves *Venus ovata*, *V. fasciata*, *Cardium oblongum*, *C. punctatum*, and the Polyp *Eschara cervicornis*. Besides these, some few characteristic species of the former region still appear, but are on the decrease.

On gravel and scattered fragments of shells, stone, or Nullipores, in 20–30 fathoms, forming the bed in a wide circle around the island of Lussin, and partly also that of Veglia, and also less prominently so in other parts, are quite characteristic: the Annelides *Serpula venusta*, *Vermilia clavigera*, *Eunice gallica*, *E. norvegica*, *Nereis Dumerilii*, and *Cerebratulus marginatus*, mostly Celtic forms; the Mollusks *Fusus lavatus*, *Turritella triplicata*, *Pleurotoma Philberti*, and *Turbo rugosus* in swarms; *Chiton lævis*, *Capulus hungaricus*, both Boreal forms, small elegant specimens of *Pecten* (*P. pusio*, *P. testæ*, *P. pellucidus*, *P. opercularis*); swarms of *Comatula* (*Alecto*) *mediterranea*, also well-developed and many-coloured varieties of the Boreal species *Ophiotrix fragilis*, *Astropecten pentacanthus*, and *Retipora reticulata*.

Forms characteristic of the whole region are found here, such as *Lysianassa humilis* in hollow sponges; the Annelide *Terebella pustulosa* on plants and sponges; the Mollusks *Turritella quadricarinata*, *Dentalium dentalis*, and two Boreal bivalves, *Venus fasciata* and *Cardium lævigatum*.

On uniform and extended loam-beds appear, in dispersed groups, the Crustaceans *Alpheus ruber*, *Galathea rugosa*, *Corystes dentatus*, and swarms of *Portunus plicatus*; also *Maldane glebifex*, an Annelide described by

Dr. Grube,¹ which, wrapped in 1–2 inch loam-sausages about the thickness of a finger, cover the bed by the million, and are easily taken for mere lumps of earth. On the same ground dwell *Terebella crocea*, *T. pustulosa*, *Sabella brevibarbis*, adhering to Ascidiæ, Dictyomeniæ, or fragments of shells, also swarms of *Aphrodite hystrix*, more rarely *A. aculeata*; besides these are found *Clymene digitata*, *Nereis Dumerilii*, *Lumbriconereis unicornis*, *Sigalion tetragonum*, *Chætopterus pergamentaceus*, *Protula protensa*, and *P. Rudolphi*, one of the most magnificent of its genus, adorned by the most brilliant colours (the *Serpula intestinum* of L.); *P. protensa*, though less brilliant in its colouring, is perhaps as beautiful, on account of the more tasteful and delicate diffusion of its tints.²

The Mollusks *Bullæa planci*, swarms of *Aporrhais pes pelecani* and *Turritella unguina*, more rarely *T. triplicata*; *Trochus granulatus*; here and there *Dolium galea*, the largest snail of the Adriatic; *Cassidaria echinophora*, *Tapes geographica*, *Cardium ciliare*, *Isocardia cor*, *Pectunculus pilosus*, a Boreal form, and *Nucula sulcata*, all abound here. Amongst the Echinoderms *Holothuria regalis* is characteristic by their abundance; *Ophiolepis ciliata* are numerous, but *Cladodactyla pentactes*, which has a wide northern extension, *Cucumaria tergestina*, *Echinaster sepositus*, *Asteriscus palmipes*, *Asteracanthion glacialis*, *Ophioderma longicauda*, are scarce.

The characteristic Polyps are *Mammillifera univittata*, *Alcyonium palmatum* in large quantities; *Pennatula phosphorea*, or sea-pens, and *Cyathina striata* on the shells of *Turritella*.

The Sponges found here are *Raspailia stelligera*, *Spongia adriatica*, *Cacospongia scalaris*, and *Esperia Lorenzii*.

The Norway Lobster (*Nephrops norvegicus*), found in swarms locally distributed over the deepest parts of the northern and central portion of the Gulf of Quarnero, must be considered a colony of an entirely foreign form, as it is not met with in any other part of the Adriatic. In its company appear, imbedded in and firmly adhering to the mud, *Virgularia*

¹ "Ein Ausflug," &c., by Dr. A. E. Grube, pp. 46, 62, 63, 65. Berlin: 1861.

² See Grube's work, "Ein Ausflug," &c., pp. 51, 63.

multiflora, a representative species of the Boreal form *Virgularia mirabilis*, a form hitherto strange to the Mediterranean fauna, and altogether to the Lusitanian province. In the same locality are found *Alcyonium palmatum* and *Pennatula phosphorea*; and the Crustacean, *Galathea rugosa*, is more prevalent and prosperous here than elsewhere.

In order to account for the insular appearance of this association of northern representative forms it is necessary to assume that, as elsewhere where analogous appearances of Boreal *outliers* occur, these forms had a further southern distribution during the Glacial Period, and that in course of time, owing to a raised temperature of the waters, particularly in summer time, their distribution became limited to the deeper and cooler regions, as long as the nature of the bed proved suitable, and the pressure of the water was not too great.

The Gulf of Fiume, the Quarnerolo, and the Channel of Punta Croce are depressions in the bed to which this theory applies. Further to the south they are shut in from the open sea by a ridge of higher ground, which accounts for their isolation, whilst the lower temperature which prevails on the bed of the Quarnero, and the difference in the composition of the water, due to the limestone springs, must explain why they prosper here, whereas they do not occur in the neighbouring Dalmatian waters.

Ulterior investigation may possibly bring to light fossil remains of northern forms of Gasteropods and Lamellibranchs, now extinct in these waters. The discovery would go far to explain the phenomenon which has caused this apparent freak of nature, and to furnish the proof of what at present must remain an assumption, viz., that changes of temperature have taken place, which have destroyed some forms of life, whilst others have been able to assimilate themselves to the new conditions.

Mr. R. Godwin-Austen, in the work, "The Natural History of the European Seas," commenced by Professor E. Forbes, but edited and continued by him, says (p. 157), "the *Nephrops norvegicus* has its numerical maximum in, and is a good characteristic Crustacean for, the Scandinavian region, but it occurs abundantly in Dublin Bay; it has not, however,

according to Mr. W. Thompson, a general distribution—such as west and south, even throughout the Irish seas. We may feel sure, from its excellence as an edible species, that it has not been overlooked by fishermen, whilst its size, form, and proportions make it the most elegant Crustacean we have—a prize which no naturalist would overlook ; yet, strange to say, it has not been recorded from the western coasts of France, nor do we meet with it till we reach the Mediterranean. It seems to be abundant in the Adriatic,¹ in which sea it may be noticed, that several other outlying forms of northern types have also been met with.”

This is one of the many curiosities which abound in Natural History, affording abundant food for meditation to the student, and over which it is well worth his while to ponder.

On this head it is not out of place to recall to the reader Professor Forbes' reflections whilst dwelling on a similar, and not less interesting enigma, viz., that of the presence of certain littoral Mollusks on both sides of the Atlantic, and the problem how their migration from one side of the Atlantic to the other was effected, as it undoubtedly *was* effected in some manner which at best remains a mere conjecture. He says :—

“The student of history follows with intense interest the march of a conqueror or the migration of a nation.

“The traveller traces, with most breathless delight, every step of the progress of some mighty hero of ancient days.

“I have had my share of the pleasure when tracking the course of Alexander and his armies in Pisidia, and determining mile by mile the route of Manlius through Milius ; on ground, too, to the modern geographer wholly new.

“Yet, absurd as it may seem to those who have not thought of such things before, there is a deeper interest in the march of a periwinkle and the progress of a limpet.

“It is easier to understand how the son of Philip made his way safely through the sea, on his famous march from Phaselis, than to comprehend

¹ In the Quarnero Gulf.

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TERSATO, NEAR FIUME.

how the larva of a *Patella* crossed the fathomless gulf between Finmark and Greenland. It is a strong saying, but not said without a meaning, that the existence of Alexander may have been determined by the migration of the shell-fish. If I am right in my interpretation, we acquire a clue to the origin of the peculiar physical conformation of the world as it is, and to the disposition of those geographical arrangements upon which the development of nations and characters of men in a great measure depend."

ZONE VII. is that of the greatest depths, extending from 45 to 75 fathoms; limestone springs rise here and there; effect of light reduced to a minimum; pressure at 60 fathoms, 12.26 atmospheres; average temperature 52° F.; difference of extreme temperatures 5° F., and change very gradual.

The characteristic species are the Polyps *Aglaophænia myriophyllum*, and *Serialaria lendigera*; the bivalves, *Pecten glaber*, *Avicula tarentina*, *Venus ovata*, and *Venus fasciata*, and the univalve, *Turritella quadricarinata*, which ends the short list.

VERTEBRATES.

The distribution of the Vertebrates is much more extended than that of the forms hitherto described; their division by horizontal regions is to a certain extent practicable, but the limits are not nearly so well defined as is the case with the Invertebrates.

They are divided into two very distinct classes, viz. :—

I. The SEDENTARY class of fishes, composed of those which are bound to given limits, both horizontal and vertical; these being determined by the temperature or composition of the water, the depth, the nature of the bed or the adjacent land, or the quality of their food. This class, which is also called *Shore fishes*, is subdivided into what I shall term :—

(a) The *Rovers*,¹ which hover about within given limits, suitable to their particular predilections.

¹ I consider these divisions the most appropriate rendering of what Dr. Lorenz terms (a), *Grundschwärmer*; (b), *Grundstete*.

(b) The *Squatters*,¹ which are bound to given localities, and have their fixed abodes.

2. The MIGRATORY or Pelagic class (*voyageurs*), which frequents the deep, without reference to the coast or formation of the bed.

CLASS I.—SEDENTARY FORMS.

1. *Littoral* forms in depths of 0–6 fathoms, or within the third and fourth zones.

(a) *Littoral Rovers*.—On the open coast-lands most species of *Blennies* and *Gobies* abound, such as the ocellated Blenny, or Butterfly-fish, a British species here common; *Bl. palmicornis*, *Bl. tentacularis*, and *Bl. pavo*, rarer; the black Goby, a British species, common, and *G. capito* rarer. These genera are numerous represented in these waters, the Gobies by no less than twenty-two species, of which only seven are known in British waters; and the Blennies by fourteen species, of which four belong to the British fauna. Some of them are brilliantly coloured.

Calm and sheltered rocky shores are frequented by *Lepadogasteres*, or Suck-fishes, amongst which are three British species: the Cornish Sucker and the Connemara Sucker are the most prevalent of this genus.

The Wrasses hover about the littoral tangles and grass-wrack; they are very numerous, and are represented by twenty distinct species, only four of which are known in British waters. This is the characteristic genus of the Mediterranean region.

Amongst the most prevalent species are *Labrus turdus*, *L. merula*, *Crenilabrus pavo*, *Cr. melops* (the Corkwing), *Cr. quinquemaculatus*, *Cr. griseus*, *Cr. rostratus*, *Coris Geoffredi*, and *Coris julis* (the Rainbow Wrasse). They are very brilliant, and the last-named is the brightest of the painted beauties, exceeding all Adriatic fishes in splendour of colour.

Shallow *zostera* fields, on clay or muddy beds, are the favourite resort of the Atherines (*Atherina hepsetus*).

¹ I consider these divisions the most appropriate rendering of what Dr. Lorenz terms (a), *Grundschwärmer*; (b), *Grundstete*.

Shoals of the Sea-bream tribe, particularly the young, rise here from the lower zone they usually frequent : they are to be found in sheltered bays, or creeks, where the bed is muddy, or covered with sea-weed, and are particularly characteristic of this zone.

The most prevalent kinds are :—*Box Salpa*, also the Gilthead, a British species, and one of the most esteemed of fishes: *Sargus annularis* and *Oblata melanura* ; they are seen in shoals around the vessels at anchor, their broad silvery sides glancing in the water, in some striped with irregular bands of gold, in others marked with one or two dusky clouds, or tinged with brilliant ultramarine or purple.¹

(b) *Littoral Squatters*.—In the mud at the mouths of rivulets and streams, and in the lagoons, the common Eel (*Anguilla vulgaris*) is common, its long, slimy body beautifully clouded with purplish brown and salmon-pink.

Of the Amphibious Carnivoræ, the common Seal (*Phoca vitulina*),² the Sea-Wolf of most Mediterranean people, ranging from the northern latitudes, is said to enter the Adriatic, and occasionally to be caught at Ragusa, but not further north. They are believed to go ashore in the Ombla valley in quest of grapes during the vintage season.

The Adriatic seal “The Monk” (*Pelagus*, *Phoca*, or *Leptonyx monachus*) also belongs to the littoral forms, but makes its appearance only on the eastern shores of the Quarnero. It is reported not to be uncommon in the bay of Carin, but only when the Bora blows across the channel of Morlacca ; and it is abundant about the islands of the Dalmatian Archipelago.³

The tortoise (*Chelonia caretta*) must also be included amongst the littoral forms ; but it is rarely caught so far north as the Quarnero.

¹ See Forbes and Godwin-Austen.

² Consult Petter’s “Dalmatia,” also Cornalia, “Fauna d’Italia,” part i. p. 62 ; the identity of this species as applied to these waters is, however, doubted by many authorities ; E. H. Giglioli says that the assertion as to the presence of this species in these waters “è basato su erronea identificazione specifica” ; and it is not altogether impossible that the above species may have been confused with “the Monk.”

³ This species is said to commit great havoc in the vineyards of Sardinia and Sicily at the time of the vintage.

2. *Forms of the declivity and shallows* in depths of 15 to 20 fathoms.

(a.) *Rovers*.—The ragged steps and prongs of the rocky declivity, overgrown with tangles, also the rocky shallows, which here and there crown the deeper loam-beds, swarm with Sea-perches, several species of Scorpions, Gurnards, Wrasses, and Sea-brems, which form a characteristic *facies* of this locality, vulgarly termed *Pesci di Grotta*.

The most common are *Box salpa*, *Box boops* (the Bogue of British waters), *Sargus annularis* and *Oblata melanura*, which rove in large shoals. In smaller shoals are *Sargus Rondeletii*, *Pagellus mormyrus*, *P. erythrinus* (the red, or Spanish Sea-bream of British waters), *Cantharus orbicularis*, and *Charax puntazzo*.

Solitary mature specimens of *Dentex vulgaris* (the British Dentex, or Toothed Gilt-head, the much-valued *Dentale* of these climes), and *Chrysophris aurata* (the Gilt-head, or *Dorada* of these shores) roam about amongst the rest.

The Sea-brems are often joined by the Umbrina of British waters (*Umbrina cirrhosa*), less frequently by *Corvina nigra*, also by Bloch's Gurnard (*Trigla cuculus* Bl.), the Piper, or Lyra (*Tr. lyra*). The streaked Gurnard (*Trigla lineata*) only frequents the deep loam-bed. In their company also appear *Serranus scriba*, *S. cabrilla*, also the smooth Serranus (never *S. hepatus*), *Scorpaena porcus*, *S. scrofa*, *Labrus festivus*, *L. trimaculatus* (the Three-spotted Wrasse); a British species.

On the lower declivity and over deep crags range the Stone-basse (*Polyprion cernium*), the John Dory (*Zeus Faber*), sometimes also the Boar-fish (*Capros aper*), all belonging to the British fauna.

Several varieties of Sea-horses (*Hippocampus*) are found over the whole declivity down to 30 fathoms: these belong, however, rather to the pelagic class.

Most Cephalopods frequent the overgrown rocky ground in average depths: the Squid (*Loligo vulg.*), the Cuttle-fish (*Sepia officinalis*), which often rise to the littoral zones. *Sepiola Rondeletii*, *Octopus vulgaris* (the Poulp, or common Octopus), and *Eledone moschata* prefer the open sea, on loam-beds.

Other forms frequent the sand-banks and zostera fields, such as *Smaris vulgaris*, *Sm. gracilis*, *Mæna vulgaris*, *Trachinus draco* (the Great Weever) and *Belone acus* (the Gar-Pike), more rarely the Spet (*Sphyræna vulgaris*), the Scald-fish (*Arnoglossus laterna*), and several species of the Pipe, or Needle-fishes (*Syngnathus*).

Some *migratory* forms, especially the *Clupeidæ*, represented chiefly by the Anchovy and Pilchard (the Sardine of commerce), and a species peculiar to the Mediterranean fauna, *Cl. papalina*, periodically appear on these grounds.

(b.) *Squatters*.—The Conger-eel (*Conger vulgaris*) lurks in holes and crevices of the lower declivity. Where the declivity changes at no great depth into flat loam-beds, or narrow channels, is the dwelling-place of the flat-fish tribe, such as the Turbot (*Rhombus maximus*), the Italian Flounder (*Pleuronectes italicus*), the Common Sole (*Solea vulgaris*), *S. monochir*, *S. lascaris*, *S. lutea*, and the British species, Bloch's Topknot (*Phrynorhombus unimaculatus*).

3. *Forms of the deep-bed*.—These are all *squatters*; the principal group amongst which is that of the *Gadidæ*, or Cod tribe, a specifically northern family, only few of the less valuable species of which appear in these waters, such as the Poor, or Capelan (*G. minutus*), the Whiting (*G. merlangus*), the Bib, or Whiting Pout (*G. luscus*), the Hake (*Merlucius vulgaris*), the three-bearded Rockling (*Motella vulgaris*), all British species, which, with the exception of the last-named rare species, form the chief produce of the ground fisheries.

Amongst these live shoals of the red Band-fish (*Cepola rubescens*), Stargazers (*Uranoscopus scaber*), and *Serranus hepatus*, mostly imbedded in the mud, whereas the *Gadidæ* hover one or two feet above the bed.

The Rays come next in order of importance. These are the Thornback (*Raja clavata*), *R. punctata*, the Burton Skate (*R. oxyrhynchus*), *R. miraletus*, the Bordered Ray (*R. marginata*), the Eagle Ray (*Myliobatis aquila*¹), the Sting Ray (*Trygon pastinaca*), *Tr. brucco*; the Electric Ray (*Torpedo*

¹ This is rather one of the pelagic forms.

Galvanii), and another species *T. narce*. They inhabit exclusively the soft loam-beds in 20–60 fathoms water.

They are often joined by the Angler, or Fishing Frog (*Lophius piscatorius*), which, however, also frequents shallow waters.

The young and immature Sharks also inhabit these regions,—probably also the mature ones, although these are rather to be classed amongst the migratory class of fishes. Amongst them the Angel-fish (*Rhina squatina*), the Spiny Dog-fish (*Acanthias sp.*), the Spotted Dog-fish (*Scyllium sp.*), are the most prevalent; the Blue Shark (*Carcharias glaucus*) is rare; and *Centrina Salviani* is very rare.

CLASS II.—MIGRATORY FORMS.

The *migratory* or *pelagic* forms comprise fishes, Cephalopods, Medusæ, also some species of Tunicates, and Gasteropods, which plough the deep without fixed abode, and without reference to coast and bed. Their movements are determined entirely by the properties of their element, *i.e.* by the temperature, composition, and depth of water, as also by the amount and quality of the nourishment it affords. They come mostly in dense shoals, and this is the season most propitious for their capture; others, again, follow these shoals in pursuit of prey.

They appear near land only during certain months. At other times they are supposed to be in deep water, and perhaps far away. But absolutely nothing is known on the subject, nor is a satisfactory reason given why they approach the land: the idea of their coming for spawning, if not altogether a fallacy, is at all events questionable as regards the majority, whose ova and young are found at a great distance from the shore.

In the upper strata of water, down to 10 fathoms' depth, *Rhizostoma Cuvieri* are common, often as much as one mètre long, and 40 lb. weight, 99½ per cent. of which, however, is water, ¼ lb. being the actual weight of animal substance when exposed to the air. Less frequently met with are species of *Pelagia*, *Oceana ampullacea* (a kind of medusa), *Beroë cucumis*,¹

¹ The members of the Medusa tribe which appear to abound most in the Arctic Seas

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Cleodora, also appear sometimes with the outward semblance of so many minute icicles.

The representative forms of *migratory*¹ fish are the Basse (*Labrax lupus*), one of the most voracious, as it is also one of the best fishes frequenting these waters; the Grey Mullet species, *Mugil auratus*, the Sea-lamprey (*Petromyzon marinus*), mostly to be found in 12 fathom waters.

Mugil auratus often seeks the shallows in hungry shoals; *Labrax lupus* approach the shore mostly after rain, when the effect of the swollen streams and torrents is to cloud the sea; *Petromyzon marinus* is fond of the brackish waters.

The Herring tribe: *Clupea sardina*, the Pilchard of British waters, comes in tremendous shoals, less frequently the Anchovy (*Engraulis encrasicolus*), and in isolated forms the Shad, (*Alosa vulgaris*); they hover about half way between the surface and zostera and cystoseira banks, which lie in 15 to 25 fathoms, on which they settle for pasture. They are, however, chased by Dolphins down to the bed in 30 to 40 fathoms, and also by the Mackerel (*Scomber scombrus*), which attacks them from below, thus driving them to the surface.

The Pilchards seek for given temperatures of water more than any other fish, and, in the Quarnero, they seem to prefer the medium depths, where a temperature of 55° F. is to be met with. This temperature occurs twice a year,—in April to May, and in September to November, and these are the seasons in which they visit us; during the rest of the year they are absolute strangers to these shores.

The Pilchard is followed in spring by the family of Mackerels; the common Mackerel (*Scomber scombrus*) at their head. There is no fish of the migratory class that approaches nearer to the shore at certain seasons, but there is no doubt about its spawning in the open sea, and it approaches

¹ I.e. *migratory* in the sense that they migrate from the sea into fresh and brackish waters, and *vice versâ*, but not *migratory* as are the Mackerel and Tunny, which are representative species of the true *pelagic* class of fishes. Basse is, in fact, a shore-rover, Grey-mullet and Lampreys are fishes of the brackish waters.



PROMONTORE LIGHTHOUSE.

the shore only after the spawning is over; it frequents these waters in dense shoals from April to October, and is the most lucrative object of the summer fisheries. The Spanish Mackerel (*Sc. colias*), the Horse Mackerel (*Caranx trachurus*), appear in their company; also the Flying-fish (*Exocoetus volitans*), besides smaller shoals of the common Tunny (*Thynnus vulgaris*), and, more rarely, the Pelamid (*Scomber pelamys*).

Lichia amia and *L. glauca* (the Derby) are rarely met with; and the Sword-fish (*Xyphias gladius*) and the Pilot-fish (*Naucrates ductor*), thus called from its sometimes preceding vessels into harbour, as if to show them the way, belong rather to the exception.

The Remora, or Sucking-fish (*Echeneis remora*), is found adhering close to the bronchial aperture of Sharks, the Sword-fish, the Tunny, but it is very rarely met with.

Seriola Dumerilii (Yellow-tails), *Centrolophus* (Black-fish), *Coryphæna hyppurus* and *pelagica* (known by misapplication as Dolphins), and *Brama Raii* (Ray's Sea-bream) occasionally make their appearance in the Gulf of Trieste. The flying Gurnard does not appear to proceed north of Lissa.

Mullidæ,¹ or Red Mullet family, abound hovering about the shores in medium depths in summer, and retreating to the deep waters on the approach of cold weather: the striped Surmullet (*Mullus surmuletus*) is the most prevalent kind, the Red Mullet (*M. barbatus*) is found in lesser quantities.

Delphinus delphis (the common Dolphin), and *D. phocæna*, the former being the most prevalent, plough the deep in chase of the dense shoals of Mackerel, and Pilchards; although causing great havoc amongst the shoals of fish, and doing, often, great damage to the nets, they are seldom destroyed by the fishermen, by whom they are considered a favourable augury of a plenteous catch.

The huge Sharks,—such as the Fox Shark (*Alopias vulpes*), the Blue Shark (*Carcharias*), the Hammer-headed Shark (*Zygæna malleus*), so called on account of its peculiar hammer-shaped head, scud about in search of prey.

The Tope (*Galeus canis*) is often common towards the end of autumn;

¹ See note, page 32. Mullidæ belong to the class of shore fishes.

the Smooth Hound (*Mustelus vulgaris*) generally so;¹ the Grey Notidanus (*Notidanus griseus*), known as the *Pesce Manzo*, or "Ox-fish," from the resemblance of its eye to that of an ox, specimens of which weighing as much as 900 lb. have been caught, is, on the contrary, rare; and also another species (*Notidanus barbarus*, Nardo), a specimen of which was fished in the Quarnero in the year 1770. The other Sharks are all more or less rare; thirty species are enumerated as belonging to the Adriatic fauna, of which fourteen extend to British waters.

The Molebut, or Sun-fish (*Orthogoriscus mola*), is often found quite near the surface of the sea, and *Orthogoriscus planci* occasionally so. The *Hippocampus* is common.

RECAPITULATION.

Dr. Lorenz has found and enumerated 460 Invertebrates, Articulates, and Radiates; Dr. Grube, 412. Combining the two lists, we arrive at the following results: viz.—Mollusks, 220; Arthropods, 117; Vermes, 100; Radiata, 56; Sponges, 17; total, 510 species.²

The following number of the different types are especially characteristic of the various zones described by Dr. Lorenz.

Characteristic Species of the various Zones.

Zones of Dr. Lorenz.	Crustaceans.	Mollusks.	Annelides.	Polyps.	Echinoderms.	Sponges.	Total.
I.	1	...	...	...	...	...	1
II.	3	8	1	1	...	...	13
III.	10	40	6	4	4	3	67
IV.	4	10	1	1	2	1	19
V.	8	22	4	2	8	2	46
VI.	3	14	2	3	3	4	29
VII. ....	...	3	...	1	...	...	4
Total ...	29	97	14	12	17	10	179

¹ *Galeus*, *Mustelus*, belong to the class of shore fishes.

² These numbers refer to the Quarnero; Professor Stossich enumerates 13 cephalopods, 371

The third, or submerged littoral zone is the richest in animal, as it is also in vegetable, life, two-fifths of the above species being common to, one-fifth being exclusively found in, and one-seventh being characteristic of, this zone.

The relative figures are :—

Zones.	Species common to the various Zones.	Species found exclusively in the various Zones.
I.....	1	1
II.....	30	8
III.....	206	104
IV.....	139	16
V.....	187	32
VI.....	92	15
VII.....	6	3

Of those which have an “*extended*” vertical distribution in the Quarnero, there are 36 whose horizontal distribution are known; of these 8 have a “*limited*” extension (only Mediterranean), whereas 28 are known to have an “*extended*” horizontal distribution; of those which are limited to one zone, 59 are known to have a “*limited*,” and 71 to have an “*extended*” horizontal distribution.

If, however, the Celtic-Lusitanian region¹ be comprised within the denomination “*limited distribution*,” thus drawing into one region the Mediterranean, the Celtic-Mediterranean, the Celtic-Lusitanian and the Canary-Lusitanian regions combined, as against the Lusitanian, Celtic and Boreal regions, as representing the “*extended distribution*,” we find :—

<i>In the first instance (as above stated),—</i>	<i>horizontal distribution,</i>	
	<i>limited</i>	<i>extended</i>
extended vertical distribution in the Quarnero	8	28
limited to one zone.....	59	71

univalves, 191 bivalves, 369 crustaceans, and 311 vermes as belonging to the Adriatic fauna. See Appendix No. 5.

¹ The regions are according to the map in the “Nat. Hist. of the European Seas.”

In the second instance,—

horizontal distribution,
limited extended

extended vertical distribution in the Quarnero	27	.....	9
limited to one zone.....	103	.....	27

both of which results (we quote Dr. Lorenz) would speak against the theory of Professor Forbes (a theory which in the case of Algæ is fully borne out), viz.,—that an “*extended*” vertical distribution speaks, at the same time, for an “*extended*” horizontal distribution, and vice versa.

At any rate, the greater number of species, which, according to this theory, should have an “*extended*” distribution, belong, on the contrary, to the “*limited*” distribution in whichever sense we chose to comprehend the term “*limited*”; on the other hand, however, it is fully borne out in the instance of some species, such as, — *Ophiotrix fragilis*, *Asteracanthion glacialis*, *Echinus microtuberculatus*, *Xantho rivulosus*, and *Portunus Rondeletii*, which are distributed throughout most of the zones, and have, likewise, a wide horizontal distribution, even as far as the Indian Ocean and the Arctic regions.

The lower we proceed the higher becomes the percentage of Northern forms.

The following table shows the horizontal distribution of those species whose general distribution is known :—

Description.	Number of Species found in the Quarnero, whose general distribution is known.	Regions to which they are known to extend, and number of Species belonging to each region.		
		Lus.; Lus. Can.; Med.	C.; C. Med.; C. Lus.	Lus. C. Bor.
Polyps	7	1	6	—
Echinoderms	24	14	1	9 ¹
Annelides	27	10	13	4 ²
Crustaceans	49	19	28	2
Bivalves	66	22	25	19 ³
Univalves	76	48	12	16
Total	249	114	85	50

¹ Of which 4 are almost exclusively Boreal.

² Of which 3 ditto ditto.

³ Of which 3 extend to the Arctic regions.

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G. punctatissimus) ; or descend the rivers and enter the sea at regular intervals—such as the Eels, also *Salmo carpio* and *Salmo trutta* ; or ascend the rivers at certain seasons, chiefly for the purpose of spawning, such as the Shad, which only ascend the rivers in spring, the Sturgeon, and the Lamprey. The fresh-water Perch is also occasionally met with in brackish water.

Amongst the sea-fishes, the Italian Flounder (*Pleuronectes italicus*) frequents brackish waters, and even sometimes enters the rivers ; some frequent and prosper in the Lagoons—such as the Atherines, two Blennies (*Bl. gattorugine*, *Bl. galerita*), Sea-horses, and the Greater Pipe-fish ; others only occasionally frequent the lagoons and brackish waters—such as the Three-bearded Rockling, the Turbot, Brill, common Sole, Basse, several species of the Grey Mullet tribe, the Gilt-head, the Black-fish (*Centrolophus pom-pilus*), *Mæna vulg.* and *Sargus vulg.* ; whilst others only frequent the deeper channels in the vicinity of the lagoons, such as—the Black Bream, the *Umbrina*, the Red Mullet, the Sapphirine Gurnard, also *Gobius paganellus*, *Lichia amia*, *Scomber pneumatophorus*, the Horse Mackerel, and the Gar-Pike.

The Bogue, the Flying-fish, the Pilot-fish, the File-fish, the Molebut, also *Carcharias Milberti* and *Falx Venetorum*, are only accidentally met with in the lagoons and brackish waters.

The Eel, Flounder, Turbot, Sole, Gilt-head, Basse, Sand-smelt, five grey and two red Mulletts, and three Gobies are reared in the lagoons, the Mullet species, Turbot, Sole, and Gilt-head being introduced as young fry.

Only 126 species belonging to 86 genera of the sea-fishes, and 24 species belonging to 18 genera of the fresh-water fishes extend to British waters.

Of the sea-fishes, 125 species are more or less common all over the Adriatic ; 70 species are more or less rare ; 90 species are so rare as to be of no importance ; whilst 31 species are only quite accidentally met with ; 14 species belong more especially to the Venetian fauna, 77 species to the Dalmatian fauna, and 29 species are exclusively and only occasionally caught on the southern shores of Dalmatia ; 5 species belong specifically to the Adriatic fauna. Only 100 species have a recognised commercial value,

40 coming under the denomination of *prime*, whereas 60 are only consumed by the poor; the rest are absolutely worthless, excepting as manure, although many are of surprising beauty in form and colour.

Amongst the fresh-water fishes, only the Trout, Pike, Shad, Eel, Sturgeon, and Lamprey have any value, commercially speaking, and, of the invertebrates, 10 crustaceans and 30 mollusks.

NOTE.—The Italian fauna of both seas (Mediterranean and Adriatic) comprises about 570 species of fishes, of which 74 species are fresh-water fishes.

CHAPTER II.

HISTORICAL.—LEGISLATION.—THE CHIOGGIOTTI.

Historical.—State of the coast, political and economic.—Inland markets; fluctuations of the trade.—Trawlers.—Statistics.—Ice.—Salt.—Italian fishermen.—Legislation.—Privileges of the Italian fishermen.—Titles from which the fishing rights were derived under the Republic of Venice.—Treaty between Austria and Italy.—The Chioggiotti; their craft engaged in the Austrian fisheries; proceeds of their share in the fisheries.—Count Marazzi.—Professor Ninni.—Individual profit of the Chioggiotti.—Consul Revest.—Distribution of the Italian fishing fleet on the Austrian coast; value of craft and gear employed.—Total value of craft and gear at Chioggia and Pelestrina.—The Italian fisheries.—Italian fishing craft; ditto engaged in the Austrian fisheries; ditto engaged in the foreign fisheries.—Value of the Chioggia fisheries.—Imports and exports of fish at Venice.—Venetian fisheries.—Craft and crew.



THE Austrian fisheries partake of the character of our coast fisheries and the *petite pêche* of the French, and they are carried on in the manner and with the appliances in use many centuries ago. The political condition of affairs on the Adriatic shores has necessarily cast its shadow on the state of the fisheries. The constant change of rulers up to within the last sixty-five years impeded the organisation and consolidation of the country, and no thought was given, under such circumstances, to the regulation of fisheries, or to other economical measures of still greater importance. Even the long period of peace which followed the Treaty of Vienna, by which the Dalmatian coast, increased by Ragusa, once more reverted to Austria, proved of small avail to the newly-acquired provinces; there was a total want of union and consciousness of identity of interests with the rest of the Empire.

On account of its poverty, the country was looked upon in the light



BRAGOZZI AT ANCHOR.

of a burden,¹ as in the days of Charlemagne, when the conquest of Istria, Liburnia, and Dalmatia is described by Gibbon as an easy though unprofitable acquisition. A civil or military appointment to any post in Dalmatia was considered a banishment, as it is indeed even now. Thus, all interest in these provinces was nipped in the bud, and the brilliant history of Venice and Ragusa was entirely ignored..

It is not until very recently, and under the present reign, that the impulse has been given to deal with the existing order of things. Politically speaking, progress has been urged by the occupation of Bosnia and Herzegovina, the acquisition of which had become almost a question of political existence to Dalmatia. This shore-land, although in the possession of the finest natural harbours in the Mediterranean, and thus pre-eminently adapted as an outlet of commerce, was precluded from securing the advantages to which its natural position entitled it, as long as it remained a mere strip of coast without any back-country.² Economically speaking, the country has gained by the creation of a marine section of the Ministry of Commerce, and the execution of the more important harbour works, foremost amongst which may be mentioned those of Trieste,³ the great emporium of Austrian commerce; Fiume,⁴ which is fast becoming the great outlet of Hungarian produce, and the rival port of Trieste; and Spalato, which is the "coming" port of Dalmatia.

Lastly, an attempt is being made to organise and develop the fisheries, which have always proved a most important branch of industry to every country which has the good fortune to be in the possession of a seaboard, not only on account of the immediate profits it brings to those personally

¹ The remark of Emperor Joseph is characteristic; when told that all the roads, piers, forts, &c., had been constructed by the French during their occupation of Dalmatia, he said that he thought it was a pity they had been driven out of the country so soon.

² The greatest breadth of Dalmatia is only thirty-seven Italian miles; near Ragusa it is only one mile, and at Cattaro still less.

³ See "The Port of Trieste, Ancient and Modern," by Capt. R. F. Burton, H.B.M. Consul at Trieste (*Journal of the Society of Arts*, Oct. 29 and Nov. 5, 1875).

⁴ See "Fiume and her New Port," by G. L. Faber, Esq., H.B.M. Consul at Fiume (*Journal of the Society of Arts*, Nov. 9 and 16, 1877).

engaged in its exercise, but for the highest State reasons, as it is the best school for training seamen,—a fact which nowadays is generally recognised.¹

Hitherto, the poverty of the inhabitants, and the want of markets other than their own, where they could dispose of the superfluous produce of the fisheries, were the chief causes which acted in unison to damp all enterprise, and to restrict it to the most immediate wants of the communities themselves, and thus check a regular development.

But, by degrees, other markets are being opened up by the construction of railways, and, instead of the complaints formerly heard as to the want of sale, we now hear complaints of shortness of supply, and dearness of the prices. This is natural and easily explained. The same change has occurred in England, only in a much more acute form; the railways have brought about an entire revolution in the trade, which is now concentrated in the metropolis, and to such an extent that seaport towns draw their supply thence. This is by no means the case here; the railways have enlarged the market to some inland towns, it is true, but only, as yet, to a very limited extent. Yet the difference is such that hitherto the fishermen were dependent on the local demand; whereas, now, the consumer is mainly dependent upon the fisherman, and the difference is felt.

The increase of the demand and the opening-up of new markets should lead, by a very natural inference, to a proportionate increase in the enterprise of the fishermen. But this is only the case in a much less degree than it could be thought possible; the people require goading on to enterprise, and there is an entire want of that free impulse to which one is accustomed in England, which works on ahead, regardless of all obstacles instead of only

¹ Thus for instance, by France, under Napoleon III., and by Germany since 1870, who have done everything in their power to foster and encourage their national fisheries. This was particularly the case in Germany, whose fisheries had, since 1847, been on the decrease. The “*Deutsche Fischerei Verein*,” several establishments of pisciculture, foremost amongst which the I. Centralanstalt zu Hünningen have since been founded, besides a joint-stock company for Herring-fisheries started at Emden in 1872, with six boats, realising 87,000 florins gross profits on a capital of 105,000 florins. The exhibition of fisheries at Berlin is another instance of the importance attached to her fisheries by Germany.

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The disinclination of migratory fish to enter, in certain seasons, water which they otherwise frequent has been shown to extend to waters where trawling is unknown; and this amply proves that the periodical scarcity of fish which is noticed in other places has nothing to do with trawling.

The disappearance of fish from waters where trawling was carried on has repeatedly led to the usual outcry against trawlers, but the dispute invariably ends in the reappearance of the fish the next season, notwithstanding the trawlers.

It must be remarked that most of the charges against trawlers are due to the idea that the spawn of fish is destroyed by their action. But the notion is now exploded, since it has been proved that the spawn of most deep-sea fish is not deposited at the bottom, but floats freely in the water, and there is not the least evidence of spawn being destroyed by the action of the trawl.¹

One of more important innovations, the importance of which cannot be over-estimated, is the regular publication of detailed statistics on everything appertaining to the fisheries; by this means, an opportunity is given of finding out what is wanting, and where a screw may be loose. The issue of such statistics rests with the Marine Section; their great difficulty, however, is to overcome the suspicions of the fishermen, who are always inclined to think that information of the kind is required with a view to an increase of taxation: hence we may conclude that, as a rule, they are understated. Thus, their reliance is doubtful on the face of them, yet, by their regular recurrence, a standard is obtained by means of which inferences may be drawn, and this is their principal value. By such means we have the opportunity of ascertaining to some extent the quantities of fish annually brought to market, which, hitherto, we have only been able to judge approximately: there is no reason to doubt its increase, but it is only by the aid of figures that comparisons can be made and conclusions drawn, and elsewhere it has become an accepted fact, that where railway communication exists the more important a place as a fishing-station, the more difficult it is for the local inhabitants to procure fish.

¹ See "Sea Fisheries." By E. W. H. Holdsworth, F.L.S., F.Z.S., &c. London: 1877.

This coast is not likely to prove an exception to the rule, and, although the trade is yet in its infancy, it is no doubt capable of great development, if the value of ice were fully understood and recognised.

Ice becomes a necessary item in order successfully to carry on the trade ; and as there is a superfluity of it in Carinthia and Carniola, to be procured for the mere cost of transport, there would be no difficulty in introducing it as a necessary element of the trade.

One of the great drawbacks to development is also the State monopoly of salt. The fishermen are, it is true, allowed a certain quantity of salt at reduced prices, but not sufficient, and very often they fall short of their supply. Thus, when large hauls of mackerel, pilchard, &c., are made, so that they cannot be consumed in their fresh state, or the fishing craft are becalmed, the fish has often to be thrown away from want of a sufficient quantity of salt ; this ought to be remedied, and the fishermen allowed as much salt as they please, returning what is not consumed.

We are now brought to consider the position of the Italian fishermen on these shores.

They chiefly hail from Chioggia, in the province of Venice, a town composed almost exclusively of fishermen, and which up to 1866 was under Austrian dominion ; they go by the name of *Chioggiotti*, and are expert fishermen and mariners. Their boats, called *bragozzi*, and described elsewhere, are constructed at Chioggia ; they are good sea-boats and above the average size of the Austrian fishing-boats ; they are used exclusively for trawling (*cocchia*) ; the sails are, as a rule, of a dusky brick colour, and ornamented with various designs more or less fantastic, in order the better to recognise one another in the exercise of their vocation, especially at night-time, as they always fish in pairs.

These boats are to be seen all along the Austrian-Hungarian seaboard, where they are engaged for months far away from their homes. Their concourse in these waters dates from the most remote times, and they have always been able to sustain a reputation of being hardy seamen, skilled in their profession, sober and frugal in their habits, and daring, when it became a question of risking their lives either in the pursuit of their

own trade, or in saving the lives of their fellow-creatures from the fury of the deep.

The difference in the conformation of the Eastern and Western shores, the iron-bound character of the Western coast, the want of safe harbours and secure anchorage-grounds, as compared with the advantages which the Eastern coast affords, alike to the development of animal life and the industry of man,—these causes, combined with the proximity of the two shores, have necessarily led to the encroachment of the Italians on the rights of the Austrian-Hungarian fishermen, and to everlasting quarrels which descend from the most remote times, recurring on identical grounds.

Vice-Consul Count Antonio Marazzi has written a very interesting report¹ on the subject of the fishermen of Chioggia, and the laws regulating the fisheries in the Adriatic: from it much of the foregoing and following remarks are gleaned.

It appears that the privilege of the Italian fishermen to exercise their industry on the Eastern shores is based on usage rather than on right; yet the privilege seems to have been recognised under the Venetian Republic, as may be seen by their ordinances, and the custom is so fully established that Austria-Hungary has thought fit to recognise—or may be to tolerate—the continuation of the practice under the commercial treaty with Italy, subject, however, to the rights of the local fishermen and the municipal laws. This concession, or privilege, granted to the Italians by Austria, has become a matter of such importance to the Italians, that it was one of the main levers by which the renewal of the commercial treaty with Italy was brought about by Austria in 1878, it may be said, at the twelfth hour.

The regulations, decrees, and ordinances bearing upon the fisheries on the Austrian coast have retained an exclusively local character, and have not been embodied in a general law.

The exclusive rights originate from three titles, viz:—

1. *Privata proprietà* (private property);
2. *Baronia* (seigneurie);
3. *Comune* (communal);

¹ “Bollettino Consolare” of July, 1873.

the rights having been absolute in the first instance, whereas, in the second and third instances, they were confined to the usufruct of the produce, as an attribute of jurisdiction conceded by the reigning lord.

In the case of the *Communes*, this right extended only to those in possession of land (*dominio*), called *capo comuni* in contradistinction to the *comuni, vassali, soggeti, or tributari*.

As a rule, the possession of estates brought with them, as a natural consequence, the fishing rights over the adjacent waters; but there were exceptions in the case of waters held independently of the territory they washed, and which were transferable as any other property.

This theory was adopted by the Venetians, who, in emancipating the littoral communes (*comuni litorani*), drew the difference between *comuni di terra* and *comuni di mare*.

Those were held *di mare*, or *marittimi*, whose chief town (*capoluogo*) was situate either on the shore, or was in communication by water with the seas; whereas, those whose chief town was situate inland were considered *di terra*, though they might be in possession of seaboard.

The fishing-rights were conferred on the *comuni di mare*, to the exclusion of the *comuni di terra*. Hence arose the anomaly of some *Communes* holding fishing rights over tracts of water the shores of which belonged to other communities, which were thus excluded from the rights of fishing on their own shores.

The Republic, nevertheless, retained her supreme rights over the seas, and required, in each case, the payment of a nominal sum of one gold coin each year in acknowledgment of these rights.

The *comuni* and *baroni*, however, generally transferred their rights of fishing to the inhabitants of the bordering coast.

The *baroni* generally claimed a fixed rent, whereas the *comuni* saddled the fishermen with the engagement to supply the adjoining markets with fish at fixed moderate prices.

The Republic defended the privileges and rights of her subjects with the utmost rigour, and nobody dared encroach on them.

The law established by these ancient and traditional customs, and handed down from generation to generation, had thus become so engrafted in the

minds of the inhabitants of the coast, that when Austria first came into possession of the coast it was thought impolitic to meddle with it.

Even the Regolamento of Dandolo, the Provveditore of Dalmatia under the French in 1808, did not attempt to interfere with rights based upon usage, but only regulated the exercise of those rights, and thus we find these feudal principles retained, until a law of 1835 attempted to deal with them.

By virtue of this law the deep-sea fisheries were declared free, the rights of fishing within the territorial boundary—*i.e.*, within one mile of the coast—being reserved to the inhabitants of seaboard, and the ancient rights pertaining to the barons and the *Communes* were thus virtually abolished.

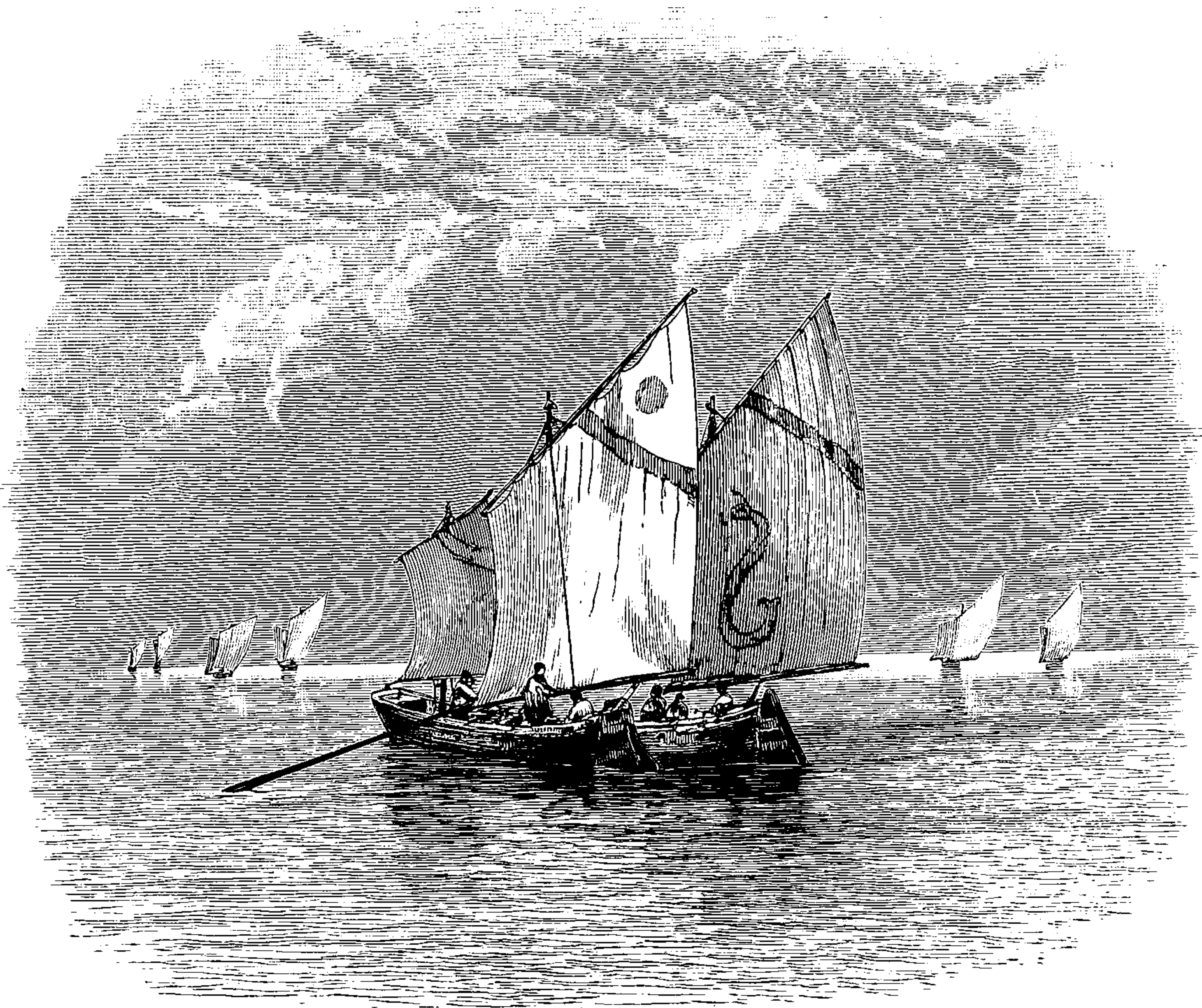
But the new law gave rise to so much litigation, that an explanatory notification had to be issued two years later, to the effect that fishing rights based upon private civil contracts, or derived from ancient conventional customs, were not infringed thereby.

Nevertheless, such rights were upheld only in exceptional cases, in order to prevent needless litigation, and the rule was only intended to ease the transition from the old to the new state of things introduced by the law of 1835, and, later on, more fully borne out by the general law of 1848, which abolished all feudal holding of landed property.

It must, therefore, be inferred that the possession of fishing rights based upon feudal principles have no longer any legal *locus standi*; moreover, the law does not exclude the right of transferring the fisheries to others by those not choosing to exercise the rights themselves; it is thus that many *Communes* have let their fisheries to the Italian fishermen within the territorial waters, thus giving rise to the protests and jealousy of the neighbouring local fishermen.¹

Beyond the general laws above cited, no special law concerning the fisheries in Austria-Hungary has been passed, owing, probably, to the difficulty that exists in reconciling the different interests, and at present it

¹ The *treaty* rights of the Italian fishermen are limited to the waters *outside* the territorial boundary.



BRAGOZZI LEAVING PORT.

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dependent on the Italian trawlers, such as the flat-fish tribe, the Norway lobster, and other kinds inhabiting the deep sea-bed.

The complaints that are made against the Chioggiotti are based chiefly upon the small-meshed nets in use by them ; that they fish the greater part of the year, and closer in-shore than their treaty-right admits, owing to which facts, it is contended, they disturb the spawning grounds (which has been shown to be a popular fallacy), and that they either catch or destroy a quantity of worthless fry.

The fact is, they offer great competition to the local fishermen, in as far as by their greater industry and laboriousness they are to a large extent enabled to regulate the market prices, whereas the local fishermen would prefer a monopoly in their favour, do as little work, and make as high prices as possible.

The question as to the spawn having been disproved, there remains the complaint as to the young fry, in respect of which is to be said that, undoubtedly, the local fishermen do infinitely more damage themselves by the use of the ground or foot-seine, worked off-shore, or in shallow creeks and bays,—a mode of fishing most commonly in use all the year round, and very pernicious to the development of the fry.

On the other hand, there is no doubt that the Italians do often fish closer in shore than they have the right to do, and this they should avoid in their own interest ; moreover, they are subject to the municipal laws wherever they happen to be, and the municipalities are able to enforce the rules as to the season of their fishing, and the limits which they should not overstep, by withdrawing their licences in cases of contravention.

In any case, the privilege derived by the treaty to the Italian fishermen of the Venetian estuary is the source of sustenance to a great number of the Italian population of that coast, and its withdrawal would cause great misery ; and it would be difficult for them to find a new field of action which would compensate them for their loss.

The average number of Italian boats fishing in the Austrian-Hungarian waters is about 600, of 6,000 tons burden, and a crew of 2,500 men : of these, 580—590 hail from Chioggia, the remaining 10—20 being Romagnoli.

According to statistics of 1869, the Chioggia boats engaged in the fisheries on the Austrian coast were thus divided:—

	Boats.	Tonnage.	Crew.
Istria ...	437	4,321	1,787
Croatia ...	64	547	278
Dalmatia ...	85	853	351
	<u>586</u>	<u>5,721</u>	<u>2,416</u>

This gives an average of ten tons and four men for each boat.

On the other hand, the Austrian fishing-craft is three times the number, but their tonnage is less than that of the Italian craft.

The crews of the Italian boats are one man for 2·4 tons, as against one man for 0·78 tons in the Austrian boats. Count Marazzi values the share of the Italian boats in the Austrian fisheries at—

	Kilos.	
	995,000	Gorizia, Istria and the Quarnero.
	7,000	Croatian coast.
	760,000	Dalmatian coast and islands.
Together,	<u>1,762,000</u>	kilos, of which—
		Francs.
	460,000	prime value 650,000
	1,302,000	ordinary „ 976,500
	<u>1,762,000</u>	kilos „ <u>1,626,500¹</u>

The greater part of this is sold on the coast, say, for about 1,000,000 francs; the sale is effected by middle men, the local dealers, who resell to the

¹ Assuming the quantity to be right, I should be inclined to put the value at, say, 400,000 florins (= 870,000 francs). Count Marazzi has, I consider, set down too high prices; but, on the other hand, he has understated the yield: hence it may be assumed that the value given may not be far out.

consumers at a large profit, and the balance is transported in their own boats to Venice, Chioggia, and other Italian ports.¹

According to the statistics of 1870, the value of imports of fish into Italy from Austria-Hungary was 1,486,606 francs; and the value of exports from Italy into Austria-Hungary 356,085 francs.

Comparing the two sets of figures, we find :—

	Francs.
Average value of fish caught by the Italian boats on the Austrian-Hungarian coast	1,626,500
Exports to Austria-Hungary	356,085
	1,982,585
Imports from Austria-Hungary	1,486,606
Value of fish caught by Austrian boats in Italian waters, not above, say	20,000
	1,506,606

Or a balance of 475,979 francs in favour of Italy.

The individual profit to the fishermen may be stated thus,² viz.—

	Francs.
Value of fish caught	1,626,500
From which deduct for expenses, wear and tear of nets, &c., taxes, &c.	276,500
	1,350,000

¹ Professor Dr. A. P. Ninni gives the following results of the Chioggia fishing-boats fishing in foreign waters (*i.e.* Austrian-Hungarian seaboard) :—374 boats, manned by 1,471 men, produce 2,900,000 kilos, value 2,270,000 lire; of which 1,700,000 kilos, value 1,770,000 lire, is sold abroad; and 1,200,000 kilos, value 500,000 lire, is brought to Italy for sale. But the value of the fish sold on the spot is here again set down at too high a figure, as in the case of Count Marazzi's estimate. I should reduce the amount by one-half.

² I am still quoting Count Marazzi.

to be divided amongst 600 boats and 2,500 men; = 2,250 francs per boat and 540 francs, or 248 florins, per man; or about $1\frac{1}{2}$ franc per day for the fisherman and his family. This is not over-flourishing, considering the constant life of toil and danger these men have to lead.¹

Consul Revest, formerly Italian Consul at Fiume, in his report of 1878, estimates the proceeds of thirty pair of boats fishing in the Quarnero at a still lower figure, viz. :—

	Florins.
One pair at 6 florins a day—30 pair at 6 florins } a day = 180 florins—for six months ... }	32,300
Less expenses, 10 florins a week	7,800
	24,500
Two-thirds to the fishermen	16,333

divided amongst 240 men = 69 florins per man, for 7 months.

¹ I should be inclined to alter the above calculation as follows :—

	Francs.
Value of fish caught	1,626,500
Deduct one-third, which goes to the owners of the boats as } their share of the yield }	542,167
Leaving	1,084,333

as the share of the crew, or, taking an average crew of 4 men per boat = 452 francs, or 203 florins per man.

If we deduct expenses, say 500 francs per boat for the season, including wear and tear, taxes, &c., we obtain the following result :—

	Francs.
Gross amount	1,626,500
Less expenses 500 francs per boat	300,000
	1,326,500
One-third share of owners of craft	442,167
Two-thirds share of crew	884,333

Or 369 francs = 166 florins per man.

But the yield of the year 1877 was exceptionally low; according to the official statistics it was only 198,187 kilos, against 272,402 kilos in 1878, and 319,978 kilos in 1879.

	Florins.
Taking the lowest average value of the yield at } 22½ soldi per kilo, it represents a sum of ... }	45,583
From which amount deduct expenses at the rate } of 500 francs per boat for the season, say ... }	12,900 ¹
Leaving	<u>32,683</u>

of which two-thirds, say 21,789 florins, divided amongst 240 men, = 91 florins per man, for the season of 7 months.

In like manner, the yield of 1878 represents a value of 62,652 florins, and a net value of 56,202 florins; of which two-thirds, or 37,468 florins, divided amongst only 30 bragozzi and 120 men, = 312 florins per man.

In the year 1878 the Italian fishing fleet was distributed as follows:—

Trieste	...	Winter season	60	Summer season	95
Rovigno	...	„	30	„	27
Pola	...	„	42	„	26
Lussinpiccolo		„	12	„	12
H. Croatian littoral		„	38	„	38
Zara	...	„	12	„	14
Spalato	...	„	27	„	8
			221		220

representing a value of about 300,000 florins; and the gear in use, a value of about 75,000 florins.

The following is an extract of a report made to the Austrian Ministry of Commerce on the subject of the Chioggia fisheries in 1862, for the preceding ten years, showing the number of fishermen, boats and tonnage thereof,

¹ M. Revest puts it at 7,800 florins only.

engaged, capital invested, and other details. These include the two fishing places Chioggia and Pelestrina.

41 *Tartani*.

Each craft has 5 shares of the gain	...	...	=	5 shares.
Crew of 6 men, each 1 share	...	...	=	6 „
41 × 11 × 130 florins	...	...	=	florins 58,630

399 *Bragozzi*.

Each craft has 2 shares...	...	...	=	2 shares.
Crew of 3 men, each 1 share	...	...	=	3 „
399 × 5 × 130 florins	...	...	=	florins 259,350

133 *Bragozzetti*.

Each craft has 1½ share...	...	...	=	1½ share.
Crew of 3 men, each 1 share	...	...	=	3 „
133 × 4½ × 130 florins	...	...	=	florins 77,805

626 *Battelli*.

Each craft has 1 share	...	...	=	1 share.
Crew of 3 men, each 1 share	...	...	=	3 shares.
626 × 4 × 130 florins	...	...	=	florins 325,520

300 *Battelli* and *Sandoli* engaged in the lagoon and *valli*-
fisheries, of which

100 *Boats*, with a total crew of 150, are estimated to gain—

37 soldi for the crew.

20 „ for the boat.

19 „ for the owners of the *valli* in which they are allowed
to fish.

76 soldi per day for 1 boat, or

76 florins per day for 100 boats, or, per annum, = florins 27,740

Carried forward florins 749,045

Brought forward florins 749,045

200 Boats, with a total crew of 300—

30 soldi for the crew.

20 „ for the boat.

50 soldi for 1 boat, or

100 florins per day for 200 boats, or, per annum, = florins 36,500

	Total florins	785,545
Profit on wholesale sale of fish, 5 per cent.		41,344
Ditto on retail sale of fish, 15 per cent.		145,921
Fish consumed by fishermen on board, say 5,000 @ 5 cents		
for 300 days		75,000
Gratuities		2,190
	Total florins	<u>1,050,000</u>

Tonnage of Craft.

	Tonnage.
41 Tartani	1,106
532 Bragozzi and Bragozzetti	3,764
626 Battelli	1,743
300 Battelletti	600
<hr/> Total 1,499	<hr/> 7,213

*5,000 Fishermen.**Capital invested.*

41 Tartane	@ fl. 4,500	
Gear	@ „ 1,000	Florins.
	<hr/> fl. 5,500	= 225,500

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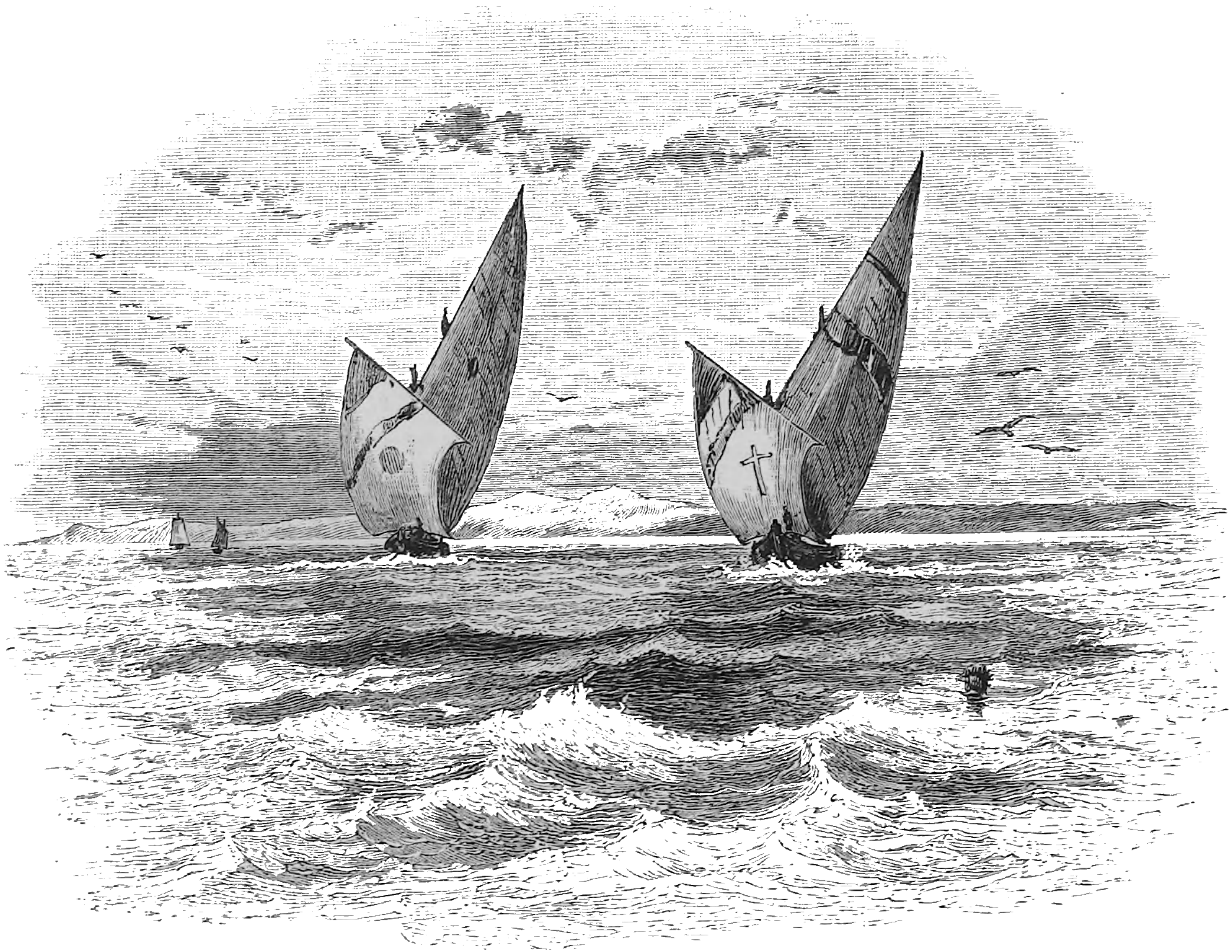
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BRAGOZZI RUNNING BEFORE THE WIND.

			Florins.
	Brought forward	=	225,500
532 Bragozzi	... @ fl. 1,200		
Gear ...	... @ „ 120		
	fl. 1,320	=	702,240
626 Battelli	... @ fl. 400		
Gear ...	... @ „ 350		
	fl. 750	=	469,500
300 Battelletti	... @ fl. 100		
Gear ...	... @ „ 17½		
	fl. 117½	=	35,250
	Total florins	...	1,432,490

Thus, we obtain a maximum of 203, and a minimum of 69 florins per man for the season, both of which estimates I am led to consider understated for reasons given elsewhere.

In any case the official estimate, which puts the share at 130 florins, must be considered the lowest possible figure; exceptionally bad seasons may account for lower estimates, but, on an average, I should be inclined to put it at double that amount, and, in some instances, it will be seen that it reaches a still higher figure.¹

On comparing, for instance, the official statistics for the last five years, we find that the shares of 18 Italian boats fishing in the Zara waters realised 10,136 florins per boat, and 1,382 florins for each man of the crew.

The season in which the Italian boats are allowed to fish on the Austrian coast commences in September and ends with April, which, deducting the festivities and holidays, would leave six months, or 180 days, clear.

The boats return home at given seasons, *i.e.*, at Christmas, Easter, All

¹ See Statistics. Dr. C. de Marchesetti estimates it at 300 florins

Saints' Day, the patron saint of the town in June, and for the fair in August. The scenes of festivity at these seasons are very gay and lively.

The return of the father, the brother, the son, the husband, and the sweetheart, is celebrated with a sincerity and good-will, tempered with sobriety, which is the result of the fisherman's humble and laborious calling, producing alike the simplicity of his habits and the morality of his life. His only ambition consists in becoming one day the owner of his own craft, in which he may continue and probably end the rest of his frugal, uniform and always perilous existence.

The number of fishing craft engaged in the fisheries of the Venetian estuary may be given at 3,000, of which 1,000 belong to the deep-sea fisheries and 2,000 to the lagoon fisheries. The deep-sea fishing craft (*barche da mare*) employ the whole population of Chioggia. In the year 1784, 164 *tartane* and 150 *bragozzi* were engaged in the deep-sea fisheries, and employed about 3,500 men.

At present, they are carried on mostly by the smaller *bragozzi*, which have increased to about 800, whereas the *tartane* have decreased to only about 50, about 6,000 fishermen being engaged.

The number of *pielegghi* has not perceptibly increased, the fisheries being carried on mostly by the *bragozzi*.¹

Italian Fishing Boats.

			Number.	Tonnage.	Crew.	Average tonnage.
1st class	...	...	430	3,867	?	9—
2nd „	...	...	11,222	39,620	?	3,53
In 1871	...	...	<u>11,652</u>	<u>43,487</u>	<u>?</u>	<u>3,73</u>
1st class	...	...	483	3,884	6,920	8—
2nd „	...	...	<u>13,543</u>	<u>44,901</u>	<u>30,788</u>	<u>3,32</u>
In 1876	...	...	<u>13,926</u>	<u>48,785</u>	<u>37,708</u>	<u>3,50</u>
In 1878	...	...	<u>15,441</u>	<u>52,339</u>	<u>?</u>	<u>3,39</u>

¹ *The Italian Fisheries.*—The Italian coast, including the islands, has an extent of 6,341 kilomètres, and the aggregate value of its territorial and deep-sea fisheries is variously estimated

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Italian Fishing Craft engaged in Foreign Fisheries, from 1864-1876.

Years.	Common Fishery.		Coral.		Sponge.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
1876.....	587	5,776	151	1,107	9	203
1875.....	695	6,115	243	1,972	17	261
1868.....	451	4,360	71	760	—	—
1867.....	407	3,951	74	833	16	278
1866.....	342 ¹	2,689	162	1,621	—	—
1865.....	288 ¹	1,965	137	1,344	—	—
1864.....	238 ¹	1,771	127	1,267	—	—

The common fisheries are carried on by Italian craft in France, Corsica, Greece, Monaco, Turkey, Algeria, Egypt, Tunis, Syria and Asiatic Turkey, besides Austria. The coral fisheries in France, Corsica, Monaco, Turkey, Algeria, Asiatic Turkey. Finally the sponge fisheries in Tunis.

CHIOGGIA FISHERIES.

	Kilos.	Lire.
Deep-sea fisheries	6,000,000	... value 2,100,000
Lagoon fisheries	700,000	... ,, 280,000
Total	<u>6,700,000</u>	... ,, <u>2,380,000</u>

Imports and Exports of Fish at Venice.

	Lire.
Imported by sea and land	value 980,550
Exported	,, 1,018,890

¹ Exclusive of the Chioggia boats, now included in the returns since Venetia reverted to the Italian kingdom.

VENETIAN FISHERIES.

1872.

Craft employed in the coast fisheries, 117; tonnage, 396.

Craft employed in the deep-sea and foreign fisheries, 681; tonnage, 5069.

FISHERMEN.

Deep-sea Fisheries.

Masters (<i>direttori</i>)	822
Fishermen	2,982

Coast Fisheries.

Fishermen	1,229
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Lagoon Fisheries.

Fishermen	2,850
						<hr/>
			Total	7,883

CHAPTER III.

FISHING DISTRICTS.—SEASON OF FISHING.—PRODUCE.

Fishing Districts.—Austria : Gorizia, Gradisca, Trieste.—Istria : Isola, Pirano, Salvore, Umago, Daila, Parenzo, Pola, Lussinpiccolo, Preluca.—Hungarian-Croatian littoral : Fiume, Buccari, Portoré, Segna.—Dalmatia ; Zara, Sebenico, Spalato, Ragusa, Cattaro.—Dalmatian Archipelago.—Season of Fishing.—Descriptive part.—Produce.—Pisces.—Sharks, Rays, Sturgeons, Perch tribe, Sea-perches, Red Mullet, Sea-breems, Scorpions, Meagres, Sword-fish, Scabbard-fish, Hair-tail, Horse Mackerel, John Dory, Black-fish, Dolphins, Mackerel, Tunny, Star-gazers, Weevers, Anglers, Gurnards, Flying-Gurnards, Gobies, Dragonets, Band-fishes, Blennies, Spets, Atherines, Mulletts, Sticklebacks, Trumpet-fish, Suck-fishes, Lophotes cepedianus, Ribbon-fishes, Coral-fishes, Wrasses, Cod tribe, Ophidium, Fierasfer, Sand-eels, Macrurus, Flat-fish tribe, Scopelidæ, Cyprinodon, Gar-pikes, Flying-fish, Salmon tribe, Herring tribe, Eel tribe, Pipe-fishes, Sea-horses, File-fishes, Sun-fishes, Lampreys, Lancelot.—Mollusks.—Cephalopods, Bivalves, Univalves, Tunicates.—Crustaceans.—Echinoderms.—Actiniæ.—Sponges.—Red Coral.



THE Austrian-Hungarian fisheries may be divided into three principal sections, viz. :—

1. Trieste and the coast of Istria.
2. Fiume and the Hungarian-Croatian littoral.
3. Dalmatian coast and Archipelago.

These are subdivided into the following harbour-masters' districts, given in the order of their importance :—

1. Trieste, Rovigno, Pola and Lussinpiccolo.
2. Fiume, Portorè and Segna.
3. Zara, Spalato, Ragusa and Megline.

These include the minor fishing places, such as Grado, Monfalcone, Muggia, Isola, Capo d'Istria, Umago, Parenzo, Orsero, Sansego, Lésina, Lissa, Lagosta, Macarsca, Trappano and Gravosa ; also Buccari, Selce, Segna, &c.

The sponge fisheries are carried on almost exclusively in the vicinity of the

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ground for red and grey mullet, basse, mackerel, pilchard, the gilt-head, and the red or Spanish sea-bream.

PARENZO.—The best fishing waters are off Punta del Dente. Red and grey mullet, basse, gilt-head, red sea-bream, pilchard, soles, both caught in large quantities, and crabs abound; the pilchards are salted and sent to Venice; the common fish, and half the “prime,” are consumed on the spot. Excess of “prime” is sent to Trieste.

The channel of LEME furnishes large quantities of grey mullet and basse.

ROVIGNO.—Same character as Parenzo. The Chioggiotti contribute one-fourth of the local consumption.

FASANA.—Similar in character, but more red mullet and scorpions.

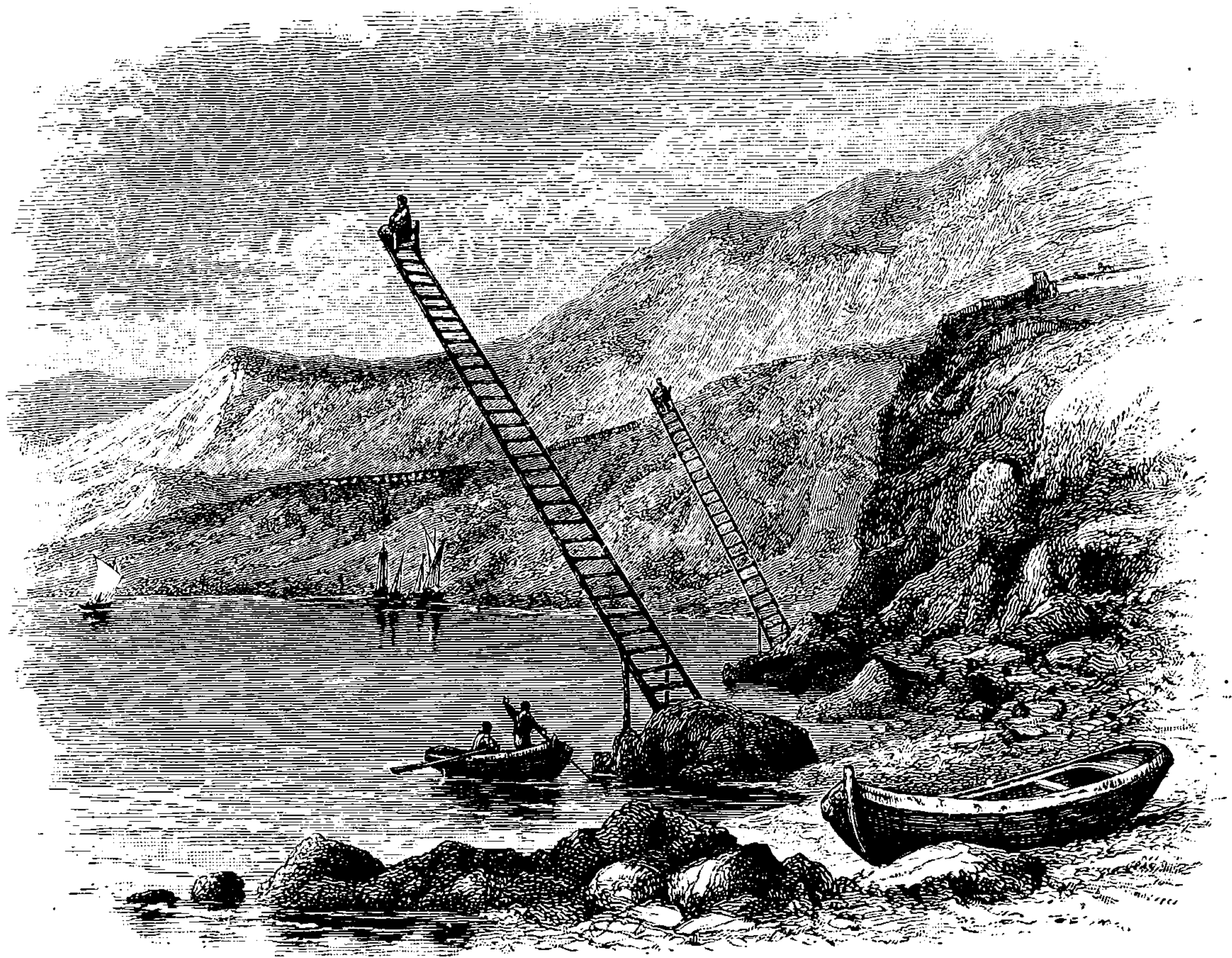
POLA is the best district in Istria for the tunny; otherwise, the character is similar to the foregoing. The waters lying between the Brioni Islands and Cape Promontore are favourable for the pilchard fisheries, which are carried on mostly by Italian fishermen; by the Chioggiotti with their trawling-nets (*cocchia*), and *Romagnuoli* (people of Romagna) with their seine-nets (*tratte*). The greater part of the yield is consumed of late years at Pola, where prices range high. The excess of pilchard is salted and exported, sometimes as much as half of the total catch; the excess of fresh tunny is also sent to Trieste and the Italian coast. The Italian fishermen furnish two-fifths of the market supply.

The number of fishermen has much increased of late years, and their profits do not seem to have decreased in the aggregate, owing to the large demand at Pola, and consequent high range of prices.¹

In addition to the species of fishes hitherto mentioned, the Istrian fisheries yield the conger-eel, gar-pike, the *Oblata melanura*, the black bream, the *Box salpa*, the pelamid, the angel-fish, &c., besides lobsters, sea-spiders, a few oysters, mussels, and the *Squilla mantis*, &c., &c.

LUSSINPICCOLO, including the islands of the Quarnero, is much frequented by the Chioggiotti; the prevalent fishes are *Mendole*, *Maride* (species

¹ Pola is now a town of 20,000 inhabitants, having risen to being what it is since 1856, when it was a fishing village of 600 inhabitants.



TONNÁRA DI PRELUCA.

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fish varies from 3 to 300 kilos a head, and the average may be 6 to 8 kilos: fishes of 150 to 200 kilos are not uncommon, beyond 200 kilos they are rare.

The fish is sent on at once to Fiume, and what is in excess of the demand goes by rail to Trieste, and by water to Venice, in which traffic five Italian boats are constantly employed. Fresh tunny-fish is not consumed inland, but it is preserved in oil for the inland markets, and also for export. The tunny fisheries would be much more productive if salt were used for preserving the catch. The fish which is sent to Trieste and Venice, when there is an excess, generally arrives in a state unfit for food, and has to be destroyed; thus, the excess beyond the local demand cannot be reckoned upon with any certainty as a profit to the farmers. The annual catch averages 125 tons, of which 40 tons are exported. The Italian fishermen have no share in the tunny fisheries, but the deep-sea fisheries are, so to say, a monopoly of theirs. They supply one-third of the local demand.

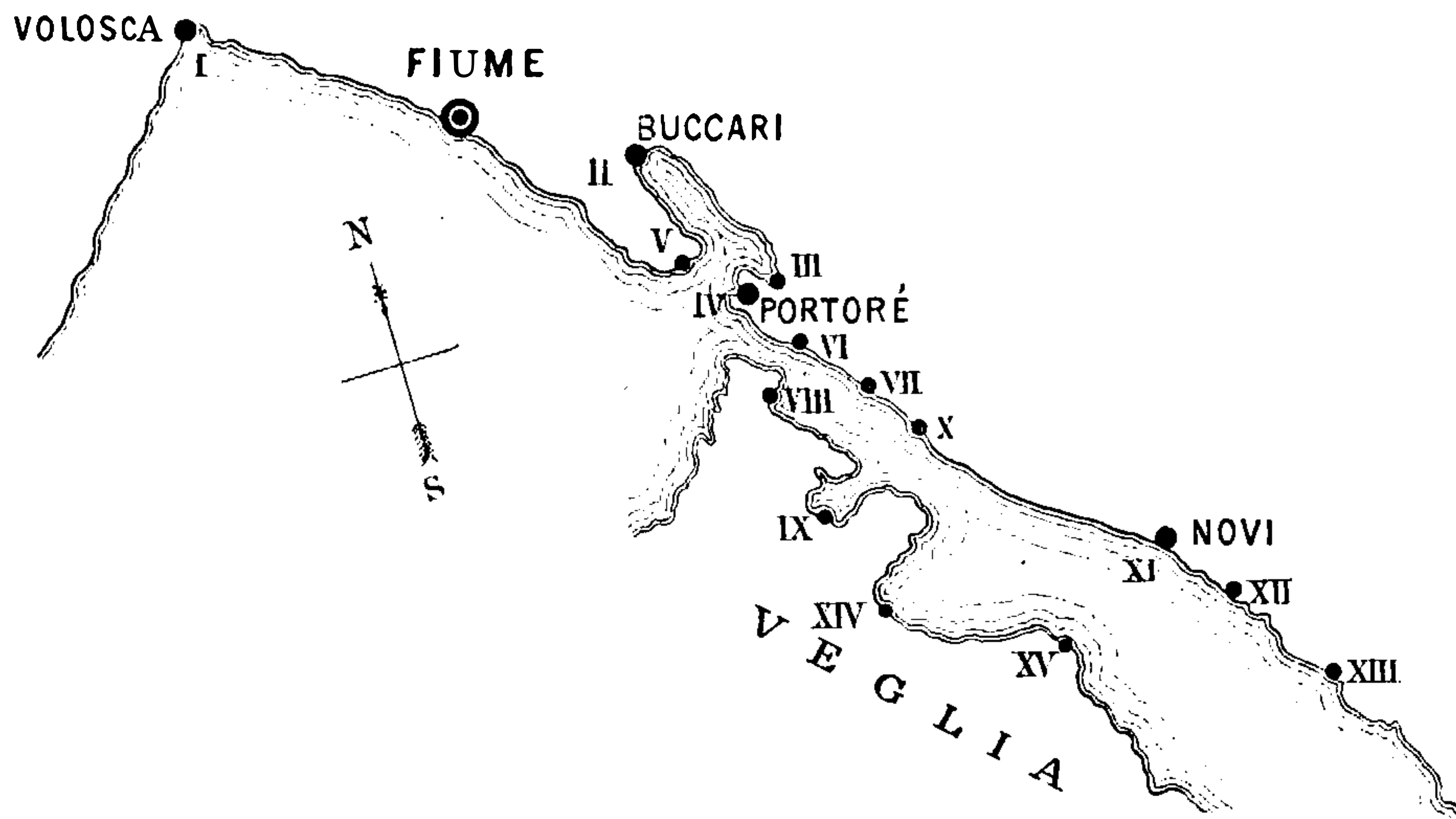
COAST AND ISLANDS NEAR ZARA.—These waters abound in pilchard, mackerel, and grey mullet; the Chioggiotti contribute a quarter of the market supply. About a quarter of the catch is exported, chiefly tunny, pelamid, pilchard, and crustaceans. Oysters are caught along the coast of San Cassano and on the *Scogli* Ostia and Galisniac. The average annual yield is: Tunny 140 tons, pelamid 45 tons, mackerel and Spanish mackerel 75 tons, dentex 44 tons, *Mendole* 200 tons, and oysters 30 mille.

SEBENICO.—The best fishing grounds are the channel and harbour, which team with tunny, pelamid, the famous dentex (known here by the name of *Dentale della corona*), and pilchard off the island of Zuri. The annual average yield of the tunny fisheries is 43 tons.

Fresh tunny and salted pilchard are exported hence to Trieste, Venice, Chioggia, Ancona, &c. The Italian fishermen are not met with here, not being allowed to trawl. The *Teredo navalis* is the curse of these waters.

SPALATO.—This district is the most favourable of all on this coast, owing to its special configuration being rocky, and cut up by innumerable channels and bays. Unfortunately, the fisheries suffer from the want of proper organisation and supervision, and an utter want of economy tends to diminish the large profits which otherwise could not fail to accrue. The

Diagram of the Tomnare in the Quarnero, showing their situation, the number and value of nets & the number of fishermen employed



	Place	Number of Nets.	Value	Number of fishermen employed
I	PRELUCA	1	fl. 600	8
II	BUCCARI	2	1100	16
III	BUCCARICA	3 (+1)	1900	34
IV	PORTORÉ	1	600	8
V	SERSTICE	1	600	8
VI	DUBNO	1	600	8
VII	S GIACOMO	2	1100	16
VIII	VOZ	2	1300	16
IX	PESCHERA	3	2000	24
X	KACIAK	1	500	8
XI	NOVI	1	600	8
XII	SELCE	1	600	8
XIII	ZRNOVNICE	1	600	8
XIV	SILLO	1	600	8

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the fish next in order of importance are mackerel, Spanish mackerel, pelamid, tunny, rays, &c. Tunny is caught in the channel of Cattaro, off Ragusa-vecchia, in the Valle di Brenno, and above all in the Bocche Fàlse; these fisheries belong to Government, who farm them out. The oyster fisheries at Stagno belong to the *Commune* of that place, and are farmed out for twenty years at a time, in order that they may be worked on principles of economy.

The Italian fishermen are not tolerated on this coast by the native fishermen. The consequence is that the fish markets of Ragusa, Cattaro, and other places are badly stocked with *prime* fish, as the native fishermen enjoy a kind of monopoly, and do not find it worth their while to engage in any other than the principal fisheries above cited: moreover, the deep-sea fish, caught by the Italian trawling-nets, are, as a rule, quite wanting, and fish often fetch fancy prices in consequence. It is surprising how a whole population can allow itself to be so treated by a greedy *camora*, particularly as the remedy is in their own hands.

Three-quarters of the yield are exported in the shape of salt fish, comprising tunny, pilchard, and other fishes; two-thirds of which is sent to Greece and one-third to Italy. The average export of salt sardines amounts to about 10,000 barrels of 1 cwt. a piece, representing a value of about £10,000.

The principal fisheries of Dalmatia are carried on by the inhabitants of the islands of Zuri, Lissa, Brazza, Lésina, Lagosta, and more especially by those of Lissa and Lésina. The fishermen of Lésina, alone of their class in the whole Empire, extend their operations beyond the limits of their native waters. They carry on the pilchard fisheries with drift-nets on the coast of Africa; thirty-four boats are at present engaged in these fisheries, and each boat carries twenty-four pieces (*spedoni*) of drift-net, each measuring eight fathoms in depth, and ten fathoms in length. The catch averages about 10,000 barrels, which find a market in Italy and the Levant.

SEASON OF FISHING.

Fishing is carried on, more or less, all the year round, with the exception

of the height of summer, when the catch is small, and is chiefly limited to line-fishing for mackerel and whiting.

The Italian boats make their appearance on the eastern shores at about the end of August, and begin to take their departure in April, and it is only during their presence (where they are tolerated) that the markets are well stocked; in other seasons the produce of the trawl-nets is entirely wanting.

When the North-Easter (*Bora*), or the South-Easter (*Scirocco*), is blowing a gale, or during calms in the height of summer, and after Sundays and holidays, the markets are mostly empty, and the time thus lost may be set down at four months in the year.

The fishing is carried on chiefly in the day-time, by preference at dawn or at sun-set, and also by night, either with or without the aid of artificial lights. The Italians get through a great deal of fishing on moonlight nights, which are more favourable for catching the *Scampi* than dark nights, the proportion being, it is said, as 5 to 2.

PRODUCE.—PISCES.

The SHARK tribe has become much more numerous in the Adriatic of late years, probably owing to the opening of the Suez Canal, some say in consequence of the naval battle of Lissa in 1866, having been attracted by the smell of the decomposing bodies.

The smaller ground Sharks are numerous and common all along the shores of the Adriatic, and constantly furnish the markets with food for the lower classes, the spiny Dog-fish (*Acanthias*) being the most valued, then the Smooth-hound (*Mustelus*), the spotted Dog-fish (*Scyllium*), the Angel-fish (*Rhinidæ*), and lastly the Tope (*Galeus*).

The larger Sharks of the Pelagic order, which are caught occasionally, such as the Blue Shark (*Carcharias*), the hammer-headed Shark (*Zygæna*), the Porbeagle (*Lamna*), the Fox (*Alopias*), the Notidanus, and other still larger Sharks, which occur quite accidentally in these waters, are eaten only by the poorest classes; they are too uncommon to be of any use for the extraction of the oil on a large scale, or for the sale of their fins, as in India and

China. The skins of the Tope, the Spotted Dog-fishes, and Angel-fishes are dried and preserved and used as elsewhere, for polishing purposes in domestic households and by cabinet-makers. The Tope and spiny Dog-fish are very troublesome to the fishermen; they bite through the nets and steal the fishes, or watch for hooked fish, biting through the lines. The Fox follows the shoals of pilchards, the Blue Shark is found in chase of tunny.

The RAYS are mostly the inhabitants of the loam-beds, or the muddy bottom near the mouths of rivers. They are mostly caught by means of the Italian trawling-nets (*cocchia*). They are all more or less eaten by the poor. The Thornback (*Rasa spinosa*) and Raja miraletus (*Quattrocchi*) are the best of the kind and belong to Class No. 2; the rest must be classed as No. 3, although the flesh of some—such as the Sting-rays and Devil-fishes—is so indifferent as to be eaten only by the poorest classes. The Electric-rays are sometimes caught in large quantities, dried, and shipped to the Levant. The Sting-rays (*Trigonidæ*) and Devil-fishes (*Myliobatidæ*) attain to great size and weight; some are mentioned of 1,250 lb. weight and 20 feet length. The tail of the Sting-ray is furnished with a weapon, whose wound is much feared by the fishermen, and the tail is generally cut off when the fish is brought to market.

The STURGEONS are represented in the Adriatic by seven species, four of which are absolutely distinct, whereas the other three are held by many to be mere varieties of one or more of the other species, without being able to lay claim to a distinct identity. They frequent the western head of the Gulfs of Venice and Trieste, near the estuaries of the principal rivers, such as the Po, Tagliamento, Livenza, Piave, Brenta, Adige and Bacchiglione, which they ascend in spring to spawn. They are seldom found on the eastern shores of the gulf, where there are no important rivers.

The common Sturgeon (*Acipenser sturio*) does not attain to the high state of development met with elsewhere, and seldom exceeds 5 or 6 feet in length. Its flesh is far superior to that of the other species and, being much esteemed in the markets of Venice and Trieste, it is one of the dearest fishes on the Dalmatian coast. It is occasionally, but rarely, caught in the Quarnero. The Adriatic Sturgeon (*A. naccarii*, Bp.) is smaller in size, the average length

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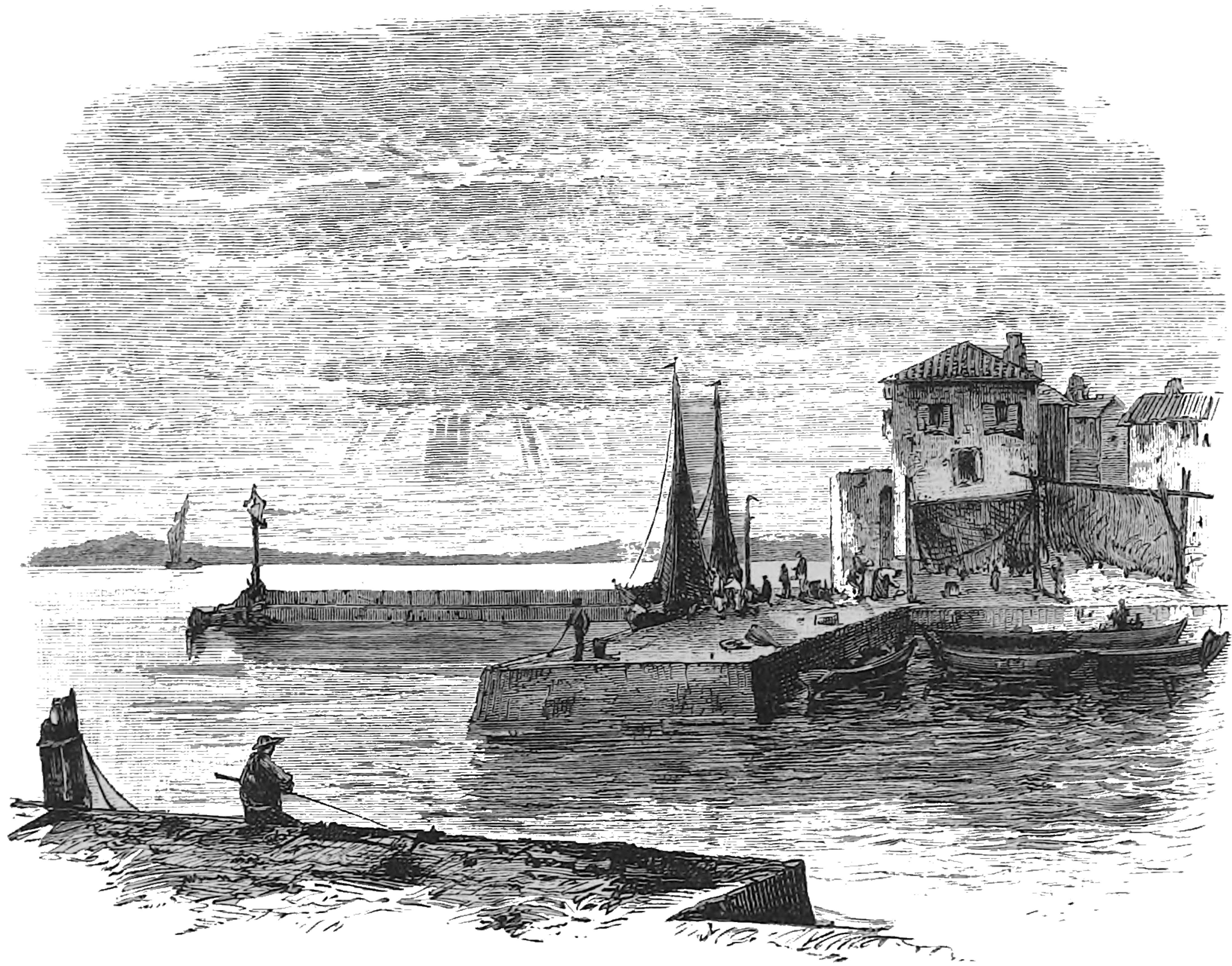
The smooth Serranus (*S. cabrilla*), a British species, is also found on the Dalmatian coast, where it goes by the name of *Pirka*; it frequents the high seas, and approaches the shore only in spring to spawn: its flesh is inferior to that of the *S. scriba*.

The dusky Serranus (*S. gigas*) is an Atlantic species, rarely met with in the Adriatic, and is evidently accustomed to colder climes. It is occasionally met with in deep water, in small shoals, where it eagerly seeks the shade alongside any craft, and is so unwilling to quit its quarters that it is easily caught with a hand-net. It is known in the Adriatic by the name of *Cherna*, or *Chierna* (pronounced *Kerna*, *Kierna*), a word probably borrowed from the Stone-basse (*Polyprion cernium*), which is known as *Cherne* by the Portuguese (pronounced *Shareny*); *Chernotte* at Madeira,¹ and *Cernio* at Nice; thus, at Naples, both are called *Cernia*, the former *Cernia di scoglio*, the latter *Cernia de funnale*; and, indeed, the confusion of the two is easily explained by the close resemblance of their habits, if not so much of their form, as the *Polyprion cernium*, or Stone-basse, has the same attributes, accompanying floating wood, whence it has been called the wreck-fish. The latter is known here and at Trieste, under the name of *Scarpena salvatica*, in Venice *Scarpena de sasso*, owing to the resemblance of its dorsals with those of the common Scorpions, with which it is generally sold as one and the same species. At Spalato it appears to be common in deep water and over rocky bottoms. The flesh of both the dusky Serranus and the Stone-basse is much prized, and, next to the common Basse, is the best of their kind.

Apogon imberbis (L.) is a species not unfrequently met with in Dalmatia, especially in winter; in other waters it is rare.

The group *Pristipomatidæ* furnishes the Dentex, or toothed Gilt-head (*Dentex vulgaris*), which holds the first rank amongst the "prime" class of edible fishes of these seas. It attains to great size and development, specimens of 2–2½ feet in length and 15–20 lb. in weight not being uncommon. It abounds more or less all the year round, more especially in autumn. An

¹ See Yarrell's "British Fishes," 3rd ed., vol. ii. p. 127.



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their bodies; the fishermen consider them a distinct species (see "Kolombatović"). These are, however, apparently mere varieties of colouring, due to the conditions of the beds they frequent, as fishes are known to assimilate themselves in colour and otherwise to the surrounding circumstances (see Günther, "On the Variation of Colour—an Introduction to the Study of Fishes," page 183).

The family of SEA-BREAMS (*Sparidæ*) furnishes twenty different species, three of which are much valued for the excellence of their flesh. These are the Gilt-head (*Chrysophrys aurata*¹), the red or Spanish Sea-bream (*Pagellus erythrinus*), and the Braize, or Becker (*Pagrus vulgaris*), which, together with the basse, dentex, and red mullet, are the fishes which hold the foremost rank amongst the class of "prime," or *Pesce nobile*, a term whose signification varies considerably according to locality, and is to a great extent arbitrary as regards a number of fishes which are often included in the denomination. The group *Cantharina* comprises three specimens of *Cantharus*, amongst which are the Black Sea-bream, a British species, which is not uncommon in winter, and *C. orbicularis*, the best of the genus. *Box vulgaris* is the better of the two Bogues, although neither are much valued as food; *Oblata melanura* is a better class of fish, as are also the three more common species of *Sargina*. *Charax puntazzo*, known as *Pesce morti*, on account of its stripes, is little valued.

Of the group *Pagrina*, the Gilt-head is the most important. These fish are caught with a line in summer, and in winter they are encircled by a net at night-time and then pronged individually, artificial illumination being used to keep them from effecting their escape underneath the net, as they are wont

¹ *Aurata* was the Latin name; and the Greeks called it *Chrysophrys* (i.e., "golden eyebrow"), in allusion to the brilliant spot of gold which it bears between its eyes. According to Columella, the *Aurata* was among the number of fishes brought up by the Romans in their *vivaria*; and the inventor of those *vivaria*, one Sergius Orata, is supposed to have derived his name from this fish. It is said to grow extremely fat in artificial ponds. Duhamel states that it stirs up the sand with its tail, so as to discover the shell-fish concealed in it. It is extremely fond of mussels, and its near presence is sometimes ascertained by the noise it makes in breaking their shells with its teeth (see Günther, "Introduction to the Study of Fishes," p. 409).

to do. By this means, many hundred are sometimes caught at a time, and not a single one attempts to escape. The Gilt-head is one of the fish which is reared in the artificial ponds (*valli chiuse*) of the Venetian lagoons, and attains to a size of $2\frac{1}{2}$ feet in length and 20 lb. in weight.

The genus *Pagrus* is too scarce to be of much importance; but the red, or Spanish Sea-bream (*Pagellus erythrinus*) is both common and much valued as food. *P. mormyrus* is not uncommon, but inferior in quality to the foregoing species.

The SCORPION family is represented by three species. One is the *Sebastes imperialis*, a rare kind inhabiting deep waters; and the other two belong to the genus *Scorpena*, of which *S. scrofa* is the larger, attaining to as much as 4 lb. in weight, whereas *S. porcus* seldom exceeds 2 lb. They are shore-fishes inhabiting the beds, and the latter generally appear in shoals; their name is due to the prickly nature of their dorsal fins, with which they are apt to inflict painful stings, causing inflammation, if one is not careful in handling them when alive. The gall of this fish is used as a remedy for its sting; they are generally caught by means of the trammel-net or shore-seine, and belong to the second class of fish.

Of the MEAGRE family, the Umbrina holds the first rank; it frequents brackish waters, and is reared in the ponds (*valli*) of the Venetian lagoons; it attains to 3 feet in length and 20 lb. in weight, as does also the Meagre proper (*Sciæna aquila*), a species which is, however, by no means common in these waters; the latter also frequents the mouths of rivers and brackish waters, and makes a noise, or grunts, when taken out of the water, similar to the gurnards. *Corvina nigra* is the third species of this tribe; it frequents the stony beds, where it deposits its spawn; hence it is called *di sasso*, or *di scoglio*. The flesh of all three kinds is much esteemed.

SWORD-FISHES belong rather to the exception in the Adriatic, although common in Sicilian waters, where the fisheries constitute an important industry,¹ their flesh selling as well as that of the tunny; they are some-

¹ See "La pesca del Pesce-Spada nello Stretto di Messina." Messina: 1880.

times caught in the tunny-nets. *Histiophorus belone* is not uncommon at Spalato.

The SCABBARD-FISH is quite exceptional; a species in the Trieste Museum was caught off Zaole after a hurricane; it is a deep-sea fish, and its flesh is said to be excellent. The Hair-tail is likewise accidental; a species in the Trieste Museum was caught on the Dalmatian coast. *Thyrsites pretiosus* was found in one instance on the beach of the island of Solta (Dalmatia).

The family *Carangidæ* comprises nine species, of which the common HORSE MACKEREL and *Lichia amia* are the two most important; they are all much esteemed as food, with the exception of the Boar-fish, which is not eaten. Three species of *Lichia*, the Pilot-fish, and *Caranx dentex* are more especially prized, whereas the Horse Mackerel belongs to the second class, being inferior to the common mackerel. The Horse Mackerel is common in summer, when it migrates to these shores in company of the *Scombridæ*, or mackerel tribe; they are caught by net and line, and owe their local denomination (*Cantarini*, *Musicanti*) to the sound they emit when drawn from the water. *Caranx dentex* has been caught on the Dalmatian coast, and *Seriola Dumerilii* has been fished at Venice, Trieste, and Ragusa. The Pilot-fish is general, and, at times, not uncommon; as many as twenty have been caught at a time in the harbour of Fiume, having arrived in the company of a vessel: Prof. Kolombatović mentions an instance of one hundred having been caught at Spalato in November, 1880, under similar circumstances. From this habit of accompanying vessels and large fish, such as sharks, it has derived its name; it is the *Pompilus*¹ of the ancients, who held it sacred. *Lichia amia*² is not uncommon in summer; it attains to a length of upwards of 3 feet, and its flesh is much esteemed, being fully on a par with that of the tunny. The other two species of this genus, amongst which is the Derby, a British species, are both rare: the Skipjack has been caught in Dalmatia; and the Boar-fish is very rare, and of no value.

¹ See "An Introduction to the Study of Fishes," by Günther, p. 444; also, Yarrell's "British Fishes," vol. ii. p. 227.

² It is reared in the lagoons.

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sentatives of this genus in these waters, whereas the Bonito and the Germon, although occasionally met with, can hardly be taken into consideration; they are both Atlantic species, which seldom enter the Mediterranean, and the latter frequents the high seas, rarely approaching the shores. The common tunny attains to great size and weight: specimens are mentioned of 10 feet in length, and 1,000 lb. in weight, and those of 5 to 6 feet are by no means uncommon in these waters. *T. thunnina* is smaller in size, but equally good eating: the Pelamid (*Pelamis sarda*) is common on the Dalmatian coast, but is inferior to both the tunny and the mackerel as food.

The tunny fisheries of the Adriatic are much behind those of the Mediterranean in their development, and the preserving of the fish is not understood here as it is, for instance, at Genoa, Marseilles, and other places. In the Quarnero, however, large hauls are sometimes made; thus, in 1872, 40 tons were taken at one spot in the course of three days. The surplus of the Quarnero fisheries is exported in a fresh state to Trieste and Venice. The average annual value of the tunny fisheries is £15,000.

The Remora must be mentioned here, but it has no value.

The Star-gazers, thus called on account of the position of the eyes being on the upper surface of the head, are common shore-fishes, which frequent the beds in small depths amongst the stones and belong to the second class of fishes. They class under the family of WEEVERS (*Trachinidæ*), which comprises also four species of *Trachinus*, three of which are common and esteemed as food. *T. araneus*, the best of its kind, attains to as much as 4 lb. in weight, the other species being much smaller.

This genus has the same properties as the scorpions to inflict most painful wounds with its dorsal and opercular spines, which create intense inflammation and fever; and, indeed, amputation of the wounded limb has had, it is said, to be resorted to in some cases. The sting of the lesser Weever (*T. vipera*), also called the Sting-fish, or Adder-pike, is the most redoubted; hence its name. According to Dr. Günther, "no special poison-organ has been found in these fishes, but there is no doubt that the mucous secretion in the vicinity of the spines has poisonous properties. The dorsal spines, as well as the opercular spine, have a deep double groove, in which the

poisonous fluid is lodged, and by which it is inoculated into the punctured wound." The white gall of the cuttle-fish is used for wounds inflicted by these fishes and the sting-ray, and, according to Costa, the fishermen of Gaëta apply the juice of the *Euphorbia titimalus* as a remedy for the sting of the Adder-pike. The spine of the operculum is generally cut off before exposure for sale.

There are two species of FISHING-FROGS, or ANGLERS, the British species *Lophius piscatorius*, and a second species *L. budegassa*, which is the smaller but the preferable of the two, and is sometimes very common at Fiume; these are amongst the most common of fishes, and are to be found in our markets all the year round, furnishing cheap food for the lower classes. They owe their name to a filament placed in the middle of the head, which terminates in a lappet, and is movable in every direction, and is used by the fish to play just in front of its wide mouth as a bait to allure fishes, which are thus caught; they inhabit the beds, and hide in the sand or amongst sea-weed.

The GURNARDS (*Triglidae*) are little valued as food, and belong to the third class. The Sapphirine Gurnard (*Lucerna venetorum*) is the best of the genus, and owes its name (*Lucerna*) to the great phosphorescence it produces. This species, besides the streaked Gurnard, and the Piper, are the commonest of the tribe; they are not caught in sufficient quantities to be of any importance. Dr. Günther informs us that the grunting noise made by gurnards when taken out of the water is caused by the escape of gas from the air-bladder through the open pneumatic duct. There are altogether seven species of this tribe.

The *Cataphracti* furnish two species, both rare in the Adriatic, viz., the mailed Gurnard, or "Fork-fish" (*Forcato*), a name derived from its prolonged præorbitals, which project beyond the snout in the shape of a fork, and which are often broken off against the rocks: it inhabits deep water, and has been caught in the Dalmatian archipelago. The second species is the Flying Gurnard (*Dactylopterus volitans*), a species which belongs to the class generally known as Flying-fishes, which comprises the Flying-herrings (*Exocætus*), these being the only two fishes which are enabled by their long pectoral fins to take flying leaps out of the water (Günther). They are much heavier and

larger than the *Exocæti*, and have not been caught, as far as I am aware, north of Lissa (Dalmatia).

Of the family of *Discoboli*, the Lump-sucker (*Cyclopterus lumpus*) is mentioned by Nardo, amongst other fishes, as having been observed in the Dalmatian archipelago, on the authority of Botteri, Heckel, Stalio, and Belotti. This fish also appears in Perugia's list of the Trieste Museum. Dr. de Marchesetti, however, pronounces Perugia's citation altogether a mistake, and I hardly think I should be justified in including the species in the Adriatic fauna.

The family of *Gobidæ*, or GOBIES, comprises thirty species, of which six belong to the genus *Callionymus*, or Dragonets; they are all small fishes and belong to the class of *minutaja* (mixed fish), with the exception of *G. capito*, the largest of its kind. They are found, more or less, everywhere, and at all seasons, and furnish food to a great portion of the poorer classes; they are shore-fishes, frequenting, as a rule, rocky coasts. Three species frequent brackish waters, and are reared in the *valli* of the lagoons, viz., *G. jozo*, *elongatus* and *paganellus*, whilst three others are fresh-water fishes.

The RED BAND-FISH (*Cepola rubescens*) is common, but of little or no value.

The BLENNIES rank with the Gobies in many respects; they are shore-fishes, and some of them enter brackish waters and have become fresh-water fishes; they belong, as a rule, to the class of *minutaja* (mixed fish); the only exceptions are two species, viz., *B. gattorugine*, which attains to a length of twelve inches, and *B. ocellaris*, both British species. Two are fresh-water fishes.

The SPET (*Sphyræna vulgaris*) is one of the rare class, and has no importance in the fisheries.

The ATHERINES, to which the name of Smelt is misapplied from their resemblance to the real smelt, have little value as food; they are common in summer all over the gulf, and the young fry is sold in many sea-ports fried or baked in milk under the name of *Nonnati* (*Nonnat*¹ of the French,

¹ The young, for some time after they are hatched, cling together in dense masses, and in

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ZOPPOLI AT BUCCARI.

Aplyes of the Ancients); they are also preserved in oil (*Anguèla marinata*). They are, however, only consumed by the poor. Being one of the few kinds of fish which spawn in the lagoons and brackish waters, their chief value is as food for the more valuable kinds of fishes which are reared in the *valli* of the lagoons. There they come under the denomination of *Pesce da strame* (*strame* = fodder). Sometimes they are caught in such quantities in the lagoons of Commacchio that whole cargoes are shipped to serve as manure. They are shore-fishes, living in large shoals, and the fry collects and ascends the rivers in shoals. Three species are known here, all are common.

The GREY MULLET (*Mugilidæ*), known in these parts by the general term of *Cievolame*, are of great importance; there are five common species, all of which are numerous, prolific, and develop rapidly. They endure more than other kinds of fishes the rapid changes of temperature; they prefer brackish waters, and the small fry enters in multitudes the mouths of rivers, the lagoons, and the *valli chiuse*; they are, therefore, of prime importance in the fisheries of the *valli*; their roe is smoked in Dalmatia, and is known by the name of *Botarga*; it is considered a delicacy, and the produce of Tunis and Carthage is the most renowned in the Mediterranean. In the *valli*, they come under the class of fish known as *Pesce bianco*; three species extend to British waters, and *M. chelo* is known to ascend the rivers and to live in lakes, returning to the sea for spawning. *M. labeo* is a new species for these seas which has been caught at Ragusa.

The STICKLEBACKS frequent the Venetian lagoons, and the TRUMPET-FISH (*Centriscus scolopax*) is occasionally caught, but neither of them have any value.

There are seven species of SUCK-FISHES (*Gobiesocidæ*), all small fishes exhibiting brilliant colours and not exceeding four inches in length: two are common, and belong to the class of *minutaja*; the remainder are only occasionally met with.

Lophotes cepedianus is a deep-sea fish, which only occurs quite accidentally.

numbers almost incredible. The inhabitants of the Mediterranean coast of France called these newly-hatched Atherines *nonnat* (unborn).—GÜNTHER.

The RIBBON-FISHES (*Trachypteridæ*) are likewise deep-sea fishes, but it has not been ascertained at what maximum depth they live: their occurrence is general in these waters, though rare; they are common in the south, for instance, at Naples, where their flesh is considered a delicacy.

Only one species of the genus *Heliastes* is known here; it is common, but little valued as food.

The WRASSES (*Labridæ*) constitute one-seventh of the Mediterranean fauna, and are, therefore, one of its chief characteristics. Twenty-one species are, more or less common to these seas: some show the most brilliant colouring, hence they derive such names as Peacock, Rainbow, Parrot, Butterfly, Damsel, &c. They do not seem to exceed a length of 12–15 inches, and are almost valueless as food, the smaller ones being thrown in amongst the *minutaja* (mixed fish). The Ballan Wrasse and the striped Wrasse, the Cork-wing and the Rainbow Wrasse, are species which extend to British waters.

The COD TRIBE (*Gadidæ*) is poorly represented in these seas; its most valuable representatives, viz., the Cod, Haddock, Coal-fish, Pollack, and the Ling, are altogether wanting. Three kinds, however, are of some importance in the fisheries on these coasts, *i.e.*, the Hake (*Merluccius vulgaris*), the Poor, or Capelan (*Gadus minutus*) and the Whiting (*Gadus merlangus*). They constitute a considerable share of the produce of the trawlers; they are also caught by means of the ground-line, and these are infinitely superior in quality to the produce of the trawls. *Gadus euxinus* and *Gadus luscus* (Bib, Pout, or Whiting-Pout) do not come into consideration, from the fact of their rarity.¹ Hake is caught all the year round, and is best eating in winter, the Poor in October. Ground-line fishing for Whiting is a favourite summer sport. The Hake attains to a length of 28 to 32 inches, and the Poor to a weight of 2 lb.; Poor and Whiting are common only in the north. Next in importance is the three-bearded Rock-ling (*Motella tricirrata*) which attains to a length of 8–12 inches, and is pretty common in summer. The two kindred species,

¹ *Gadus euxinus* is not rare at Spalato, where, in summer, it is more common than *G. minutus*.—KOLOMBATOVIĆ.

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in the Venetian lagoons, but are not reared in the *valli*, such as the Scald-fish (*Arnoglossus laterna*) and *Arnoglossus Grohmanni*: they evidently prefer brackish waters, and belong, together with the small Soles, to the class of *minutaja*. *Citharus linguatuta* is common, but inferior as food. Two species of *Rhomboidichtys* are rare, and occur only on the coast of Dalmatia.

Only two specimens of the Plaice (*Pleuronectes platessa*) have been found by Professor Trois in the fish-market at Venice, said to have been caught in the Quarnero. The Soles, with the exception of the common Sole, are either rare, or have little value as food. Generally speaking, it may be said that the flat-fish caught in these seas are inferior to their brethren in more northern climes: the flesh is flaccid and less firm.

Two specimens of the family of *Scopelidæ*, which have been met with on the southern coast of Dalmatia, have no interest but from an ichthyological point of view. *Cyprinodon calaritanus* is half a fresh-water fish, for it ascends the rivers for a considerable distance: it occurs in the brackish Venetian lagoons, and in places where the sea is collected for evaporation (*saline*) and where the degree of saltness is much greater than the ordinary sea-water. Like most fish which lie imbedded in mud or frequent the muddy beds, it has no value as food.

The GAR-PIKE, caught in considerable quantities at Sansego and Lussin, is one of the fish which is reared in the *valli*. The Saury-pike occurs, quite exceptionally, on the Dalmatian coast only, and is a pelagic species, as is also the closely-allied genus of *Exocoetus*, or Flying-fishes. The latter seldom come so far north, and that only in the height of summer. The common Pike (*Esox*) has been observed in the brackish waters of the Venetian lagoons.

Of the SALMON family, five species of Trout belong to this fauna, two of which are non-migratory species of Dalmatia: *Salmo fario ausonii* is the one common on the northern shores (at Trieste and Fiume), and *Salmo carpio* occurs in the Venetian watershed. The Grayling is found in the northern and western watershed, but not on the eastern coast: the Argentine has a southern extension, and being, moreover, a deep-sea fish, it is seldom met with in the north. A specimen of *Salmo trota* (L.) is mentioned by

Giglioli as having been caught near Spalato; this appears to be the first notice of this species in Mediterranean waters.

Of the HERRING tribe (*Clupeidæ*) the more important northern forms, such as the Herring, Sprat, and Whitebait (fry of the Herring), are not met with in these waters; but the kindred species, Pilchard, or Sardine, and *Clupea papalina*, commonly called *Papalina*, a Mediterranean species, and the Anchovy (*Engraulis encrasicolus*) are the representative species of this tribe, and form the chief staples of these fisheries.

The Anchovy is common all over the Adriatic, from May to September, and seldom occurs further north; *Clupea aurita* has occasionally been observed on the coast of Dalmatia, and is generally mistaken for the common Sardine, though its flesh is far inferior: the *Papalina* occurs under the same conditions, and is as much esteemed as the common Sardine. It attains a length of 4 inches. This species is not described by the learned ichthyologist Dr. Günther, his nearest description as applying to it being that of *C. aurita*, as synonymous with *C. phalerica* (Risso), which latter Canestrini, on his part, renders as synonymous with *C. papalina* (Bp.). Dr. de Marchesetti has been good enough to point out the difference between the illustration of Valenciennes and the description of Günther, on the one hand, and the *C. papalina*, as known here, on the other hand (see SYSTEMATIC LIST OF FISHES, No. 322).

The Sardine is common all over the Adriatic from May to October, and is eaten fresh, salted, smoked, and preserved in oil, like the "Sardines de Nantes." Risso made the observation at Nice that only every fifth year was a good year for the Sardine fisheries on those coasts. Here, the fishermen consider themselves lucky if every fourth or fifth year prove a good one, but in some places a really good season is not known for seven, twelve, or fourteen years, the same being the case in respect of mackerel. The salting is carried on chiefly on the west coast of Istria, on the coast of Dalmatia (Ragusa), and the Dalmatian islands, the produce of Rovigno (Istria) and the island of Lissa being especially renowned.¹

¹ See methods of curing and cooking fish.

The Sardine fisheries hold the first rank amongst the sea-fisheries of the Austrian-Hungarian coast. Their average annual value is computed at £40,000, and the value of the Anchovy fisheries at £4,000. The total value of the produce of the Sardine and Anchovy fisheries in the Mediterranean does not probably exceed £400,000; this is trifling in comparison to the Herring fisheries in the north, whose value is estimated at at least £3,000,000. In the south, the Sardine is fished sometimes in considerable quantities, even in the winter, and Professor Kolombatović mentions that in the winter of 1880 eighty barrels were cured at Spalato, besides those consumed fresh. This may also be said of the *Papalina*, which, however, appears by no means to be so common in the south.

The Alice-Shad (*C. alosa*) is said to ascend the rivers of northern Italy and to enter the lakes of Garda and Como for spawning. It appears doubtful whether this species occurs on the eastern coast, and whether it is not the inferior Twaite-Shad (*C. finta*), which is common there, and with which the former has been confused. The specimens in the Trieste Museum are all *C. finta*, and the resemblance of the two species accounts for the uncertainty on the point; in fact, many authors, amongst whom Canestrini, Valenciennes, Heckel, and Kner, consider them identical.

The COMMON EEL is of prime importance in the fisheries of the lagoons on the Venetian coast and near Grado,¹ and it is pickled (*marinato*) and preserved in oil to a large extent.

Two kinds of Conger-eels are caught, the common species being much esteemed as food; they are also dried and smoked. Three species of *Ophichthys* and two species of *Muraena* (the Murry) occur occasionally, but they all have a southern extension, and seldom find their way very far north.

Some of the PIPE-FISHES are common in summer, but they have no value

¹ There are 173 *valli*, or breeding-ponds, on the Venetian coast, of which 63 are in the lagoons of Venice alone; they employ upwards of 1,000 fishermen, and produce upwards of 2,600 tons of fish a year; one alone—that of Comacchio—yields 1,200 tons of fish, 800 tons of which are Eels. Such results would not be possible were it not for the quantities of atherines and *Crangon vulgaris*, which serve as food for other fishes (see NETS, *Valli*).

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ostrighera; in the lagoons with the *cassa*, or by hand; in harbours with the *fiocina a branche curve*, and on piles, dams, and rocks by the *rasparetta*, or *mezzaluna*. Three-year old oysters are the best. The annual consumption at Trieste is 10,000, @ 5 to 10 soldi a piece. The inland import is inconsiderable, as Vienna is supplied from Hamburg and Ostende. The annual yield is estimated at 70 to 80 mille, valued at £600.

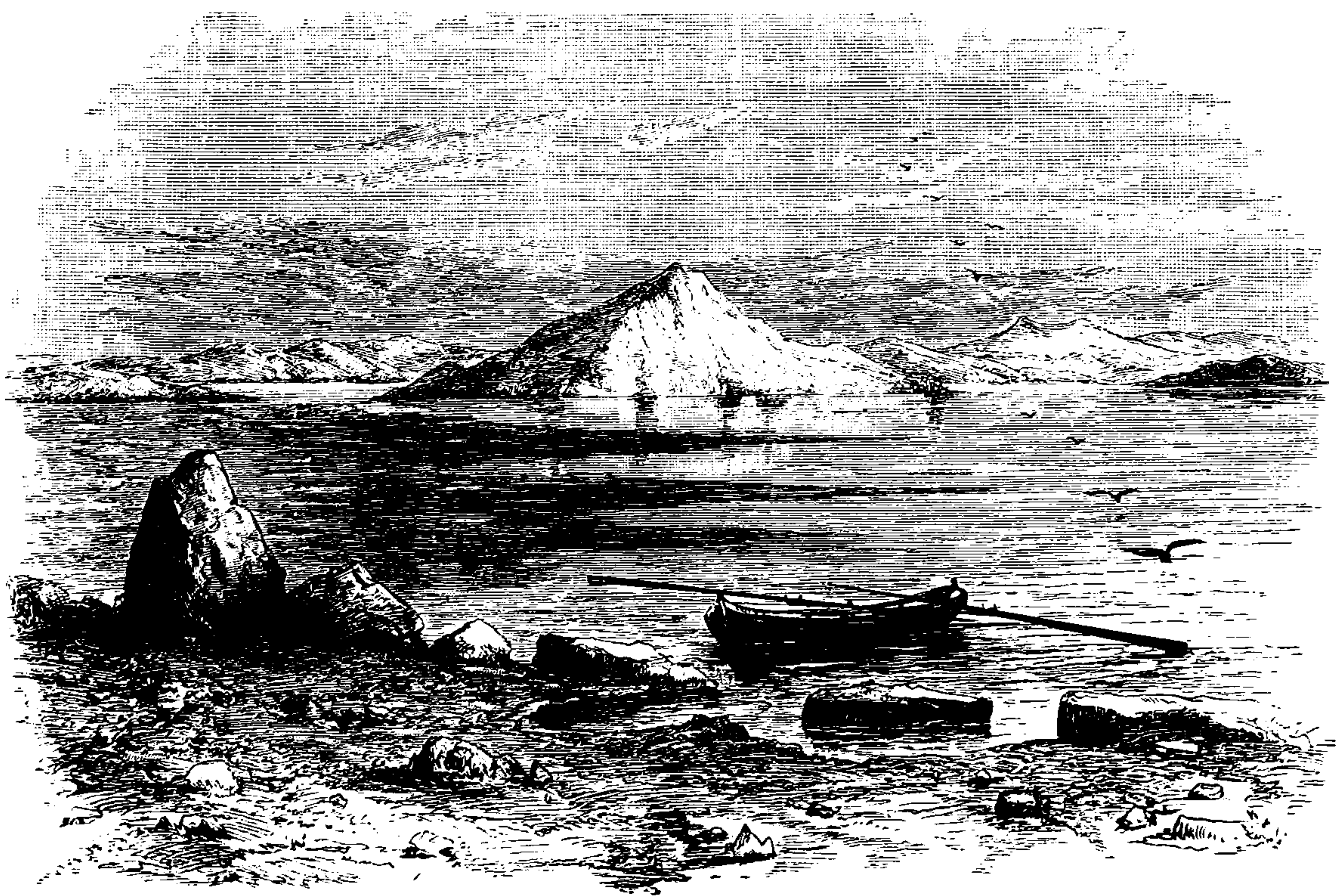
Ostreoculture¹ is carried on in a most primitive manner by the fishermen of Monfalcone, Duino, Zaole, Muggia, &c. It consists in driving piles, or rather oak branches (*pali*), into the bed of the sea, in $1\frac{1}{2}$ –2 fathoms water. This is done in spring; and in autumn, when the spat has settled on them, they are transferred into deeper waters, there to await their development after the third season. In Dalmatia, the branches of oak are merely thrown into the water, and there allowed to remain until the oysters mature and fall off.

At Grado, the French system known as *Claires* was tried, but it proved a failure, and had to be abandoned, chiefly on account of the small tides prevalent in these waters, which accounts for the high mortality of the oysters, which perished of cold in winter and of heat in summer.

A great deal more might, no doubt, be done in the way of ostreoculture, and the Hungarian Government is anxious to promote something of the kind in the bay of Buccari. Capt. R. F. Burton, H.B.M. Consul for Trieste, has also interested himself in the matter, and has proposed a company for the purpose: Val d'Arsa, in Istria, would be a most suitable ground for carrying out the project, the more so as it is connected by rail with Vienna.

There are five different kinds of oysters common to the Adria, viz., *O. adriatica* (Lam.), (*Ostrica di palo*, *Ostrica dell' Adriatico*), found generally on the limestone-beds of the Adriatic, but neither in the lagoons nor in the oyster-ponds; *O. lamellosa* (Brocchi), (*Ostrica à lamelle*), a species which is reared in ponds on a large scale, attains to large dimensions, and is the most savoury of the Adriatic species; three varieties of *O. edulis* (L.), viz., *var. depressa* (Phillipi), (*Ostrica commune depressa*, vulgo *Ostrichino*), a small species

¹ Consult "Die Bewirthschaftung der Meeres," &c., von Anton Gareis.



SCOGLIO SAN MARCO, FROM THE ISLAND OF VEGLIA.

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not consumed everywhere as food, for instance, at Ancona, although caught there in large quantities; in France they are eaten and are also used for bait. The shells of the *Cytherea chione*, L. (*Issolone*), and the *Unio pictorum* (*Unione*, or *Sbadiglia dei pittori*, vulgo *Caparone d'acqua dolce*, *Cucchiarella*), are used as painters' pallets; those of the *Pecten jacobæus* (L.), as ornaments by the pilgrims to S. Iago di Compostella and other places, whence the name of *Capa santa*.¹

The UNIVALVES are very numerous on the eastern shores of the Adriatic, but are much inferior in quality to the bivalves, and are, as a rule, eaten only by the poorer classes.

Those which most deserve notice are: species of *Trochus* (*Caragolo*, *Neridola*); *Turbo rugosus* (*Occhio di Santa Lucia*); *Cassidaria tyrrhena* (*Porcelletta*); *Cerithium vulgatum* (*Caragolo longo*, *Campanari*); *Murex brandaris* (*Garusoli*), attached to the shells of which is generally found an *Actinia effæta*; *Murex trunculus* (*Garusoli*), the species which is supposed to have supplied the purple of the Romans; *Aporrhais pes pelicani* (*Zamarugolo*); *Haliotis tuberculata* (*Orecchio di San Pietro*, "St. Peter's ear"); species of *Fissurella* and *Patella* (*Pantalena*). The shells of *Turbo rugosus* and *Trochus adriaticus* are made use of as women's ornaments (*Caragoletti da galanterie*). The NUDIBRANCHS are not eaten.

Of the TUNICATES may be mentioned *Cynthia microcosmus*, called *Sponga mangiabile* by misapplication. They are found on hard beds in open, shallow waters, generally in company of the arch shells, together with which they are usually caught from November to March by means of the *Mussolera*. After removing the outside coating, or mantle, the inside, resembling the yellow of an egg, but tasting somewhat bitter, is eaten either raw by the

¹ See Capt. Burton's account of the Legend of St. James, in "Camoens: his Life and his Lusiads," vol. i. p. 207. ". . . . and during the height of his (the Saint's) fame, a hundred thousand 'Saint Jaquè's pilgrims,' many of them English, who preferred it even to Canterbury and her 'holy blisful martir,' made pious visitations to 'Sanctus Jacobus Apostola' (Compostella). The cockle-shell was the badge of this tribe, as the palm was of the 'palmer,' or Jerusalem pilgrim. Our 'remember the grōtto' is connected with St. James."

fishermen themselves, or otherwise is sprinkled with flour and fried in oil. The liver is also eaten, but the outside coating, hard and indigestible, resembles the fibres of wood.

CRUSTACEANS.

Ligia italica (*Salizzoni delle rive*) does great damage in the fishing-ponds (*valli*), gnawing the fishing-nets. *Squilla mantis* (*Canocchie*) is found on muddy beds between the Istrian and Italian shores, as far as Ancona, in 4–10 fathoms water; in lesser quantities on the eastern coast of Istria, near the islands of Ulbo and Selve; otherwise it is rare. It is in season from September till March, and is caught by the Italian trawling-nets; it is much consumed in Italy, and the females, before they are in egg, are highly esteemed. The annual consumption at Trieste is 3,000 kilos @ 12–40 soldi per kilo.

The PRAWN, *Palæmon squilla* (*Gambaro*), *Salicoques* of the French, is found near the shore, in bays and creeks, on sandy and overgrown beds, in spring and autumn, and in deeper water in summer and winter, chiefly near Grado and on the Istrian coast; also near Ulbo, Selve, Novegrad, Sebenico, Spalato, Curzola, &c. It is in season all the year round, particularly in spring and autumn, and is caught with the hand-nets known as the *Cogòlo*, *Guatto*, and the trawls; it is also reared in the lagoons and used as bait for the basse; it is generally sprinkled with flour and fried in oil, and is also used as bait. The annual consumption at Trieste is 200 kilos @ 12–50 soldi per kilo.

The SHRIMP, *Crangon vulgaris* (*Schilla*) is caught and sold together with the *Gambari*; it is used as bait for the basse, and is fished in autumn. Those reared in the *valli* are the most prized, and fetch higher prices.

Gebia litoralis (*Corbola* or *Scardobola*) is, when alive, used as bait for the basse, the gilt-head, and the *Sargus vulgaris*, and is plentiful in the Bay of Noghera.

Calianassa subterranea (*Scardobola falsa*) is similar to the foregoing species, and is found imbedded in the sand; it is used chiefly as bait.

The celebrated NORWAY LOBSTER (*Scampo*) is limited to certain parts of the Gulf of Quarnero, about the islands of Veglia and Cherso, where

the temperature of the water on the bed is low. It is in season all the year round, but is caught exclusively by the Italian trawls from September to March. Thirty thousand kilos are brought to market at Fiume, and sell at 60–250 soldi per kilo; it is exported to Trieste and the interior, also to Venice and Chioggia. At Venice the tails fetch, in times of scarcity, as much as 8 lire a kilo. The annual value of the fisheries may be given at £2,000.¹

LOBSTERS (*Astice*) are found chiefly on the west coast of Istria, less commonly in Dalmatia, on rocky shores in 7–15 fathoms; they are caught with a trammel-net, or with a number of willow-basket traps (*Nasse, Verse*) baited with sea-spiders or sardines, &c., or by night with the prong by artificial illumination. The annual consumption at Trieste is 1,700 (@ 1–5 florins each; a considerable number is also sent inland. The average catch is about 30 thousand a year, valued at £2,000; these figures include the ROCK-LOBSTER, *Palinurus vulgaris* (*Languste*), which is caught in Dalmatia from May to August, especially off the islands of Lésina, and Lissa; near Rogosnica, Sebenico, &c., as far as San Pietro, just south of the island of Lussin. It is not caught further north. As food it is inferior to the lobster. The annual consumption at Trieste is 2,000 at from 1–5 florins each, the latter price when very fine.

Dromia vulgaris (*Fachino*), of no importance and not abundant, is caught near the shore.

The SEA-SPIDER, *Maja squinado* (*Granzo* or *Granzon*, male, *Granzéola*, female), is found on rocky beds along the whole coast of Istria, especially on the west coast, near the islands of Ulbo and Selve, and as far south as the islands of Incoronata; it is less abundant further south to Ragusa. In April and May it is often met with in shoals in 2½–10 fathoms; it is in season from March to June. It is caught by the *Squænera*, *Popovnica* or *Volega* attached to a long pole, *Grampa*, *Fiocina*, and *Ganzo*. It has a good flavour, and is much used as bait for sardines, and, in some waters, for catching the

¹ For illustrations of the Norway Lobster and the Rock Lobster (*Palinurus vulgaris*) consult Prof. T. H. Huxley's monograph, "The Crayfish, an introduction to the study of Zoology." London: Kegan Paul, 1880.

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Calappa granulata; *Cancer pagurus* (Granziporo); *Xantho rivolosus* (Forfetula); *Portunus depurator* (Gambero dell' ala), found in small quantities on rocky shores; *P. arcuatus* and *P. corrugator*, both rare, the latter found chiefly on the Dalmatian coast; *Grapsus marmoratus* (Granzo piatto), sometimes found on rocky beds.

Pinnotherus veterum, "the watchman of the Pinnæ" (*Granzetto dell' Ostrega*), is found in the shells of living bivalves, such as *Pinna*, *Mytilus*, *Modiola*, *Ostrea*, &c., in which it seeks refuge, living on the small *animalculæ* contained in the constant stream of water which flows in and out of these mollusks.

The fancy of our forefathers has attributed the status thus existing between the two species as arising from a friendly alliance based upon mutual benefits rendered, viz., protection and board afforded, on the one hand, by the mollusk, whilst the duties of the "watchman" consist, on the other hand, in giving due warning of the approach of an enemy, such as a star-fish or crab, thus enabling the host to ensure protection by closing its doors on the intruder. And these observations descend from so early a date, that we find the *pinna* and the crab amongst the early Egyptian hieroglyphs, bearing the interpretation of the duty incumbent on the "pater-familias" of duly providing for his offspring. According to Grube, the crab is also found in the respiratory cavity of *Phallusia mamillata*.

Pinnotheres pisum, a smaller species than the foregoing, lives in *Modiola* shells, sometimes as many as a whole family, consisting of one male, several females, and their offspring, all in one shell.

These kinds are generally eaten together with the mollusks.

Species of *Porcellana* are also found in the shells of mollusks.

RADIATES.

The ECHINODERMS play a very unimportant part as nourishment to man, although some species are consumed, and even regarded as delicacies, in some countries, for instance, in China, where the Sea-Slug, *Holothuria edulis*, or *Trepang*, which attains to a length of 12 inches, forms an important article of

commerce. *H. tubulosa* is eaten at Naples, but only by the lowest classes; it is not eaten at all in the Adriatic.

SEA-URCHINS (*Rizzi di mare*) and STAR-FISHES (*Stelle marine*) are sometimes caught in large quantities by the trawls and seines, and the latter are generally reconsigned to the deep. This is a mistake, as they might be used as manure; besides which, they commit great ravages on the oyster-banks. The Urchins, when in egg, are eaten raw, and, on account of their greater development than in northern waters, become rather important articles of food for the lower classes in winter and spring; this is especially the case with *Echinus melo*.

In Sicily they are in season about the full moon of March, where *E. esculentus* still goes by the name of "King of Urchins," whilst the larger "Melon" Urchin (*Melon di mare*) is popularly considered to be its mother; hence its name, *Echinometra*, among the ancient naturalists. The size and abundance of these edible species is a striking peculiarity of all Mediterranean and Adriatic fish-markets.

At Trieste and Fiume the consumption is small, but they are eaten more or less along the whole coast, and the consumption increases in the south, especially on the coasts of Greece, and generally by Greek sailors, when in season. In Dalmatia they are pounded and used as bait in the basket-traps (*Nasse*), and also as a cure for diarrhœa.

E. brevispinosus and *E. lividus* are eaten at Trieste and in Istria under the name of *Rizzi di mare*; *E. melo* in Dalmatia, under the name of *Melone di mare*.

All Sea-anemones (*Actiniæ*) are edible, and are to be met with in large quantities in most French fish-markets, such as Marseilles, Cette, Bordeaux, Bayonne, &c., under the name of *cul de mulet*.

Here the green Actinia (*Actinia viridis*), *Madrona*, occasionally appears in the markets of Trieste and on the coast of Istria, where it is caught near the shore, on stony and sandy beds; it is sprinkled with flour and fried in oil.

SPONGES.¹

According to Dr. Syrski many more than 100 different kinds are found in the Adriatic, none of which, however, have any value, commercially speaking, excepting the one species *Spongia adriatica* (*Sponga*). It appears on the coast between Budua on the one hand, and Trieste and Duino on the other, on rocky or otherwise hard beds, in 3 to 10 fathoms. The fisheries are carried on almost exclusively by the inhabitants of the island of Crapano (west of Sebenico), during calm weather, from March to October. The sponges are torn off or raised by means of prongs, or tongs; they are well pressed and washed, sometimes bleached, and exposed in bags in the sea, and once more soaked. There are 80 to 100 boats engaged in these fisheries, each manned with two men, and each boat fishes, on an average, 300 to 400 lb. a year, or together about 320 cwt., fetching from 15 to 100 florins, or an aggregate of 20,000 florins.

Three qualities are prepared for the trade; the first (*Spugne da bagno, o levantine*) comes from the islands of Incoronata and Zara vecchia, and is worth 10 florins a kilo; the second (*Spugne da cavallo, od equine*) is worth 5 florins; and the third (*Spugne Zimocca*) is worth 3 florins, and is fished on the coast of Istria. The greater part of the take is forwarded to Trieste, whereas little is sold on the Dalmatian coast.

Little or no economy is observed in the sponge fisheries. The fishermen go over the same grounds year after year, instead of taking the various grounds by rotation of four or five years, as ought to be the case, in order to allow the sponges time for their development. This want of economy is in a great part due to the customary method of fishing, which is of the most primitive character, and wasteful in the highest degree. Divers and divers' apparatus are unknown; the sponges are torn off indiscriminately, whether mature or not; a number are lost in drawing up the prongs, or tongs, and most of what is brought to the surface is more or less damaged;

¹ A collection of about 100 species was arranged and exhibited by MM. G. R. von Eckel at the Berlin Exhibition of Fisheries, 1880.

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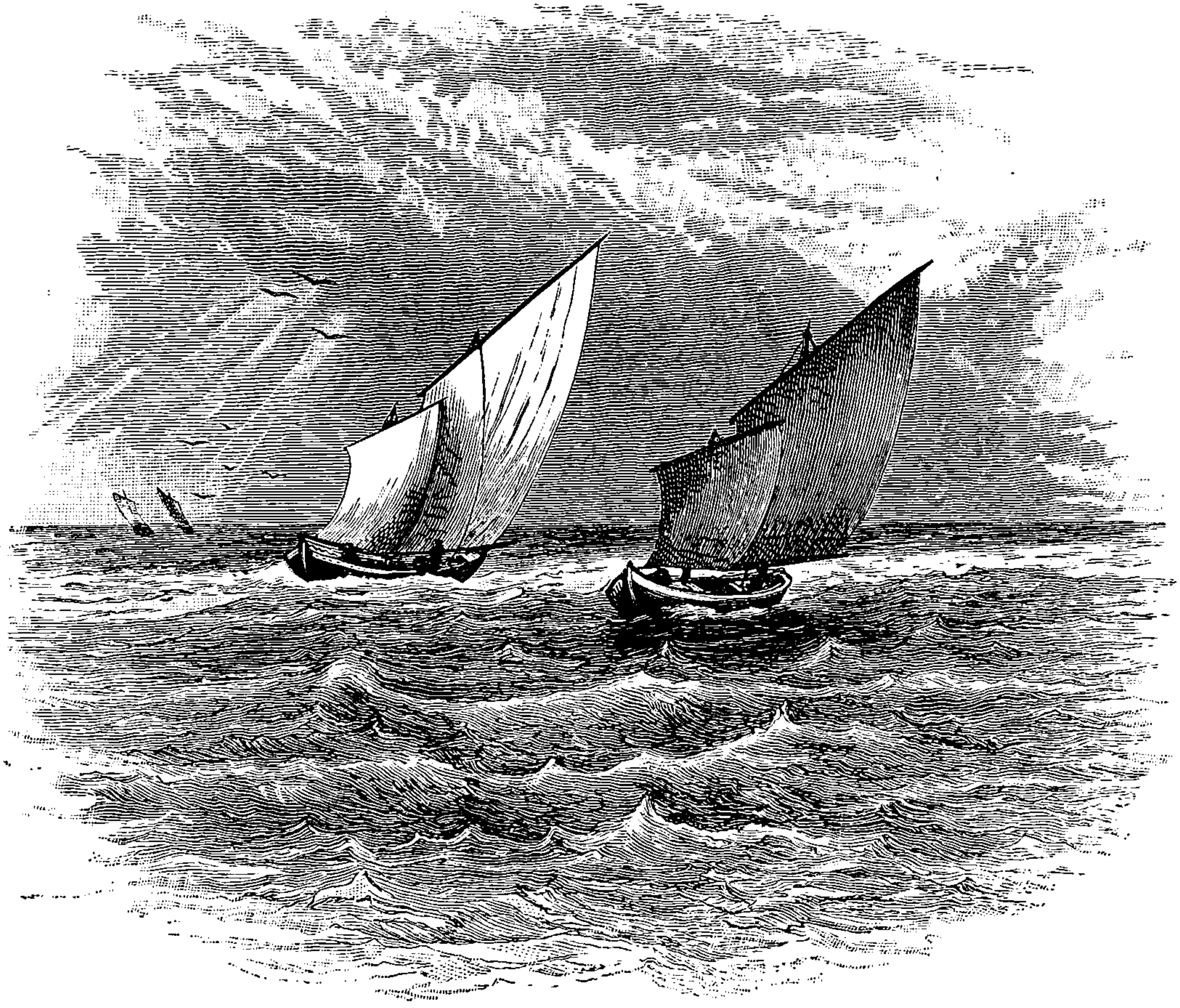
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BRAGOZZI FISHING.

in fact, everything is left to chance, as the fishermen have little or no idea of the state of the ground they are working over; and it is, therefore, hardly surprising that the fisheries do not assume more importance.¹

RED CORAL.

Red Coral (*Corallium rubrum*), *Corallo rosso*, is found on the Dalmatian coast from Budua as far as the island of Grossa, to the west of Zara; thence, in a lesser degree, to the islands of Unie and Cherso, in the Gulf of Quarnero, on rocky beds, in depths of 10 to 150 fathoms.¹

The season of fishing lasts from May to September, and is carried on only in calm weather. The fishing gear is described elsewhere (see NETS).

The proceeds of the fisheries are variously estimated at 6,000 florins and 14,000 florins: exports to Genoa for about 10,000 florins, where it is valued on account of its consistence and pale red colour. Up to 1868 the coral fisheries were crown property, and were farmed out for about 1,000 florins; since 1868 they are free, but only to Austrian subjects. They are exclusively carried on by the inhabitants of the island of Zlarin, near Sebenico, by means of eight boats, each manned with a crew of five men; each boat requires in the course of the season 3 to 6 cwt. of hemp, and, in order to supply this and the necessary stores of provisions, each boat requires about 500 florins to fit out; in order to provide this, the fishermen are generally forced to sell the produce of their labour beforehand, at prices ranging from 6 to 9 florins per pound.² The yield of each boat varies from 80 to 100 lb. in the course of the season, say from 600 to 800 florins in value, which is very small in comparison to that in the Mediterranean.³ The fisheries are on the decrease; only three boats were engaged in the fisheries in 1881, and the total catch was under 150 kilogrammes.

¹ See "Die Bewirthschaftung des Meeres," &c., von Anton Gareis.

² The price of coral in the market varies from 40 frs. to 70 frs. per kilo, and choice thick and pale red coral (*peau d'ange*) is worth 400 to 500 frs., and even more.

³ The average yield of a boat on the coast of Algiers is 200 kilos.

The remarks concerning the sponge fisheries apply equally in this case; the fishing gear is primitive, and improvements introduced elsewhere have not been applied here; divers are not employed, no close time is observed, and no system prevails in respect of fishing over the same grounds only after a given rotation of years,¹—in one word, there is a total want of economy in their practice.²

NOTE.—The number of distinct genera of fish and invertebrates, caught on the Austro-Hungarian coast, attained to 123 in the year 1877–1878. The different districts yielded each the following numbers, viz.: Trieste, 86; Rovigno, 70; Pola, 73; Lussinpiccolo, 66; Hungarian-Croatian littoral, 62; Zara, 66; Spalato, 101; Ragusa, 56; Megline, 38. These numbers represent only those which have a marketable value, and similar species of one and the same genus figure as one.

¹ For instance, in the Straits of Messina the waters are divided into ten allotments, only one of which is allowed to be fished over each year. Consult on this subject “L’Industria del Corallo in Torre del Greco,” per Giov. Mazzei-Megale. Napoli: 1880.

² The Austrian coral fisheries are of little or no importance as compared with the fisheries of the Mediterranean. Thus the French fisheries employed, in 1855, 226 boats and 2,000 men, and yielded 2,700,000 frs. The Italian fisheries are still more important; thus, Torre del Greco, renowned for its tunny fisheries, has always carried on important coral fisheries, in which, 100 years ago, 300 boats were engaged (in 1858, 330 boats). Elba and Leghorn have likewise over 50 boats engaged in the fisheries; altogether some 900 to 1,000 boats, and 7,000 to 8,000 men are employed, and the produce amounts to at least 12 million francs.

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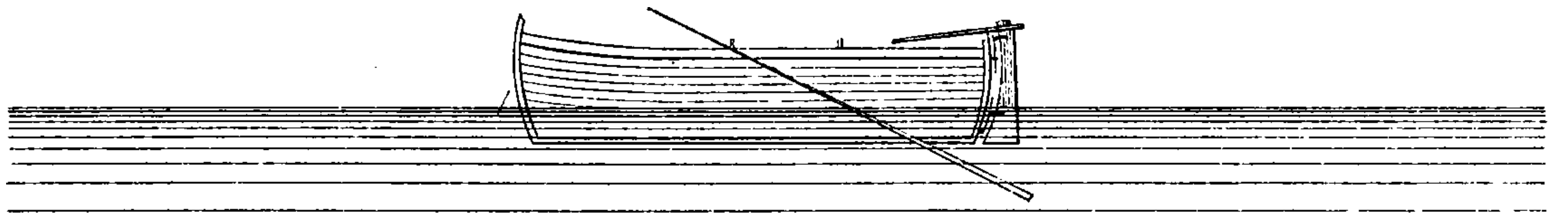
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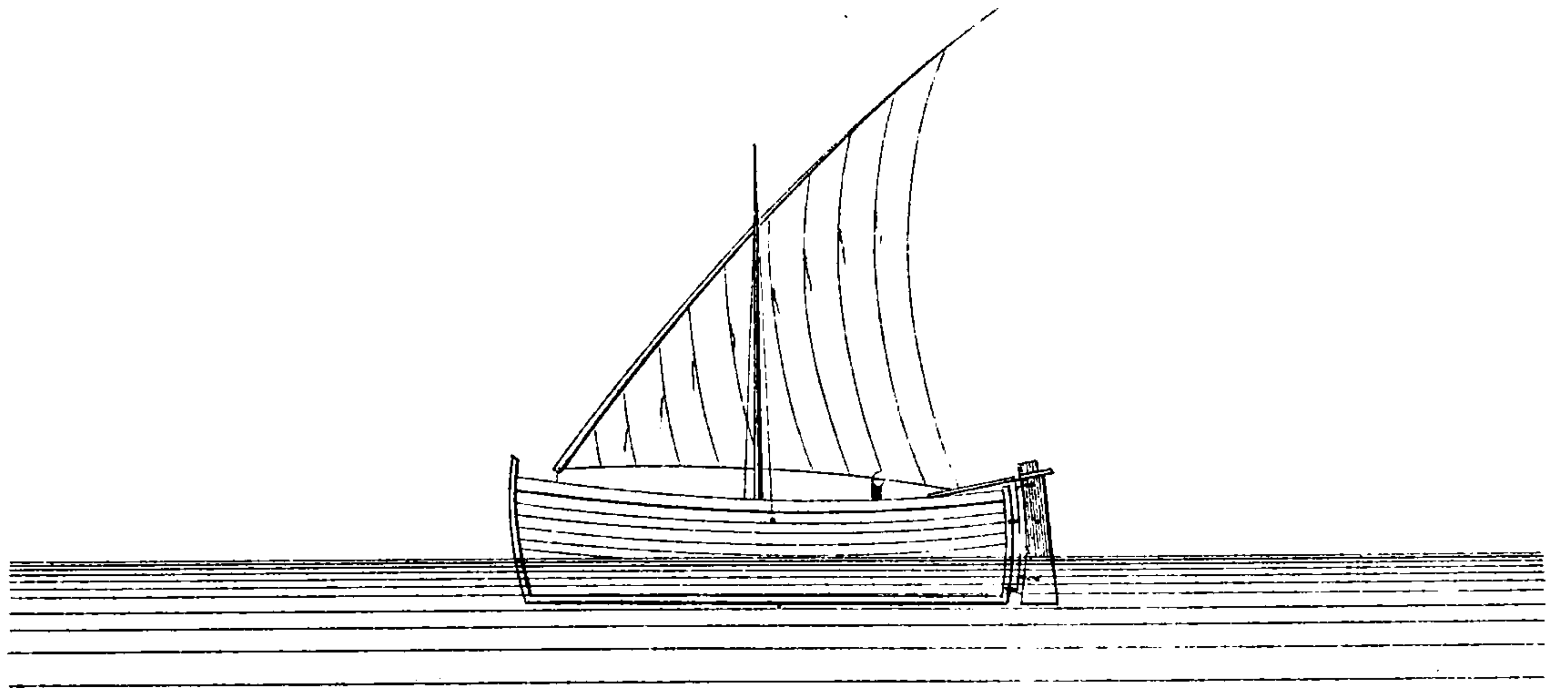
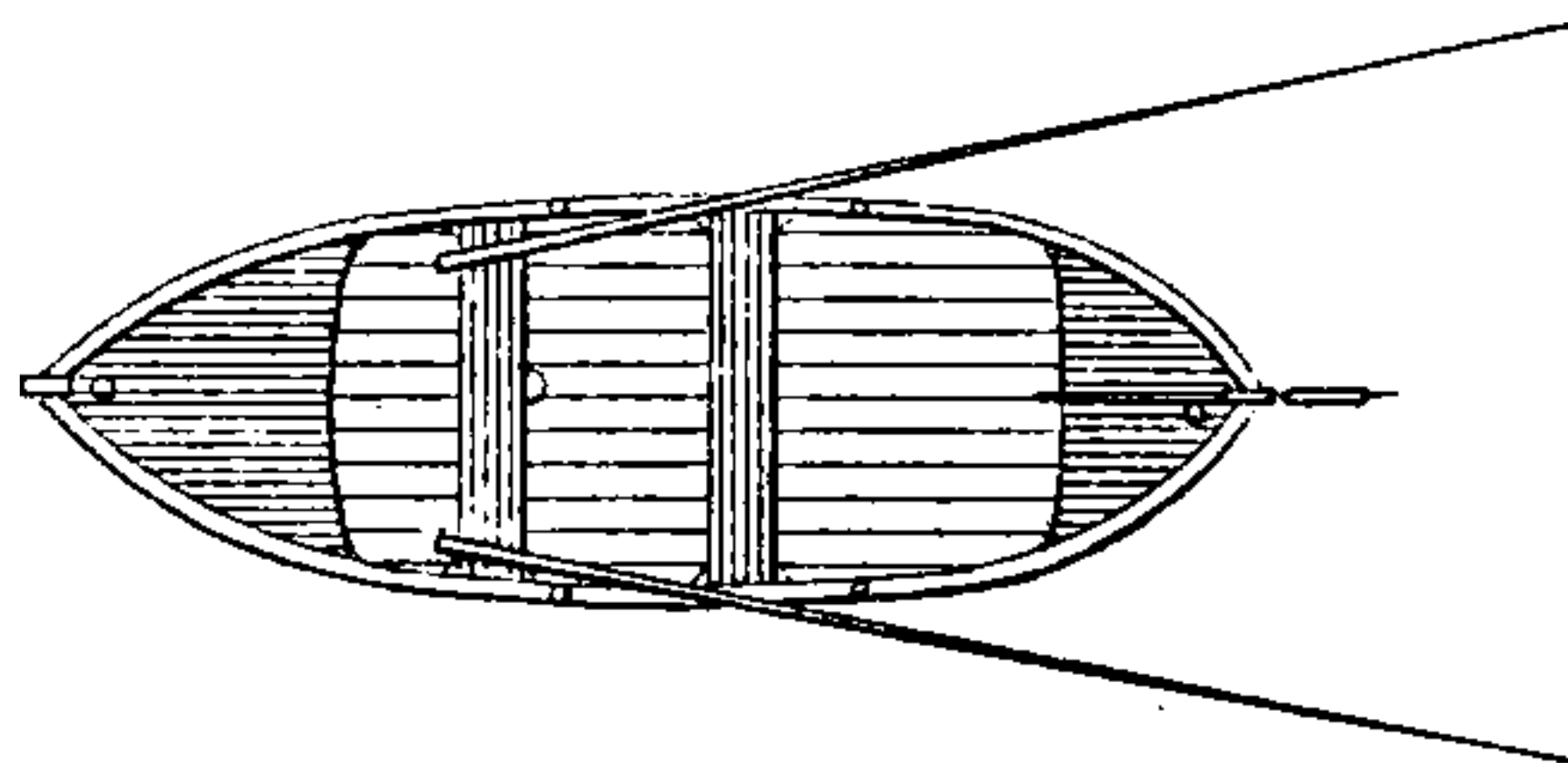
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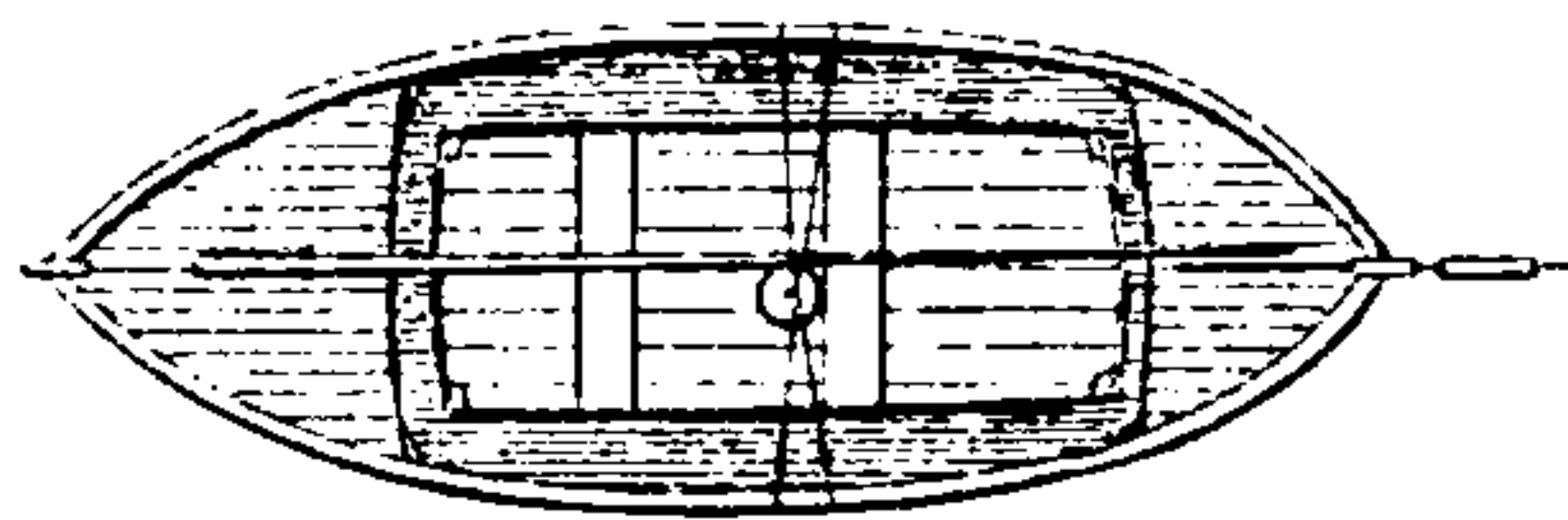
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BATELLO DI MUGGIA.



BARCA DI MUGGIA.



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fishing with prong or line; it often has two masts and two sails; length, 5–8 m.; tonnage (*tonellata*), 1–8 tons; for three to five oars. This name is also applied to an undecked boat, from 18–36 feet long, with pointed bow and circular poop, used in the lagoon fisheries, in which two sails can be hoisted.

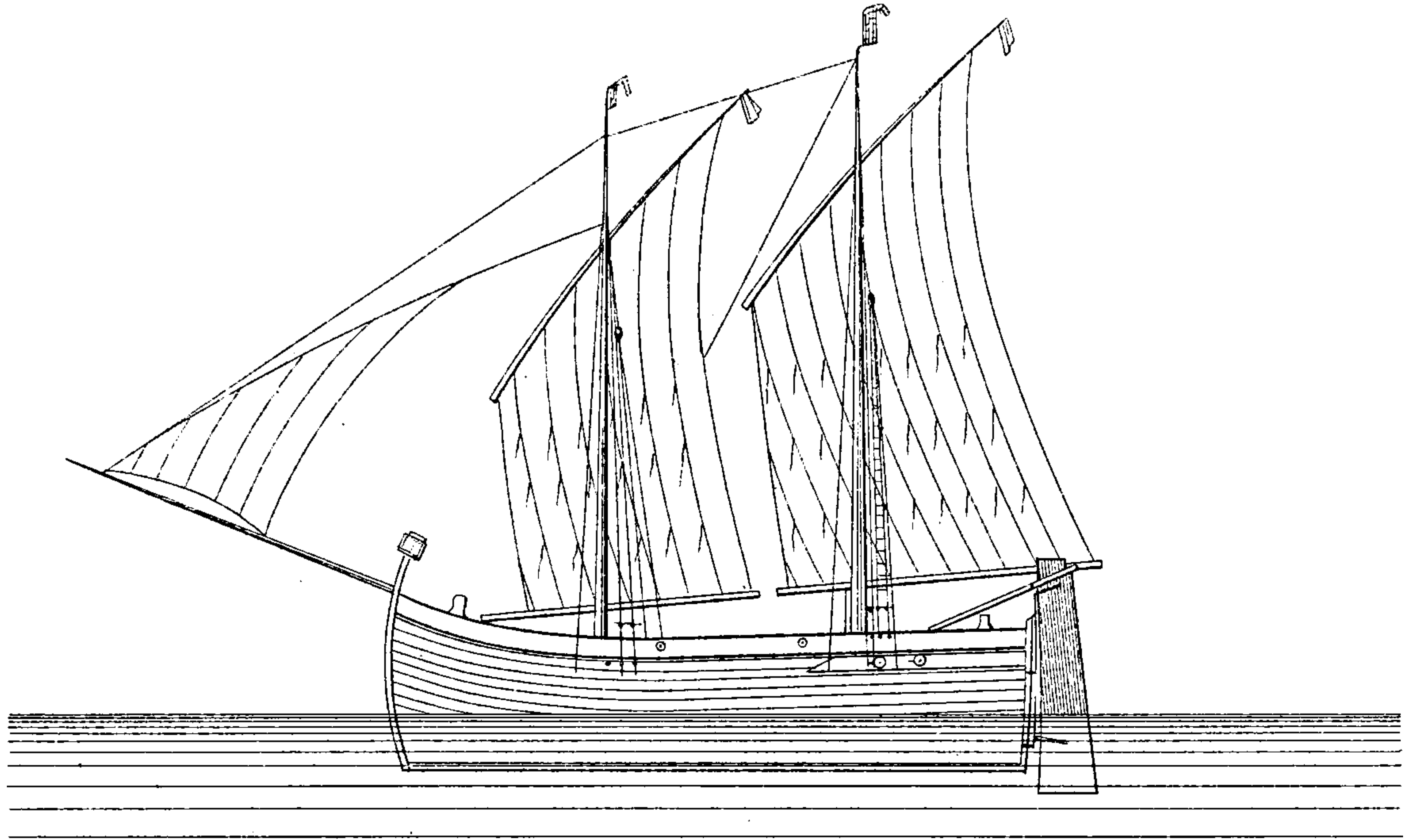
The *Barca*, *Barca di Muggia*, is a flat-bottomed, fore-decked boat, about the size of the foregoing, with one mast and lateen sail; used on the west coast of Istria, chiefly at Rovigno and Muggia, near Trieste (see Plate III.).

The *Bragagna*, or *Bragagnello*, is a deep undecked boat, 30–40 feet long, with two masts and two *spunteri*, or spars, common to the *Tartana*, to the ends of which are attached the ropes (*resta*) of the trawling-net *Tartana*; used in the lagoons, and worked by two or more men. In calm weather the boat is worked by means of a windlass (*argano*). Burden, 1–2 tons; crew, two to four men (see Plate IV.).

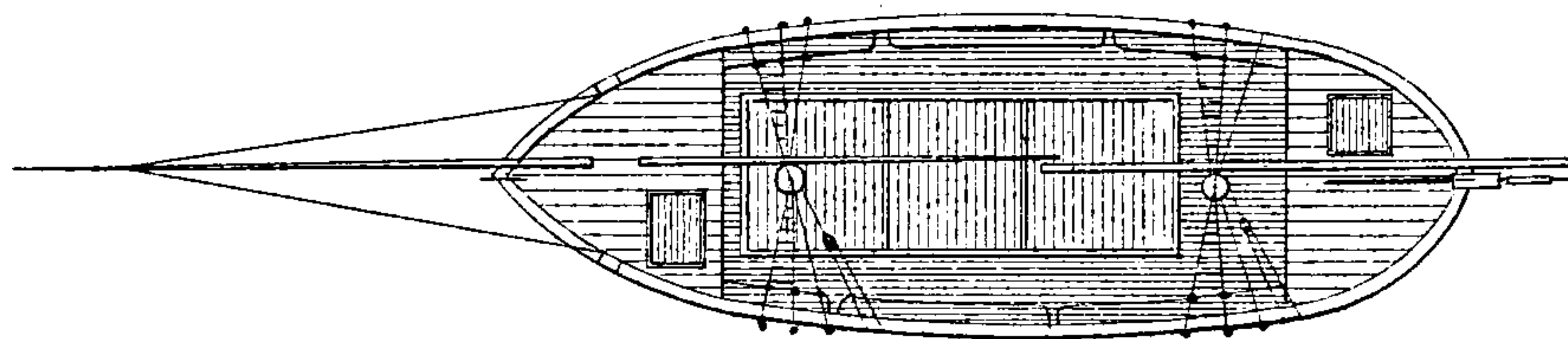
The *Brazzera di Capo d'Istria* is a large broad open boat now little in use, but still used at Capo d'Istria for casting the large seine-nets; with one mast and lateen sail and a flying jib. Burden, 2–3 tons; cost, 200 fl. to 400 fl. (see Plate V.).

The *Gaëta* is a partly decked boat used chiefly in Dalmatia; one mast and lateen sail, three oars; crew, three to five men; tonnage, 2–4 tons; length, 5–6 m.; breadth, 4 feet; price, 70 to 100 fl. Used for casting the Sardine drift and other nets; furnished with an iron basket (*Graticola*), for the purpose of holding fuel, which is required for artificial illumination for night fishing. The *Illuminatore* (Croat *Svičarica*) is used in the Sardine fisheries with the large seine-nets on dark, calm nights by the light of resinous pine-wood. One of the fishermen has a weighted line (*Scandaglio*), by means of which he finds out the position of the shoals, or schools, which, attracted by the light, are slowly and quietly led into a creek, encircled in the net, and drawn ashore. It is surprising how clever the men are in feeling their way about with the line, and thus divining, with a great amount of certainty, not only the exact position of the shoal, but also the class of fish, on their mere contact with the line (see Plate V.).

The *Leuto* is a decked boat, with an opening in the middle, which can be closed; one-masted, with a large lateen sail and flying jib (*flocco*); four or



BRAGAGNA.



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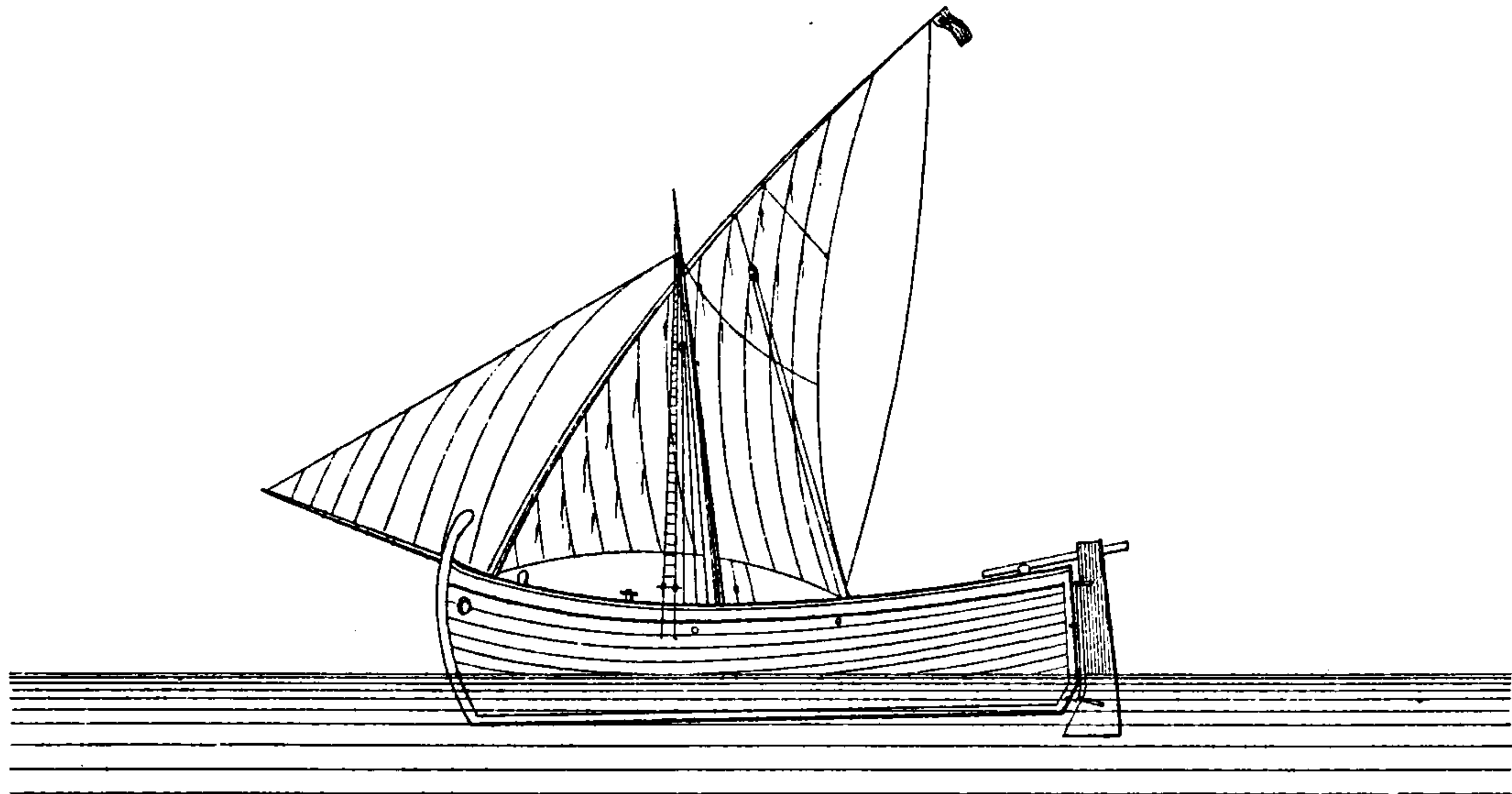
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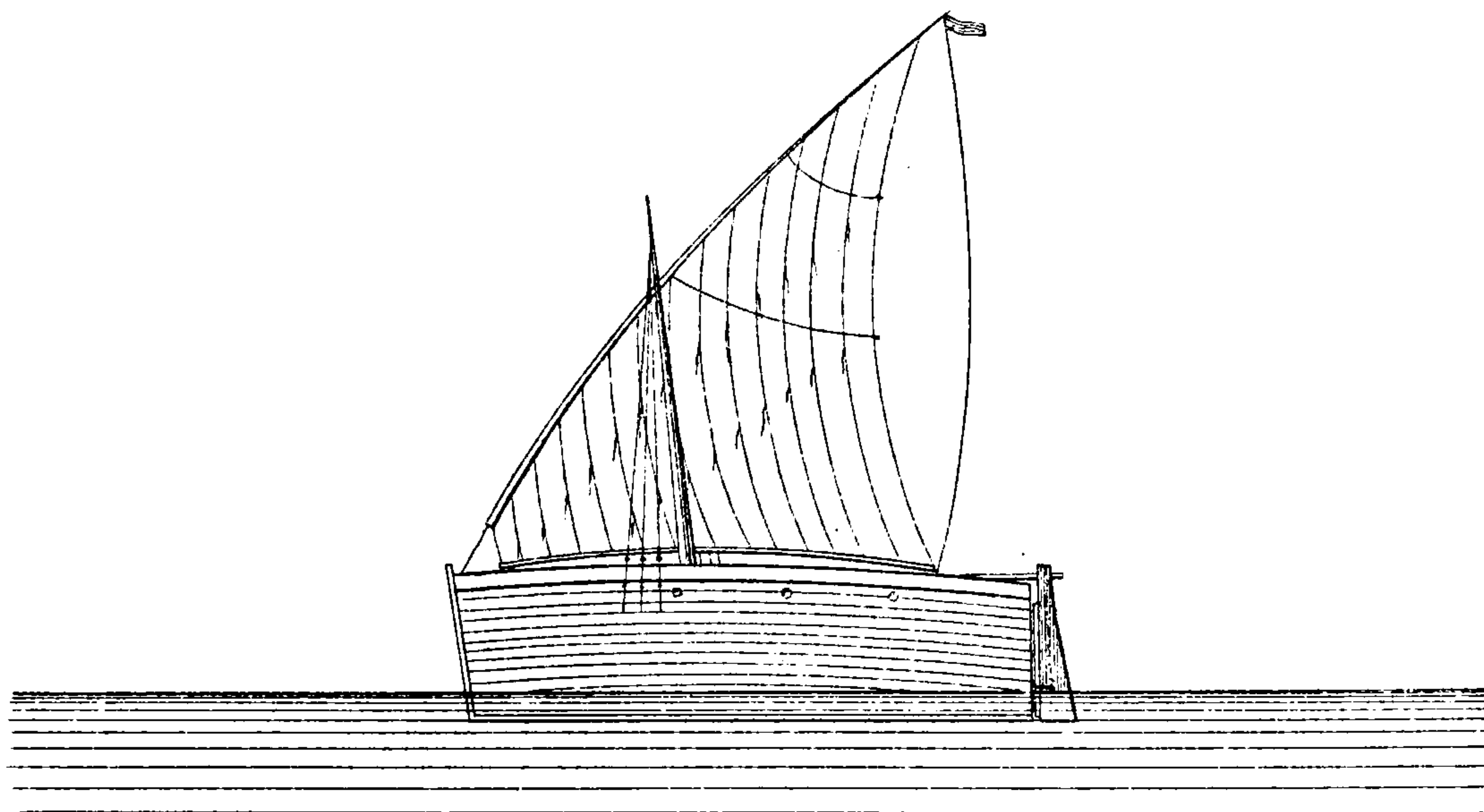
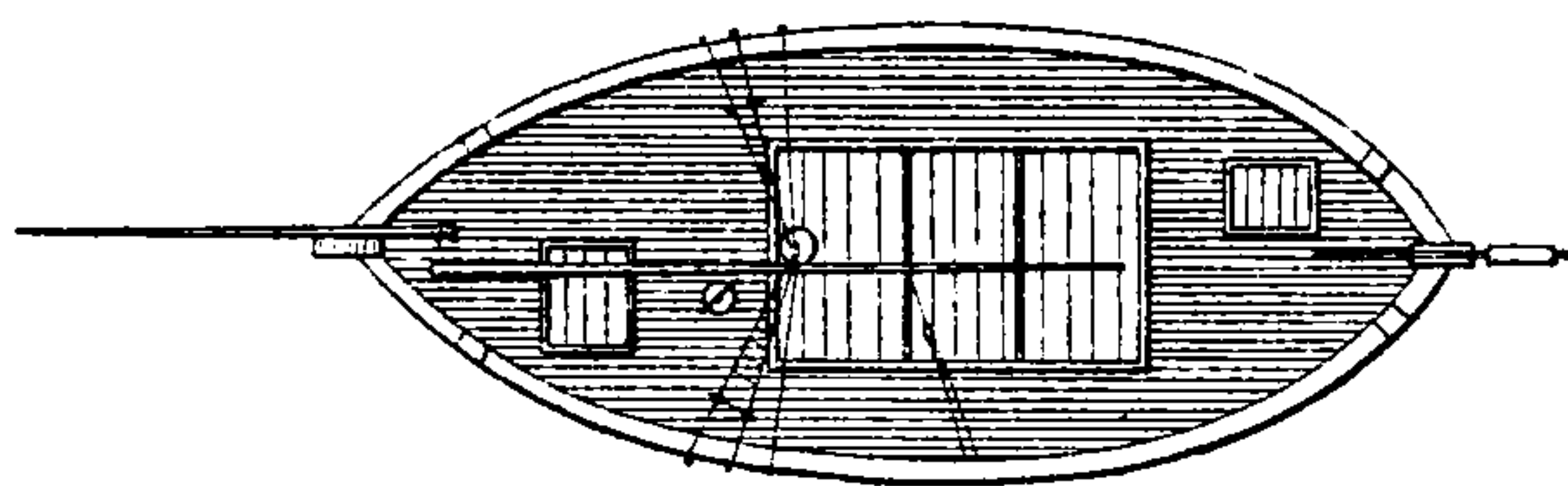
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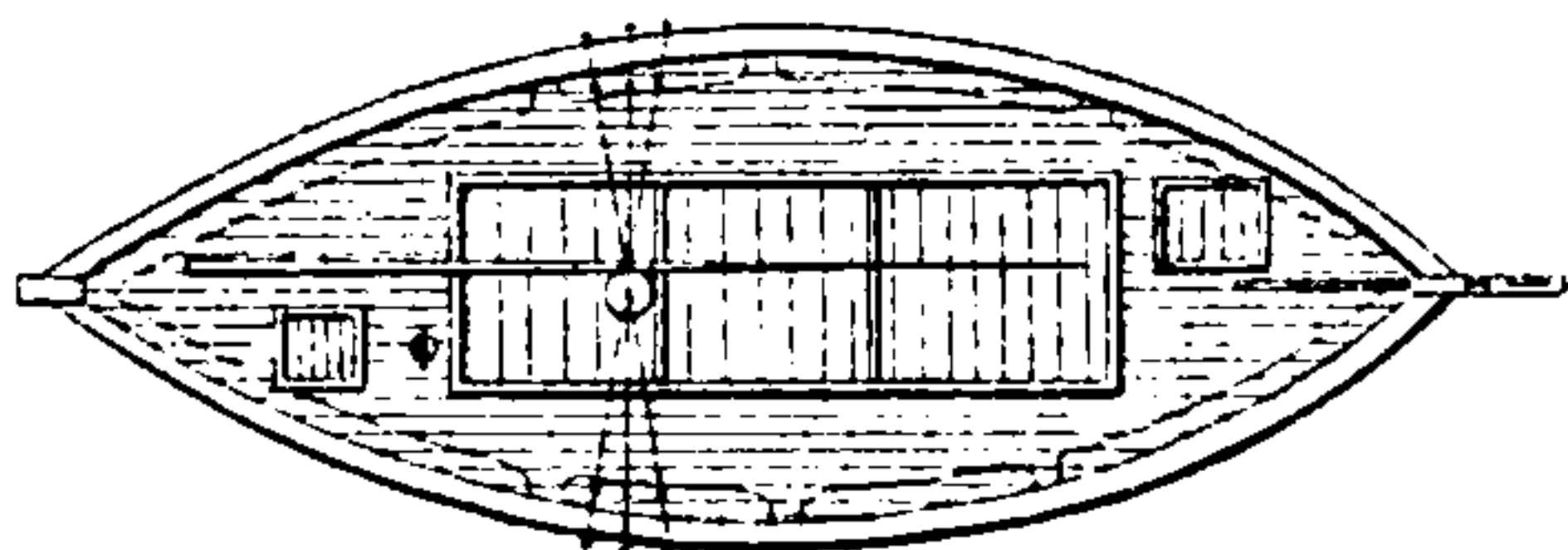
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BRAZZERA DI CAPO D'ISTRIA



GAETA



more oars ; crew, five to seven men ; 3–5 tons ; 6–8 m. long ; price, 100 fl. to 350 fl. Used in Dalmatia for the trawl and seine-nets (see Plate VI.).

The *Bragozzo*, or *Schiletto*, as it is called at Ancona, is a fore and aft decked boat, constructed at Chioggia, and used exclusively by the fishermen of that place. The undecked part is called *boccaporta*. Two masts, with *trabaccolo* sails ; foremast and sail much smaller than the main, and foremast raking considerably forward ; fore stem ornamented with polished iron stem and hawser-holes (*occhi della catena*) ; flat-bottomed, and rudder extending considerably beyond the bottom, to obtain stiffness. Length, 30–40 feet ; 6–10 tons burden ; crew, four to five men ; price, 350–1,000 fl. To be met with all over the Adriatic, fishing in couples, and running parallel to each other before the wind, each having one end of the trawling-net known as *cocchia* in tow ; they have great beam, and sail in the strongest *bora* which many larger vessels are afraid to face, with lowered fore-sail and treble-reefed main-sail luffing up to the wind as each successive gust strikes them. The deep rudder contributes materially to the stability of the craft, and on this, in fact, it mainly depends, as is the case with the American centre-boards ; it is so fixed to the stern-post, that, when passing in shallow water, it can be hoisted by a block fixed on the mainmast, so that it does not touch the ground (see Plate VII.).

The device carried by these boats on the top of their masts in fine weather, or when in port, is most elaborate ; it is known by the name of *Cimarol*,¹ and is fixed into the mast-head, acting as a weather-cock. It is carved out of a single piece of wood, and is divided into three fields, containing an allegorical design of some religious subject. In the specimen represented (Plate VIII.), the centre piece represents the Passion of Christ ; there is the cross, the crown, the ladder, the vinegar-vessel, &c. ; above is S. George and the dragon, and below are represented the patron saints of Chioggia (S. Felice and S. Fortunato).

The woodwork, being perforated, presents in itself no hold for the wind, and for this reason the outer edge is bordered with a piece of canvas, on

¹ *Cimarol*, derived from *Cima* — mast-head.

which the wind acts as on a sail ; above are two turtle-doves, the messengers of peace and the emblems of constancy, with extended wings, each supporting a wind-rose ; above each turtle-dove are real palm-branches, which are fixed there on Palm Sunday and renewed each year, emblematic of success ; at the top is the Italian flag, held by a mariner, bearing on one side the initials of the name of the boat, and on the other side the initials of the name of the owner ; the flag-staff is crowned by the cross, and the whole device is ornamented by a number of small banners, placed there as records, and probably in consequence of vows made at the time of escapes from danger. The whole device is extremely elegant, and is a novel and tasteful decoration wherever it may be seen ; it gives a fair idea of the simplicity of thought, the piety and at once the ingenuity of these laborious, nerved, and frugal seamen, in their dangerous calling. The whole is balanced to a nicety, and moves easily when fanned by the slightest breeze. The foremast carries a similar, though smaller and less elaborate, device ; the design varies in shape and details amongst the different craft, but the emblems are more or less common to all. They are so coloured, that they appear as of bright metal when the sun shines on them.

The *Tartane* are somewhat out of use, their number having decreased to about fifty. They likewise hail from Chioggia, but they originate from the south, and are very much more common in Sicilian waters and in the Gulf of Naples : the Spaniards have very large ones, exceeding 100 tons. They work the trawl singly (not in couples, as is the case with the *Bragozzi*), and the drag-ropes (*alzane*) are attached to two long spars (*spuntieri*, or *sponteri*), extending fore and aft, the vessel drifting broadside on. The trawling-net is also known by the same name of *Tartana*. This craft varies from 60–100 feet in length, is decked throughout, with circular bows and poop, and more beam than the *Bragozzo* ; it is of 10–15 tons burden, and is worked by a crew of eight men. It has not so much spring aforehead as the *Trabaccolo*, and the helm does not extend beyond the after-steven. The rig consists of one mast raking a little forward, a very large lateen sail, a driver and jib like the *Brazzera* ; it is seldom met with on the eastern coast (see Plate VI.).

The *Tartanella* is a decked shore-boat used in Dalmatia, particularly

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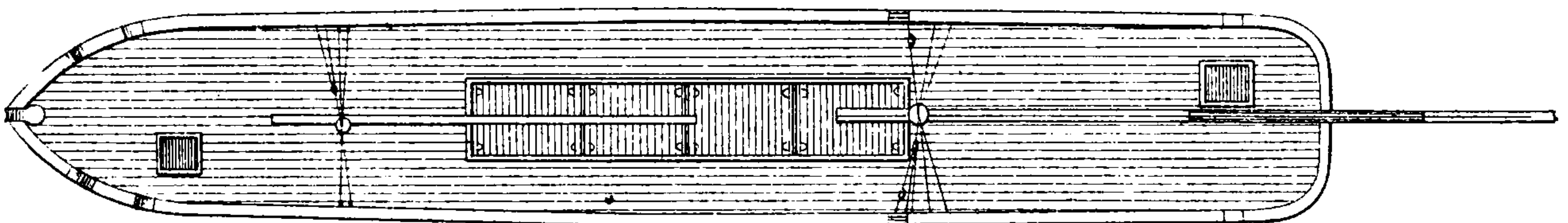
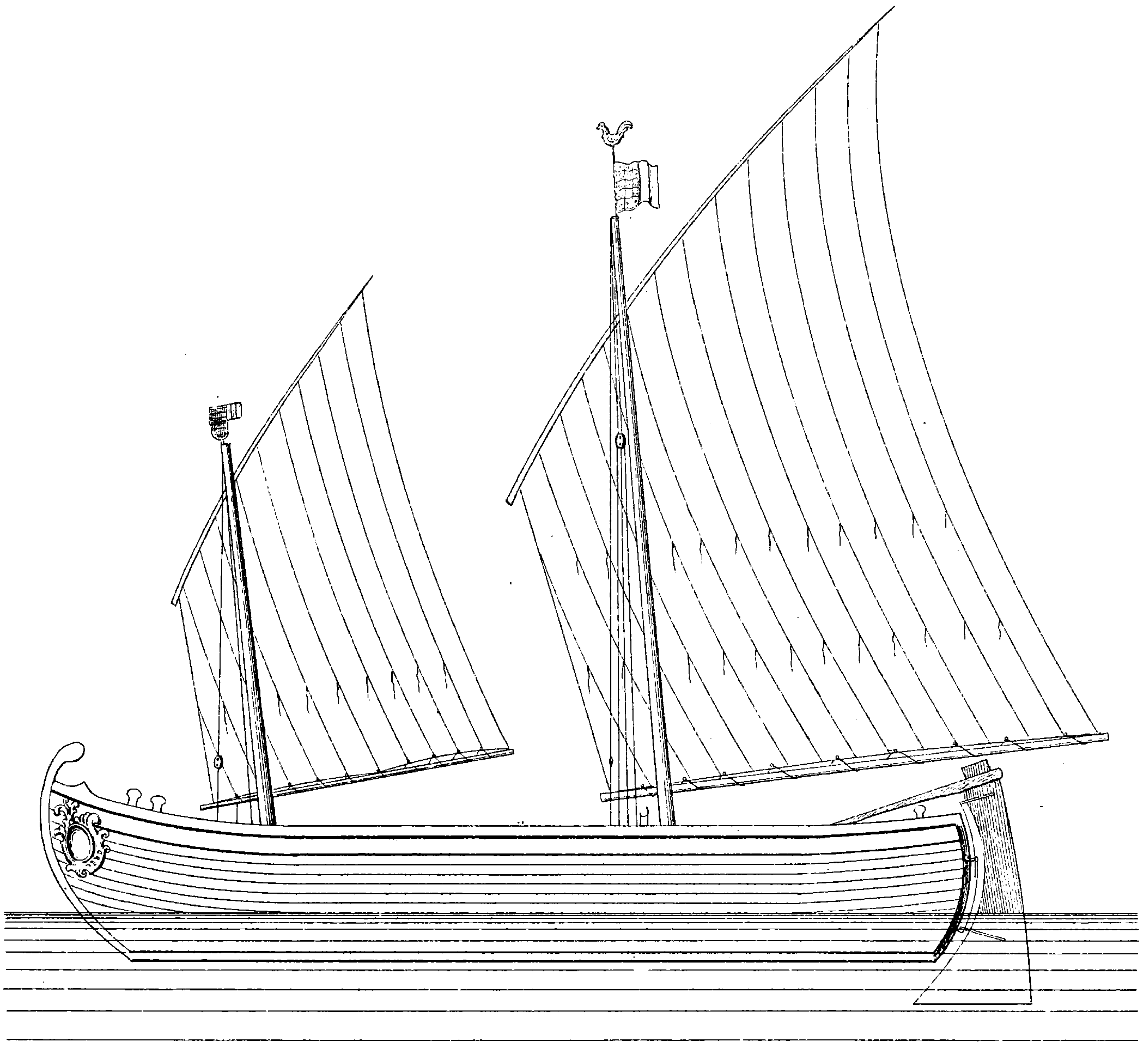
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CHAPTER V.

THE NETS.

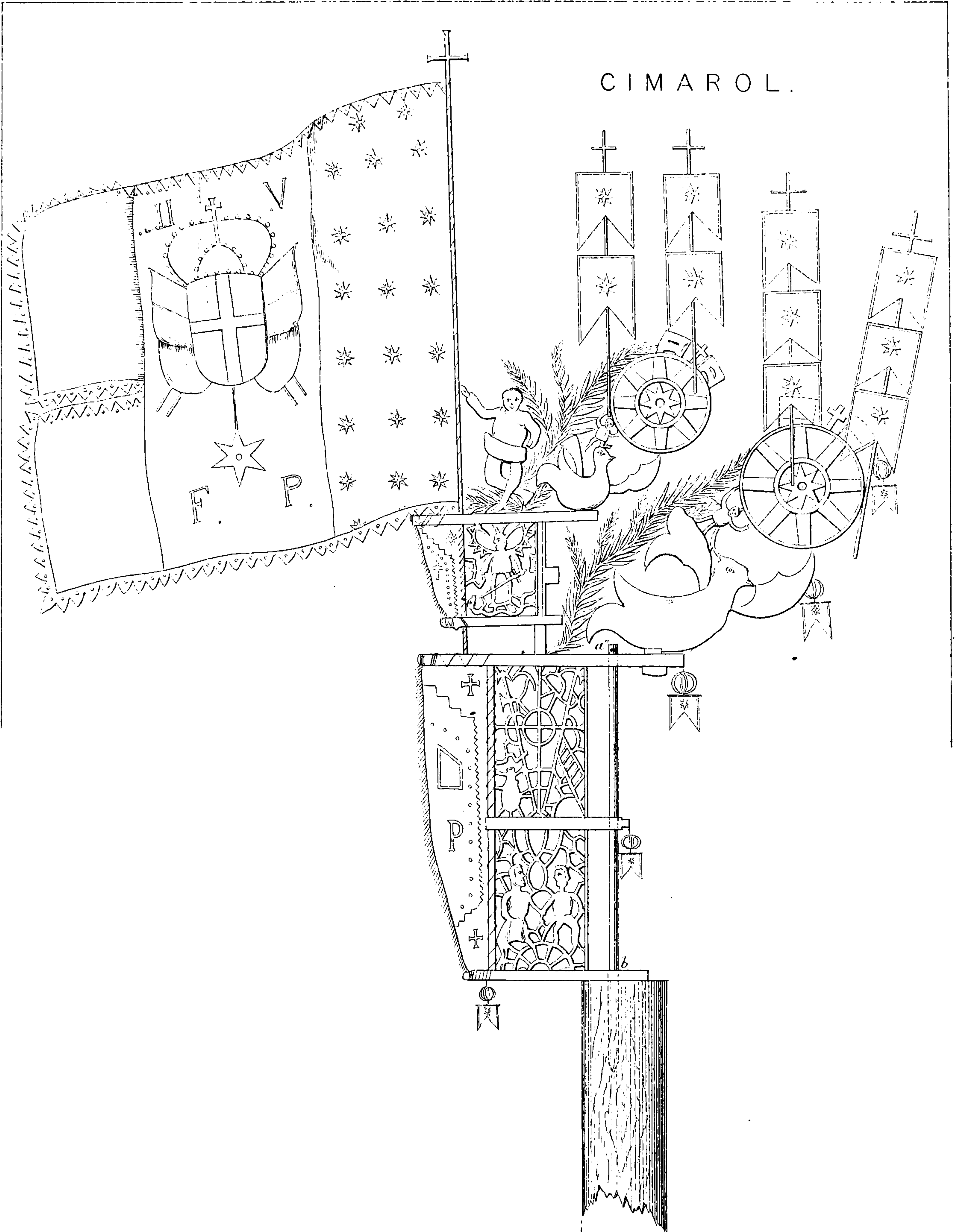
Process of making, tanning, and mounting.—Drift-nets; Trammel-nets; Circle-nets; Seine-nets; Trawling-nets; Hand-nets.—Fish-weirs and ponds.—Snares.—Basket-traps.—Store-pots, &c.—Value of the fishing gear.



ALL nets and fishing gear go by the name of *Arti*, or *Arte*. The fine nets are made of flax (*Lino*) and the coarser ones of hemp (*Canapin*, or *Grisiolo*), whilst the strongest fixed nets, such as the *Tonnare*, are made of *Canapa*, or *Trada*, and are imported from Italy. *Canapa* is the hemp in its raw state; *Trada* consists of the longest, strongest, and whitest fibres of hemp, collected after the process of combing has taken place; *Canapin* is the second quality, the fibres of which are shorter; and *Grisiolo* is the third quality, or refuse, consisting only of short fibres. The strongest twine (*tregina*) made for nets consists exclusively of *trada*, three threads or strands being twisted together; this twine is also used for fishing-lines. The smaller nets are made by the fishermen themselves and their wives, who also spin the hemp or flax for the purpose; the tanning process of home and machine-made nets is also done by them. Nets are made at Grado, Isola, Loyrana, Rovigno, Spalato, and Ragusa, or imported from Venice, Chioggia, Ancona, and more especially from Apulia.

The tanning process (*intenzar la rè*) is effected by a solution of the bark of the *Pinus maritima* (*scorza de pin mazená*), which is ground fine and boiled in sea-water; the solution is either repeatedly poured over the net, or the net is boiled in it and then dried in the sun. The finer nets are tanned either with the branches and leaves of the *Pistacia lentiscus*, the leaves of the Shumac (*Rhus cotinus*), the myrtle (*Myrtus italica*), and the *Erica*

CIMAROL.



A

B

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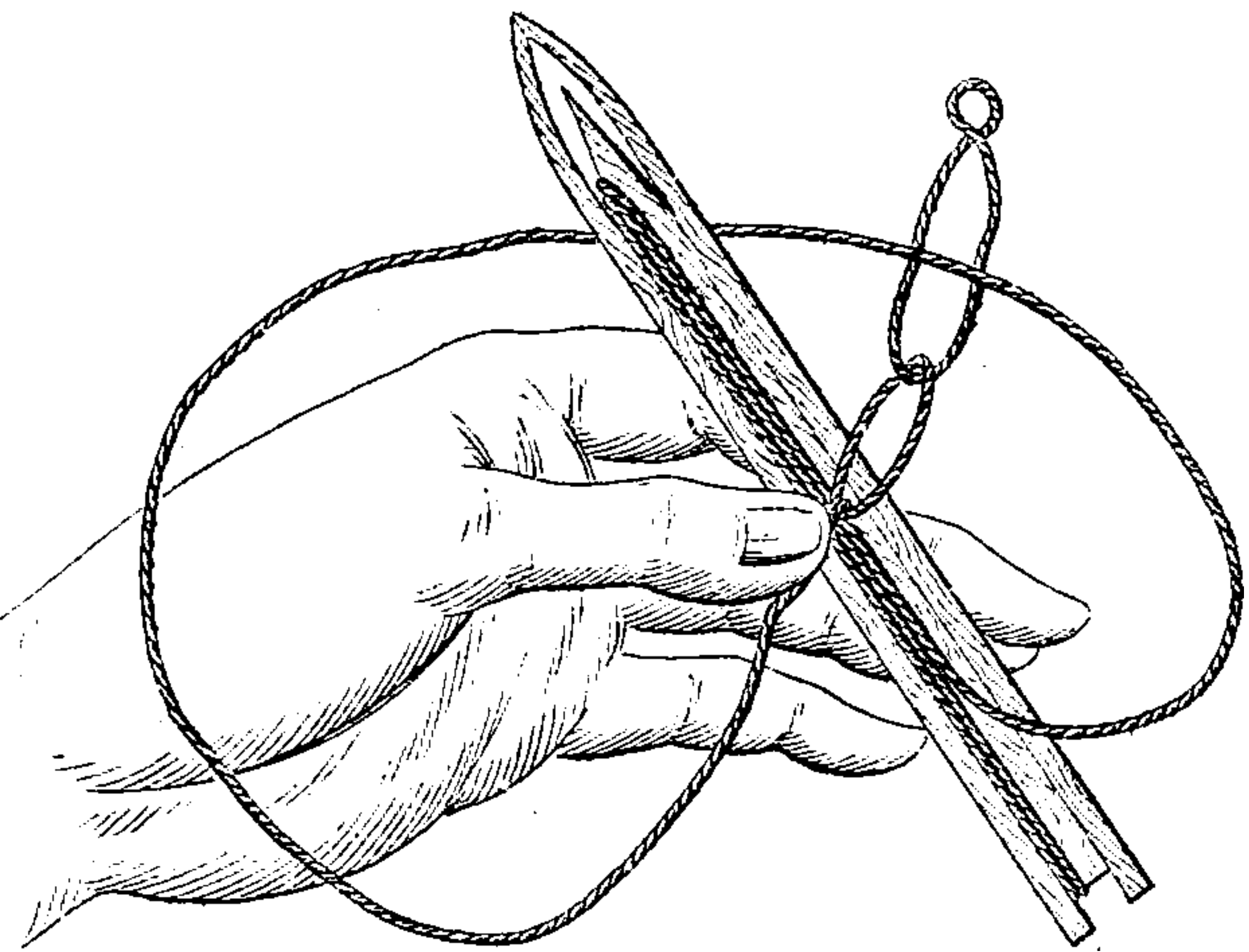
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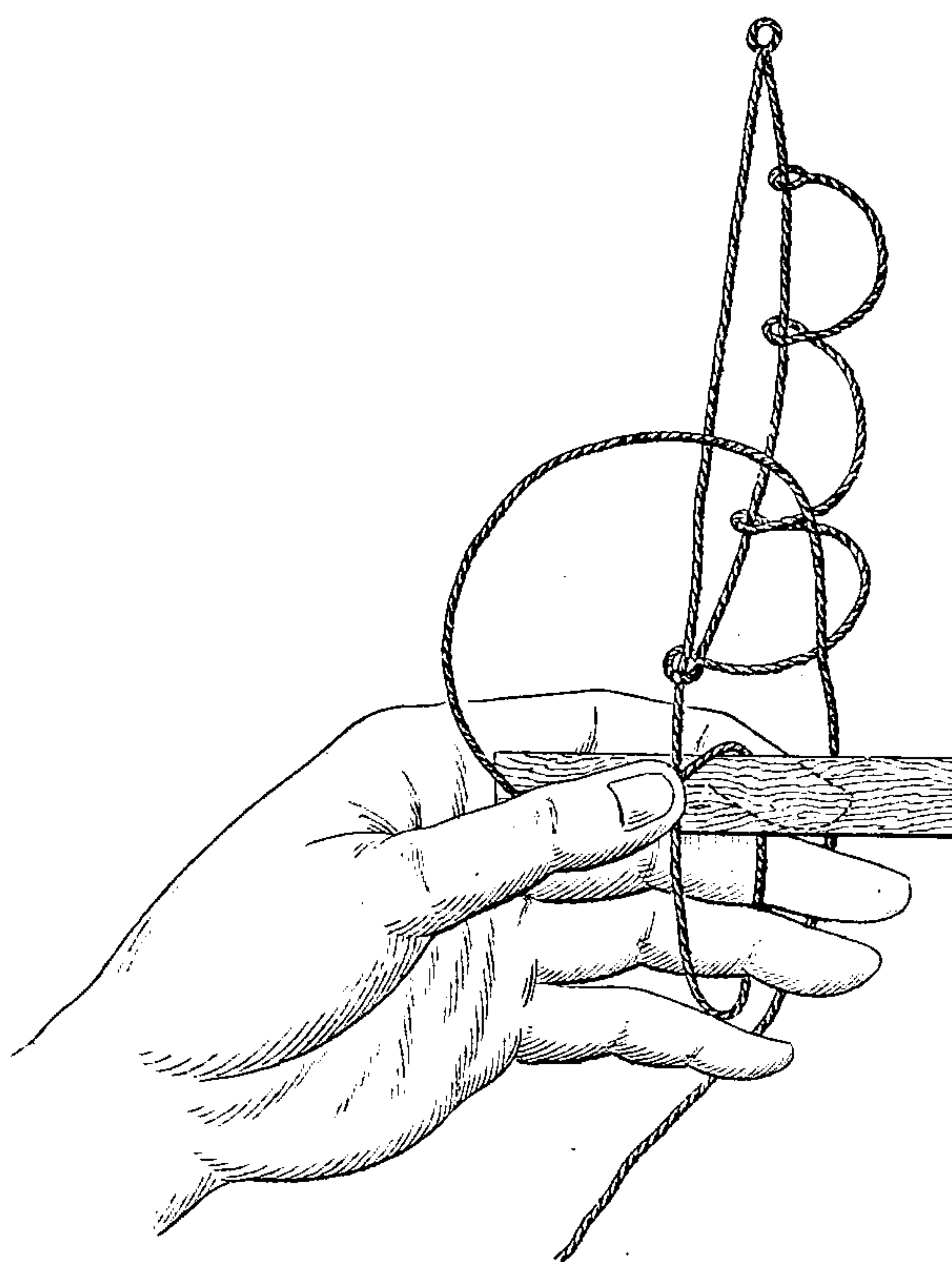
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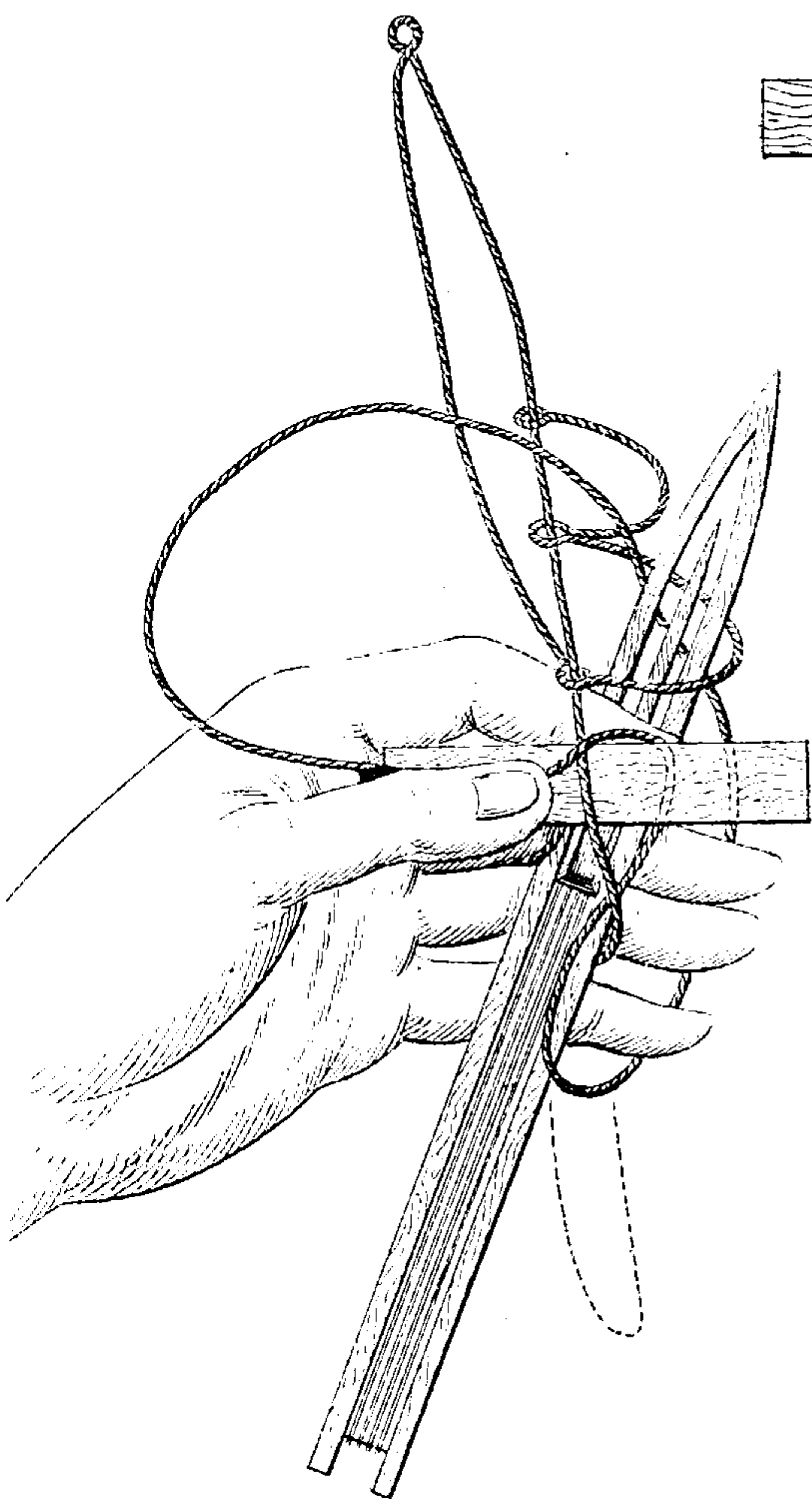
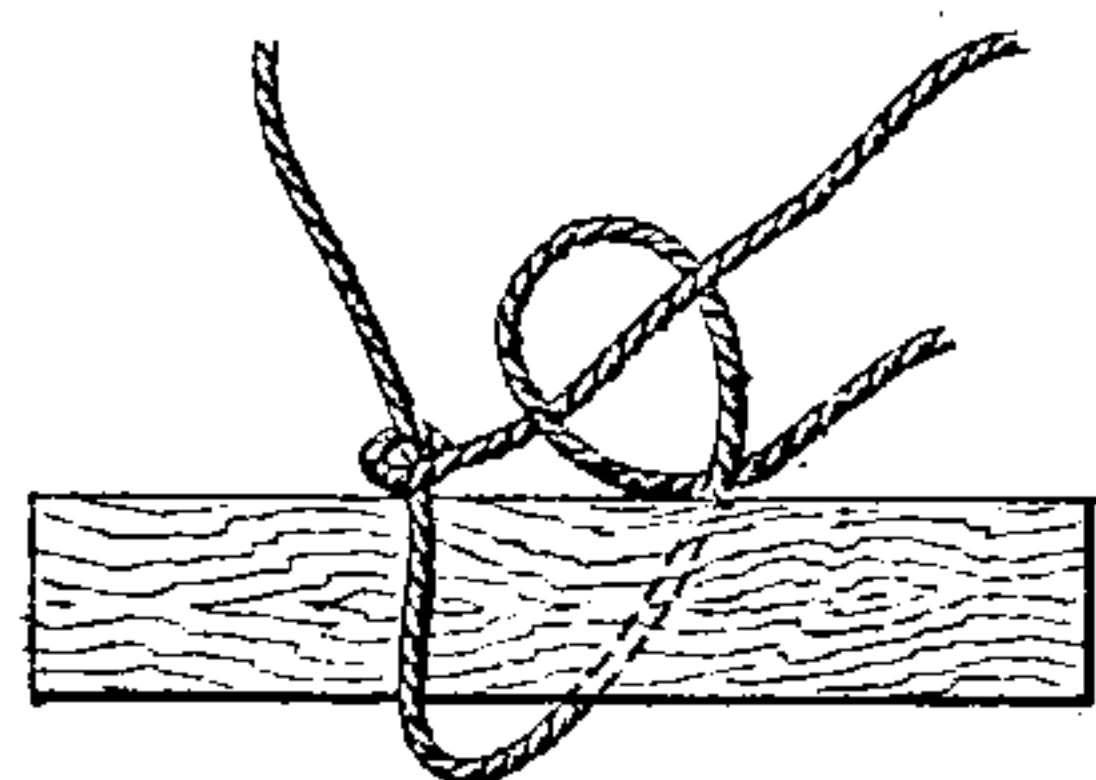
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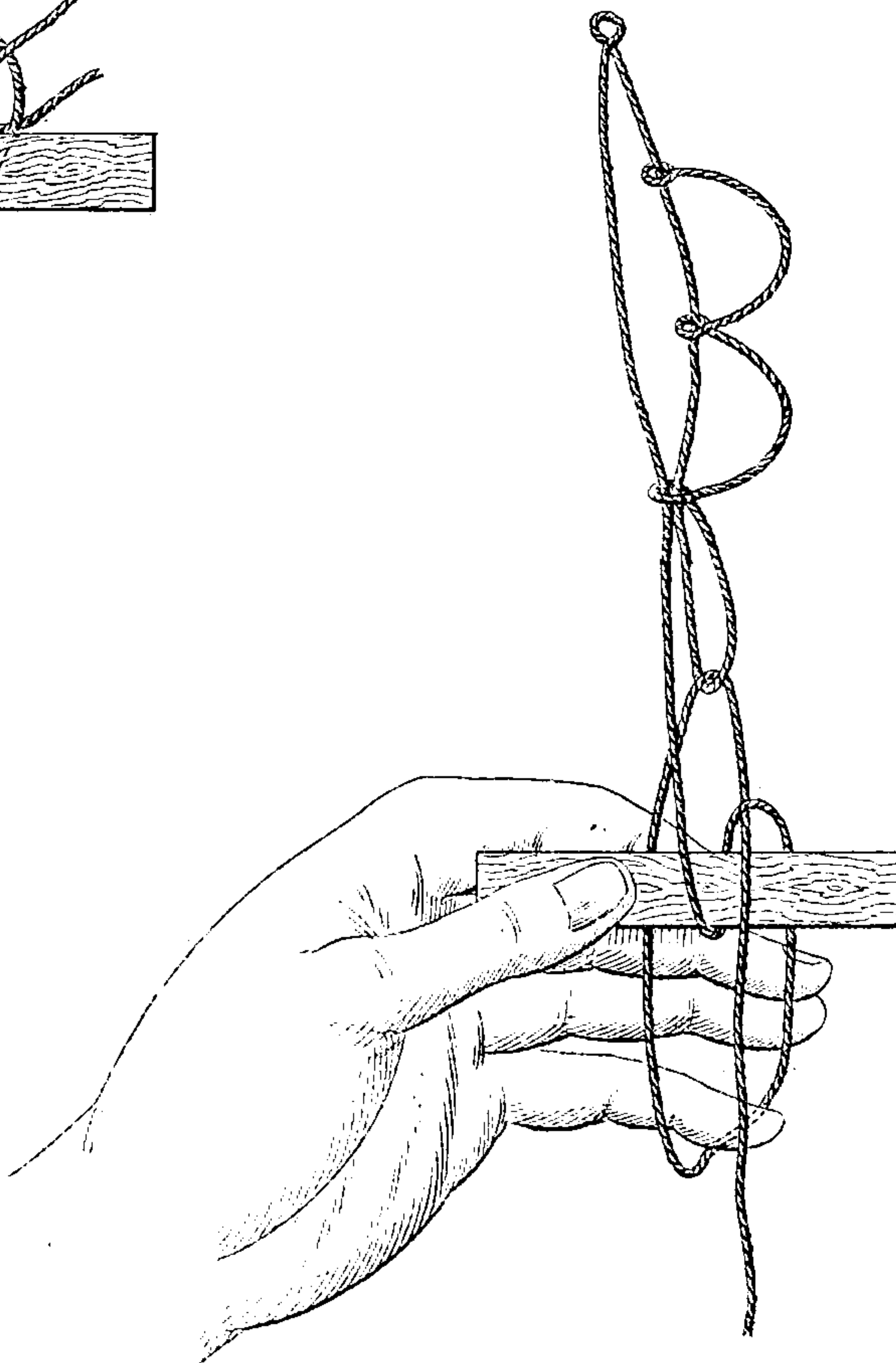
GROSSO DRITTO



GROSSO SCORRENTE.



GROSSO SINISTRO.



GROSSO SCORRENTE.

vulgaris, a species of heath, of which a solution is prepared and used in a similar manner to that described above. Nets in constant use are tanned, as a rule, once every one to three months, and last one to three years; if only occasionally used, and dried after use, the fine thread-nets last six to ten years, with the aid of trifling repairs; untanned nets are naturally less durable, but are preferable, as being less conspicuous in the water. The coarser twine nets which are tanned, and still more so those which are tarred, as is the case in the north of Dalmatia, last eight years and more.

When tanned, the nets are "mounted," *i.e.*, cut to their proper shape and size; the lower edge, "foot," or "sole" (*ima*), is then weighted with lead (*piombi*), and the "back," or uppermost part, is edged with rope, as also the "heads," or ends of the net; the back is further provided with the necessary cork floats (*corteghe*, or *sugheri*), and ropes for hauling in.

The common knots (*gropi*) in use are illustrated on Plate IX. They consist of the *gropo dritto* (right-hand knot), the *gropo sinistro* (left-hand knot), and the *gropo scorrente* (sliding-knot). The prevalent classes of meshes (*maglia*) are illustrated on Plate X.

The different kinds of nets in use may be classed as follows:—

I. DRIFT-NETS

(*Standnetze*, *Poste*), or *Reti da posta, d' imbrocco, da incetto*, generic terms used to designate the class of nets into which the fish enter of their own accord, or are allured by bait, or are driven in by fright, and, once embroiled in the meshes, are there held by their gills,—terms which comprise the trammel-nets. They are called also *reti semplici*, or *nude*, *i.e.* "simple," or "naked," in contradistinction to the trammel-nets, which are known as *trimagliate*, or *vestite*, *i.e.* "dressed" (see Plate X.). Foremost amongst these is the *Sardellera* (called *Voiga*, or *Budello* in Dalmatia, and *Manaida* or *Signorella* in Italy), a hanging-net consisting of one large or eight to sixteen smaller pieces (*Spedoni* or *Budelli*), joined together so as to form a long straight wall, several hundred yards long and several yards deep, the "head" being supported by floats at or near the surface, and the "foot" weighted so that the net hangs perpendicularly in the water; the "head" is

mounted on a shorter length of line, so as to hang slack in the water, and to give way when the fish strike it. Four *Spedoni* joined together form what is called a *giogo*.

The net is attached at one end by a rope to a stone, and at the other end to a float, consisting either of an empty cask or of cork; it is then allowed to drift at the mercy of winds or currents.

The net is "cast," or "shot," by first casting anchor, from which spot the boat is then withdrawn to a certain distance, where the stone is sunk to which one end of the net is attached; the boat is then hauled in by the anchor-rope, whilst the net is being paid out by two men. If bait is used, as on the west coast of Istria, it is scattered about before paying out the net, and subsequently, also, in a circle round the position of the net.

If mackerel, or horse mackerel, make their appearance, they are looked upon as the forerunners of sardines; which is, however, not always the case.

The nets act as barriers for intercepting moving shoals, and the fish become meshed in their efforts to pass through, forcing their heads into the meshes, the size of mesh varying according to whether mackerel, or other fish, are to be caught, and being made so as to allow the head and gill-covers to pass through, but not so the body of the fish. When the fish has passed through beyond the gills, it is effectually caught, and there is little chance of escape, the opening of the gill-covers which enable the fish to breathe, and the act of breathing itself, causing the mesh to slip forward and catch in the gill-opening, by which action the fish is prevented from withdrawing the head.¹

If the net is moved, and scales appear at the surface, it is a sure sign that the net has been "struck," and the net is then drawn in, commencing at one end, and by degrees, as it is drawn in, the fish are extracted and put in casks, or tubs, being at the same time sprinkled with salt.

The catch is effected most profitably just before sunrise, or just after sunset, when the net escapes the notice of the fish.

The sardine rises to the surface only in fine and moderately warm weather;

¹ E. W. H. Holdsworth.

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whereas the cold or heat, the wind or rain, are so many inducements for it to seek the greater depths; thus, fishing at the surface is carried on chiefly in the months of June to September. The most profitable fisheries are in June; in the cooler months of April and May, and October and November, the fishing is carried on with the same nets in deeper waters, the nets being extra weighted by means of stones.

These nets are used for mackerel, sardines, and anchovies.

On the west coast of Istria, the harry crab (*Carcinas mænas*), brought almost exclusively from Venice and Grado, and the sea-spider (*Maia squinado*), caught on the coast, are used as bait; and, in the season of the Sardine fisheries, as many as 1,000 sacks of this bait are used a day. They are kept alive until used, then pounded in a stone mortar, and mixed with sea-water; the liquid bait (*tritura, pacciugo, pastello, pesto di granzetti*) is thrown into the sea round about where the net is cast; the sardines are very greedy, dart after it and dash against the net, where they become embroiled. In Dalmatia, the seine-net and the *Illuminatore*, which will be presently described, take the place of this mode of fishing.

A bait made of salt herrings has also been used with success.

Length of one piece (*spedone*), 30 m.; depth of ditto, 8 m.; size of mesh for sardines, $1\frac{1}{2}$ to 2 c.¹ diagonally; price, 30 fl.

The *Rete di Sardelletti* is a smaller-meshed net of the same description, for catching the small sardines (*Clupea papalina*). Length, 40 m.; depth, 8 m.; price, 35 fl.

The *Sardonera* is a still smaller-meshed net, of coarser twine than the *Sardellera*, for catching anchovies (*Sardoni*), used chiefly in the month of July. Mesh, 1 c. in the diagonal. Length, 40–60 m.; depth, 5 m.; price, 35–60 fl.

The *Anguellerà* (*Rete d'angudella*) is a ground-net for catching the fry of atherines (*Anguelle*), the smallest-meshed net of all (8 mm. diagonally); eight to ten lengths of which are generally joined together. One length, 30 m.; depth, 3 m.; price, 20–35 fl.

¹ C denotes centimètre, m. mètre, and mm. millimètre.

The *Zerer* is a similar net to the foregoing one, made of very fine twine, and used at Rovigno. Mesh, 1 c. in the diagonal. Length, 25 m.; depth, 2 m.

The *Agonera* (*Gavonera* in Dalmatia) is a ground-net for full-grown atherines (*Agoni*, *Gavoni*, *Gerai*). Mesh, 1 c. in the diagonal. Length, 40 m.; depth, 3 m.; price, 25 fl.

The *Senello* is a ground-net of fine twine, for *Menole* (*Mæna vulgaris*), and young grey mullet (*Cievoli*). Mesh, 38 mm. in the diagonal. Length, 20–30 m.; depth, 1½ m.; price, 15 fl.

The *Spirone di Verzelate* is a ground-net for grey mullet (*Verzelate* = *Mugil saliens*), which is cast in a circle. Mesh, 5 c. in the diagonal. Length, 25 m.; depth, 8 m.; price, 30 fl.

The *Spirone da Lotregani*, or *Cievolera*, is a similar net of finer twine for grey mullet (*Lotregan* = *Mugil auratus*, and *Cievololo* = *Mugil cephalus*). Mesh, 4 c. diagonally.

The *Prostica* is a ground-net used in Dalmatia for catching red mullet, bogue, *Oblata melanura*, and *Mænidæ*, generally cast in the evening and drawn up the following morning. Mesh, 26 mm. in the diagonal; length, 100 m.; depth, 4 m.; price, 50 fl.

The *Bobera* (*Posta di bobbe*, Croat. *Bukvare*) is a ground-net for the bogue, mackerel, horse mackerel, and mendole. Mesh, 35 mm. in the diagonal; length, 20–100 m.; depth, 6–7 m.; price, 20–80 fl. In many places this net is used for the kind of fishing known as *pesca da ludro*.

The *Scombrera* is a smaller ground-net for mackerel (*Scombri*). Length, 50 m.; depth, 5 m.; price, 30 fl.

The *Cagnera* (*Rete di can*) is a ground-net weighted with stones for small sharks (*pesce can*), and rays, in the open sea; used at Zara, and in the Quarnero. Length, 40 m.; depth, 2 m.; price, 25 fl.

The *Squaënera* is a ground-net of coarse twine for angel sharks (*Squaëne*), and rays, also for sea-spiders, and lobsters. Mesh, 20 c. in the diagonal. Length, 20 m.; depth, 1½ m.; price, 15 fl.

The *Poklopnica* is a net similar to the *Prostica*, with the difference that the "head" is weighted instead of being sustained by floats. It is held

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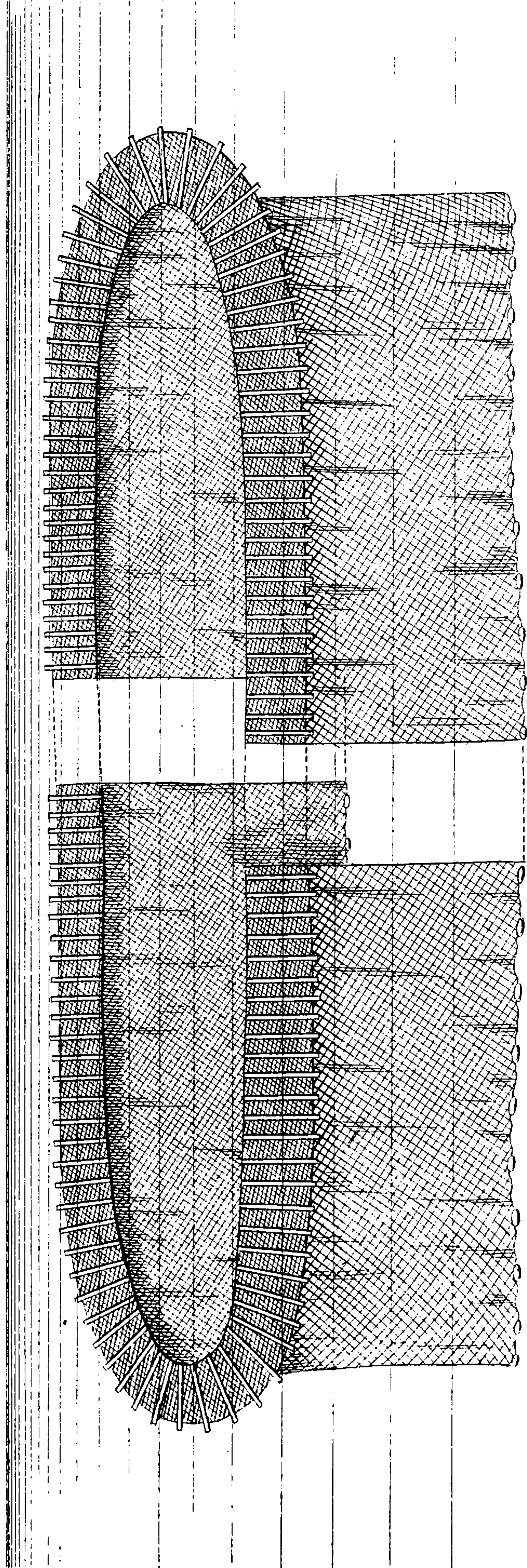
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stretched by means of wooden laths, and its position in the water is horizontal. It is used at Lésina for fishing mendole, and the net is cast just over the shoals, or schools, of fish. Although made of fine twine, the net is heavily weighted.

2. TRAMMEL, OR SET-NETS,

Reti tramacchiate, or *tramagliate*, or *vestite*, *i.e.* dressed, derived from the Latin *tres maculæ*, *i.e.*, three meshes; it is known in France by the name of *tremail*, or *tramail* (from *trois mailles*), and in low Latin by the name of *tramallum*, or *tramela* (see Plate X.).

They consist of three long nets, placed side by side, and fastened together at the back, foot, and ends. The middle net is small-meshed (*nappa sottile*), 2–3 c. in the diagonal, and is made both longer and wider than the two outside nets, the excess being gathered in at short intervals along the edges, where the three nets are fastened together. The consequence is that the middle net hangs slack between the two outer nets. The two outer nets (*Chiaroni*) are made of coarse twine, the mesh called (*Cerberè*) measuring 15–34 c. in the diagonal; they are mounted so that the meshes are exactly opposite one another, the inner net hanging loosely between them, and, being fully extended, the meshes are wide open, thus allowing a free passage for the fish. When a fish passes through the first outer net, it meets the inner small, meshed net, and carries a portion of it through the other outer net, thus producing a bag or pocket beyond it, whence is derived the term of *Reti d'insacco*, by which these nets are also known. The more the fish struggles to escape, the more hopelessly it becomes entangled.

The trammel is cast so that its length is in the direction of the tide, being anchored and buoyed or sustained by means of dry pumpkins at both ends; the back, or upper side, being well corked, and the foot weighted, to keep the whole net in its proper position. It is generally left down over night, sometimes longer, and the fish either enter by chance, or are driven towards it by striking on the water.

The *Saltarello* (at Naples called *Vollari*) is a combination of a simple ground-net composed of several *Spedoni* hanging perpendicularly in the water,

by means of which the fish, chiefly grey mullet and basse, are encircled, together with a trammel-net, which is made to float on the surface of the water outside the ground-net, but attached to it, and entirely surrounding it. In practice it acts so that the fish, finding themselves closed in by the ground-net, and finding exit impossible, are given to jump (*saltare*) out of water in their endeavours to clear the obstruction of the ground-net, and thus fall on to the trammel (*il salto*), in which they entangle themselves.

On the Istrian coast the trammel is kept afloat by means of cork floats, and the ground-net is secured by piles driven into the bed of the sea; in Dalmatia, it is supported by reeds, which are tied to it at intervals of $1\frac{1}{2}$ to 2 feet, and act as floats. It is generally set close to the shore, the outside forming a semicircle, whereas the shore-side is cast in a straight line, and consists merely of the ground-net without the floating trammel. Length of ground-net, 200–300 m.; depth, 8 m.; length of trammel, 60 m.; breadth, 2 m.; price of the whole, 300–500 fl.

In use at all seasons (see Plates X. and XI.).

The *Cerberao*, or *Rete tramezzata*, is a ground-trammel cast in a straight line or semicircle, into which basse and gilt-head are driven by shouts, or by striking the water; used chiefly in spring. Length, 20–30 m.; depth, inner net, 6–8 m.; outer net, 4–6 m.; price, 18 fl. Mesh, inner net, 5 c.; outer net, 21 c.

The *Baicolera* is a similar but smaller-meshed trammel, for catching the fry of the basse (*Baicoli*) at the commencement of the winter.

The *Bombina*, or *Gombina* (Croat. *Popovnica*), is a trammel generally used for grey mullet, toothed gilt-head, *Occhiada*, *Spizzo*, *Sargo*, *Sparo*, scorpions, &c., into which they are driven. Length, 20–25 m.; depth, 2–4 m.; price, 10–30 fl. Mesh, inner net, 4 c.; outer net, 30 c.

The *Tarabara* is a similar net in use in the Quarnero.

The *Passelera* is a ground-net for flounders (*Passera*), rays, soles, scorpions, &c. Length, 8–12 m.; depth, 70–90 c.; price, 15 fl. Mesh, inner net, 6–8 c.; outer net, 30 c. This net is generally cast over night, and drawn up in the morning. At Grado they distinguish two kinds, viz., *Passarella da palude*, i.e., for the marshes or lagoons, and *Passarella da fondo*, i.e., for deep-

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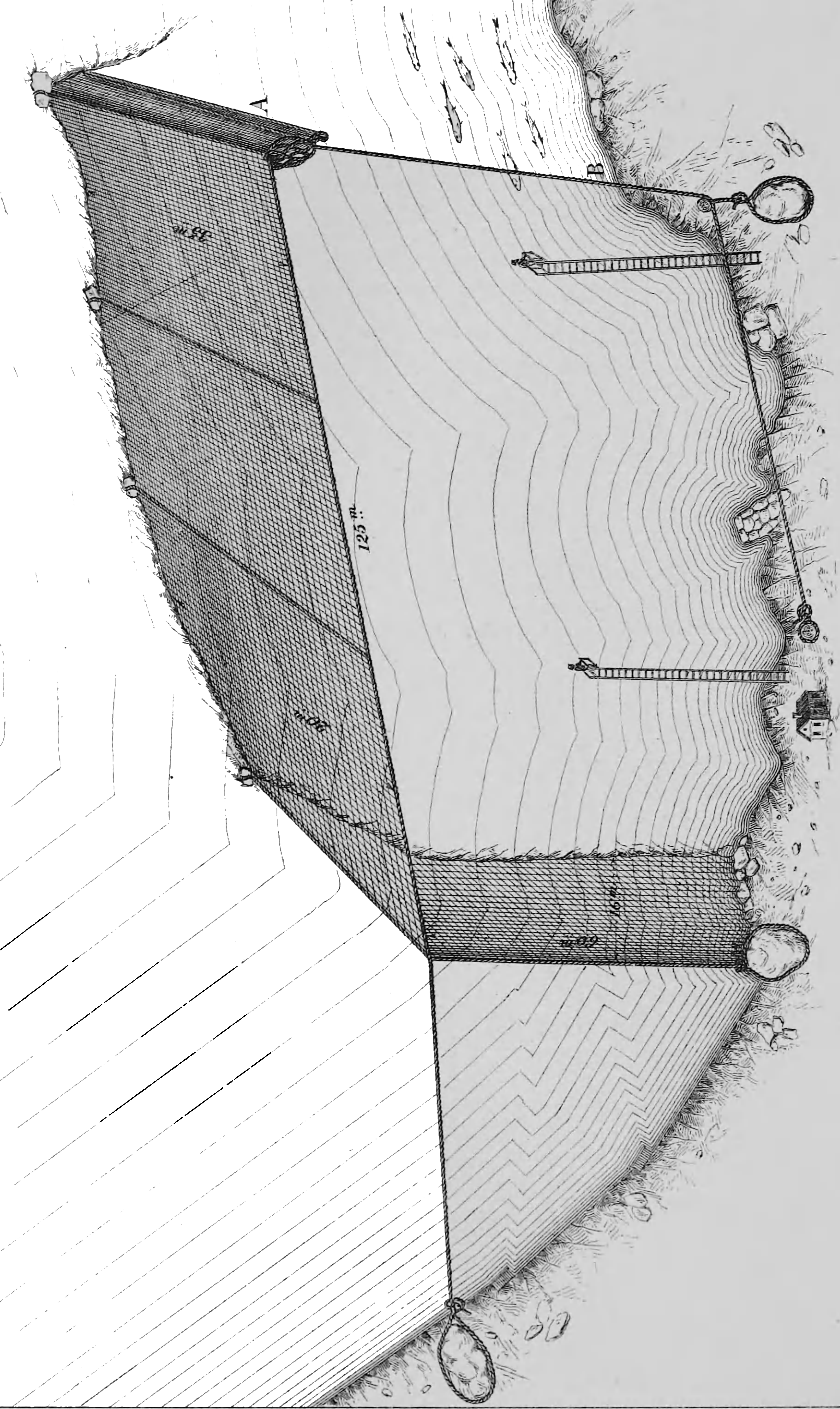
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TONNARA DI PRELUCA .

sea fishing. The latter is known at Rovigno as *Passarella da pelago*. The former is used only in shallow waters and is less substantial in make than the other kinds: the drag-ropes are of bulrushes, the twine is slender, and the net is not heavily weighted.

The *Sfogliante*, or *Rete di Sfoglie*, is a ground-net for soles (*Sfoglie*). Length, 20 m.; depth, $1\frac{1}{2}$ m.; price, 15 fl.

The *Rete di Barboni*, *Barbonera* (or *Tarantella* in the Quarnero), is a ground-net for red mullet (*Barboni*), small scorpions, &c. Length, 20–35 m.; depth, 2 m.; price, 20 fl. Mesh, inner net, $2\frac{1}{2}$ c.; outer net, 26 c.

The *Rete di Guatti di sasso* is a ground-net for gobies (*Guatti*). Length, 10 m.; depth, 1–2 m.; price, 8–10 fl. Mesh, inner net, $2\frac{1}{2}$ c.; outer net, 22 c.

3. SET, OR CIRCLE-NETS (*Reti a fermo* or *da chiusa*).

These are fixed nets, used for the capture of tunny, made of thick cord, with floats but without leads, and sometimes as much as 250 fathoms long and 15 fathoms deep (see Plate X.).

The *Tonnare* (*Madrague* of France), or *Poste di Ton*, are found all along the coast, but mostly on the Croatian seaboard, and they are much on the increase in Dalmatia. The distribution of the net is, as a rule, semicircular, one end being anchored close in shore; the net is then drawn out seawards, the outer part being parallel with the land, thus forming an enclosure, with one side left open for the passage of the fish. The locality is chosen according to the formation of the shore and bed, the chief condition being deep water, especially at the entrance. This favours the passage of the tunny, which is in the habit of approaching the shore in shoals, either in pursuit of mackerel, or, as is generally believed to be the case, to scratch itself against the rocks in order to rid itself of a parasite which irritates it. Thus, a deep creek, or bay, is favourable for fixing the net, particularly where the channel forming the opening is narrow and deep: in this case a net is simply drawn across, leaving the channel free.

Special regard has to be paid, in fixing the locality of these nets, to the course frequented by this eminently migratory genus in its annual passage from the Atlantic to the Black Sea and Sea of Azov, a distance of 2,800

miles, and back again. Its course is always the same, from one year to the other, and, as it would seem, age after age,—an ever-living stream of undiminished fulness, furnishing food to thousands of the Mediterranean populations.¹

The fishermen must be continually on the watch for the shoals of fish; and for this purpose a watchman is constantly posted, during the season of passage, at the top of an inclined ladder, at an angle of about 75°, forming a kind of observatory, or crow's nest, whence the entrance of the fish can be seen. These are the *Thynnoscopi*, or *Ichthyoscopi* of the Greeks. When the shoal has entered the enclosure, the entrance is at once closed by drawing ashore a sufficient quantity of slack netting, which is left hanging for this purpose at the outer end of the net, by means of a rope, the end of which is kept on shore (see Plate XII., *Tonnara di Preluca*). The alarm is then sounded by throwing stones near the inlet through which the fish have just passed, and by raising a hue and cry, in which all join, in order to drive the shoal towards the closed end of the enclosure. The scene is now one of intense excitement and bustle, the nets are hauled in, and the fish are killed by means of spikes and oars, thrown ashore, disembowelled, and sent to market.

The *Tonnara di Buccarica* (see Plate XIII.) is constructed in a more complicated style, forming a series of three nets similar to that of Preluca. The shoals of Tunny generally hug the land and enter the smaller net close to the shore; but, owing to the irregular conformation of the coast, they are apt sometimes to pass outside the first or second net, in which case the second and third larger nets are ready for their reception. Owing, again, to the sea-bed not being properly levelled, the shoals sometimes escape under the nets, in which cases the outer nets serve to prevent their further escape, unless they find another exit below the next nets. As a last resource, a net is drawn across the entrance of the bay in which the three nets are fixed, by means of a boat, from the points, A B, shown in Plate XIII. The value of a Tonnara varies in price from 600 florins (Preluca) to 2,000 florins (Peschera):

¹ Godwin-Austen.

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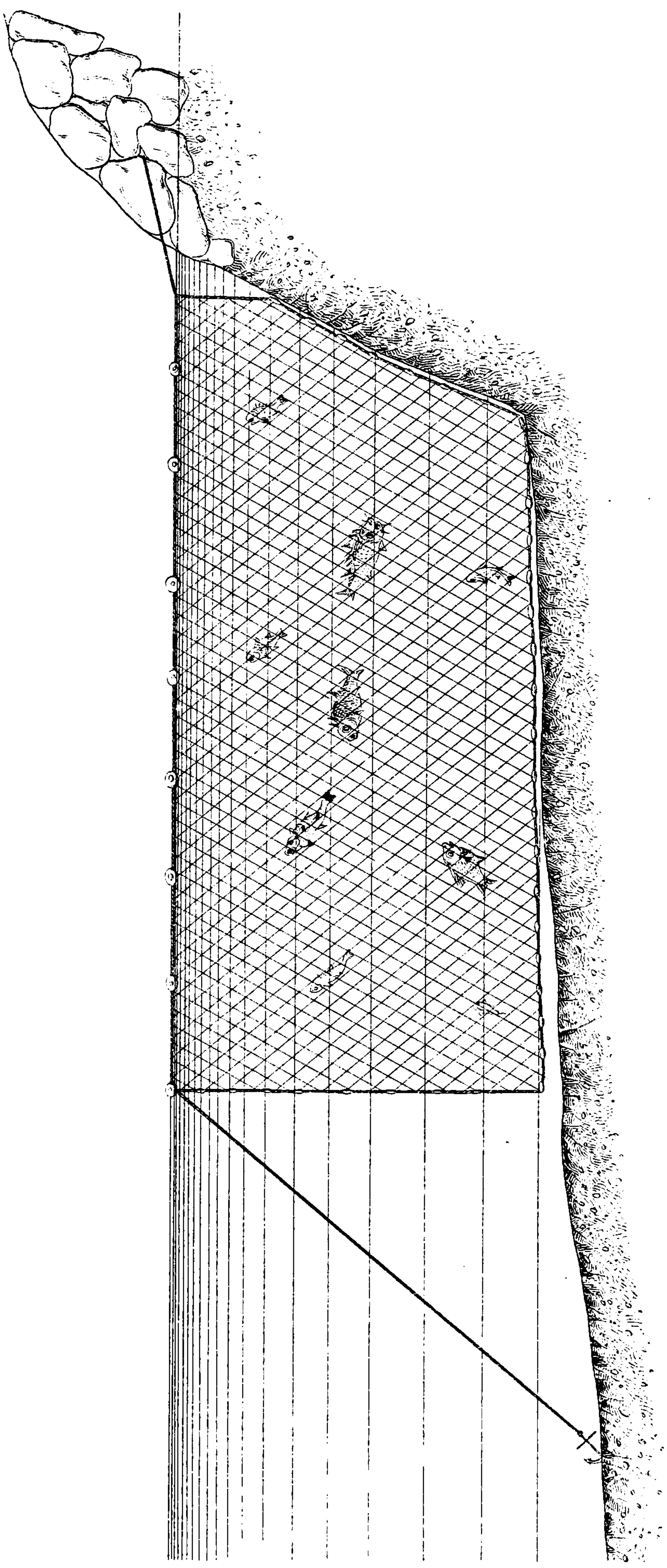
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PLATE 14.



PALANDARA DA POSTA.

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the fish, finding no issue at the sides, which form an impervious barrier, rush to the bag, whence there is no escape for them.

Foremost amongst these is,—

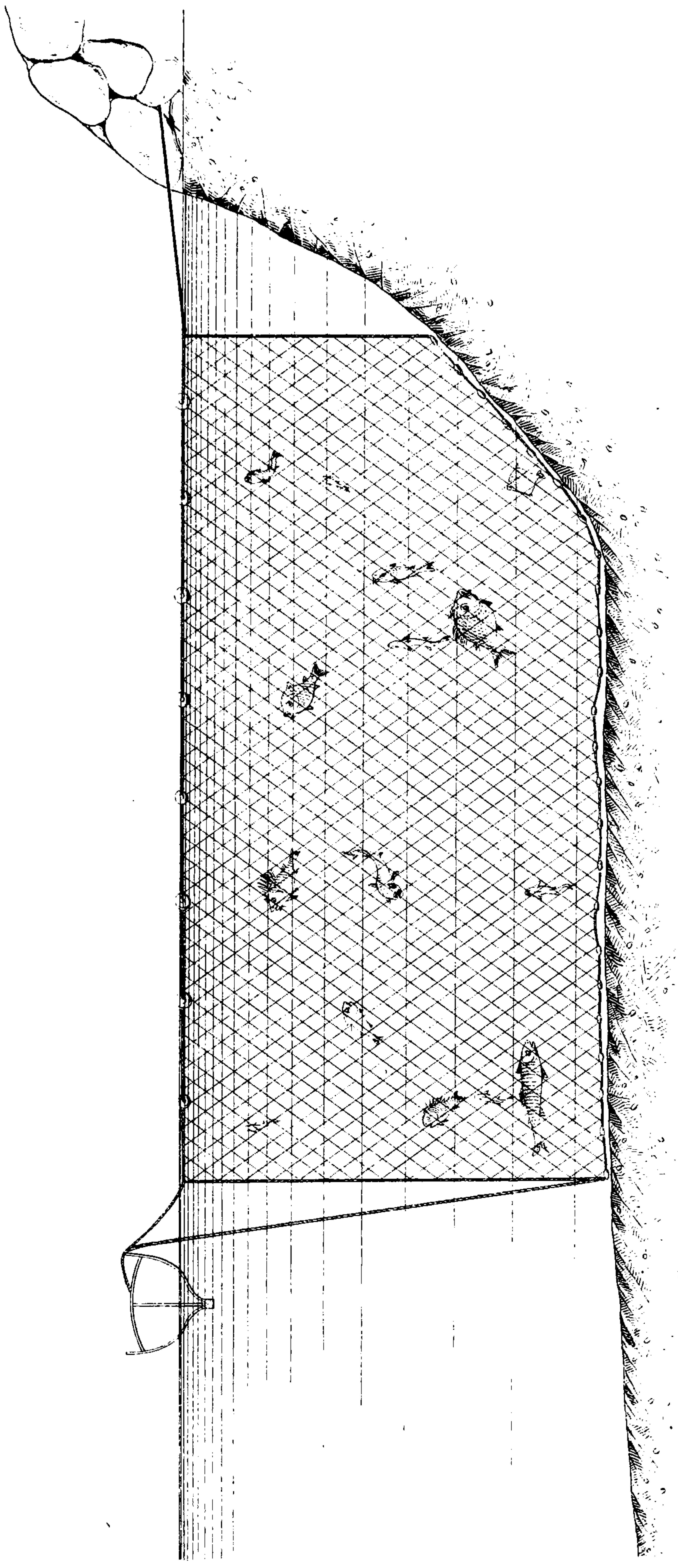
The *Tratta di Sardelle* (*Tratta grande d'estate*). The employment of this net is subject to certain provisos—instituted by a *Regolamento*, or enactment, of *Dandolo*, the French *Provveditore* of Dalmatia in 1808, and subsequently revised by an enactment of 1861,—according to which the proprietors of nets, wishing to fish during the ensuing seasons, have to register their application before the municipal authorities, and later on to appear in person. Their nets and boats are subject to inspection, and those that are in proper condition are divided into groups, called *Broschetti*, to each of which suitable fishing tracts, *i.e.*, small creeks and bays with flat beds, called *Poste*, are allotted, which they subdivide amongst themselves by drawing lots. The object of this supervision is to insure the due and proper exercise of the fisheries, upon the yield of which so large a part of the community depends either directly or indirectly.

The fishing is carried on only during dark nights of the months of May, June, July, August, and September, *i.e.*, more or less during 21 nights of each month, or 105 nights in all.

The *Regolamento* requires three boats for each net; one of these is the *Gaëta*, which carries the fire-basket and a supply of fire-wood for one night, and is termed the *Luminiero*. An experienced fisherman proceeds in this boat about a mile from the shore in search of the Sardines (*Sardelle*), which he leads into the bay,¹ where, at a distance of 300 to 500 m. from the shore, they are enclosed in the net, the manipulation of which is carried on on board a second boat called *Leuto*. The net is then hauled ashore, and the depth of the bag (*Panza, Sacco*) is regulated, *i.e.*, drawn up, or lowered, according to the position of the fish in the water, and the depth of the water itself, by a line which is worked on board a third small boat which follows in the wake of the net. The net is 120–200 m. in length, sometimes longer; depth of bag, 20–40 m.; mesh, 2 c.; cost, 600–800 fl. and upwards.

¹ See description given under the heading BOATS (*Gaeta*).

PLATE 15.



PALANDARA DA TIRO.

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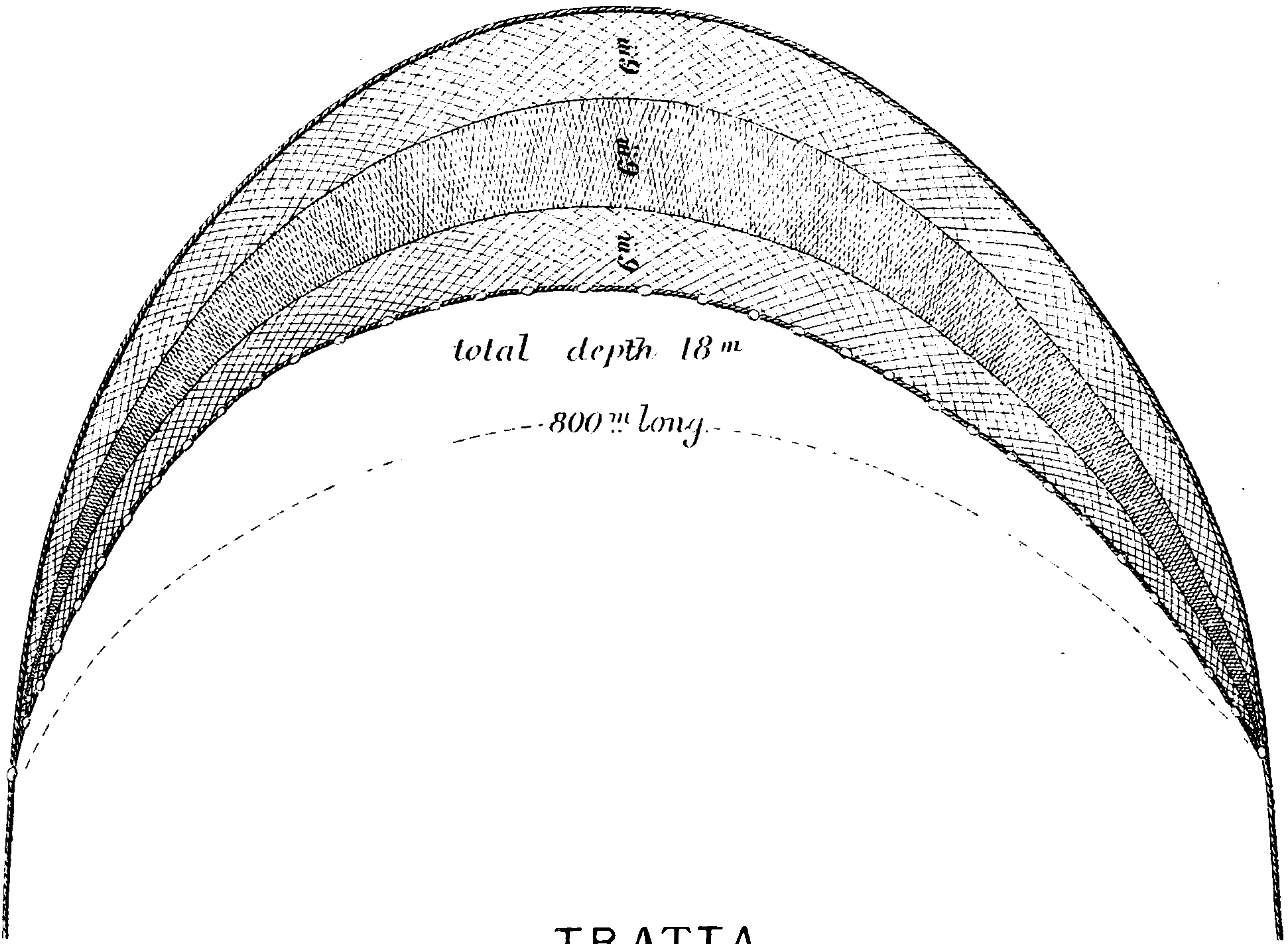
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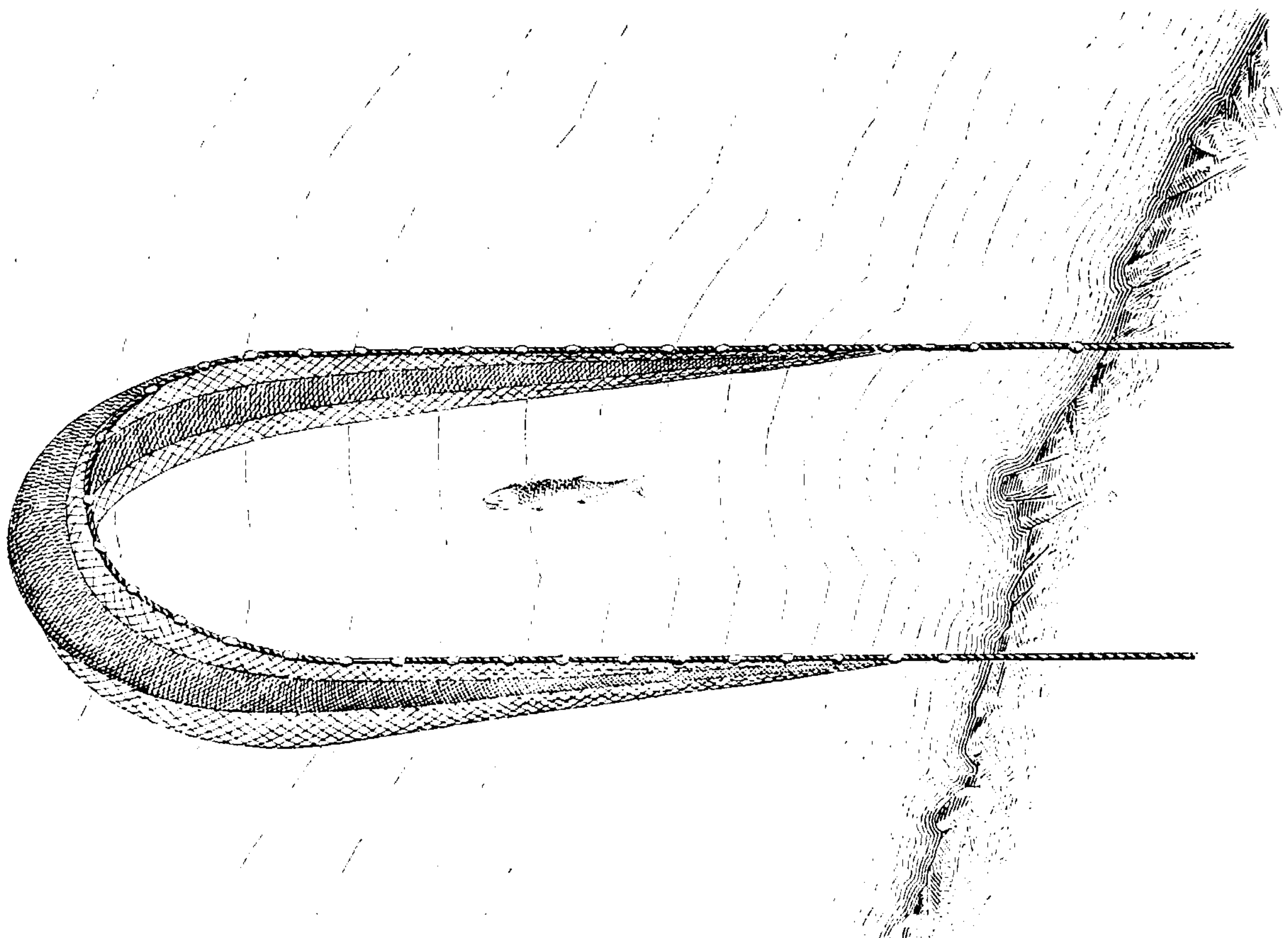
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TRATTA.



The crew of the three boats consists of fifteen men; the cost of the net and the boats is 1,500 fl., and of the wood burnt in one season by each group of three boats 375 fl. The proprietors of the nets are often well-to-do people, who have the fishermen in their employ, supplying them with cash and provisions on usurious terms, besides drawing one half-share of the yield as the share of the net (see Chapter VII., DIVISION OF PROFITS).

The question of the seine fisheries *versus* the drift-net fisheries is often a very vexatious one, and great rivalry exists between the fishermen exercising the one mode as against those exercising the other. A great deal is to be said for both, and there are no reasons for favouring the one to the detriment of the other; yet the drift-nets have sometimes been banished in favour of the seine, although there is no satisfactory reason why they should not be placed on a footing of equality, and suitable tracts allotted to each, to the exclusion of the other.

The drift-net fisheries are carried on entirely by the poorer class, and the fishermen themselves are, as a rule, the owners of the craft and nets; hence greater consideration is due to them, if any difference is to be made, than to the seine fisheries, the greater part of whose yield is absorbed by people who have nothing to do with their immediate exercise and the labour and dangers consequent thereon. Besides this, the fish caught in the bag of the *Tratta* is often more or less damaged, and the produce of drift-nets is, for this reason, infinitely preferred by the curing establishments.

The *Tratta d'Angusigole*, or *Agugliara*, Croat. *Iagličara*, is a seine for gar-pike (*Angusigole*, Croat. *Iaglica*) carried on the deck of one boat, the end being drawn by another smaller boat, by which the net is cast in a circle, the end being brought back to the first boat, on which the net is then hauled in. The net is well corked and remains at the surface; this mode of fishing being known as *pesca a volo*. Length, 100 m.; depth of centre bunt, 20–24 m.; depth of wings, 2 m.; mesh, 2 c.; price, 300 fl.

The *Tratta da Sardoni* is used for anchovies (*Sardoni*). Length, 150–300 m.; depth, 20–25 m.; mesh $1\frac{1}{2}$ c.; price, 600–1,000 fl.

The *Tratta da Sombri* is for mackerel (*Sombri*), Spanish mackerel,

bogue, &c., in use in the Quarnero and on the coast of Dalmatia. Length, 200 m.; depth, 24 m.; mesh, $1\frac{1}{2}$ c.; price, 500 fl.

The *Tratta da Cievoli* is made of coarse twine and is used in the Gulf of Trieste, in autumn, for grey mullet (*Cievoli*). Length, 600–1,000 m.; depth, 20 m.; price, 2,000–8,000 fl.; mesh, 4 c.

The *Tratta da Orate* is a smaller-meshed net (mesh, 2 c.) for gilt-head (*Orate*). Length, 300 m.; depth, 12–16 m.

The *Palandara da Tiro* is for tunny and bonito (Croat., *Palanda*), and is drawn by a boat under sail or oars, or by hand from shore. Length, 80–100 m.; depth, 30–50 m.; price, 100–120 fl. (see Plate XV.).

The *Tratta di Ton* (called *Sabakone* or *žabakun* in Dalmatia), likewise for tunny and bonito. Length, 400 m.; depth, 50 m.; price, 800 fl.

The common *Tratta*, also called *Sciabica* (*žabica*) and *Rezzola* (*Rezzuola*), which corresponds with what is called in England the ground or foot-seine, or scringe-net, is much used all along the coast by the native fishermen, as it gives comparatively little trouble. It is worked from the shore; each wing is attached to a long drag-rope, and when the net is shot one end is left on shore, and made fast. The whole of the net is then put in a boat, which is rowed out from the shore and proceeds in a semicircle, casting the net on its course, and landing the drag-rope of the other end on the beach at some distance from the starting-point. The two ropes are, after a while, hauled in, the men working the drag-ropes approaching one another as the net comes to land, until at last they meet, and then the bunt of the net, in which the fish are collected, is drawn ashore. This net is familiar to everybody who has visited the shores of the Mediterranean.

Like all *tratte*, they are netted on the same principle, viz., that the meshes open out by the vertical strain in the water, and close by the longitudinal strain when being hauled in. It is the one most in use in the Quarnero, made of coarse string; depth of bunt as much as 20 to 25 fathoms; size of mesh diagonally,—bunt 1 cent., wings 4 cent.; they are sometimes 400 to 500 mètres in length (see Plates XVI., XVII., XVIII).

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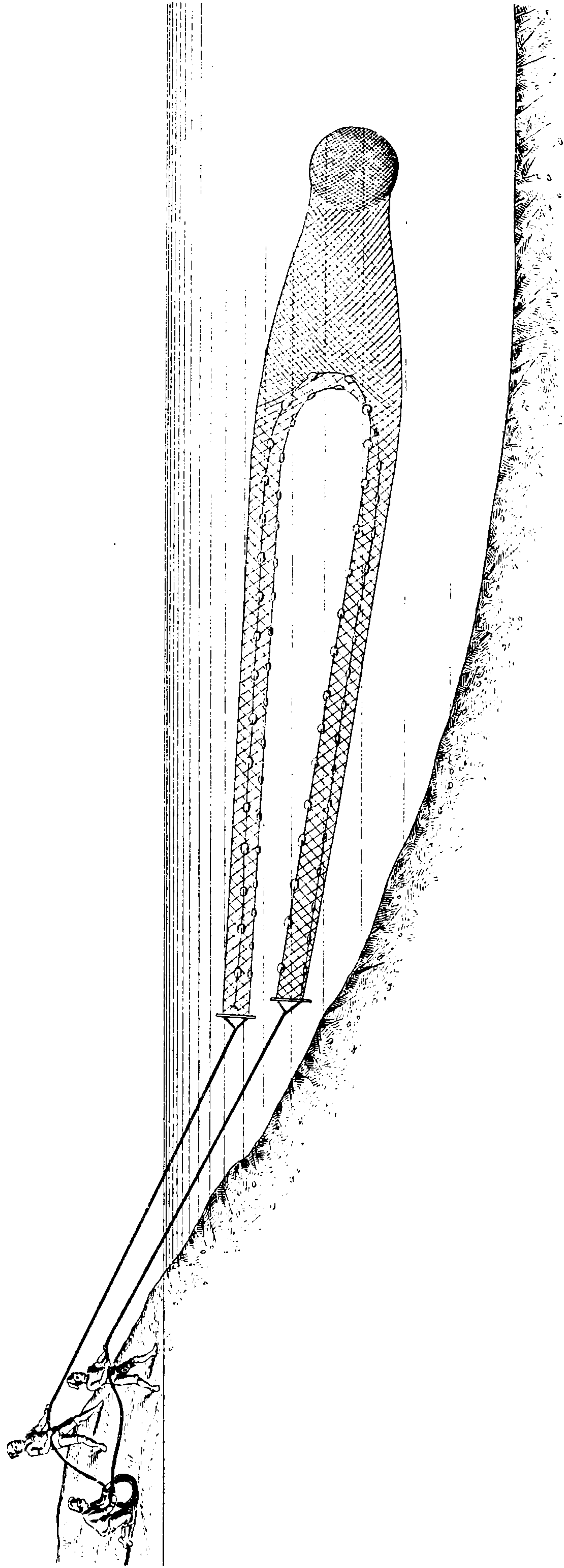
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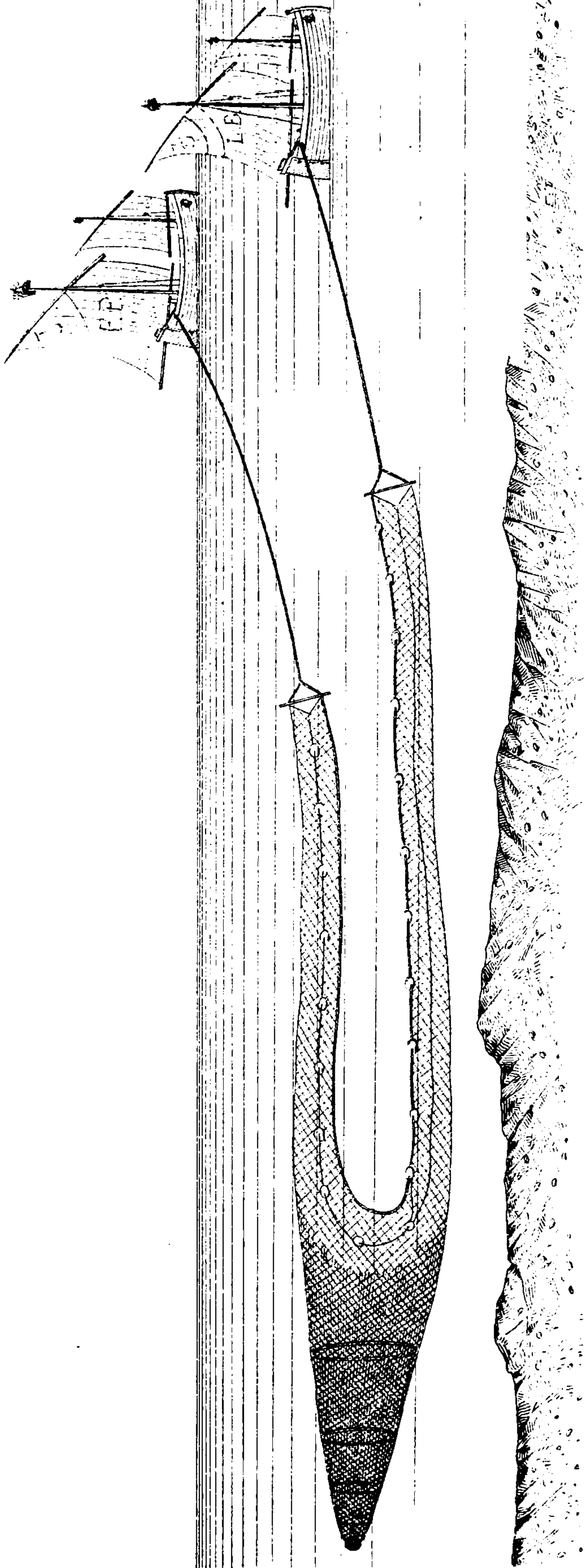
the *Cogòlo* is generally enclosed in a second net of coarse string in order to protect it against the friction with the bed and the depredations of the dolphins, which are apt, at times, to injure the net. The length of the wings, or arms, is sometimes as much as 30 fathoms each, the depth being 10 feet at the ends, and 20 feet towards the middle, where the bag commences. The bag is small-meshed ($1\frac{1}{2}$ –2 c.), and well corked at the head, to keep it well open whilst in motion. It is also extra weighted at the foot, so that it falls quickly to the bottom, and is thus trawled along the ground, the boats being under full sail, the faster the better, the Italian fishermen fishing in almost all kinds of weather. Two pieces of wood are fastened longitudinally to the under side of the bag to protect it from friction with the ground and to enable it to slide along with greater facility. The value of the *Cocchia* is about 100 fl. This mode of fishing was prohibited by the Venetian Republic in former times, and by the Austrian Government by the enactment of 1835; but the want of organised inspection rendered it impossible to enforce the prohibition, and it was once more recognised under the Austro-Hungarian and Italian treaties of commerce of 1867 and 1878.

As to the destruction of spawn, Professor G. O. Sars has proved that the ova of the best-known and most valuable fish are found floating at the surface during the whole period of their development. This is the case with cod and haddock, and probably also with whiting, coal-fish, pollack, hake, and tusk. The spawning of mackerel at the surface has been repeatedly seen, and the ova identified. The common plaice has also the habit of spawning near the surface, and its ova float during the whole of their development. This being the typical representative of the flat-fish, it is probable that the turbot, brill, and sole do not differ in this respect. Several other kinds have been identified, such as the gar-fish, gurnard, &c. Hitherto the only fish whose spawn has been found on the ground is the herring. It is, therefore, a mistake to assume that trawling is more liable to destroy the spawn than any other modes of fishing.¹

The *Cogòlo* is a hempen net made in the shape of a long conical bag, nar-

¹ See Holdsworth's "Sea Fisheries."

COCCHIA.



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The *Tartana* is still met with in the Gulf of Trieste, and on the west coast of Istria, but it is hardly known on the rest of the Austrian-Hungarian seaboard (see Plate XX.).

The *Tratta da Menole* (*Giravica*, *Oližnica*, or *Tratta piccola d'inverno* in Dalmatia) is similar to the sardine seine-net, only smaller and of coarse twine; used for *Mænidæ* (*Menole*), and *Smaridæ* (*Gira*, or *Girica*, Croat.). Length, 120 m.; depth, 8–10 m.; mesh at the wings 3 c., at the bunt $1\frac{1}{2}$ c.; price, 100–150 florins.

The *Tratta da fondo* (*Migavica*,¹ or *Sabaka*, or *žabaka*, in Dalmatia) consists of a small-meshed bag in the middle, without the hoops used in the *Cogòlo*; it has longer wings, of larger meshes, than the *Grippo*; it is used for catching all kinds of shore-fish. Length, 180 m.; depth of bunt, 30–35 m.; mesh at the ends of the wings 11 c., decreasing to $4\frac{1}{2}$ c. towards the bunt; bunt 2 c.; price, 120–300 florins. The net of this name used on the coast of Istria is smaller and has no bag. Length, 50 m.; depth, 8 m. The *Tratta per novellame* is a very small trawl used for catching fry for the fish-ponds (*valli*). Length, 4 m.; depth, 65 c.; mesh 1 c. at the sides, $\frac{1}{2}$ c. in the middle.

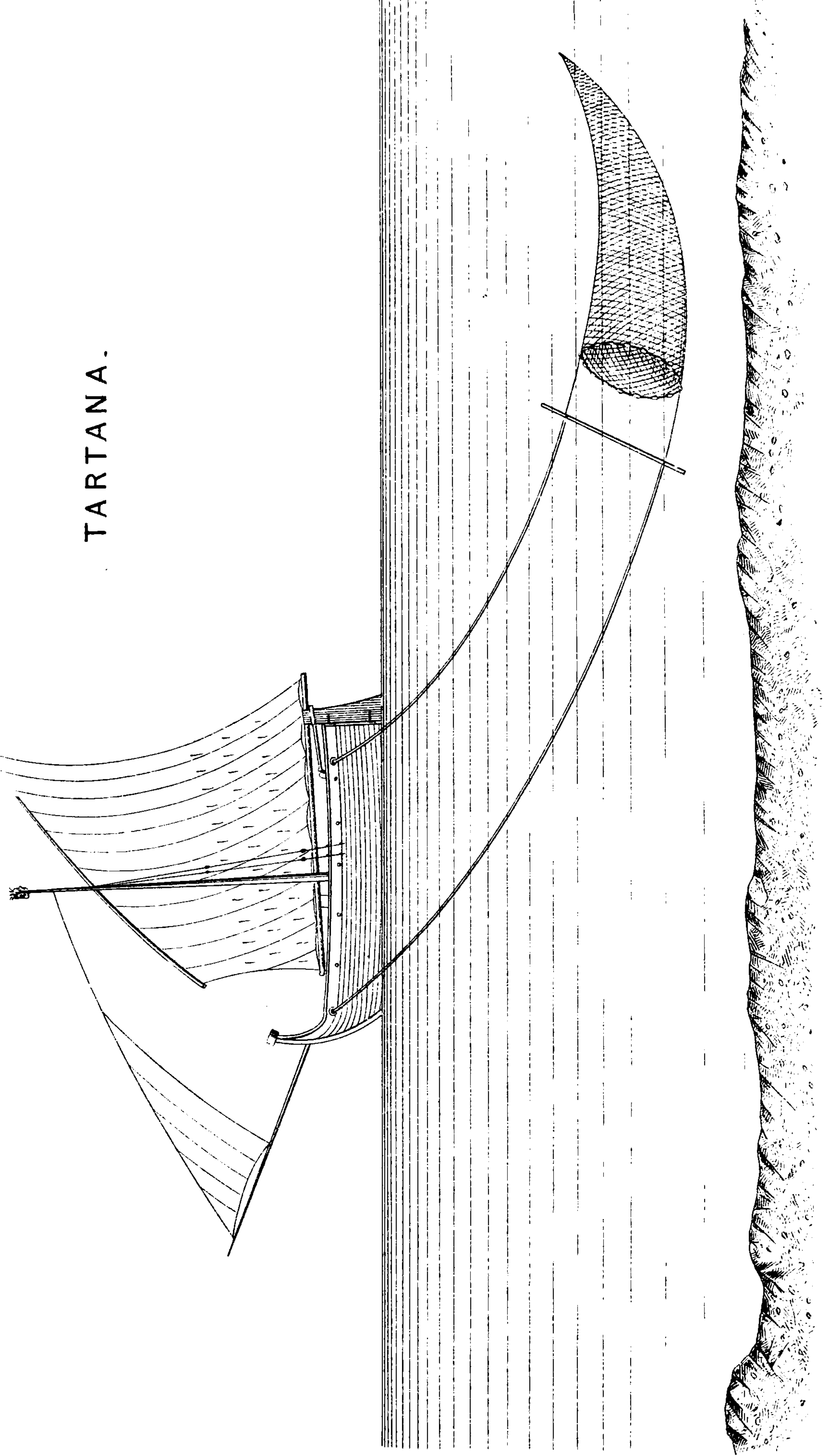
The *Trattisella* is a small trawling-net.

6. HAND-NETS.

The *Ostreghera*, *Ostricara*, or *Cassa* (Ital., *Cucchiaia*, or ladle), is a coarse and strong large-meshed (6 c.) hempen net, fixed to a heavy semi-circular iron-rod frame, after the fashion of a weeding-hook; turbot and flounders, and other ground-fish are caught with this. Iron spikes are, sometimes, fixed to the under side for the purpose of raking the ground, and thus forcing up certain species, which would otherwise remain buried in the mud or sand. The net is bag-shaped, and is held extended lengthways by a thick pole 2 m. long, and vertically by a cross-bar fixed to the middle of the pole. Inside the net there is sometimes a small net-bag, so constructed that

¹ The meaning of this word is to “wink” (with the eye). This term is in allusion to the closing of the meshes by the horizontal tension of the net.

TARTANA.



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four other nets are tied to as many cords, $1\frac{1}{2}$ –2 m. long, and disposed at the point of intersection of the spars and the beams. The stone, which weighs 60 kilogr., is fixed to the cross-beams by what is called the *gassa*; to this are attached double ropes (*fregana*), 20 m. long, which, in their turn, are tied to the drag-ropes (*alzane*), 120–200 m. long. The apparatus is drawn by a rowing boat at full speed over the coral beds, and is constantly raised and lowered so as to suit the depth of water and only to graze the bed. By this means, where coral is met with, and particularly on the projecting points (*secche*), the branches are broken off, and get entangled in the loose netting; but everything is left to chance, and, doubtless, much of the coral is lost. For working under projections of rocks a single beam is used, to which a ring is attached for hanging a net. As a great deal of netting is destroyed by the constant friction with the rocks, as much as 300 to 600 lb. of hemp are required each season by each apparatus.

Rizzajo (*Rizzagio*, *Rizzagno*, *Rizzer*, also *Gaccio*, or *Giacchio*) has somewhat the form of an open umbrella, which is thrown over a swarm of fish, such as grey mullet, salpa, &c. The lower part is well weighted, so that it sinks rapidly, and is, at the same time, fixed by a number of strings, which pass inside the net through an aperture in the centre of the top, and which are held in the hand of the fisherman. When the net is thrown over the fish, the lower sides are almost instantaneously drawn together at the centre aperture, by which means a greater or lesser number of fish is captured. Sometimes 5–10 kilogr. of fish are caught at a time. Price, 8–10 fl. (see Plate XXIV.).

The *Volega*, or *Oprara* (in Venice *Vuoega*, Germ., *Koescher*, Croat., *špurtilo*), is a kind of butterfly-net, for taking fish out of the seine-nets. *Cerchio* and *Cerchiello* are similar nets, used for similar purposes in the lagoons.

7. FISH-WEIRS AND PONDS.

These are peculiar to the Venetian lagoons, but they are also found on the coast near Grado and Capo d'Istria; and, although they pertain rather to the Italian than to the Austrian fisheries, they deserve mention here, as they form an important item in the fisheries of the northern head of the

Adriatic, and were, moreover, for a succession of years comprised in the Austrian fisheries.

Fish-weirs (*Fischwehren*, *Fischzäune*) *Serragli*, or *Serragie*, constructed either of nets (*S. di reti*), or of reed-screens (*S. di grigioli*)¹ fixed to piles driven into the bed; the latter mode is adopted near Grado, Capo d'Istria, &c. The thickness of the screens varies according to the use they are put to, in some places double or treble screens being used. From point to point the screen sides are made to converge towards one another, forming a funnel-shaped enclosure called *lavoriero*; at the narrowest point are fixed the *Cogòlo*-nets, which allow of the entrance of the fish, but from which the exit is impossible. As the tide recedes, the fish find their way into the *Cogòli*, which are drawn up by means of a float to which they are attached, and emptied of their contents. The *Cogòli* are made of three different sizes, as regards the size of mesh and of the entrance, according to the species of fish for which they are intended, viz., for eels, grey mullet, and gobies.

The foundation of the *serragli* is commonly called *zocco*, and by the *valligiani*, i.e., the people who have charge of the ponds, *sciassa*; the broken and useless reed-screens, which have to be cleared away before new ones are set, are called *scattaroni*, and the act of clearing them away, which is done once or twice a year, *scattaronare*.

Fish-ponds (*valli*), chiefly on the coast of Venice,² also on the coast near

¹ *Grigioli*, *Griziole*, and *Canne* are screens, or mats, made of marsh reeds by fastenings or ties, called *drezze*: when the reeds are fastened together singly, the screen is called *pesson*, and when in bunches *griziole*. Their height is regulated according to the number of *drezze* they contain; the higher ones have eighteen, the lowest four or five; the *drezze* should be a foot apart: 100 *drezze* form a *cusidura*—a term used in contracts.

² The Venetian lagoons comprise that of Marano, or Friuli, with an area of 55 square miles (60 to 1°); that of Caorle (area 160 square miles), and that of Venice proper (200 square miles): to these may be added the lagoon of Chioggia, lying to the south (33 square miles), and the lagoon of Comacchio with an extent of 49,000 hectares. (See "Industrie de la Lagune de Comacchio," by Coste; also Friedländer, "La pesca nelle Lagune di Comacchio," 1872; also the "Fisheries of Comacchio and Ferrara," by Mr. Consul Colnaghi, September, 1876, in the Consular Reports, 1877, and Journal S. A., vol. xxv., No. 1,304). North-East of Comacchio are the minor lagoons of Messola (23,000 hectares), Codigoro (2,374 hectares), and Massa Fiscaglia (1,000 hectares).

Grado, consisting of a space of water partitioned off from the rest of lagoons, in which they are situated, by reed-screens (*valle a grigioli* or *grisiolo*), or by dams and sluices (*valle chiusa arginata*); there are also *valli semi-arginate*.

La valle chiusa ad argine is so constructed that the sea-water can flow in at different points, the in-flow being regulated by means of sluices (*chiaviche*), so that the water does not become stagnant. The bed must vary in its quality and depth of water, so as to suit the requirements of the different kinds of fish as to food and temperature. In winter a stream of sweet water is let in, in order to facilitate the freezing of the surface, and thus afford greater protection to the fish from the cold.

The *valli a grigioli*, and *semi-arginate*, are built on the same principle, but they are liable to destruction by storms or floods, and require more expense for keeping in repair. The people in charge are called *vallicultori*, or *valligiani*, and the head man *Paron (padron) da valle*. The pond proper is termed *Lago*, or *Campo della valle*, where the young fish (*pesce novello*) is allowed three years to mature. The *cogolera* is a labyrinth of reed-screens and *Cogòli*, similar to the *serragli*, into which fresh water is at times let, thus alluring the fish into the nets; the mature fish are taken out in the autumn and winter. In the pond there are deeper basins and channels (*Gorghì*), to enable the fish to seek refuge from the great heats and colds; otherwise they die off.

The pond proper is separated from the *cogolera* by a dam (*traghetto*) with an opening furnished with a sluice. The approach to the *cogolera* is called *Vegnua*, or *Venuta*; an obstruction to the passage of grey mullet and gilt-head is the *fermativa di cievoli e orade*, by means of which they are isolated; further on is a similar obstruction for eels, the *fermativa di bisatti*, and another called *chila*, for catching the eels that escape from the former.

On either side of the *cogolera* are ditches (*depositi*), partly roofed over, affording protection to the young fry in hot or cold weather; a trellis-work separating the *depositi* from the rest of the *cogolera*, in order to afford protection to the fry from the pursuit of the mature fish.

The *valli* are opened in spring, allowing the free passage of the fish, which accordingly enter of their own accord; this is called the "*montata*,"

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and occurs chiefly in the months of March and April, and the *valli* are closed when the heat of the sun becomes scorching, as, otherwise, the fish would escape into deeper and cooler waters.

The diked ponds are again opened in the months of August and September, at which season the grey mullet species (*Mugil saliens*) ascends, the reed-ponds remaining closed, as the young fry, even if it were admitted at this season, would escape through the reed-screens on the first approach of the cold weather. In the case of the diked ponds, the dikes and sluices prevent the escape of all fish.

The descent of those species of mature fish which enter the sea at regular seasons, for spawning or other purposes, is known as the *calata*; this is the time which is looked forward to with the greatest impatience by all concerned. It is the season when the catch of eels, and the so-called *pesce bianco*, is at its height, *i.e.*, at the commencement of November; it is also known as the *fraina*, or *frimas*, *i.e.*, the hoar-frost (*infra hyemem*). The scene on a night of *fraina* is indescribably lively and exciting; nobody, who has not witnessed it, can have any idea of the feelings of wonder and astonishment it produces in the spectator, and it requires the pen of an artist properly to describe it.

A *valle* gives a profitable yield, so to say, all the year round; thus, a pound of eel-fry (*Elvers*) (known as *capillari*) will yield from 3,000 to 4,000 kilogrammes, at the age of five or six years; and a pound of grey mullet-fry will yield 170 kilos of flesh in the course of a year. A second catch of eels takes place during Lent; this is known as the *pesca quaresimale*. As most of the *valli* are able to sustain a greater quantity of fish than enters of its own accord, this being particularly the case in respect of the diked ponds, to which the passage is limited to the apertures in the dikes known as *bove*, recourse is had to what is called *seminagione*, *i.e.*, the replenishment of the ponds with *pesce novello*, which is caught by the *pescenovellanti*, as described elsewhere. Fry of the gilt-head is worth 10 florins per mille; grey mullet 1 florin per mille.

Great care is requisite for rearing the fish which has entered the *valli*; the different species are carefully separated according to the state of their

maturity, and are restrained from returning to the sea during the great heats or colds.

The eels change their name from *Capillari* (Elvers, or fry) to *Pasciuti* in the course of their development, and to *Anguille* or *Bisatti* when mature; these, again, are distinguished by the names of *Anguille comuni*, *Anguillazzi*, *Rocche*, *Miglioramenti*, and *Capitoni*.

DESCRIPTION TO PLATE No. XXI.—The fish enter from the *Campo della Valle*, through the *Vegnua* or *Venuta*, into the *Colauro* or *Colaura* (*dove cola il pesce*), which is formed of screens, called *contrapetti*; thence through the aperture, A, called *boccarin* or *boccarielo*, into the space, B, called *anticamera*, whence they are distributed in the various *fermative*, *camarelle*, or *Otelle* (*Ostelli*), after passing through the *lavoriero*, 4, also called the *cappello a tre venti*, into 5, the *pizzo*. 2, are the *Otelle* (*Ostelli*); 3, the *camarelle* or *fermative*, forming so many obstructions to the passage of different kinds of fish which are to be separated from the rest; 6 is the *chila* or *chilla*, for catching the eels which escape from 3.

A fresh-water supply is kept up through the double sluices (*chiaviche*), first, of the *Traghetto* or outer dam; and, second, of the *Argine* or dam proper.

DESCRIPTION TO PLATE No. XXII.—Instead of dikes or dams, the sides or partitions consist of reed-screens fixed to piles driven into the bed $1\frac{1}{2}$ foot apart, and the rampart is somewhat higher than the high-water mark at spring-tides.

1. *Lavoriero* or *Cappello a tre venti*.
2. *Pizzo*, or *gomio*.
3. *Boccariol dell' otella* (or *fermativa*) *da cievoli* (grey mullet), through which mouth (*bocca*) or entrance the fish pass into
4. *Camarella* } *da cievoli* (grey mullet).
5. *Otella* }
6. *Camarella* } *da strame*, or *pesce moro*.
7. *Otella* }
8. *Camarella del pizzo*.

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Pesce da strame designates the fish of minor value serving as food to the more valuable kinds, in contradistinction to the *pesce bianco* (grey mullet and eels), *strame* meaning literally straw or fodder. The fish included in this term are gobies, flounders, and smelts (atherines).

The space marked 8, not partitioned off by *Cogòli*, or forming special *Camarelle* or *Fermative* (such as 6 and 7), is occupied by the eels, which require more room in which to circulate freely.

Cogolere, furnished with the *camarelle*, or *otelle*, are called *Cogolera maestra*; and those which have not these are called *Cogolera da bisatti* and *da strame*.

In the Venetian lagoons, there are as many as 135 *cogolere* in a single *valle*; their number depends, as a matter of course, on the size and position of the *valle*, and other less important circumstances.¹

FISH WHICH ARE REARED IN THE VALLI.

Angusigola, the Gar-fish.

Anguèla, the Smelt (Atherine).

Barbon (*Mullus barbatus*, L.), Red Mullet.

Bisatto, the Eel.

¹ Produce of the valli from the Po to Grado, according to the investigations of the Sub-Commission of Fisheries at Chioggia.

	Kilogr.	Lire.
Eels,	800,000	640,000
Grey Mullet, Gilt-head, Basse	1,200,000	840,000
Sole, Goby, <i>Carcinus mænas</i> , and other Crustaceæ	600,000	150,000
Total	2,600,000	1,630,000

Fishermen employed in the *valli*, 1,000.

Produce of the Campi (*valli*) of Comacchio from 1,000,000 to 1,500,000 kilogr. per annum.

- Bosega* (*Mugil chelo*), a Grey Mullet species.
Branzin, the Basse.
Corbetto, the Umbrina.
Caustelo (*Mugil capito*, Cuv.), a Grey Mullet species.
Gò, Goby species (*G. jozo*, L.).
Dotregan (*Mugil auratus*), a Grey Mullet species.
Lizza (*Lichia amia*, Cuv.).
Lucerna, the Sapphirine Gurnard.
Marsion, a Goby (*G. elongatus*, Can.).
Menola bianca (*Smaris vulgaris*).
Orada, the Gilt-head.
Paganello, a Goby (*G. paganellus*, L.).
Passarin, the Italian Flounder.
Rombo, the Turbot.
Sfoglio, the Sole.
Soazo, the Brill.
Triglia, the Striped Surmullet.
Volpina, the common Grey Mullet (*M. cephalus*).
Verzelata (*Mugil saliens*), a Grey Mullet species.

8. SNARES.

Nasse, or *Verse*, are basket-traps, made of willow withes in the shape of casks, with funnel-shaped entrances at either end, through which fish, cephalopods, and crabs enter, allured by means of bait. Once inside, the prey is prevented from escaping by the pointed ends of the willow switches. These traps are provided with an aperture closed by a lid, by which the captives are secured. Their size varies from $1\frac{1}{2}$ to 6 feet in length and 8 to 30 inches in breadth; the width of the entrances varies according to the description of fish they are set to catch. Several of them, as many as a dozen, are generally laid together in 6 fathoms of water, well baited with produce of the sea, either living or dead, pieces of grilled or smoked fish, crabs and sea-spiders, pieces of cephalopods, small fish and sometimes a

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CHAPTER VI.

LINE-FISHING.

Lines.—Hooks.—Implements of various kinds.—Prongs, &c.—Scares.—Bait.

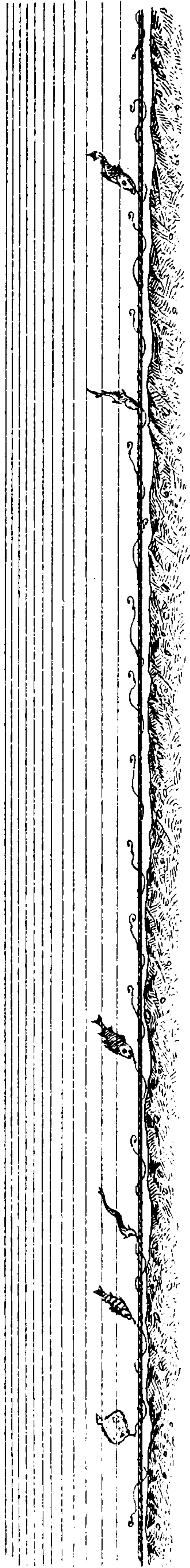


LINE-FISHING is not of great importance in these waters, and is not carried on on a scale to render it of much consideration. There is, consequently, little to be said on this head. Suffice it to enumerate the different kinds of lines in use. These consist, as elsewhere, of the hand-lines which the fishermen hold, and of the long lines which are shot or trailed in the wake of a boat and then hauled in.

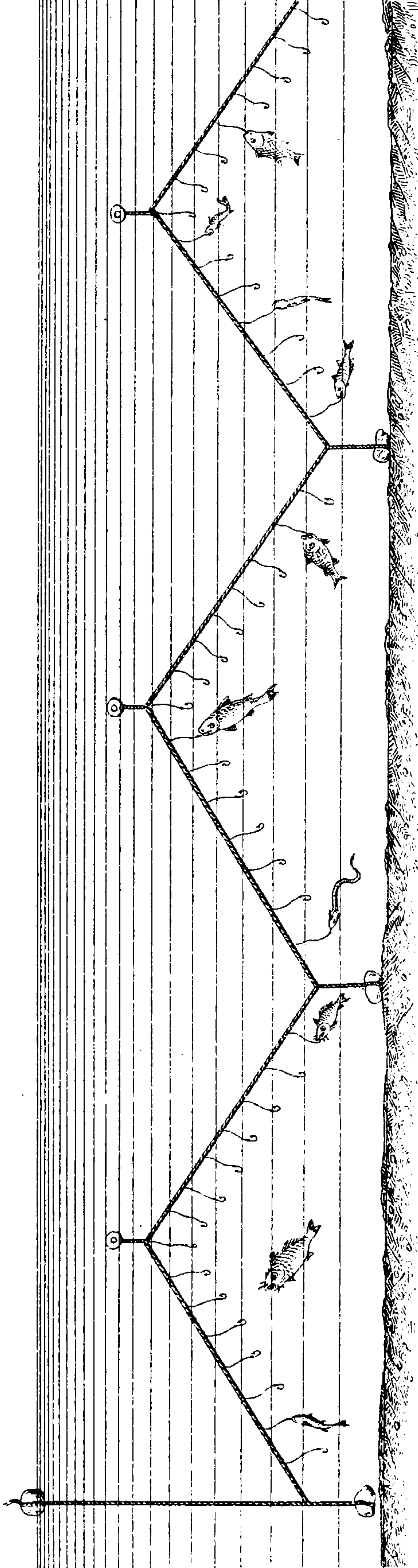
The *Canna* is a simple hand-line, to which two or three hooks (*ami*) are fixed, baited with worms or smelts, and used from the shore with or without a rod, for gobies, the smooth serranus, *Sargo*, *Sparo*, *Spizzo*, *Occhiada*, &c.

The *Pannola* is a line 15 to 40 fathoms long, weighted with lead at intervals of 10 to 15 feet. At its end there is a copper wire 10 feet long, to which one, two, or more hooks are attached; it is sometimes made of horsehair and wound on a large piece of cork. The hooks are baited with small fishes, or pieces of dried sardines, which shine in the water, and the line is towed by a boat close in shore, and hauled in from time to time. It is used for catching mackerel, basse, *Occhiada*, gar-fish, gobies, &c. (see Plate XXIV.). The *pannola da scombri* (for mackerel) is rather complicated. It consists of the principal line (*maistra*), 15 m. long. At the end of this are four snoods; two (*i volanti*) are of the ordinary kind ending in catgut, and two hooks; the other two (*le piombere*) are heavily weighted with shot (60–70, at intervals of 1–2 inches), and end, likewise, in catgut and two hooks. The *pannola da dentale* (for dentex) is 30 m. long, with copper wire at the end

PARANGALA DISTESA.



PARANGALA GALLEGIANTE.



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used near Pola, fixed by one end to the shore, the other being attached to a floating plank (*barchetta*), on which is hoisted a sail, when the wind is blowing off shore. The snoods are of horsehair, so as not to become entangled.

The *Canavaca* is a deep-sea line, 30 to 40 fathoms long, with four or six snoods at the end, baited with sardine and well weighted to keep the baited hooks near the sea-bed. It is for catching poor, whiting, hake, &c., in summer, at Fiume (see Plate XXIV.).

The *Brancarella* is an 8-inch staff attached to a line, the under end of which forms a crown of 16 to 25 hooks bent upwards. The bait (*esca*) consists of a bogue, or other fish, through which the staff is passed, the head of the fish being at the upper end. It is used for catching the cuttle-fish, which darts at the bait and is caught by the upturned hooks.

The *Puschia* is similar in form, but smaller.

The *Sustavica* is similar to the foregoing, the only difference being that the staff is covered with white rabbit-skin. It is used for catching the squid (*Calamaro*), near the islands of Selve and Arbe (see Plate XXIV.).

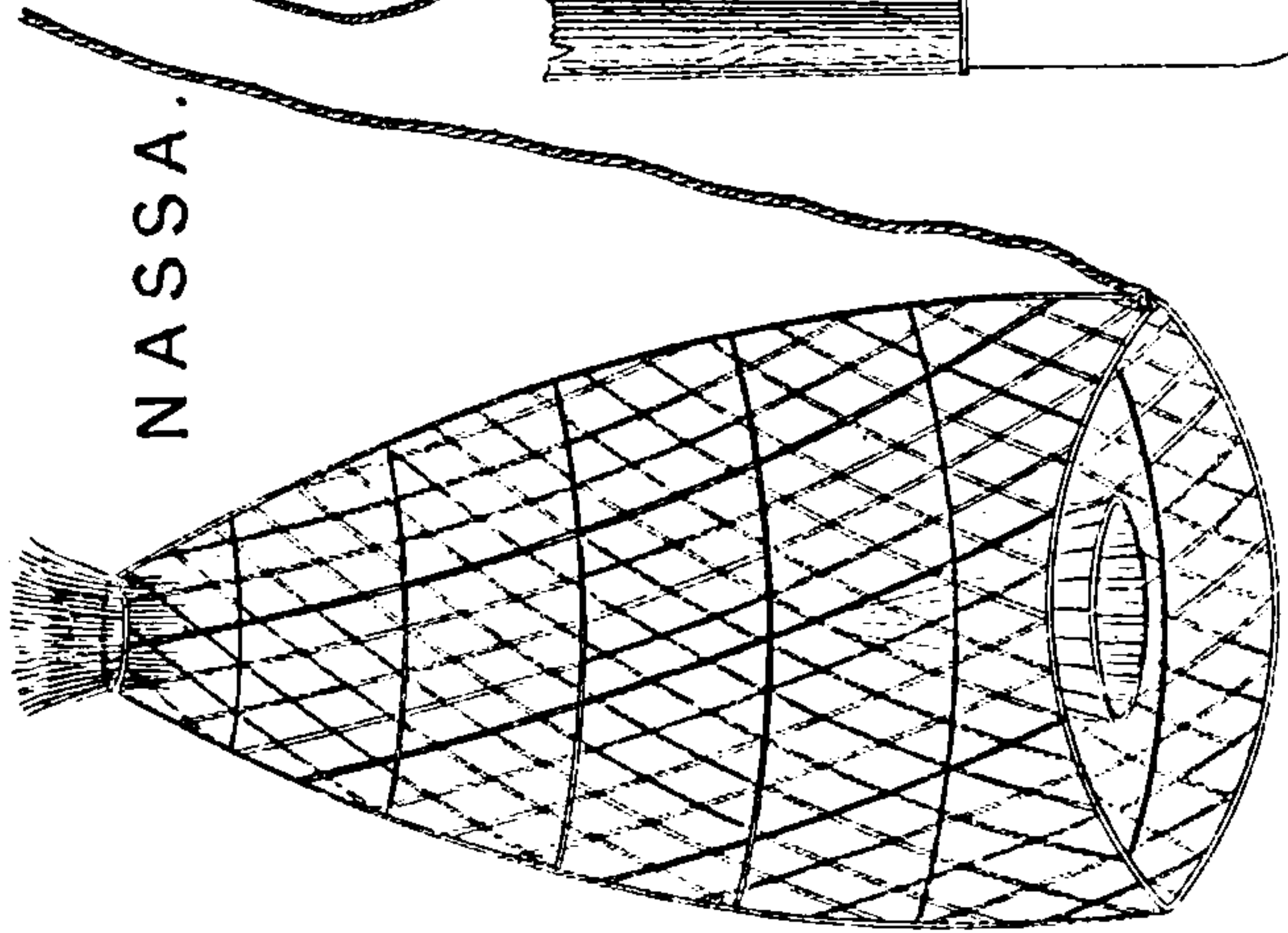
The *Sepparola* is a dummy cuttle-fish made of wood, painted and weighted, with glass eyes, attached to a line and drawn by a boat. It is used as a snare for the cuttle-fish, which follows and encircles it, both being drawn up together (see Plate XXIV.).

VARIOUS IMPLEMENTS.

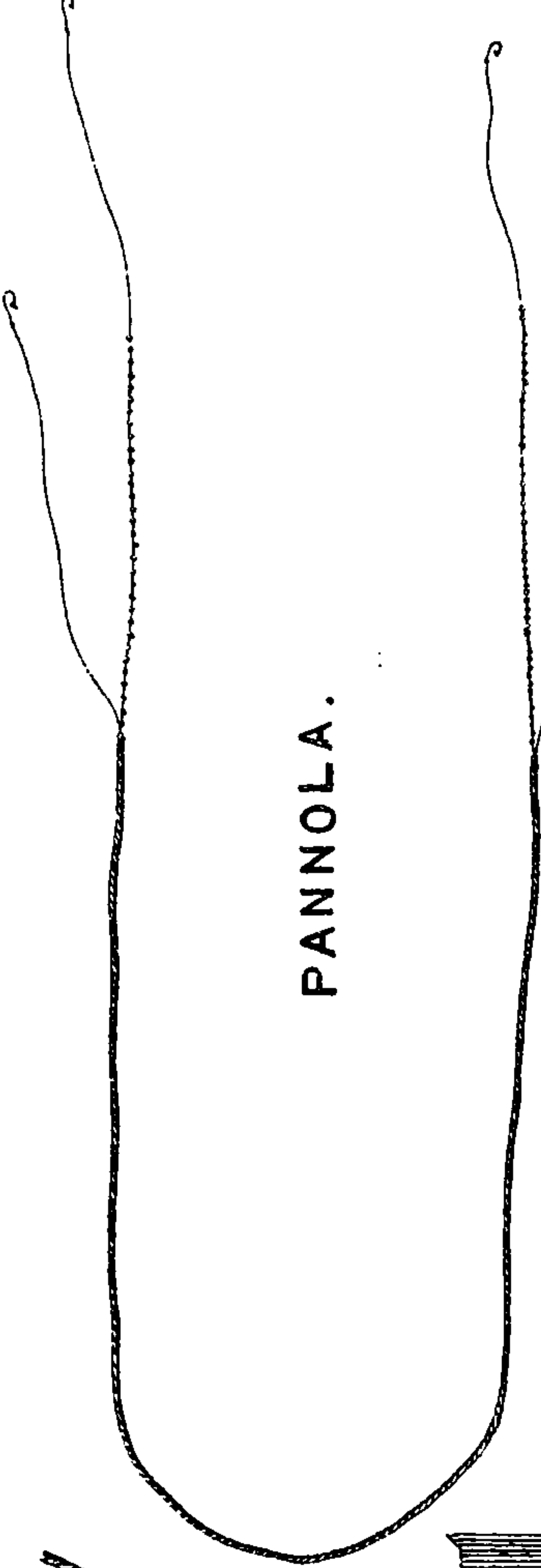
Implements of different kinds for raising sponges, mussels, &c., or for spiking fish and cephalopods in clear water not above 5 fathoms in depth.

Great practice and skill are required for using with effect the prongs for spiking fish and cephalopods. This mode of fishing is carried on chiefly at night by the light of torches, which attracts the fish (chiefly the dentex and the basse), the fishermen of the channel of Novigrad being especially expert.

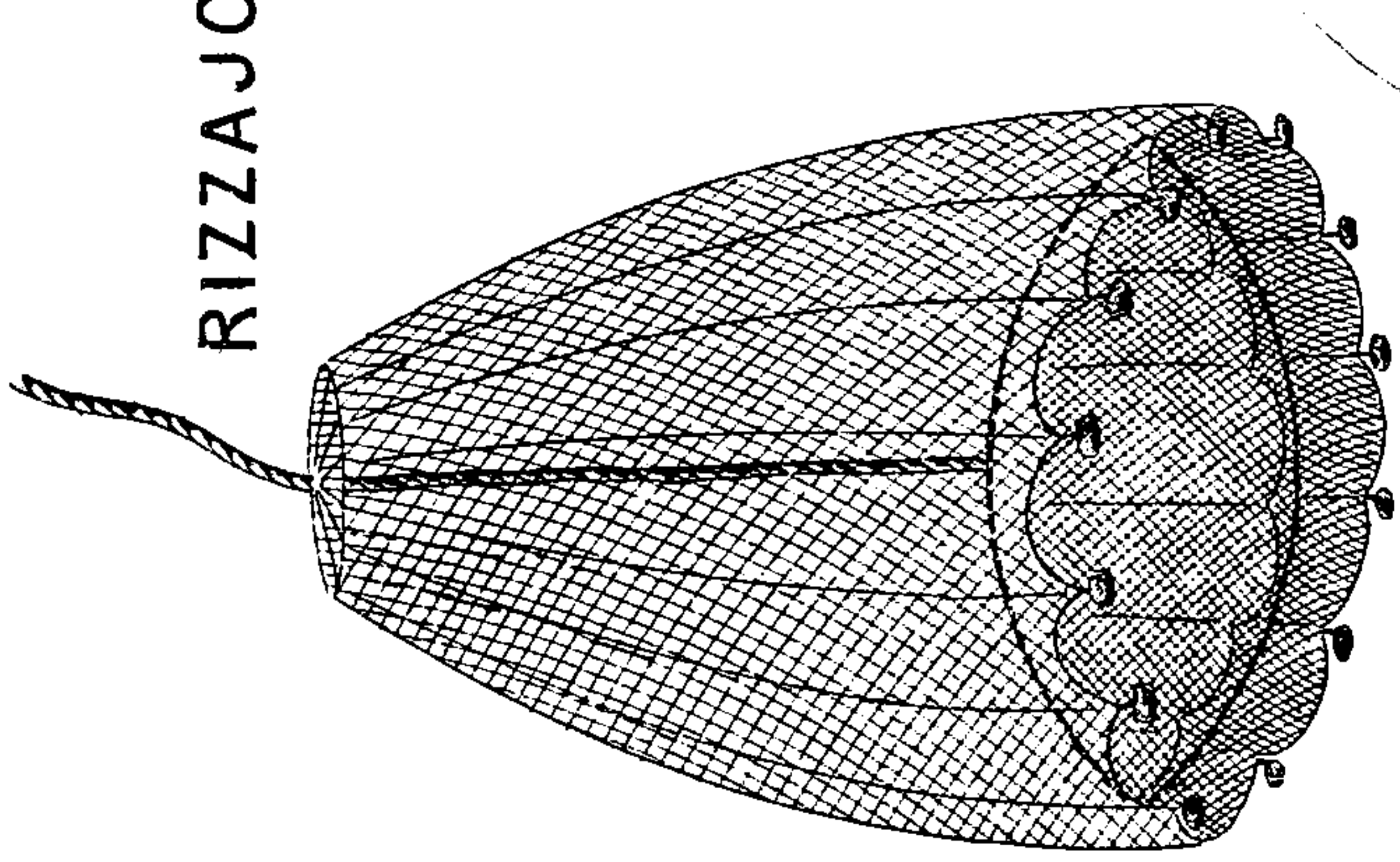
Quicklime is often used to burn the octopus out of the holes or interstices of rocks in which it has sought refuge after an unlucky attempt to prong it. By this means it is often forced out of the place of retreat on finding no



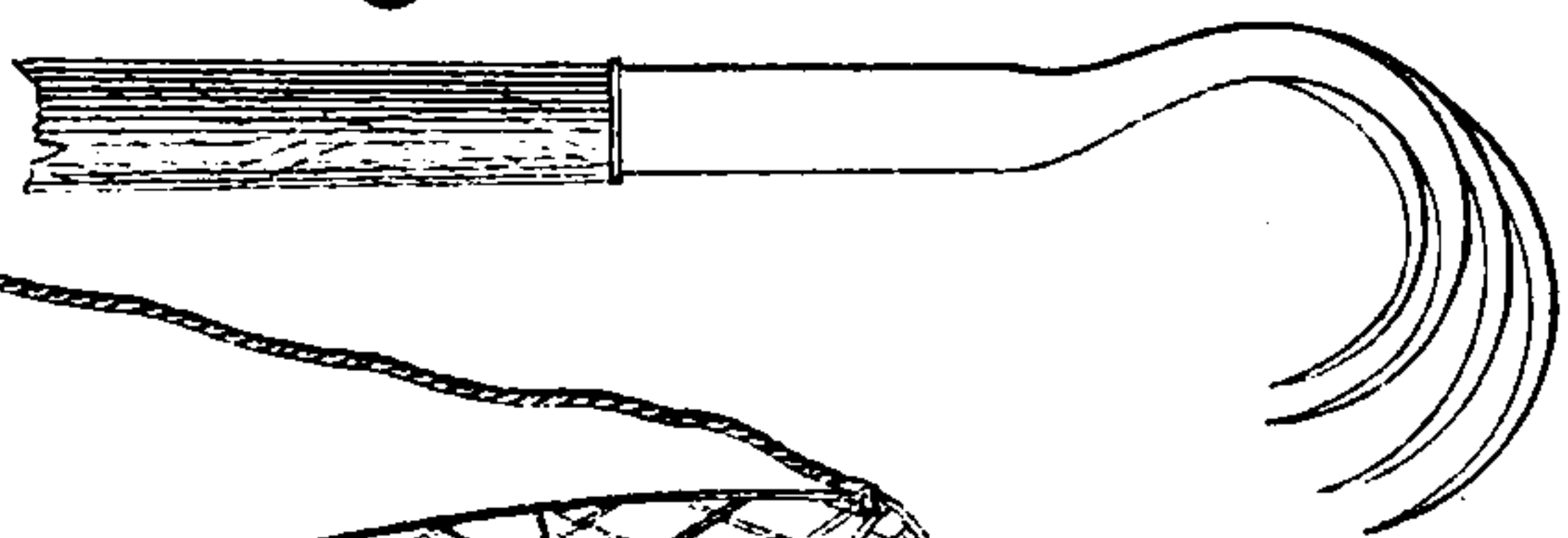
NASSA.



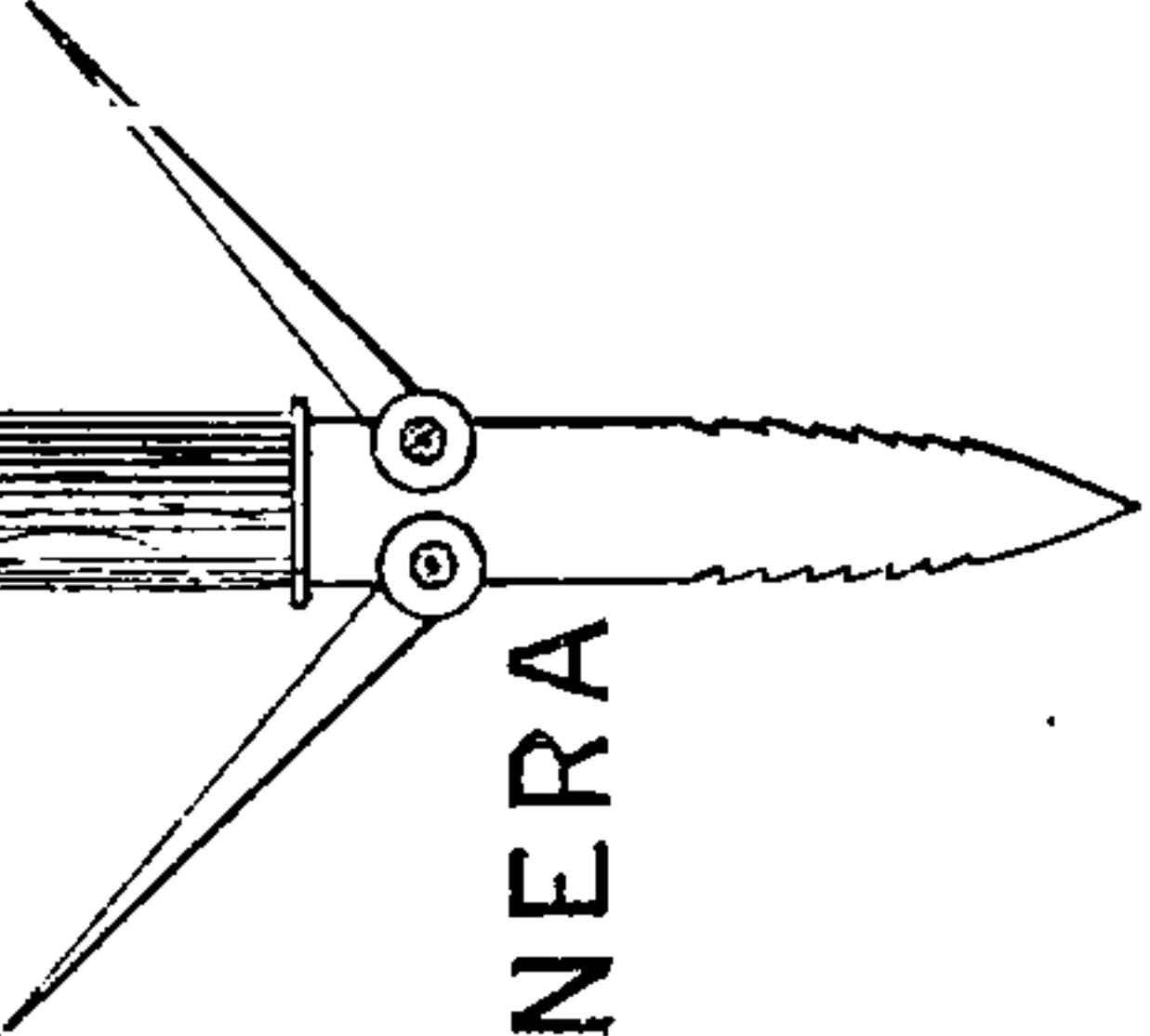
PANNOLA.



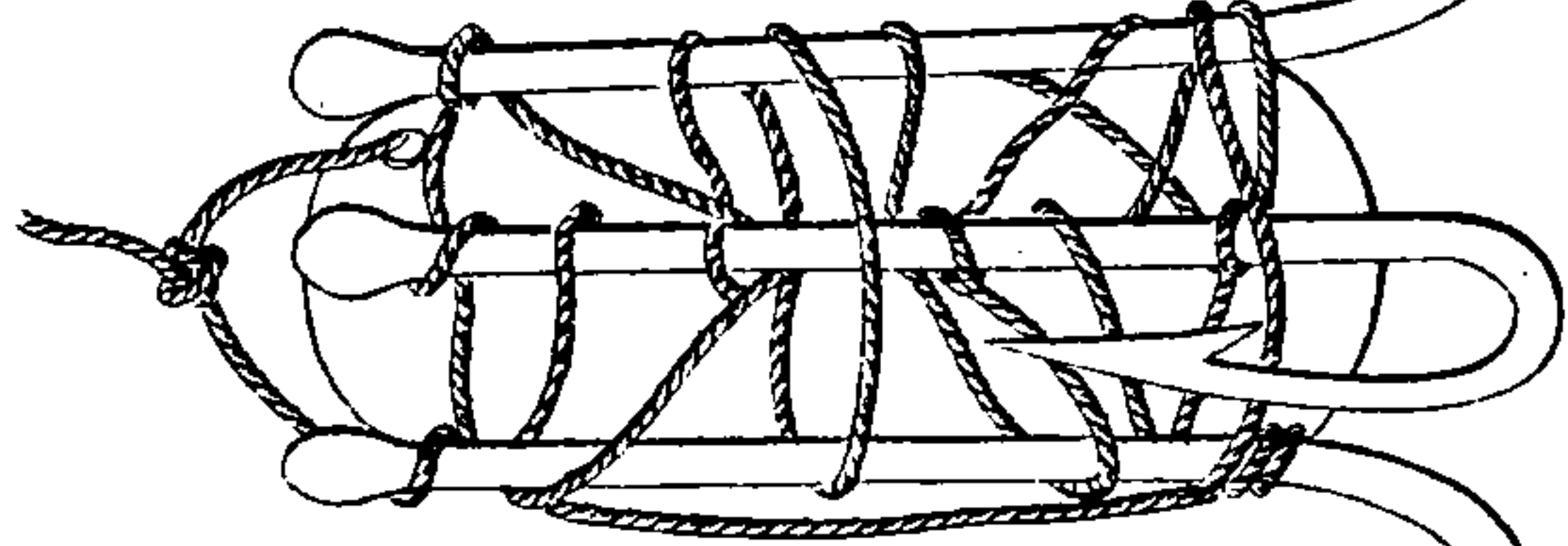
RIZZAJCO



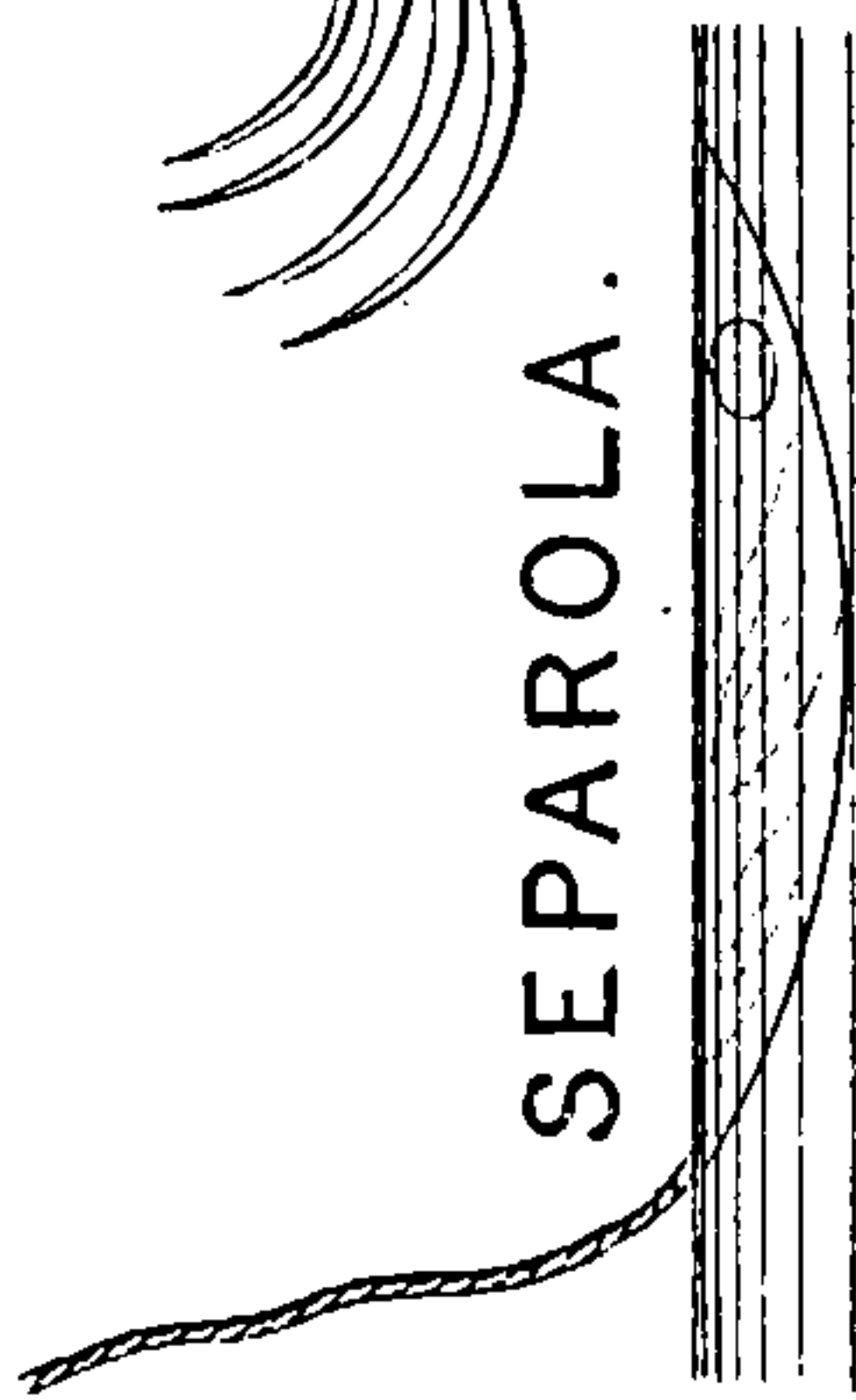
GRAMPA.



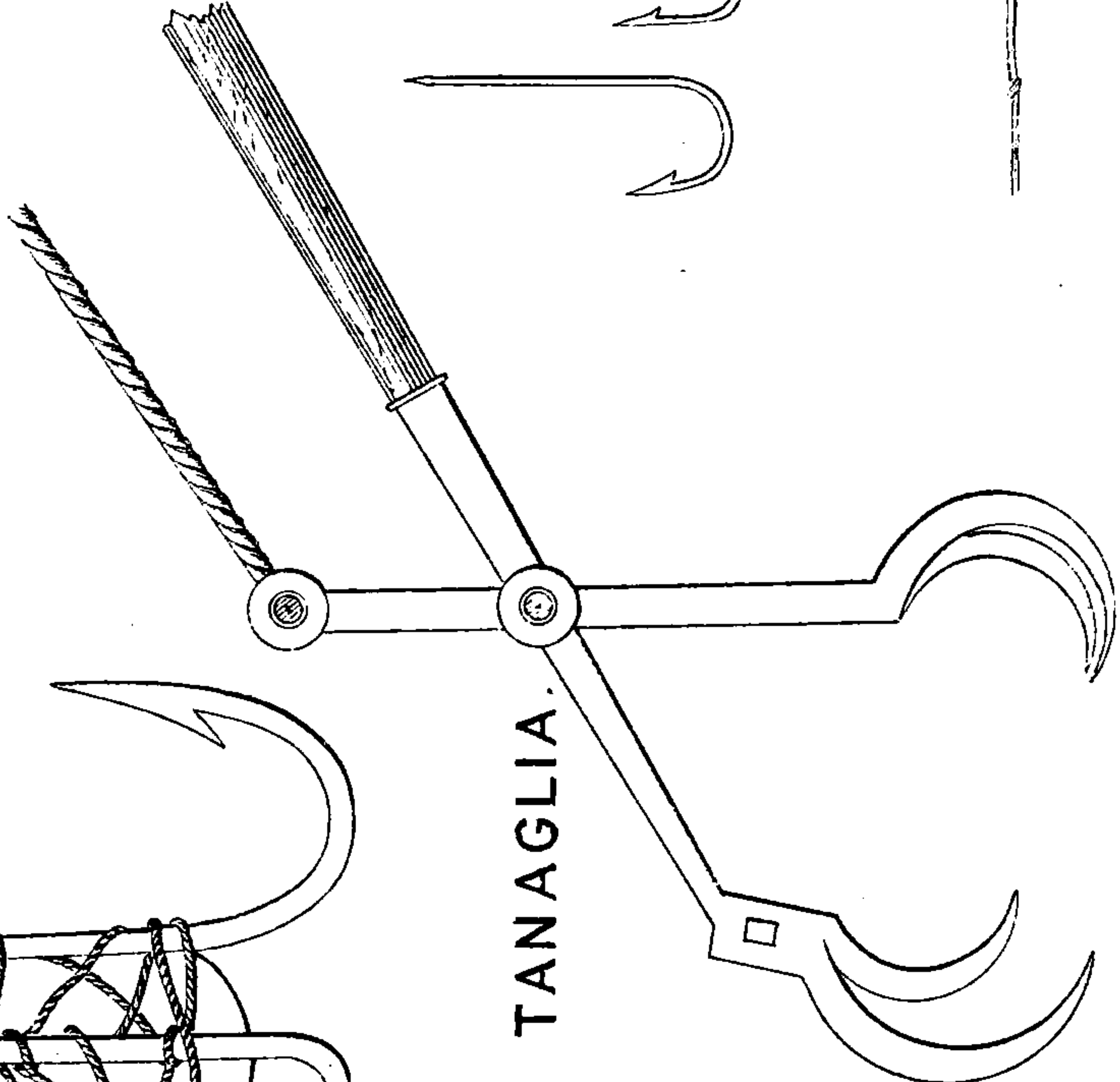
DELFINERA



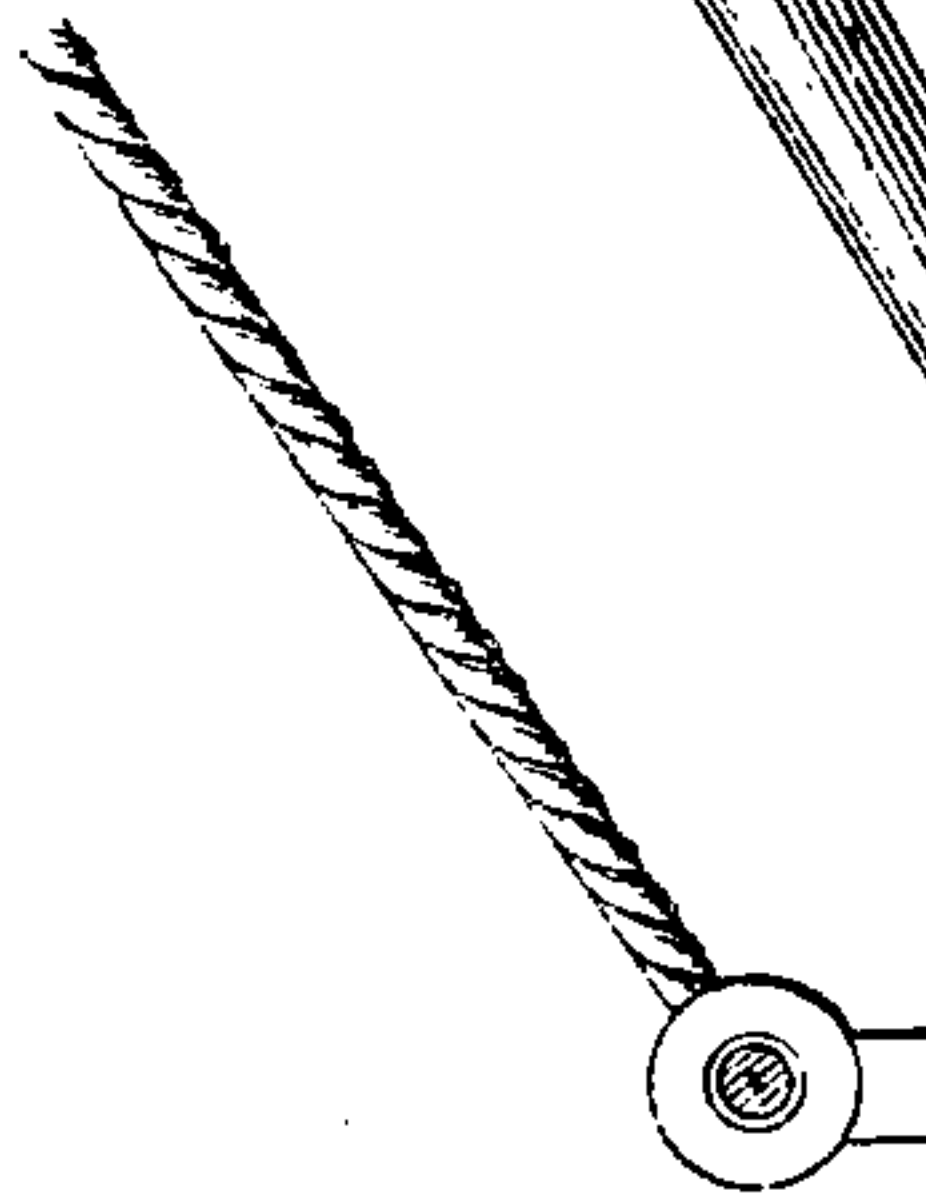
SUSTAVICA.



SEPAROLA.



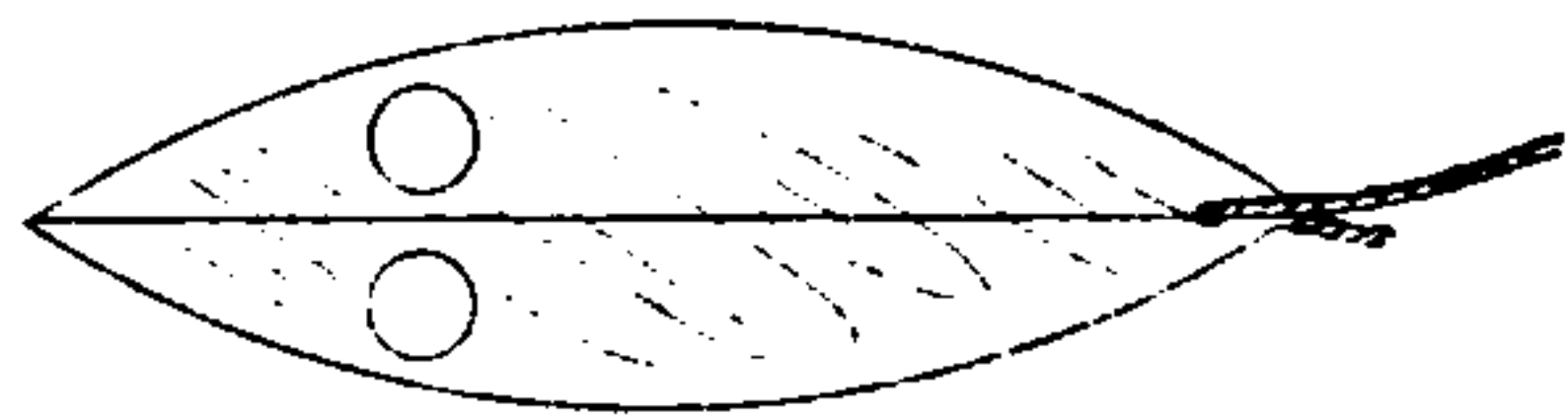
TANAGLIA.



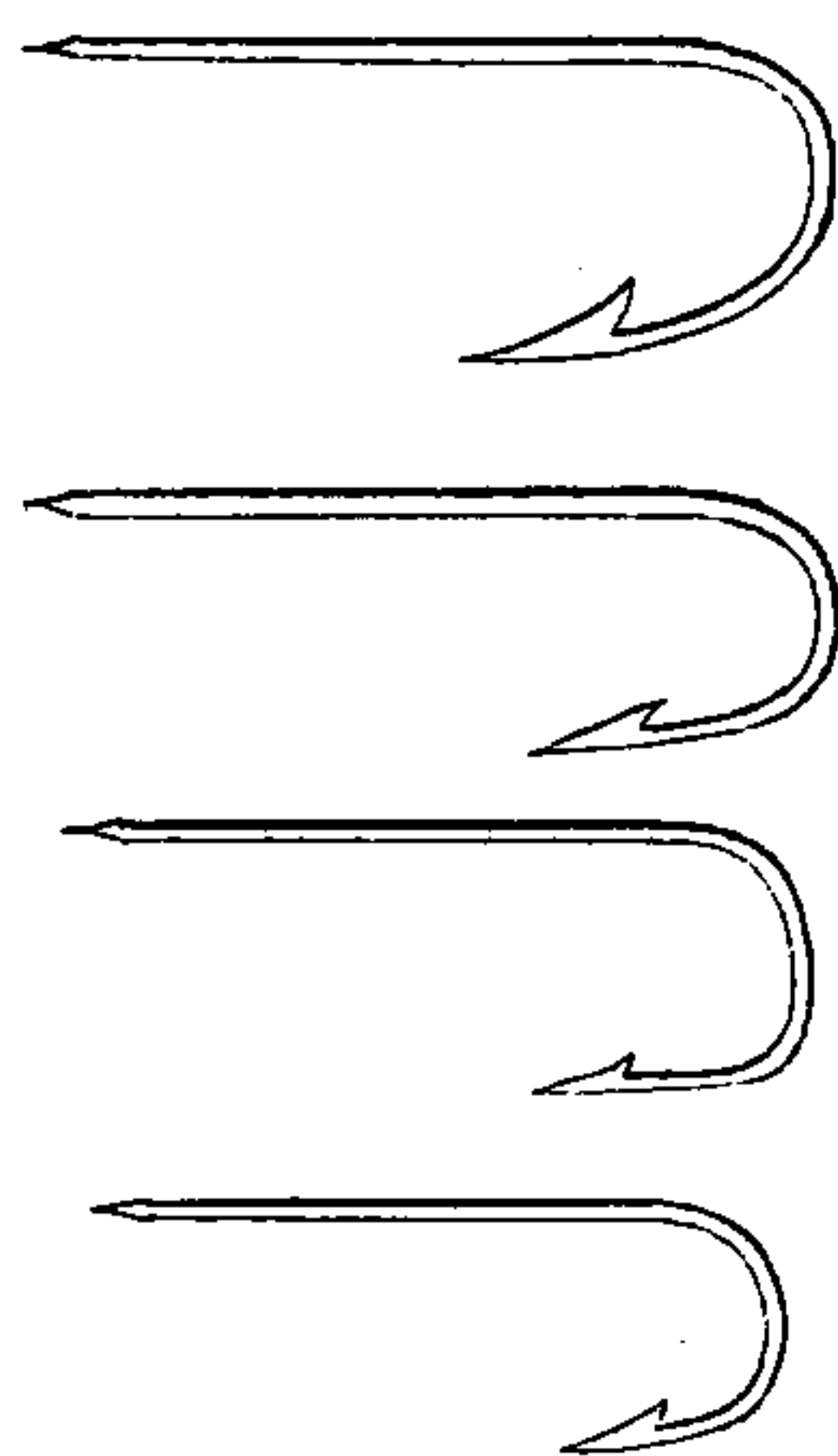
SUSTAVICA.



AMI.



FOSSINA.



TRAJNA.



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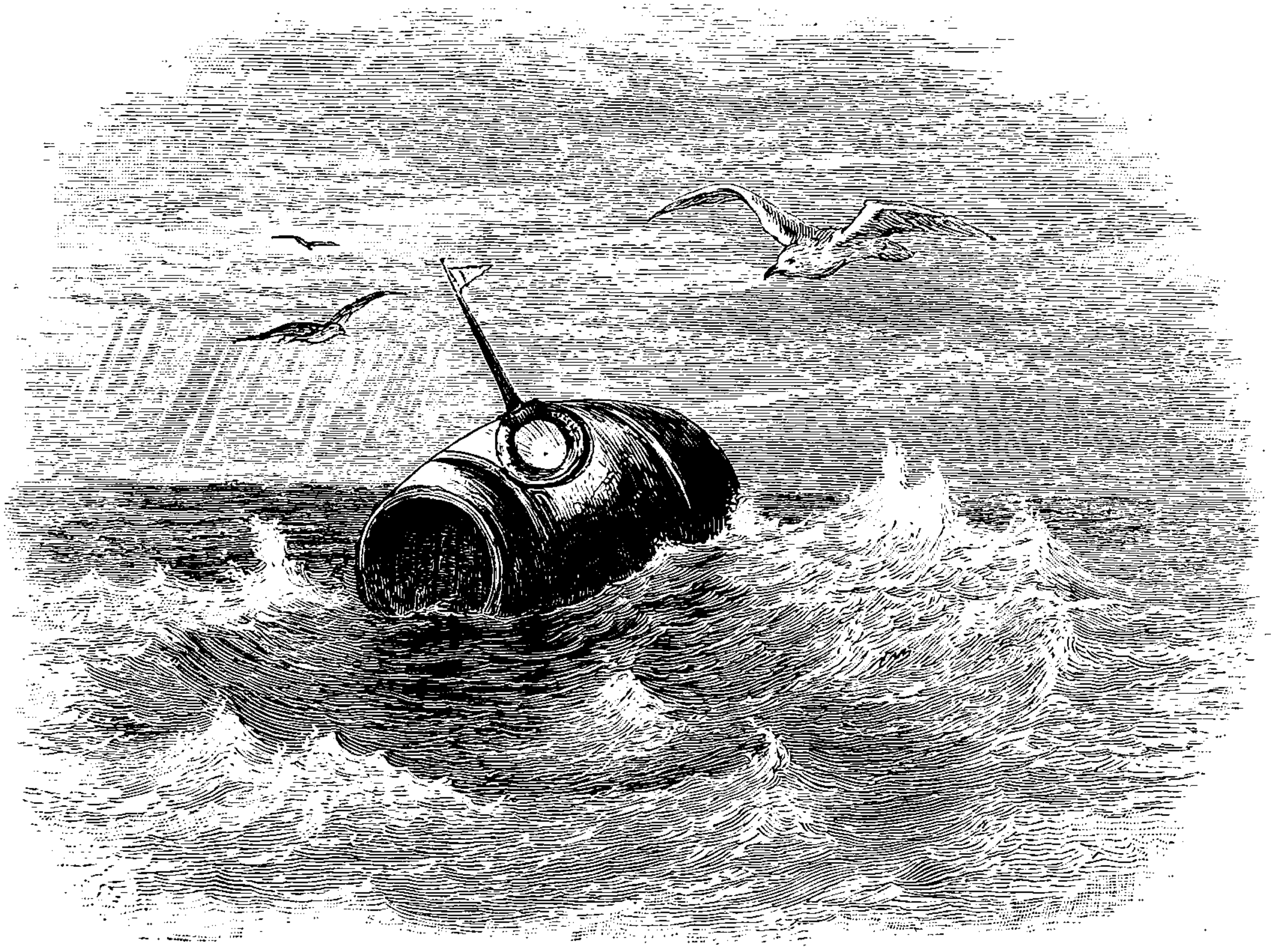
is a hollow cone at the end of a pole, for striking the surface of the water ; at Trieste, a square board is substituted for the cone.

The *Tramata* is a cord for the same purpose.

The *Fraschiata* is a similar cord, to which are tied bundles of brushwood, at intervals from one another.

BAIT (*Esca, Esche*).

Besides the bait commonly used elsewhere, poisonous bait is used in some places, for instance, the sap of the *Euphorbia cyparissias* is used near Rogosnica, Milna, and at the mouth of the Narenta, to stupefy the basse ; also the fruit of the South Asiatic plant, *Menispermum cuculus*, which is sold in retail at about a penny for five grains in the form of a powder, and is made into paste with flour. The latter is often used near Meligne.



· SEGNALE (BARREL BUOY).

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 NAMES APPLIED TO THE DIFFERENT MODES OF FISHING.

The different modes of fishing are designated, as a rule, by the names of the fishing gear; for instance, *pesca a cocchia, a cassa, a cerberai, a bragagna, colle bombine, a foscina, a toгна, a tratta, a tartana, &c., &c.*

Other modes of fishing, again, are designated by special terms; for, instance, the opening of the *valli chiuse*, in order to allow the fish to enter the fish-ponds, is called *pesca a montada*, or *pesca a valle*; *pesca a saltarello* is with a rowing boat, at night, with a light in the bows, the rowers pulling hard but with muffled oars, and the fish, following in the wake of the boat, jump (*saltare*) out of the water and into the boat. The fish thus caught are grey mullet (*volpine* and *cievoli*).

Pesca a zattera is similar in principle, but differs in one respect, that no light is used, the fish, also grey mullet, being scared in a given direction by striking the surface of the water; they meet with an obstruction, which they jump over, and are caught in a net, on the principle of the *Saltarello*, described amongst the trammel-nets.

The boat called *Pielego* drags in its wake a heavily-weighted line, to which are attached a number of baited hooks on snoods at equal distances apart, the end of the line grazing the bed. This is called *pesca a pielego*.

Pesca a parangala is carried on with a similar line, which remains motionless in the water (described under LINE-FISHERIES).

Pesca a spavento, or a ludro, is when the fish are driven or scared into nets by artificial means, such as by striking the surface of the water, &c.

Pesca a comagna is carried on with a very fine net called *fiorese* in the lagoons, for catching grey mullet (*cievoli*) when feeding: hence the term *comagna*, a distortion of *quando mangia* (*i.e.*, when it eats).

Pescar' a braccio, a fiappar, a palpar, is also a method of fishing in use in the lagoons, and consists in wading in the shallows, and extracting by hand the gobies which are immersed in the mud. This mode is also employed, in mild autumns and winters, for catching flounders and turbot at the heads of channels.

Pescar colle peche, or orme, or pedate (footsteps), consists in leaving

imprints of the foot on soft mud or sand, which retain the water at ebb-tide, and thus attract crabs (*granchi*), which are thus caught by hand. This is also known by the term of *facendo le zappeghe*.

The fisheries are also designated by the names of fish; for instance, *pesca a pesce novello*, which is carried on by means of the *tela*, or *bragotto*; *pesca a scombri* is the line-fishing for mackerel (*scombri*) with the *togna*; *pesca a sardella* is the sardine fishery with the boats known as *Sardellere*, &c., &c.

When fishing is carried on without defined aim, it is called *pesca vagantiva*; *pesca al menuo*, or *pesca minuta*, is when the fishing is limited to small fish of little or no value (*minutaja*).

Deep-sea fishing is called *pesca da mar*, such as is exercised by the Chioggiotti; *pesca da marina* is fishing from the shore; *pesca da valle*, such as is practised by the *valesani* in the *valli* (fish-ponds), especially in the season of the *fraina*. Those that fish at random in the lagoons are called *mestieretti*, or *pescaoreti*.

SARDINE FISHERIES.

It is necessary to supplement the description given at pages 100 and 114 by a few remarks. The single hauls made by the drift-nets are much smaller than those of the seine-nets. They seldom exceed 40–50 casks in the first instance, whereas hauls of 500 and even 700 casks are occasionally made by the seine-nets. In Dalmatia the fisheries are carried on only on the dark nights (*scuri*). In Istria the fishing goes on also by moonlight. The *scuri* from May to September are known as the *scuri principali*. Then the fishing is carried on promiscuously off the islands of Lissa, Lésina, Brazza, and Curzola. The *scuri* before May and after September are called *venturini*. In this season the fishermen are only allowed to exercise their calling in their own fishing districts.

The fishermen of Comisa (western Lissa) are chiefly engaged in these fisheries, and they export 10–12,000 casks of salted sardines a year. After a mild winter the first shoals of sardines put in an appearance in the South Adriatic at the beginning of March, and at this season the fishermen of

Comisa are already on the watch for fish at the more distant *poste* off the island of Pelagosa.

The groups (*Broschetti*) consist of four nets. The nets vary from 40–100 fathoms in length, 12–18 fathoms depth of bag, the wings measuring 4 fathoms in depth. The Croat names used in Dalmatia are as follow:— the seine-net is called *Mrježa srdeljna*; the bag, *Gaja*; the mouth of the bag, *Goše*; the wings, *Krilo*. One of the drag-ropes is called *usa prva*; the other, *usa zatega*; they are kept at the surface of the water by means of small casks.

The iron basket, carried by the boat, *Gaëta* (see page 100), for fuel, is called *Svičalo*; the fuel itself, *Luč*. The third boat, which is used for landing the fish, is called *Ciglarica*. While the fishing is going on, a fire is kept burning on the shore to serve as a landmark: this fire is called *palak*. The weighted line (*škandaj*), used on board the *Gaëta* (see page 100), has a hollow pumpkin (*tikva*) to sustain it in the water.

The fuel required is a considerable item of expense. Fifteen cubic m. are used for each net during the twenty *scuri* of each month, thus making 75 m., or 375 florins for the season, at 5 florins per mètre. Thirty *tratte* from Lissa consume 2,250 cubic m. in the course of the season at a cost of 10,000 florins; and eighty *tratte*, hailing from Lésina, 6,000 cubic m. at an expense of 27,000 florins. The devastation of the forests caused by these requirements accounts for the rise in prices from 1½ fl. to 5 fl. per cubic m. On the island of Lésina alone 50,000 trees are felled every year for the purpose of these fisheries. Supplies are also drawn from Curzola (*Corcyra nigra* of old, thus called on account of its dense forests), Lagosta, Lissa, Brazza, Meleda, &c. The wood used is the *Pinus maritima* (Croat. *morski bor*), *Juniperus oxycedrus* (Croat. *smrč*), *Juniperus phœnicea* (Croat. *gluhač*), and *Juniperus macrocarpa* (Croat. *puk*). Common fir-wood (*zappino*) is also imported from Apulia, the demand exceeding the local supply.

DIVISION OF PROFITS.

The division of the yield of the seine-fisheries amongst the fishermen is deserving of notice. It varies according to locality and season. During the

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This is the mode of partition in vogue off the islands of Lissa, Lésina, Brazza, and Curzola, where the principal sardine fisheries are carried on.

At Trieste, Cattaro, Giuppana, Calamotta, and Sebenico, the *padrone* generally receives half, the other half being equally divided amongst the crew.

At Pola one-sixth falls to the share of the owner of the craft, one-sixth to the owner of the seine, one-sixth to the master (*direttore*), and one-half is equally divided amongst the crew.

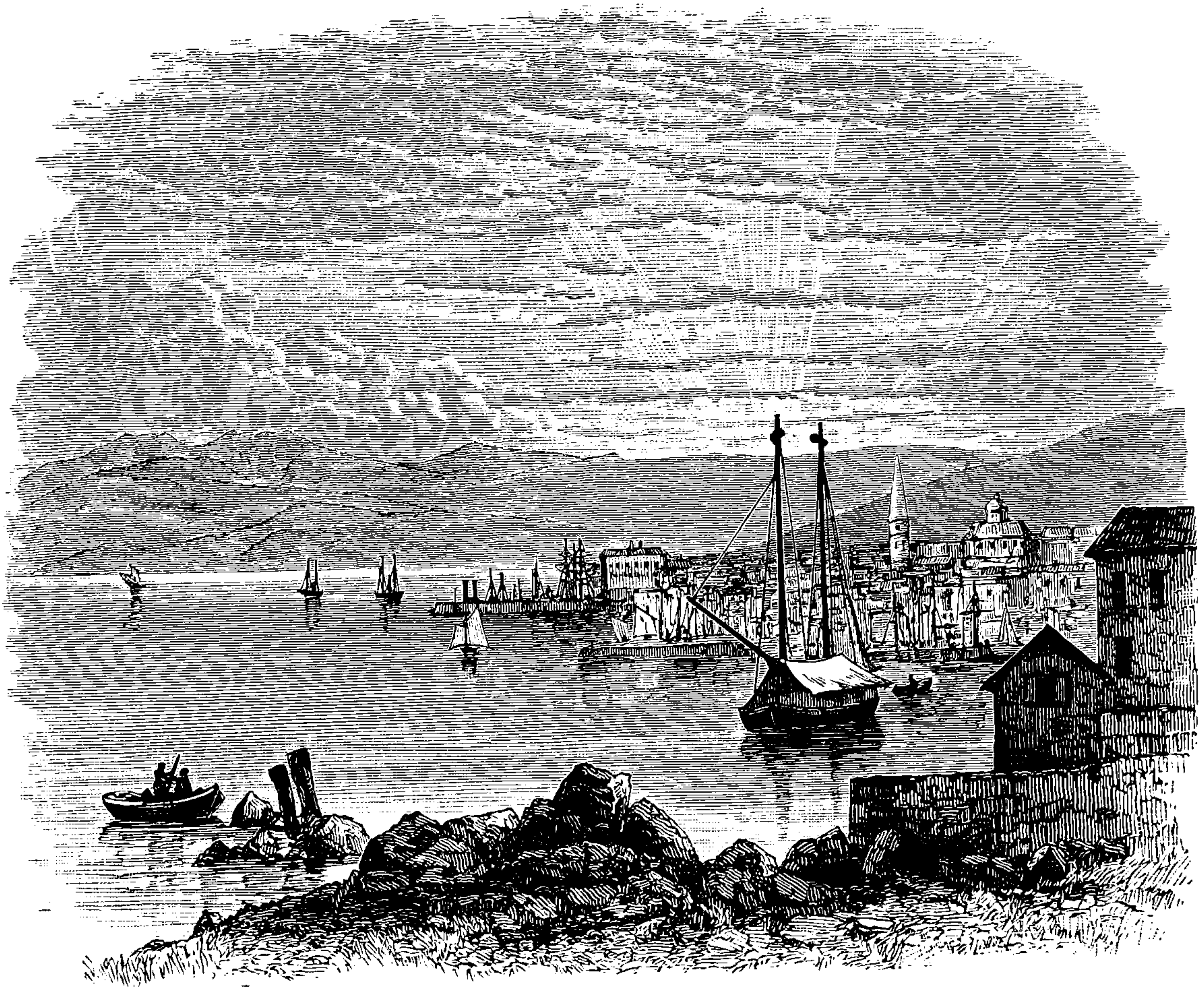
At Spalato the *padrone* is in the habit of receiving seven shares; the crew of three men each two shares; the boat which carries the fresh fish to market two shares, and the master (*direttore*) two shares; together, seventeen shares. The *direttore* likewise receives a weekly pay of fifty soldi (ten pence).

At Gravosa two-thirds fall to the share of the owners of craft and gear, and one-third to the crew.

At Curzola five shares go to the owner of the net, one share to the boat, and one share to each man of the crew, including the master (*direttore*).

At Zara and along the Hungarian-Croatian littoral the crew, as a rule, is paid fixed daily wages and finds its own victuals: the wages vary from one shilling to two shillings and sixpence a day according to the season.

In the case of the drift-net fisheries (*voigari*), carried on chiefly off the coast of Istria, the accounts are made up at the end of the season, the value of the fish being calculated at export prices current at the time. After deducting the cost of victuals supplied to the crew by the *padrone* and the cost of salt and barrels for curing purposes, the balance is divided into sixteen shares, of which the *padrone* receives three, the master (*direttore*) three, and each of the five men two shares.



FIUME FROM THE EAST.

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yield the Mackerel (*Scombro*) and its relatives the Tunny (*Ton*), the Pelamid (*Palamida*), and the plain Bonito (*Tombarello*), the latter being only occasionally met with. To these must be added the *Lizza* (*Lichia amia*). Of the flat-fish tribe, occur the Turbot (*Rombo*), the Brill (*Suazo*), and the Sole (*Sfoggia*), which are most prevalent and best for eating in the autumn and winter months. Of the Herring family, are the Pilchard (*Sardella*), the Anchovy (*Sardon*), and the *Papalina* or *Sardellina* (*Clupea papalina*), which belong to the yield of the summer fisheries. Pilchard comes early and late in summer; Anchovy in autumn. These are all, more or less, to be classed among the prime fish, *Pesce nobile* or *fino*.

Amongst the second class of fish, known as *Pesce ordinario*, or *salvatico*, are included the five species of *Mugilidæ*, or Grey Mullet tribe (*Volpina*, *Cievolo*, &c.): they are almost always in the market, and in Fiume they are distinguished by the vulgar names of *metja*, *divi*, *pravi*, *bon*. Besides these are the two Scorpions (*Scarpena*), two Gurnards (*Lucerna*, *Anzoletto*), four Weevers (*Ragno*), the Star-gazer (*Bocca in cao*), some of the better of the Serranus tribe, the *Cantharus orbicularis*, the Bogue (*Bobba*), the *Oblata melanura* (*Occhiada*), the *Sargus Rondeletii* (*Sargo*), the *S. annularis* (*Sparo*), the Meagres and Umbrina (*Corbo*), the John Dory (*Pesce San Pietro*), the Horse Mackerel (*Suro*, *Saron*), some of the better class of Gobies not included amongst the class of *Minutaja* (mixed fishes), most of the Cod tribe (*Gadidæ*), the Whiting (*Molo da parangolo*), the Poor, or Capelan (*Pesce molo*, *Busbana*), the Hake (*Asinello*, *Merluzzo*) and the Rock Ling (*Mare dei gronghi*). Of the flat-fish tribe is the *Citharus linguatula* (*Pataraccia*) besides the Gar-pike (*Angosigola*); and the Conger-eel (*Grongo*). The Shark tribe supplies the Spiny Dogs (*Assià*), which are not despised even by the better class; and the Ray, the Thornbacks (*Razza spinosa*) and *Raja miraletus* (*Quattr'occhi*).

The third class of fish, known as *Pesce popolo*, comprises the *minutaja*, or *misto* (mixed fish), the Mendole (*Menole*, *Maride*, *Garizzo*), the *Cantharus vulgaris* (*Cantaro*), the Box Salpa (*Salpa*), the *Charax puntazzo* (*Spizzo*, *Pesce morti*), the common kinds of Gurnards (*Anzoletti*), the genus *Stromateus* (*Pesce figo*), the common kinds of Gobies (*Guatti*), and Blennies

(*Gattorusole*), the Anglers (*Rospi*), the Atherines (*Anguèle*), the Red Band-fish (*Pesce cordéla*), the *Heliastes chromis* (*Pesce fabbro*), the Wrasses (*Liba, donzella*), and, generally speaking, the Sharks and Rays, amongst the latter the Electric Ray (*Tremolo*).

The smell of the Sharks is anything but agreeable; they are at once gutted, and the bowels thrown away; the body is cut open lengthways and the larger fish divided in their breadth; this is also the case with the Rays, Tunny, and Pelamid. The entrails of some fish, such as the Grey Mullet, are a delicacy (like the Woodcock's), and are not extracted.

The Spiny Dogs (*Assià*) are the most esteemed amongst the Sharks, and both the Smooth Hound (*Cagnetto*) and the Spotted Dogs (*Gatte*) are often sold in their stead, although much inferior. The better to deceive purchasers, they are skinned previous to exposure for sale, only a strip of the dorsal fin being retained in order to simulate the spine peculiar to the former species. The oil extracted from the liver of *Centrina Salviani* (*Pesce Porco*) is much valued for healing burns and wounds, and that of the *Notidanus* is light and good.

Small Sharks and Rays, Anglers, the Hake and Rock Ling, the Star-gazers, and John Dorys are common features in almost all markets during the greater part of the year; they are most prevalent and best for eating in winter, when they are brought to market, sometimes in large quantities, by the Italian trawlers. They find a ready sale among the poorer classes.

Hake caught by the line (*Asinello d'amo*) is much superior in quality to that caught in the trawling-nets, and is held a delicacy and preferred by many people to the Basse. This circumstance, or else the prevalence of this fish on the Croatian shores, has given rise to the vulgar name by which it is known at Fiume, *Branzin croato*, which is applied in a contumelious sense against the Croats. Specimens are sometimes caught 3 feet in length. A favourite way of preparing them for the table is to "lard" them with salted sardines and to broil them in cream. Hake is a *spécialité* of the Fiume and Croatian markets: 125 tons are bought and sold in the course of the year. The supply of the Austrian markets is only 10 tons. The chief take of Poor and Whiting extends likewise along the eastern coast as far as Zara. The

relative figures are: Fiume and Croatian ports, 80 tons; Zara, 140 tons; and the remaining ports together, 60 tons.

The huge Sharks make their appearance only during the summer heats. Gurnards are most prevalent in winter and early spring; Weevers, Scorpions, and the Poor in spring and autumn; Meagres in spring and summer; Gar-pike, Whiting, Horse Mackerel, and *Lizza* in summer; Mendole and Conger-eels in summer and autumn. The Cephalopods are never missing in the markets, and, especially the young ones, are much esteemed as food in winter. The Cuttle-fish (*Seppa*), the Octopus (*Folpo*), and *Eledone moschata* are the cheapest produce of the sea, and are favourites with the lower classes. The flesh of the Squid (*Calamaro*) is sweetish, and hard as leather; it is indigestible, even in the best of seasons, yet it is a favourite with the better classes, to judge by the price it sometimes fetches. *Sepiola Rondeletii* (*Sepiola*) is often served on the tables of the rich, and is not to be despised.

Among the Crustaceans the Norway Lobster (*Scampo*) undoubtedly holds the first rank in the Fiume market; it is found throughout the winter, from September to April, when the Italian trawling-boats ply, and it sells, as a rule, at 1s. to 1s. 6d. per kilo, and at 3s. to 4s., exceptionally, for instance, at Christmas and Easter. In Trieste and Venice it is considered a great delicacy. The heads are removed for transit, and only the tails are offered for sale, fetching as much as 10s. a kilo. The common Lobster (*Astice*) is common on the west coast of Istria and Trieste, and the Rock Lobster (*Languste*) on the Dalmatian coast; they are often very abundant in summer, selling at Fiume and Trieste at 1s. to 1s. 6d. a piece. At other seasons they sometimes fetch as much as 10s. for the inland markets.

Crabs are not much cared for: the larger kinds, such as the Sea-spider (*Granzéole*), and the Harry Crab (*Granzi*), when plentiful, sell at 1d. or 2d. each. The Fiume market is very poor in this respect, the variety in other fish-markets being much greater. Shrimps and Prawns (*Skilla*, *Gambaretto*) are caught in large quantities on the sand-beds near Grado and in the lagoons of Venice, whence they are brought to market at Trieste.

The rest of the submarine animal produce goes by the name of *Frutti di*

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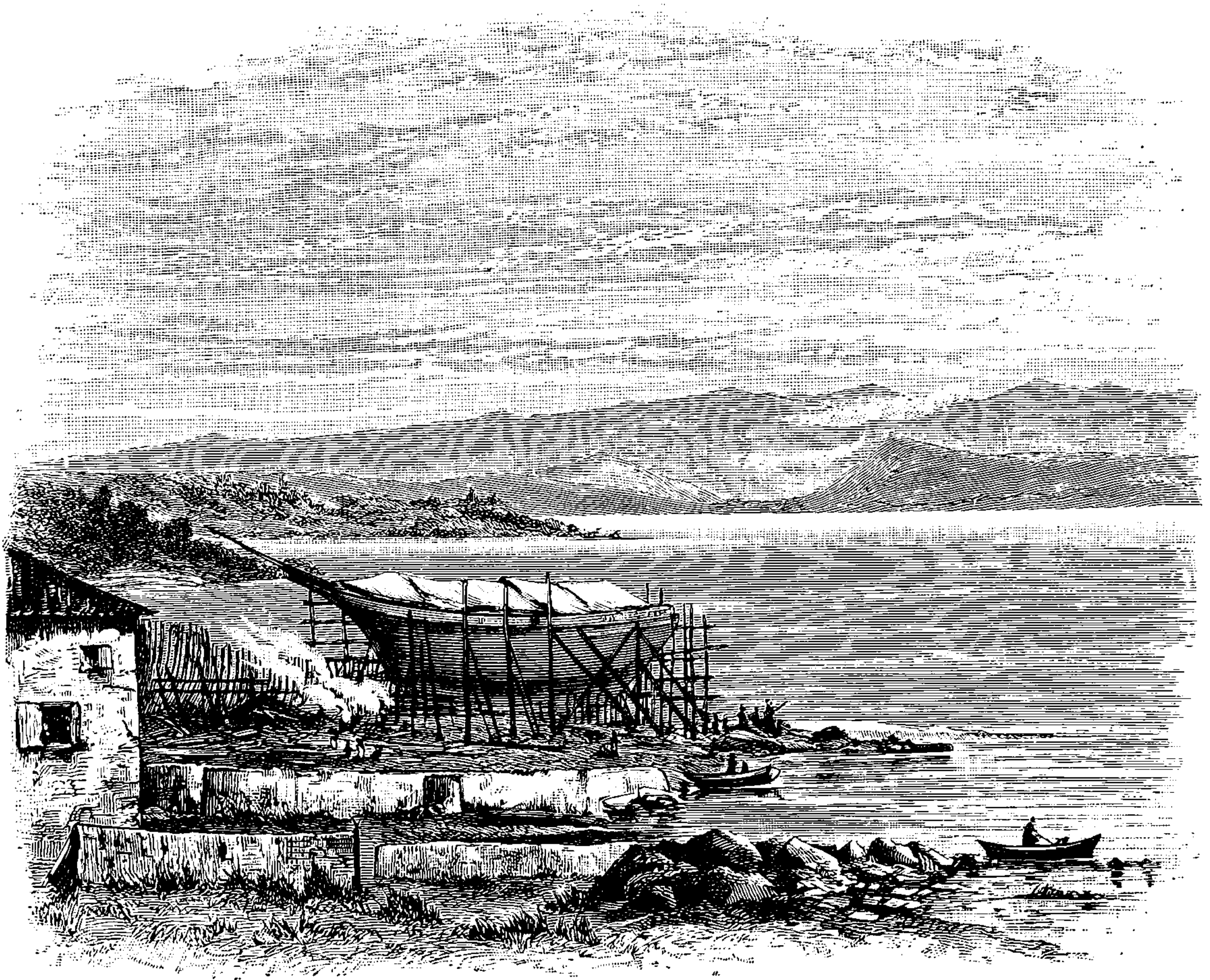
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mar; this term includes all mollusks, such as Oysters (*Ostriche*), the *Solen siliqua* (*Cape lunghe*), the Rock-borers (*Pholas dactylus*) and the Date Shell (*Dattoli*), the latter being considered a great delicacy; likewise the Mussels, *Mytilus edulis* (*Pedocchio*) and *Modiola barbata* (*Mussoli*). The poorer classes of Trieste and Venice consume a quantity of *Pectines*, chiefly *Pecten jacobæus* (*Cape sante*), also *Arca Noë* (*Cofani di grotta*), *Cardium rusticum* (*Cape tonde*), *Venus gallina* (*Peverazze*), *V. decussata*, *Scrobicularia piperita* (*Caparozzoli*). *Pinna rudis*, *P. squamosa*, *P. muricata* (*Asture*, or *Palóstriche*), are also eaten.

Some Sea-snails are regularly sold at Trieste and other markets, such as *Helix sp.* (*Buovoli*) and *Murex brandaris* (*Garusoli*), the latter often in large quantities, overgrown by *Actinia effæta*. The *Murex trunculus* is covered with a kind of slime of the brightest violet colour, from which the purple of the Roman Cæsars was made.

The stranger will be struck in many markets by the appearance of *Ascidia microcosmus*, which looks anything but appetising; in like manner the Sea Urchins (*Rizzi di mar*), *Echinus lividus* and *E. melo*, which show signs of life by the fact of their prickles being constantly in motion. They are eaten, but only when they are in egg, and in this state they form an important article of food in all southern waters. They are in season in winter. Nardo says that they are not consumed at Venice. The most prevalent is *E. lividus*, which is abundant, adhering to the rocks just below the water-mark, and the small *E. microtuberculatus*. The large violet *E. brevispinosus*, Risso, is not so common. It is armed with short white-tipped prickles, and was formerly considered identical with the northern species, *E. esculentus*. An Actinia (*A. cereus*) is also consumed by the poor classes at Trieste and at Nice, whence Risso has called it *A. edulis*.

Besides the foregoing produce, which is common to most fish-markets, and is more or less prevalent according to the seasons in which each particular species occurs, there are other species, which form the exception. The latter are looked upon as curiosities, and find their way into the hands of the ichthyologist, if he be lucky, or, as is more frequently the case, they are sold together with the other commoner kinds of fish without any special

distinction. Amongst these may be mentioned the dusky Serranus (*Cherne*), the Stone Basse, the *Sebastes imperialis*, the Flying Gurnard (*Rondinella*), the Spet (*Pesche schermo*), and the Scabbard-fish (*Spada argentina*), which has been caught after a hurricane off Zaole; also the Hair-tail, the Atlantic Bonito, the Germon and the Pilot-fish (*Fanfano*), which occasionally enters the ports in the company of vessels; the Remora, attached to the bronchial aperture of sharks, tunny, and sword-fish; the Black-fish (*Centrolophus* sp.), Dolphins (*Coryphæna* sp.), Ray's Sea-bream and *Ausonia Cuvieri* (*Pesce gallo*), a specimen of which was caught near Trieste in December, 1879, weighing 50 kilos, the first time since twenty years ago, when one was caught at Muggia; also the *Caranx dentex*, the *Seriola Dumerilii*, the Derby (*Lizza bastarda*), the *Lichia vadigo*, the Boar-fish, the Sword-fish (*Pesce spada*), the Ribbon-fish (*Pesce falce*), the *Histiophorus belone*, the Trumpet-fish (*Pesce trombetta*), besides various of the rarer species of the Goby, Blenny, Wrasse, Cod, and Flat-fish tribes; the larger kinds of Sharks, which only occur sporadically in these waters; the File and Sun-fishes, the Needle-fishes, &c., &c. A specimen of *Orthogoriscus Planci*, the truncated Sun-fish (*Girasol*) was caught not long since in the Quarnero, likewise a specimen of the Flying-fish (*Exocætus*). To these may be added the following species, viz., the Hammer-headed Shark, the *Notidanus barbarus*, the *Sargus Salviani*, the mailed Gurnard, the *Coris Giofredi*, the *Phycis blennioides*, the *Phycis mediterraneus*, the *Pleuronectes platessa*, the *Myrus vulgaris*. The Sturgeon is but rarely met with on the eastern coast, but a specimen has been caught in a trawling-net in the Quarnero in the month of October.

The Sea-spider (*Grazéole*) is seldom to be found in the Fiume market though common at Trieste. Other kinds of crabs, as for instance, *Stenorhynchus phalangium*, *Xantho floridus*, *Pagurus* sp., *Galathea* sp., are occasionally met with. *Dromia Rumphii* and *Pinnotherus veterum* are less prevalent. Amongst the shell-fish, *Spondylus aculeatus*, *Haliotis tuberculata*, *Dentalium entalis*, *Cerithium vulgatum*, *Turritella communis*, *Aporrhais pes pelecani*, and *Dolium galea*, are occasionally to be found, especially so at Trieste.

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CHAPTER IX.

METHODS OF CURING AND COOKING FISH.

Curing Pilchards, Anchovies, &c.—Preserving Pilchards, Tunny, Norway-lobster, &c. in oil.—Fishes which are smoked, or dried for exportation.—Ways of preparing various fishes and other produce of the sea for the table.



ALT FISH is prepared chiefly on the west coast of Istria, at Isola, Capo d'Istria, Pirano, Rovigno, &c., and on the islands Lésina, Lissa, Lagosta, &c. The curing of Pilchards and Anchovies is the most extensive; next in importance are Mackerel, Horse Mackerel, Gar-fish, *Smaris vulgaris*. The Pilchards are, as a rule, slightly salted, and packed in casks or tubs on board the fishing craft. On landing they are sorted and washed in sea-water. Those in good condition are then packed tightly in small pine casks 18 by 12 inches, about 1 lb. of clean white salt being spread between each alternate layer of fish. When the cask is full, a circular piece of wood (*fracca*), rather smaller than the head of the cask, is placed on the top of the fish, weighted with a stone of about 2 cwt., so as gradually to press out the brine and oil, and by compressing to exclude the air. The hoops of the cask being loose, the brine and oil drain through the sides and bottom of the cask. This is called the *primo stivaggio*. After twenty-five or thirty days the stone is removed; the brine (*Salamoja*) is allowed to run off, the cask is filled up with fish and salt as before, and re-weighted. This process, called the *secondo stivaggio*, or *dare il colmo* (*colmo* = superfluity), is repeated until the fish is sufficiently compressed (*saldo*); the cask is then closed and brine is poured on the cover until sold, in order to keep the contents fresh and moist.

This operation is carried on on a stone, or, generally speaking, on a hard

and waterproof ground-floor, built on a slant so as to allow the brine to run off by gutters made for this purpose in the floor, into a well or cistern, for further use in moistening the fish. The liquid fat or oil which floats on the water is put in casks and sold to leather-dressers. The due degree of saltiness of the brine is ascertained by means of a raw hen's egg; if it sinks, more salt must be added.

The number of fish contained in each cask is marked on the outside; thus: $\text{+} = 1,000$; $\text{+} = 1,500$; $\text{+} = 1,700$; $\text{>+} = 1,750$; $\text{+} = 2,000$. A cask contains from 1,200–2,200 Sardines, or 400 Mackerel.

Three to five months after salting, the fish is in proper condition for consumption; well-cured fish keeps for two or three years; the colour becomes dark-red, the smell aromatic, and the flavour spicy. In commerce a pointed stick, or skewer, is stuck into the midst of the fish in order to see whether the fish is in good condition, which is ascertained by the smell; this is called *speronare il pesce*.

The fish caught by the seine-nets (*Tratte*) do not cure as well as those caught in the drift-nets (*Reti d' imbrocco*), being more or less damaged by pressure and devoid of scales; hence the latter are preferred for curing purposes.

Anchovies (*Sardoni*) and *Smaris sp.* (*Menole*) are preserved in like manner, chiefly in small tubs, but not so durably, on account of the easier access of the air.

The pine wood of which the casks are made comes from Croatia and Bosnia; a cask costs 80 soldi, = 1s. 4d.; a tub, 30 soldi, = 6d. The salt used for a cask, say about 40 lb., is supplied by the Government monopoly at half the usual price charged, say 4 fl. to 4.65 fl. per 100 kilogr., = 6s. 8d. to 7s. 6d.

The curer and packer is, as a rule, also the fisherman. When this is not the case, he pays the fisherman 9–12 fl. (15s.–20s.) for the fresh fish requisite for one cask, say 1,500 larger, or 1,600 smaller fish. The cask of cured fish sells at 15–22 fl. (25s. to 36s. 8d.). The retail price is one soldo a piece, or 5–6 for a penny. A tub of salt fish contains 22 kilos, for which 8 kilos of salt are required. The packer pays 3–5 fl. for the fish (5s. to

8s. 4d.), and sells the cured fish at 6–7 fl. (10s.–11s. 8d.), the retail price being 2–5 fish a penny (1–2 soldi a piece).

The labour of salting and packing is carried on chiefly by women, for which service they receive, as a rule, 5 soldi (1d.) per mille pilchards, and one-half of the damaged fish and of the pressed fat gained from the process of curing. Some are paid as much as 12 soldi per mille; the foreman receives 25 fl. per month during the curing season, and 10 fl. per month up to the time of sale. Rovigno, in Istria, is the principal place of this industry, which is, on the whole, flourishing, though the export to Italy has decreased since 1866. The produce was 3,600 casks in 1872; that of Pirano was 1,400 casks *Sardelle*, and 600 tubs *Menole*, in 1870. This industry seems to have declined since the former century. The Venetian Senate assigned to the *Commune* of Rovigno an annual allowance of 580 tons of salt in 1753. This is sufficient for curing 30,000 casks after deducting a third for domestic purposes. Dalmatia exports from 30,000–50,000 casks of salt fish a year; Lissa, 10,000 casks.

Meanwhile a new industry has sprung up at Barcola, Duino, and Grado, consisting in curing the Pilchards in oil, after the fashion of the *Sardines de Nantes*, in small tins and casks. Lissa exports 500 small casks of Sardines in oil, and 3,000–4,000 tins, of which 2,500 are Sardines, 1,000 Anchovies, and 500 Mackerel. The fish is bought at 3–4 florins (5s. to 6s. 8d.) per 1,000, the drift-net fish being preferred to the seine-net fish. The heads are cut off and the fish gutted. They are next washed, put in baskets and strewed with salt. After a lapse of eight hours, they are washed in sea-water and exposed to the sun to dry on small gridirons. If the weather is damp, they are put in a drying-room. They are then put into large kettles and cooked in oil heated by means of steam. During the latter process they remain on the gridirons, by means of which they are put into and extracted from the kettles. They are then brought on to large tables, covered with zinc plates, and there packed into tins of 6, 7, 8, 12, 20, 30, and 50 fish. The open tins are put into a large tank which is filled with oil, and in which they remain twenty-four hours, so as to allow the oil time to soak the fish. The surplus oil is then drained off by means of a tap, and the tins are taken out and soldered.

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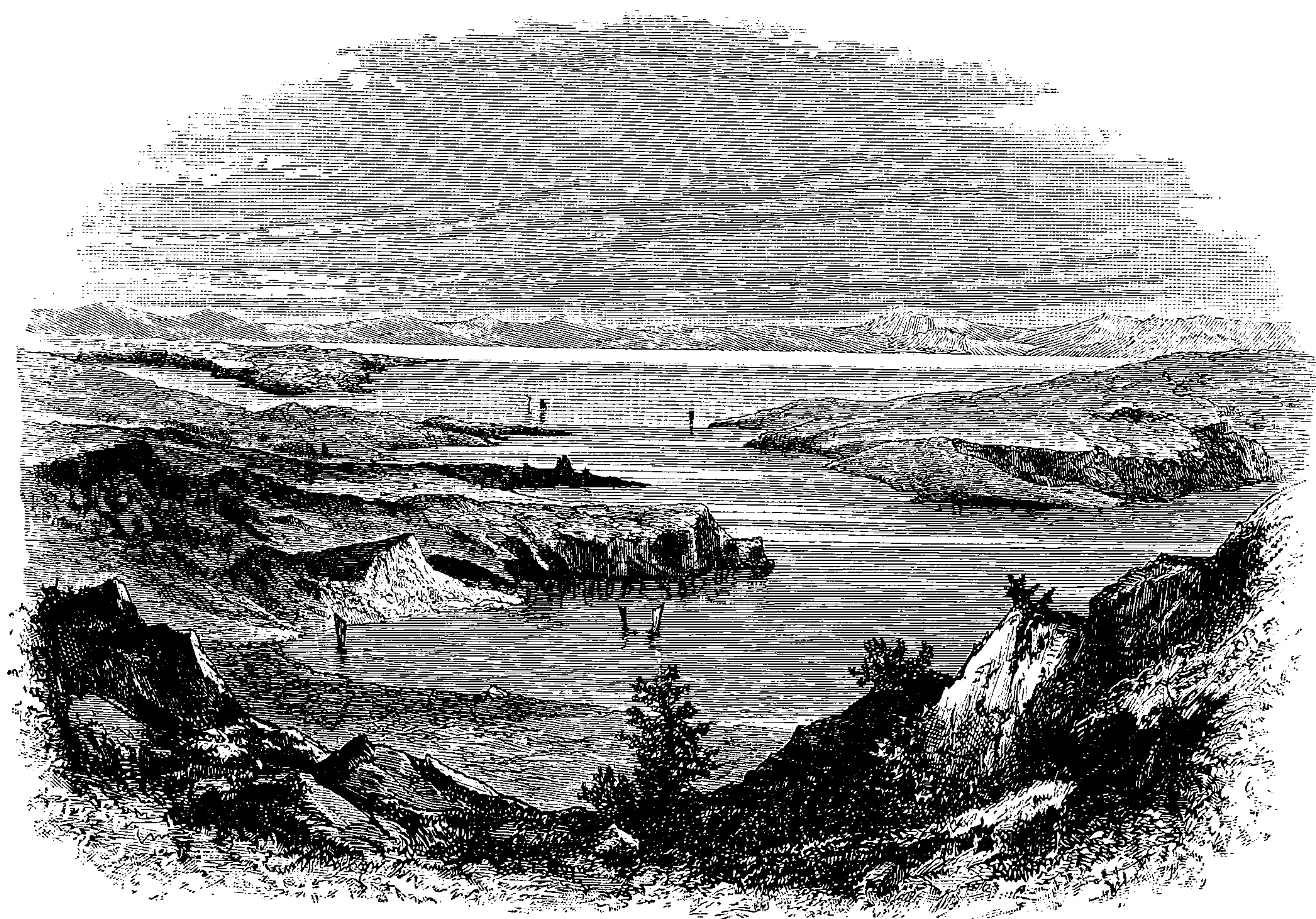
to Greece, but this article is of a very inferior quality. Conger-eels, Gilt-head, Mackerel, Red Mullet, Dentex, and Grey Mullet are smoked in Dalmatia and Istria.

The roe of the Grey Mullet is extracted, smoked separately, and sold under the name of *Bottarga*, the *botargo* of our Elizabethan writers. This is the chief occupation of the fishermen of Trapano and Makarska, who are engaged in the Grey Mullet fisheries at the mouths of the Narenta in the months of October and November. The catch at Trapano is 15 tons of fish, producing 300 kilogr. of roe; the fish is eaten on the spot.

In some parts, especially in the *piccolo mare* of Taranto, the Red Mullet (*Barbon*) is sometimes so fat, especially at the time of the new moon, that it falls to pieces when cooked, and has, therefore, to be cooked wrapped up in a piece of paper.

Sea Urchins are eaten raw; Anemones are fried in oil; Crabs are either simply boiled and the flesh eaten with finely-cut garlic and parsley, or else the water, in which they have been partly boiled, is poured off, and the flesh stewed in vinegar and oil, and seasoned with garlic, parsley, pepper, &c.; or, after being well washed and sprinkled with salt, they are fried in oil. Mussels are generally stewed in their own water in addition to salt and oil, or else fried with bread-crumbs, parsley, oil, and pepper, lemon-juice being added. A soup is also made by boiling them in their own water, water and bread being added, or else olive oil with as much rice as may be needed, with a seasoning of garlic, parsley, and pepper. Periwinkles are first boiled, extracted from the shell by the aid of a pin, and eaten either with salt alone, or dipped in a broth of oil, pepper, and salt.

Cephalopods, when large, are boiled and eaten in a broth of vinegar and oil well seasoned with pepper and salt; the Octopus has first to be well beaten, on account of its toughness; the smaller ones are generally fried in oil and are a favourite dish, especially in winter. The favourite way of eating all kinds of fish is in a broth made of the water in which they have been boiled, to which oil is added and a seasoning of garlic, parsley, and pepper. This mode of cooking is called *brodetto*, and, as a rule, it is eaten with a great deal of rice. The Stock-fish (*baccalà*) is eaten in this way, and is a



GULF OF BUCCARI, PORTO RÈ.

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CHAPTER X.

STATISTICS.¹

Proceeds of the fisheries.—The Austrian fishing fleet; its distribution on the coast.—Yield of the Istrian, Hungarian-Croatian, and Dalmatian fisheries.—Recapitulation.—Share of the Italian boats.—Statistics of the Austrian sea-fisheries; ditto of the Hungarian sea-fisheries.—Total yield.—Craft belonging to the Hungarian-Croatian seaboard.—Imports and exports of fish.—Fish sold in the Fiume fish-market.



HAVE mentioned how difficult it is to collect reliable statistical data on the subject of the fisheries, wherefore they can at best be given approximately, and, as a rule, it must be assumed that they are under-stated. Professor Schmarda estimates the value of the Austrian fisheries at three and a half million florins, including the *valli chiuse*, or fishing ponds of the lagoons. This comprises, however, the fisheries of the coast of Venice, which at the time belonged to Austria, consisting of about 1,000 boats of 6,000 tons burden and a crew of 5,000 men, but which now belong to Italy. In 1864, before the cession of Venice by Austria, the Austrian fishing fleet comprised 2,340 boats of about 10,000

¹ The statistics of the Austrian sea-fisheries are compiled with commendable exactitude and completeness, and, what is more, they are regularly published in the "Austria," a statistical periodical of the Austrian Ministry of Commerce. Strange to say, this state of things bears a favourable comparison to England, where it is a matter of great difficulty, not to say of impossibility, to attain anything like exhaustive data on the subject of the British sea-fisheries; and this is the more remarkable, considering their great national importance, representing, as they do, a value of something like twelve millions sterling, and probably more. Even Ireland has her Inspectors of fisheries and Scotland her Fishery Board, both of which publish statistics in their reports to Parliament, but these relate almost entirely to the salmon fisheries. As to the sea-fisheries of Great Britain, it appears that the Board of Trade has no official statistics on the

tons, and a crew of 8,000 men. On the cession of Venice, in 1867, it fell to 1,296 boats, of 3,892 tons and 2,571 crew.

The following table shows to what extent the Austro-Hungarian fishing fleet has increased during the ten years 1868–1877:—

Year.	Number of Boats.	Tonnage.	Crew.
1868	1,269	3,799	4,049
1869	1,859	4,967	5,228
1870	1,880	4,992	5,322
1871	1,349	3,802	4,303
1872	1,894	5,533	7,117
1873	1,952	5,670	7,196
1874	1,959	5,688	7,264
1875	1,966	5,787	7,341
1876	1,990	6,056	7,400
1877	2,004	5,877	7,489
1878	2,184	6,397	8,544

In 1872 the distribution of the fleet was as follows:—

	Boats.	Tonnage.	Crew.
Gorizia, Gradisca	65	292	254
Istria, Islands of the Quarnero	508	1,678	1,953
Hungarian-Croatian littoral	73	187	248
Dalmatia and islands	1,248	3,376	4,662
Total	1,894	5,533	7,117

subject. It is to be hoped that the International Fisheries Exhibition of 1883 may serve to do something to remedy this deficiency. The Hungarian statistics fall short in completeness and clearness of those of the sister country, and they are not published; but, then, her fisheries are of small significance, and people here are only beginning to awaken to the fact of the importance of the sea-fisheries if properly carried on, and of the vast amount of capital swimming in the seas, which they only have to stretch forth their hands to secure. Improved railway communication may contribute in a main degree to improve this state of things, for hitherto the great drawback has been the want of market for the sale of the yield in excess of the local consumption.

or an average of rather less than three tons and a crew of four men per craft, which has since remained unchanged.

1. The average yield of the *Istrian* fisheries, including Trieste, Gorizia, and the islands of the Quarnero, Veglia, Cherso, and Lussin, may be given at between three and three and a half million kilogr., valued at about 600 to 650 thousand florins, of which about one-half is consumed on the spot, three-fifths of the prime and two-fifths of the ordinary being exported. The proportion of prime and ordinary varies according to the yield of the Sardine fisheries, the proportion of prime being larger when the Sardine fisheries are favourable; in average years it may be taken at two-fifths prime and three-fifths ordinary. The neighbourhood of Trieste and Venice facilitates the sale, and the market is extending rapidly in consequence of the railway communication, the value of which will only in course of time be fully appreciated by those engaged in the fishing trade. At present it is looked upon as a luxury to send fish by rail inland, but the time will come when the inland markets will look for their supply of sea fish with the same regularity as of meat. This is the case in other countries, and it will be the case here sooner or later; indeed, signs are not wanting even now that the local supply suffers under the innovation; and, as the supply of fresh fish in Austria is largely supplemented by the importation of salt fish, there is no doubt that fresh sea fish will, in course of time, find its way to those inland markets best able to pay the higher prices. Even nowadays sea fish from Trieste is sometimes to be had at Vienna at lower prices than at Trieste. About two-thirds of the take is consumed or exported in a fresh state, whilst one-third, and sometimes more, is salted; this depends on the catch of Mackerel (*Scomberi*), Spanish Mackerel (*Lanzardo*), *Menole*, and *Maride*, which are salted in seasons of large takes.

In normal years it may be assumed that the fish cured by salting consists of two-thirds of Sardines, one-sixth of Anchovies, one-twelfth of *Menole*, and one-twelfth of Mackerel, Spanish Mackerel (*Lanzardo*), *Maride*, and Tunny-fish.

2. On the *Hungarian-Croatian* littoral Tunny predominates, hence also

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nourishment consists in a great degree of fish; hence it may be taken that the ordinary fish is consumed entirely on the coast, and that the total local consumption amounts to two-thirds of the whole take. The greater part of the prime (including sardines) is salted for export to Trieste, Italy, and Genoa.

Exportation of salt fish from Dalmatia.

	Casks of 50 kilogr.	Value in Florins.
1869	24,649	394,384
1870	33,269	532,304
1871	37,452	599,232
1875	50,476	807,616
1876	54,594	873,504
1877	33,276	532,416
1878	32,730	523,680

If we recapitulate, we arrive at the following figures:—

total catch, say, 10,000,000 kilogr. ;
value 2,100,000 florins;

or an average price of 21 soldi per kilo. This is, however, probably a minimum estimate. I should be inclined to put it at 2,500,000 florins, if not more.¹

The share of the Italian fishermen in the Austrian-Hungarian fisheries, according to the official statistics for the year 1878 to 1879, is as follows:—

¹ Part of the foregoing information is taken from Count Marazzi's report, but I have been obliged to demur to his concluding figures; Count M. puts the total yield at 5,750,000 kilogr., which is too low; and the value at 5,690,000 francs, which, proportionately to the quantity given, is much too high; but it must not be forgotten that Count M. had not to hand the official statistics that are now published.

Statistics of the Austrian Sea-Fisheries.

(Published by the Statistical Department of the Austrian Ministry of Commerce.)

Harbour Master's Districts.	Catch.		Value in florins.	Material used.		Fisher-men engaged.	Local Consumption.		
	Number.	Kilogr.		Craft.			Number.	Kilogr.	
				Number.	Value, fl.				Number.	Value, fl.
<i>From 23 April to 22 October, 1877.</i>									
Trieste.....	1,745	1,435,147	160,766	482	196,490	19,030	228,946	1,745	327,380
Rovigno	82,198	382,944	90,443	204	63,360	8,741	143,856	31,454	150,263
Pola.....	472,079	143,676	47,395	147	143,309	1,600	44,494	132,779	132,656
Lussinpiccolo	24,868	394,426	62,398	232	43,300	1,892	69,987	22,797	181,011
Zara.....	1,577,691	1,769,348	391,990	362	66,683	1,531	150,825	1,551,368	1,608,678
Spalato	129,258	2,069,868	421,394	739	169,322	2,819	212,942	124,150	315,484
Ragusa	1,398	273,573	55,619	306	65,640	1,297	106,027	1,880	123,274
Meglina	?	38,600	14,901	23	5,450	33	6,778	?	38,600
Total	2,289,237	6,417,582	1,244,906	2,495	753,554	36,943	963,857	1,865,173	2,877,346
<i>From 23 October, 1877, to 22 April, 1878.</i>									
Trieste.....	11,530	524,394	103,913	673	195,336	24,023	214,662	11,530	191,870
Rovigno	48,892	214,360	66,885	165	96,240	7,201	64,415	7,792	134,334
Pola.....	276,420	252,894	58,820	147	143,870	7,987	117,577	78,770	146,394
Lussinpiccolo	4,901	95,890	19,977	217	56,440	1,681	48,768	4,901	78,070
Zara.....	3,363,588	1,919,171	479,443	363	76,667	1,614	153,706	3,180,473	1,737,958
Spalato	309,316	737,183	113,502	580	153,337	2,467	107,478	308,316	617,604
Ragusa	758	282,212	44,779	309	69,262	1,561	88,667	596	142,876
Meglina	2,000	18,530	8,659	12	2,000	233	6,980	2,000	18,530
Total	4,017,495	4,044,634	895,978	2,466	775,152	46,857	802,253	3,594,378	3,067,636
<i>From 23 April to 22 October, 1878.</i>									
Trieste.....	7,550	772,787	165,548	716	244,240	31,388	400,435	2,459	594,131
Rovigno	42,946	475,856	104,332	148	81,710	7,067	69,522	18,728	90,389
Pola.....	1,239,729	116,559	41,854	146	100,690	4,363	71,433	1,096,029	83,498
Lussinpiccolo	5,030	355,484	77,155	220	50,540	1,680	63,545	5,030	133,792
Zara.....	1,845,139	1,565,658	404,408	357	78,793	1,416	152,079	1,787,579	1,450,014
Spalato	90,118	1,825,810	341,563	720	162,664	3,092	208,418	89,898	574,878
Ragusa	1,401	328,945	66,505	314	68,540	1,470	103,525	1,447	132,130
Meglina	2,400	42,460	15,601	15	3,000	19	6,750	2,400	42,460
Total	3,234,373	5,483,559	1,216,966	2,636	790,087	50,495	1,075,707	3,007,951	3,101,292

Notes to the Statistics on the Austrian Fisheries.

The numbers of the different kinds of produce caught are *not* given in every instance, so that the sum total is not exact.

¹ Comprising 865 Italians.
² Comprising 886 Italians.
³ Comprising 1,189 Italians.
⁴ Comprising 182 Italian craft.
⁵ Comprising 257,750 florins, value of the Italian craft.
⁶ Comprising 970 Italian gear.

⁷ Comprising 69,130 florins, value of the Italian gear.
⁸ Comprising 183 Italian craft.
⁹ Comprising 271,500 florins, value of the Italian craft.
¹⁰ Comprising 561 Italian fishing gear.
¹¹ Comprising 47,510 florins, value of the Italian fishing gear.

¹² Comprising 999,543 kilos caught by Italian craft.
¹³ Comprising 193,090 florins as the share of Italian craft.
¹⁴ Comprising 716,709 kilos caught by Italian craft.
¹⁵ Comprising 149,234 florins as the share of Italian craft.

Total amount of Capital Invested from 23 April to 22 October, 1878.

Native Capital, florins	1,547,914
Italian "	317,880
Total florins	1,865,794

Total amount of Native Capital invested, irrespective of its actual employment, 1,731,991 florins.

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Statistics of the Hungarian-Croatian Littoral.

1876, 1877.

Districts.	Caught by Native Fishermen. Kilogr.	Caught by Italian Fishermen. Kilogr.	Value in Florins.	Tunny Fisheries. Kilogr.	Value in Florins.
Fiume	325,753	198,187	91,806		
Buccari.....	10,516	...	2,268	25,500	9,900
Portoré.....	15,260	...	1,453	42,000	16,300
Selce.....	29,361	...	3,194	450	50
Segna	64,486	...	17,483		
Carlopago.....	32,671	...	1,742	190	21
	478,047	198,187	117,946	68,140	26,271
Italian Fishermen	198,187				
Tunny Fisheries	68,140	...	26,271		
Total	744,374	...	144,217 ¹		

1877, 1878.

Districts.	Caught by Native Fishermen. Kilogr.	Caught by Italian Fishermen. Kilogr.	Value in Florins.	Tunny Fisheries. Kilogr.	Value in Florins.
Fiume	423,821	272,402	132,548		
Buccari.....	17,850	...	2,764	50,000	16,600
Portoré.....	17,766	...	1,784	101,000	60,600
Segna	23,050	...	9,372	6,113	2,262
Selce.....	15,472	...	2,944		
Carlopago.....					
	497,959	272,402	149,412	157,113	79,462
Italian Fishermen	272,402				
Tunny Fisheries	157,113	...	79,462		
Total	927,474	...	228,874 ¹		

¹ The average for eight years is officially stated at 152,000 florins.

Statistics of the Hungarian Fisheries.

Species.	Total Catch in kilogrammes.		Share of the Italian boats in kilogrammes.		Total Value in florins.	
	Summer season.	Winter season.	Summer season.	Winter season.	Summer season.	Winter season.
Palæmon rectirostris and Crangon } vulgaris .....	...	22,400	...	22,400	...	6,720
Nephrops norvegicus	5,545	26,630	5,545	26,630	2,772	10,652
Homarus vulgaris .....	...	100	...	...	...	45
Maja squinado	1,700	6,063	1,700	6,063	680	1,819
Carcinus maenas .....	...	800	...	...	...	80
Lithodromus lithophagus .....	...	30	...	...	...	13
Pectunculus glycymeris	4,475	19,930	2,815	18,125	895	3,986
Sepia officinalis	3,547	2,070	...	970	1,064	621
Loligo vulgaris	9,610	13,617	3,285	11,017	1,922	1,361
Eledone moschata .....	...	4,040	...	4,040	...	808
Galeus canis	200	280	...	...	...	...
Mustelus vulgaris	880	15 ²	...	...	...	...
Carcarodon Rondeletii .....	...	4,090	...	3,840	...	818
Scyllium canicula	1,070	...	...	...	428	...
Acanthias vulgaris	4,440	23,952	3,115	23,352	1,332	7,186
Raja clavata	500	50	...	...	60	5
Myliobatis aquila	290	300	...	...	58	60
Alosa finta .....	...	585	...	...	...	146
Alosa major (?)	8,896	3,980	...	585	...	796
Clupea sardina	1,700	34,570	...	1,175	1,779	6,914
Clupea papalina	2,485	2,785	...	33,870	340	357
Engraulis encrasicolus	150	21,645	...	2,585	297	4,329
Anguilla vulgaris	450	990	...	570	180	198
Conger vulgaris	15,505	1,200	13,685	...	3,101	360
Merluccius vulgaris	11,805	21,431	10,465	19,831	3,545	4,286
Gadus sp.	255	370	...	245	102	148
Solea vulgaris .....	...	20	...	...	...	2
Platessa passer	1,653	1,900	400	1,220	496	760
Rhombus maximus	2,685	...	...	...	805	...
Belone acis	1,131	1,040	...	470	452	312
Labrax lupus .....	...	20	...	...	...	2
Exocoetus exiliens	50	60	...	...	5	6
Trachinus draco	2,680	100	2,660	...	268	10
Uranoscopus scaber	3,789	8,900	3,165	7,375	1,515	2,670
Mullus surmuletus	260	...	260	...	26	...
Trigla lyra	1,165	666	...	305	466	60
Scorpaena porcus	390	...	...	...	98	...
Serranus cabrilla	65	14,185	...	14,085	26	4,255
Sargus annularis	25	9,935	...	9,895	10	1,987
Sargus vulgaris	1,927	1,100	...	200	578	330
Chrysophrys auratus	470	450	...	350	188	75
Cantharus vulgaris .....	...	60	...	...	...	12
Charax puntazzo	1,275	300	...	...	510	120
Box boops	2,705	...	...	...	682	...
Box salpa	1,995	100	...	...	798	40
Oblata melanura	2,642	2,190	...	1,740	660	547
Dentex vulgaris	15,322	9,500	...	5,890	4,597	2,850
Smaris vulgaris	350	2,125	...	1,870	175	638
Mugil cephalus	16,193	5,170	...	...	3,239	1,034
Scomber colias	6,570	900	...	...	1,314	180
Scomber vulgaris	71,898	3,300	...	...	28,760	1,320
Thynnus pelamys	11,870	...	...	...	4,748	...
Zeus faber	1,658	1,330	1,630	1,330	663	532
Caranx trachurus	650	...	...	...	195	...
Lichia amia	835	...	...	...	167	...
Gobius jozo	1,613	...	1,455	...	242	...
Gobius paganellus	120	15	...	...	20	1
Gobius ophiocephalus	100	100	...	...	20	20
Lophius piscatorius	3,790	24,570	3,775	24,570	948	2,457
Delphirus delphis ³	230	28	...
Total	229,609	299,899	53,955	266,023	71,279	71,918

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The value of the produce of the Italian bragozzi in the Quarnero was

	45,583 florins in 1877;
	62,652 florins in 1878;
	82,039 florins in 1879;
total	190,274 florins for three years, ¹

to be divided amongst 130 bragozzi and 520 men. Expenses deducted (26,000 florins), there remain 109,516 florins as the two-thirds share of the crew, or 210 florins per man. The yield of 182 bragozzi in the Austrian fisheries in the year 1877-8 (see STATISTICS) was 342,324 florins;² deducting expenses (36,400 florins), there remain 203,948 florins as the two-thirds share of a crew of 728 men, or 280 florins. Reviewing the figures given here and elsewhere (see pages 53-57), we may fairly come to the conclusion that the average share of the Italian fishermen in the Austrian-Hungarian fisheries amounts to from 200 to 300 florins per man. The average value of the Italian fishing craft and gear engaged in the Austro-Hungarian fisheries is 400,000 fl.

In order to arrive at an approximate estimate of the individual share of the native fishermen, we will take the official statistics to hand, viz.:—

<i>Austrian Fisheries.</i>							Florins.
Summer fisheries...	...	...	...	...	...	...	1,216,966
Winter fisheries ...	...	...	...	...	...	...	895,978
							2,112,944
Deduct shares of Italian craft	...	...	...	...	...	...	342,324
							1,770,620 ³

¹ Taking the official average figures for eight years, this would be only 146,000 fl.

² The official average values for five years are as nearly as possible the same figure.

³ If we take the average yield for five years, this sum would be 1,604,000 fl.

<i>Hungarian Fisheries.</i>								Florins.
1876—77 ...	...	...	...	...	...	...	...	117,946
1877—78 ...	...	...	...	...	...	...	...	149,412
1878—79 ...	...	...	...	...	...	...	...	108,369
excluding the produce of the tunny fisheries ...								375,727
Deduct share of Italian craft for the said three years ...								190,274
Total for three years ...								185,453
Average per annum, 61,818 florins. ¹								

We thus arrive at a total yield of 1,832,438² florins, excluding the share of the Italian craft and the produce of the tunny fisheries on the Hungarian-Croatian littoral, which are worked by contractors (see page 65). Some of the fisheries are worked on the system of shares, such as the sardine seine-fisheries (see page 139) and the tunny fisheries (see page 165); in other cases the fishermen are paid fixed wages at the rate of 70 soldi to 150 soldi a day. It is, therefore, difficult to arrive at a fixed valuation of the individual gain derived from the yield of the fisheries.

The value of the material used, the property of native fishermen, represents an amount of 1,650,000 florins; one-third of this amount, say 550,000 fl., would represent the interest on capital, wear and tear of material, &c. This would leave a net yield of, say roughly, 1,280,000 fl., or, according to the lower estimate, 1,130,000 fl., to be divided amongst, say on an average, 10,000 men, more or less, engaged in the fisheries, or 113–128 fl. per man. The gross yield would be from 168–183 fl. per man. This is, probably, the lowest figure that can be taken. Considering, however, that many of the fishermen do not devote the whole of their time to fishing but have other occupations besides, it is easily explained how the average gain of each

¹ If we take the average for eight years, this sum would be 78,700 fl.

² Or, according to the official averages for five and eight years, 1,683,700 fl.

individual native fisherman falls short of the gain of the Italian fishermen, who devote the whole of their time to fishing and exercise their calling on a much more extensive scale, considering the number of men employed and the capital invested in their craft and gear. The gross profit of the fisheries, compared with the capital invested, is as nearly as possible 100 % in both instances.

The yield of the tunny fisheries on the Hungarian-Croatian coast was :—

			Florins.		Tons.
1876—77	...	...	26,271	...	68
1877—78	...	...	79,462	...	157
1878—79	...	...	34,828	...	87
total for three years ...			<u>140,561</u>	...	<u>312</u>

Average per annum, 46,854 florins; 104 tons.¹

The fishermen engaged in the Tunny fisheries on the Hungarian-Croatian littoral receive from 28 florins to 72 florins per ton, according to circumstances, say, an average of 50 florins, or 5,200 florins on 104 tons. If we, further, deduct rent, 5,000 florins; interest on capital invested, 1,200 florins; wear and tear and maintenance, 3,000 florins; sundries, 2,000 florins, there remains a profit of 30,000 florins to the farmer,—a profit which might be greatly increased if a system of properly salting the fish caught in excess of the local demand were introduced.

NOTE.—This calculation is based on the supposition that all the fish caught is sold; but it appears that a great quantity of fish caught in excess of the local demand is spoiled in transit to other markets, owing to the want of a proper system of salting; and, whereas the local demand is probably not more than one-half the quantity which serves as the basis of this calculation, it is safer not to put the net profit to the farmer at above from 15,000 to 20,000 florins.

¹ The average for eight years is 122 tons.

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Fish brought to market at Fiume during the winter season of 1879-1880.
Weight in kilogrammes; value in florins.

Description. Local terms and equivalents.	October.		November.		December.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.
16. Agoni (<i>Smaris gracilis</i> , Bp.) .....	...	...	...	...	40	20
41. Angosigole (<i>Gar-pike</i>) .....	...	...	...	...	...	...
11. Anguille (<i>Eels</i>) .....	...	...	100	60	1,335	483
25. Arbori (<i>Red, or Spanish Sea-bream</i>) ...	...	...	...	...	...	...
9. Barboni (<i>Red Mullet</i>)	633	284	622	221	355	186
30. Barracole (<i>Thornback</i>) .....	...	...	95	17	...	...
35. Bobe (<i>Bogue</i>) .....	...	...	...	...	50	30
23. Branzini (<i>Basse</i>).....	20	16	20	16	40	72
20. Calamari (<i>Squid</i>) .....	...	...	20	10	115	75
14. Cani (<i>Sharks</i>).....	250	43	210	35	80	32
40. Cantre (<i>Sea-bream</i>).....	...	...	15	2	...	...
15. Cievoli (<i>Grey Mullet</i>)	30	18	100	36	350	210
38. Colombi (<i>Whip, or Eagle Ray</i>) .....	...	...	...	...	...	...
37. Dentali (<i>Toothed Gilt-head</i>) .....	...	...	...	...	...	...
7. Folpi (<i>Poulp, Octopus</i>)	1,715	216	1,610	246	810	182
17. Gatti (<i>Spotted Dog-fish</i>) .....	...	...	40	6	...	...
28. Girai (<i>Sand Smelts</i>) .....	...	...	...	...	45	27
19. Grancevole (<i>Sea-spiders</i>) .....	...	...	...	...	...	...
26. Granzi (<i>Harry Crabs</i>) .....	...	...	40	6	180	16
29. Gronghi (<i>Conger-eel</i>)	10	6	45	27	...	...
13. Menole (<i>Mæna vulg., Smaris vulg.</i>) ...	...	...	321	64	255	81
1. Merluzzi (<i>Hake</i>).....	11,370	2,436	8,405	1,565	4,080	1,312
5. Misti (<i>mixed</i>)	1,950	148	1,385	210	723	186
2. Molli (<i>Poor and Whiting</i>).....	4,040	1,140	3,278	811	1,140	414
27. Occhiade (<i>Oblata melanura</i>) .....	...	...	...	...	...	...
12. Orade (<i>Gilt-head</i>)	50	31	10	8	95	72
6. Rase (<i>Rays</i>)	1,240	196	1,420	210	450	108
4. Rospi (<i>Angler, Frog-fish</i>)	2,075	192	2,200	265	735	167
36. Salpe (<i>Box salpa</i>)	20	6	...	...	40	19
24. Sardelle (<i>Pilchard</i>)	265	81	10	4	...	...
3. Sardellini (<i>Clupea papalina</i>) ..	9,930	823	1,155	115	280	38
18. Sardoni (<i>Anchovies</i>)	70	17	470	83	...	...
31. Sarghi (<i>Sargus Rondeletii</i>).....	...	...	...	...	...	...
33. San Pietro (<i>John Dory</i>) .....	...	...	...	...	10	4
10. Scampi (<i>Norway lobster</i>)	1,520	641	839	370	147	146
39. Scarpene (<i>Scorpions</i>) .....	...	...	...	...	...	...
34. Sombri (<i>Mackerel</i>)	50	32	25	16	...	...
8. Seppie (<i>Cuttle-fish</i>).....	1,511	495	1,086	371	349	156
32. Sfoglie (<i>Soles</i>)	40	29	20	16	20	36
42. Spizzi (<i>Sargus vulgaris</i>).....	...	...	...	...	...	...
21. Tombarelli (<i>Plain Bonito</i>).....	385	73	20	5	...	...
22. Tonno (<i>Tunny</i>)	253	150	77	39	15	12
Total	37,427	7,073	23,638	4,834	11,739	4,084

N.B.—The numbers prefixed to the names indicate the order of importance according to the quantity.

Fish brought to market at Fiume during the winter season of 1879-1880.
Weight in kilogrammes; value in florins.

Description. Local terms.	January.		February.		March.		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
16. Agoni	155	63	210	109	371	192	776	384
41. Angosigole .....	...	...	...	...	10	5	10	5
11. Anguille .....	...	...	380	202	655	200	2,470	945
25. Arbori	185	45	80	18	...	...	265	63
9. Barboni	973	455	910	442	947	553	4,440	2,141
30. Barracole .....	...	...	...	...	...	...	95	17
35. Bobe .....	...	...	...	...	20	10	70	40
23. Branzini	67	73	93	64	61	56	301	297
20. Calamari	50	30	83	17	164	104	432	236
14. Cani	140	39	150	43	90	26	920	218
40. Cantre .....	...	...	...	...	...	...	15	2
15. Cievoli	205	105	10	6	151	95	846	470
38. Colombi	30	6	...	...	...	...	30	6
37. Dentali	20	16	16	12	...	...	36	28
7. Folpi	105	210	711	140	660	177	5,611	1,171
17. Gatti	225	50	80	19	240	58	585	133
28. Girai	20	5	10	6	90	51	165	89
19. Grancevole .....	...	...	190	38	278	56	468	94
26. Granzi .....	...	...	...	...	...	...	220	22
29. Gronghi .....	...	...	15	10	46	27	116	70
13. Menole	1,000	164	360	70	60	14	1,996	393
1. Merluzzi	6,300	1,762	8,210	868	5,234	1,617	43,599	9,560
5. Misti	1,590	333	2,290	631	1,351	393	9,289	1,901
2. Molli	2,162	662	2,375	658	4,969	824	17,964	4,509
27. Occhiade	37	14	21	6	115	39	173	59
12. Orade	925	520	675	402	336	234	2,091	1,267
6. Rase	1,520	311	1,313	270	1,970	448	7,913	1,543
4. Rospi	1,485	200	1,820	380	1,621	287	9,936	1,491
36. Salpe .....	...	...	...	...	...	...	60	25
24. Sardelle .....	...	...	...	...	...	...	275	85
3. Sardellini	2,110	242	960	167	3,360	742	17,795	2,127
18. Sardoni .....	...	...	...	...	...	...	540	100
31. Sarghi .....	...	...	50	4	38	21	88	25
33. San Pietro	60	29	...	...	12	5	82	38
10. Scampi	215	186	886	460	821	659	4,428	2,462
39. Scarpene	30	14	...	...	...	...	30	14
34. Sombri .....	...	...	...	...	...	...	75	48
8. Seppie	553	258	865	348	920	488	5,284	2,116
32. Sfoglie	5	5	...	...	...	...	85	86
42. Spizzi	10	6	...	...	...	...	10	6
21. Tombarelli .....	...	...	...	...	...	...	405	78
22. Tonno .....	...	...	...	...	...	...	345	201
Total	20,177	5,803	22,763	5,390	24,590	7,381	140,334	34,565

N.B.—The numbers prefixed to the names indicate the order of importance according to the quantity.

Quantity and Value of the Imports and Exports of Fish in the Austrian-Hungarian Empire during the Year 1878.

	IMPORTS.			EXPORTS.		
	Quantity in 100 kilogr.	Of which Hungary.	As compared with 1877.	Quantity in 100 kilogr.	Of which Hungary.	As compared with 1877.
(a.) Fish and Shell- fish, living and dead.....	5,484	318	+ 472	8,628	132	+ 1,571
(b.) Herrings, salt and smoked...	62,759	2,659	+ 14,989	...	...	...
(c.) Stock-fish, &c.	4,943	275	- 77	...	...	...
(d.) Undefined, pre- pared and pre- served Caviar, Sardines salted and in oil.....	23,879	5,265	+ 2,004	642	248	- 962
Total	97,065	8,517	+ 17,388	9,270	380	+ 609
Value florins 2,726,036.			Florins 552,406.			
Excess of Imports over Exports.....			{ Quantity..... 87,795 8,137 + 16,779 Value florins 2,173,540.			
DALMATIA, 1878.						
		100 kilogr.	Value in florins.			
Exports		14,534	460,066			
Imports		5,677	113,840			
Excess of Exports		8,857	346,226			

In the above returns the fish caught by the Italian fishermen and taken by them direct to Italy is not included amongst the exports: this may be taken, as has been shown elsewhere, at at least 600,000 francs, or 250,000 florins, or $1\frac{1}{4}$ million kilogrammes at an average price of 20 soldi per kilogr. The excess of imports over exports is 7,894 tons; value, 1,827,404 fl.; as against a yield of the sea-fisheries of 10,000 tons; value, 2,100,000 fl. The

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Austrian Sea-Fisheries.

Annual average for the last five years (1877-1882), from Official Statistics.

District.	Extent of Sea Coast in nautical miles.	Absolute Proceeds of the fisheries per nautical mile of coast extent in florins.	Order of importance according to Proceeds per nautical mile of coast extent.	Total Annual Value of Fisheries in 1,000 florins.	Boats and Gear (native) registered on the 22nd April, 1882.					Fishermen.			
					Boats.		Gear.		Total.	Native Fishermen actually engaged in the fisheries.	Italian Fishermen actually engaged in the fisheries.	Number of Native Fishermen registered 22nd April, 1882.	Number of Native Fishermen per mile of coast extent.
					Number.	Value in 1,000 florins.	Number in 100.	Value in 1,000 florins.	Value in 1,000 florins.				
Trieste	75	4,056	1	304	894	189	393	399	588	2,022	383	2,636	35
Rovigno	79	1,676	2	132	150	43	91	78	121	688	318	599	8
Pola	131	882	4	115	150	15	17	37	52	496	178	477	4
Lussinpiccolo...	329	214	8	70	143	27	12	48	75	665	58	517	2
Zara	986	726	5	716	427	85	23	215	300	1,288	86	1,652	2
Spalato	505	955	3	482	793	195	31	216	411	3,489	138	3,588	7
Ragusa	380	273	6	104	316	68	28	109	177	1,060	..	1,246	4
Megline	119	235	7	28	39	5	1	13	18	153	..	158	1
Total	2,604	750	...	1,952	2,912	627	595	1,116	1,743	9,861	1,161	10,873	4

GOVERNMENT pays for the capture of the shark of the species *Carcharodon* a reward varying from 20 florins for specimens under 1 mètre in length to 100 florins for specimens over 4 m. in length, if casually caught; but, if special chase is made after a particular Shark, its capture is rewarded with 100 florins for specimens from 1 m. to 4 m. in length, and with 500 florins if above 4 m. in length. Of 53 Sharks sent to the Trieste Museum, from 1872 to 1882, for identification, there were:—

- | | | |
|-----------------------------------|------------------------------|-----------------------------|
| 21 <i>Carcharodon Rondeletii.</i> | | 2 <i>Odontaspis taurus.</i> |
| 23 <i>Lamna Spallanzanii.</i> | | 2 <i>Notidanus griseus.</i> |
| 2 <i>Odontaspis ferox.</i> | | 2 <i>Carcharias lamia.</i> |
| | 1 <i>Carcharias glyphis.</i> | |

These varied in length from 1.46 m. to 5.30 m., 7 were above 4 m. in length, and the largest *Lamna* measured 3.50 m.

SPECIFICATION of the average annual quantity and value of FISHING CRAFT AND GEAR, native and Italian, actually engaged in the Austrian fisheries (the Hungarian-Croatian littoral excluded) during the last five years (from Official Statistics).

FISHING DISTRICTS.	FISHING CRAFT.				FISHING GEAR.			
	Native.		Italian.		Native.		Italian.	
	Number.	Value in 1,000 Fls.	Number.	Value in 1,000 Fls.	Number in 100.	Value in 1,000 Fls.	Number.	Value in 1,000 Fls.
Trieste	665	161	89	77	292	336	131	34
Rovigno.....	155	44	42	59	81	79	965	9
Pola	154	28	43	81	122	91	200	11
Lussin	182	30	11	14	15	56	30	3
Zara	315	69	18	11	16	171	37	4
Spalato	723	164	32	34	31	205	16	3
Ragusa	305	67	—	...	18	104	...	...
Meglina ...	32	5	—	...	2	11	...	...
TOTAL.....	2,531	568	235	276	577	1,053	1,379	64

SPECIFICATION of native FISHING GEAR registered on April 22, 1882, on the Austrian Littoral (Hungarian-Croatian Littoral excluded).

Description.	Number.	Value 1,000 Florins.	
A—DRIFT-NETS.			
1. Sardellere	13,006	429	
2. Sardonere	635	26	
3. Agonere	252	16	
4. Zereri	4	—	
5. Spironi da verzellate	240	8	
6. Prostice	234	8	
7. Bobere	260	4	
8. Reti da ludro	209	8	
9. Scombrere	141	12	
10. Cagnere	55	2	
11. Squænere	11,016	24	
B—TRAMMEL-NETS.			
12. Gombine	7,150	83	
13. Cerberai	431	6	
14. Passelere	3,468	92	
15. Barbonere	23	1	
16. Saltarelli	12	1	
C—SET-NETS.			
17. Pallandare	120	90	
18. Tonnare	24	24	
D—SEINE, DRAG, AND TRAWLING-NETS, &c.			
19. Tratte	1,082	213	
20. Bragagne	5	1	
21. Cocchie	14	3	
22. Tartane	144	5	
23. Grippi	70	3	
24. Sciabacche	125	10	
25. Mussolere	16	}	
26. Ostregheri	1,011		1
27. Guatte a mano	56		
E—SUNDRIES.			
28. Various implements, lines, &c.	19,797	46	
Total	59,500	1,116	

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TABLE showing the share taken by Italian boats in the Austro-Hungarian Fisheries during the last five years, 1877-1881, the average annual value of the fish sold on the spot, the average catch per boat, and the individual share of the crew.

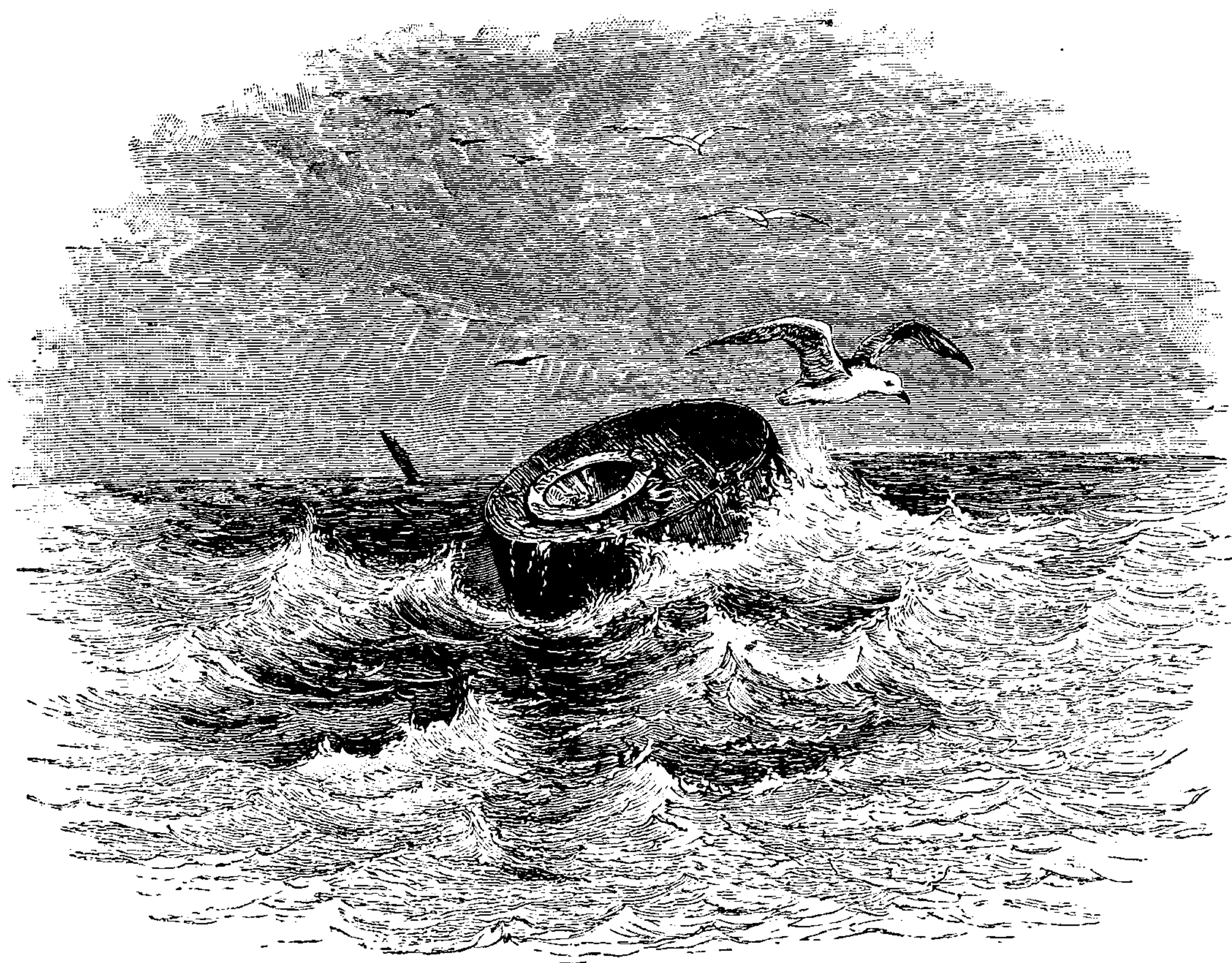
Fishing Districts.	Total number of Craft engaged during five years.	Annual average of Craft engaged.	Annual average of Crews engaged.	Annual average value of Fish sold on the spot, in 1,000 florins.	Average share of each Boat.	Individual share of each Man of the Crews.
Trieste	444	89	383	53	591	64
Rovigno	210	42	318	32	768	47
Pola	213	43	178	46	1,077	135
Lussinpiccolo	57	11	58	9	822	75
Fiume	212	42	180	49	1,167	133
Zara... ..	88	18	86	182	10,136	1,382
Spalato	160	32	138	26	800	90
TOTAL	1,384	277	1,331	397	1,433	166
Besides what is sold on the spot, fish is taken to Italy in their own boats, valued at ...	...	...	...	240	867	120
TOTAL	1,384	277	1,331	637	2,300	286

Average Annual Catch for Eight Years on the Hungarian-Croatian littoral.

	1,000 KILOGRS.	Comprising—	1,000 KILOGRS.
Fiume and Quarnero	522	Hake	125
Buccari	36	Pilchard*	123
Portoré	71	Tunny†	122
Segna (Zengg)	46	Whiting, Poor	79
Selce	86	Rays	37
Calopago	11	Norway Lobster	30
Jablanaz	4	Octopus	25
Stinizza	2	Mænidæ	20
TOTAL	778	Cuttle-fish	18
		Anglers	18
		Red Mullet... ..	18
		Mackerel	17

* 74 tons were taken at Selce.

† 34 tons at Buccari, 70 tons at Portoré, 9 tons at Segna, 10 tons at Selce.



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FAUNA OF THE ADRIATIC.

PART I.—LIST OF MAMMALIA.

Order—PINNIPEDIA.

Fam. PHOCINA.

Gen. PHOCA, L.

1. *PHOCA VITULINA*, L.

The common Seal.

Foca (*It.*).

Croat., Tuljan, nerpa, morsko tele.

Habit. Only single specimens are occasionally caught at Ragusa, but not further north; identity appears doubtful as regards these waters.

Gen. PELAGIUS, *Cuv.*

2. *PELAGIUS MONACHUS*, L.

Phoca monachus, L.

The Monk.

Foca (*It.*).

Habit. Frequents the reefs (*Scogli*) of the Dalmatian coast, where it is not uncommon; Bay of Carin.

Order—CETACEA.

Fam. DELPHINIDA.

Gen. DELPHINUS, L.

3. *DELPHINUS DELPHIS*, L.

The true Dolphin.

Delfino comune (*It.*).

Croat., Pliskavica, piskavica, dupin.

Habit. The most common sp. of its tribe in the Adriatic, appearing in chase of the shoals of mackerel and pilchards in summer.

4. *DELPHINUS TURSIO*, Fabr.

Croat., Velika pliskavica.

Habit. A rare sp. of the Adriatic; Civitanova.

5. *DELPHINUS RISSOANUS*, Laur.

Grampus griseus, *Cuv.* (?)

Habit. Only accidentally met with in the Adriatic; Chioggia, Zara.

Gen. PHYSETER, L.

6. *PHYSETER MACROCEPHALUS*, L.

Spermaceti Whale.

Fisetere (*It.*).

Croat., Ulješura.

Habit. Only accidentally met with in the Adriatic; Porto S. Giorgio.

7. *PHYSETER TURSIO*, L.

Habit. Not unfrequently met with in the Adriatic; sp. from the coasts of Istria and Dalmatia; Umago, Pago.

PART II.—LIST OF REPTILIA.

Order—CHELONIA.

Fam. CHELONIIDÆ—Sea-Turtles or Tortoises—*Schildkröten*.Gen. CHELONIA, *Brongn.*1. *CHELONIA MIDAS*, Schweigger.Chelonia albiventer, *Nardo (young)*.Tartaruga (*It.*).*Croat.*, Morska željva.*Habit.*—Only two specimens have hitherto been caught in the Adriatic.2. *CHELONIA CARETTA*, L.Testudo caretta, *Schneider*.Tartaruga de mar (*It.*).Galana, Gagiandra de mar (*Ven.*).*Croat.*, željva glavuša.*Hab.* Pretty general, and not uncommon; has been taken in the port of Trieste.3. *EMYS LUTARIA*, Mer.*Vulg.*, Bissa scudelera, Gagiandra, G lana, Codope (*Venice*).*Croat.*, željva muljača.*Habit.* Salt marshes of Venice.

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Quality. Flesh tough, and oily taste; only eaten by the very poor.

5. *ZYGÆNA TUDES*, Cuv.

Sfirna tiburo (*It.*).

Vulg., Pesce Pantofola (*Ven.*).

Intermediate sp. between *Z. malleus* and *Z. tiburo* (Heart-headed Shark); Bonap. doubts the validity of this sp.

Habit. Sp. from Venice; very rare.

Gen. IV. *MUSTELUS*, Cuv.

6. *MUSTELUS LÆVIS*, Risso.

Mustelus equestris, Bp.

Palombo nocciòlo (*It.*).

Vulg., Can, Cagnetto (*Ven.*).

Habit. More southern sp. than *M. vulgaris*, and rare in the north of the Adriatic; ground fish.

Quality. Flesh fairly good (No. 3).

7. *MUSTELUS VULGARIS*, M. & H.

Mustelus plebejus, Bp.

The Smooth Hound, Skate-toothed Shark, Stinkard, Ray-mouthed Dog.

Der Glatthai.

Palombo comune (*It.*).

Vulg., Pesce Can, Can bianco, Cagnetto (*Tr.*, *Fiume*, *Ven.*).

Can macchia, Can pontisà.

Can senza denti (*Ven.*).

Croat., Pas, Pas bulaš (*Spalato*).

Habit. General and common at all seasons; sp. from Trieste, Venice, Quarnero, Spalato.

Quality. Flesh inferior and little valued.

Fam. II. LAMNIDÆ.

Gen. I. *LAMNA*, Cuv.

8. *LAMNA CORNUBICA*, Gm.

Porbeagle, Beaumaris Shark.

Fouille-bœuf, Loutre, Taupe de mer, Squale Nez, Longnez.

Lamna smeriglio (*It.*).

Vulg., Cagnizza (*Tr.*).

Cao da oglio, Cavo d'ojo (*Ven.*, *Fiume*).

Cagnia (*Ven.*).

Habit. Rare; southern sp.

9. *LAMNA SPALLANZANII*, Bonap.

Der Nasenhai, Schnauzenhai.

Ossirino dello Spallanzani (*It.*).

Vulg., Cagnizza nasuta (*Tr.*).

Cagnia (*Ven.*).

Habit. Rare; Dalmatian coast.

Season. In the autumn, 1880, five large sp. were caught in Dalmatia.

Quality. Flesh little or no value.

Gen. II. *CARCHARODON*, M. & H.

10. *CARCHARODON RONDELETII*, M. & H.

The great Blue Shark.

Der Riesenhai, Menschenhai.

Carcharodonte del Rondelezio (*It.*).

Vulg., Cagnissa, Cagnissa vera (*Tr.*), Cagnia (*Ven.*).

Croat., Pasnica, Pas ženska. Kučina (*Spalato*).

Habit. Occasionally, but rarely, met with in the Adriatic; one was caught at Ustrine in September, 1879, measuring 5·30 mètres in length, one of the largest which has been caught in these waters.

Season. Summer.

Quality. Flesh uneatable.

Gen. III. *ODONTASPIS*, Ag.*

11. *ODONTASPIS FEROX*, Risso.

Triglochide feroce.

Vulg., Cagnia, Can da denti (*Ven.*).

Habit. Quite accidental in the Adriatic.

Quality. Flesh uneatable.

Gen. IV. *ALOPECIAS*, M. & H.

12. *ALOPIAS VULPES*, Gm.

The Fox Shark, Fox, Sea-Fox, the

* *Odontaspis taurus*. (See No. 353.)

Thrasher, or Thresher, Sea-Ape, Long-tailed Shark.

Le renard marin, Singe de mer, Squale renard.

Der Seefuchs, Fuchshai.

Alopias codalunga (*It.*).

Vulg., Volpe, Pesce Volpe, Pesce bandiera, Pesce spada (*Ven.*, *Tr.*, *Fiume*).

Croat., Riba lesica (*Croat. lit.*).

Lisica (*Spalato*).

Pas spadun (*Spalato*).

Habit. General, but rare; sp. from Venice, Rimini, Trieste.

Season. Summer.

Gen. V. SELACHE, *Cuv.*

13. *SELACHE MAXIMA*, *Cuv.*

The Basking Shark, Sun-fish, Sail-fish, Common Sail-fish.

Le Pélerin, Squale très-grand.

Selachio gigante (*It.*).

Vulg. Cagnia (*Ven.*).

Habit. Quite accidental in the Adriatic.

Fam. III. NOTIDANIDÆ.

Gen. I. NOTIDANUS, *Cuv.*

14. *NOTIDANUS GRISEUS*, *Cuv.*

The Grey Notidanus, Six-gilled Shark.

Le grisè, Squale grisè.

Der Rothbraunehai.

Notidano capo-piatto (*It.*).

Vulg., Pesce manzo (*Ven.*, *Tr.*, *Fiume*).

Gatton bruno (*Tr.*).

Cagnia, Can (*Ven.*).

Croat., Vol (*Croat. littoral*).

Volina (*Spalato*).

Habit. Rare; sp. from Venice, Rimini, Quarnero, Spalato.

Quality. Flesh white, but not good.

Season. Summer; at Spalato two large sp. were caught in the winter of 1880.

15. *NOTIDANUS CINEREUS*, *Raf.*

Heptanchus cinereus, *Raf.*

Le Perlon.

Der Grauhai.

Eptanco anciolo (*It.*).

Vulg., Gatton grigio (*Tr.*).

Cagnia Can (*Ven.*).

Habit. Rare; sp. from Trieste.

Quality. 3; flesh pretty good.

16. *NOTIDANUS BARBARUS*, *Chier.*

Notidano del Chiereghin (*It.*).

Vulg., Can barbaro (*Ven.*).

Habit. Very rare; sp. from Venice, Quarnero. Adriatic species.

Fam. IV. SCYLLIIDÆ.

Gen. I. SCYLLIUM, *Cuv.**

17. *SCYLLIUM CANICULA*, *L.*

The Rough Hound, the Spotted Dog-fish (*female*), Lesser Spotted Dog-fish (*male*), Spotted Shark, Robin Huss, Morgay.

La Squale rousette, Squale rochier.

Der Katzenhai, Seehundchen.

Scillio gattuccio (*It.*).

Vulg., Gatta (*Ven.*, *Tr.*, *Fiume*, *Cattaro*).

Gatta d'aspreo (*Ven.*, *Tr.*).

Gatta de Quarnero (*Ven.*).

Croat., Mačka, Mačak cèrni.

Habit. Common at all seasons all over the Adriatic; on muddy bottom and amongst *algæ* on the hunt after cuttle-fish.

Season. Spring and autumn.

Quality. Flesh has a disagreeable musky smell and oily taste; is tough and stringy; the skin is rough and is much used for polishing cabinet work.

18. *SCYLLIUM STELLARE*, *L.*

The Spotted Dog-fish, Large Spotted Dog-fish, Rock Dog-fish, Nurse-hound, Bounce, Cat-fish.

* *Scyllium acanthotum*. (See No. 354.)

Le Squale Roussette, Chat rochier.

Der Pantherhai.

Scillio gatto-pardo (*It.*).

Vulg., Gatta, Gatta schiava (*Tr.*, *Ven.*, *Fiume*).

Gatta nostrana (*Ven.*).

Croat., Mačak naški, Sužanj mačak, Mačka šargasta (*Spalato*).

Habit. Common in summer; frequents the open sea.

Quality. Flesh less disagreeable than that of the foregoing sp.; skin rougher and tougher, hence more serviceable for the cabinet-maker.

Gen. II. PRISTIURUS, *Bp.*

19. *PRISTIURUS MELANOSTOMUS*, *Bp.*

The Black-mouthed Dog-fish, Eyed Dog-fish.

Pristiuero boccanera (*It.*).

Habit. Very rare; common in the south of Italy.

Quality. 0; flesh uneatable.

Fam. V. SPINACIDÆ.

Gen. I. CENTRINA, *Cuv.*

20. *CENTRINA SALVIANI*, *Risso.*

Le Squale humantin.

Der Stachelhai.

Centrina porco (*It.*).

Vulg., Pesce porco, Pesce sorcio (*Tr.*, *Ven.*, *Fiume*).

Croat., Prasac, Riba prasac (*Croat. littoral*).

Prasac morski (*Spalato*).

Habit. Not uncommon in the Quarnero in summer; sp. from Venice, Trieste, Fiume, Spalato.

Quality. 0; oil used for healing burns; flesh indifferent.

Gen. II. ACANTHIAS, *M. & H.*

21. *ACANTHIAS VULGARIS*, *Risso.*

The Spiny Dog-fish, the Picked Dog-fish, Common Dog-fish, Hound-fish, Thorn-hound, Bone-dog, Picked Shark.

L'aiguillat.

Der Dornhai, Speerhai, Dornhund.

Spinarolo imperiale (*It.*).

Vulg., Asià, Asiar, Asial (*Tr.*, *Ven.*, *Fiume*, *Cattaro*).

Pesce Can-spinarol (*Fiume*).

Croat., Košćerin. Kostelj (*Spalato*).

Habit. Common at all seasons.

Season. Best for eating in the winter months.

Quality. 3; best of all the sharks.

22. *ACANTHIAS BLAINVILLII*, *Risso.*

Spiny Dog-fish.

Spinarolo comune (*It.*).

Vulg., same as foregoing sp.

Croat., same as foregoing sp.

Pas, Kostelj vlastelin (*Spalato*).

Habit. Not as common as, and hardly distinct from, the foregoing species.

Season. Autumn, March.

Quality. Inferior to foregoing species, for which it is generally sold.

Gen. III. SPINAX, *M. & H.*

23. *SPINAX NIGER*, *Bp.*

Le Sagre.

Sagri moretto (*It.*).

Habit. Dalmatian coast in depths of 4—500 fathoms; very rare; does not exceed fourteen inches in length.

Gen. IV. ECHINORHINUS, *Bl.*

24. *ECHINORHINUS SPINOSUS*, *L.*

The Spinous Shark.

Squale bouclé.

Ronco spinoso (*It.*).

Habit. Quite accidental; Venice.

Fam. VI. RHINIDÆ.

Gen. I. RHINA, *Klein.*

25. *RHINA SQUATINA*, *L.*

The Angel-fish, Angel Shark, Monk, Monk-fish, Shark Ray.

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31. *RAJA MACULATA*, Mont.Raja batis, *Bp.*The Homelyn Ray, Fuller Ray, Spotted
or Painted Sand-Ray.

Der gefleckte Rochen.

Dornrochen.

Razza macchiettata (*It.*).*Vulg.*, Rasa.*Habit.* Rare sp. of the Adriatic; sp. from
Venice, Trieste.*Note.* Identity confused.32. *RAJA PUNCTATA*, Risso.Dasybatis asterias, *Bp.*

Der punctirte Rochen, Sternrochen.

Arzilla rossina (*It.*).*Vulg.*, Rasa (*Tr.*, *Ven.*, *Fiume*).Rasetta, Baràcola, Baràcola bianca, Barà-
cola alba (*Ven.*).Baracoletta (*Fiume*).*Croat.*, Barakulica, Polig bieli. Ražica
(*Spalato*).*Habit.* Common at all seasons.*Quality.* 3.33. *RAJA ASTERIAS*, M. & H.Hardly distinct from the foregoing sp.; Canes-
trini cites it as synonymous with *R. maculata*
Montagu.*Habit.* Venice.34. *RAJA FULLONICA*, L.

The Shagreen Ray.

Arzilla scardasso (*It.*).*Vulg.*, Rasetta, Baracola (*Ven.*).*Habit.* Rare; Venice.*Quality.* 3.35. *RAJA ASPERA*, *Bp.**Vulg.*, Rasa (*Tr.*).Baracola vera (*Ven.*).*Habit.* Venice, Trieste; common in summer.*Quality.* 3.*Note.* Canestrini doubts the identity of this sp.
with the figure described by *Bp.*; represented
in the Trieste Museum.36. *RAJA MIRALETUS*, L.

Der zweifleckige Rochen.

Das Vierauege.

Razza baraccola (*It.*).*Vulg.*, Quattro occhi, quattr' occhi (*Tr.*,
Ven., *Fiume*), Baosa, Scarparo, (*Ven.*).*Croat.*, četiri oči. Barakula (*Spalato*).*Habit.* Common at all seasons.*Quality.* 2.37. *RAJA RADULA*, Delar.The Sandy Ray (*Yarrow*).The Cuckoo Ray (*Yarrow*).Razza scuffina (*It.*).*Vulg.*, Rasa.*Habit.* Only accidentally met with in the
Adriatic; frequents the southern waters; sp.
from Trieste.*Quality.* 3.*Note.* Almost identical with the *R. circularis*
of Couch. (*See Note, No. 41.*)38. *RAJA MARGINATA*, Lac.

The Bordered Ray.

Raie petit museau.

Der Randrochen.

Razza marginata (*It.*).*Vulg.*, Rasa (*Tr.*, *Fiume*).Baracoletta (*Ven.*, *Fiume*).Bavosa, Baosa (*Ven.*).*Croat.*, Buča. Volinica (*Spalato*).*Habit.* More or less throughout the Adriatic;
not very common.*Season.* Always.*Quality.* 3.39. *RAJA MACRORHYNCHUS*, *Bp.*

Der dickschnauzige Rochen.

Razza bavosa (*It.*).*Vulg.*, Rasa, Bavosa (*Tr.*, *Ven.*, *Fiume*).

- Moro (*Tr.*).
 Rasa di sabbia (*Fiume*).
Croat., Klinka. Volina (*Spalato*).
Habit. Common all the year round.
Quality. 3.
40. *RAJA OXYRHYNCHUS*, L.
 The Burton Skate.
 Der Schlammrochen.
 Der spitzschnauzige Rochen.
 Die Spitzchnauze.
 Razza monaca (*It.*).
Vulg., Bavosa, Baosa (*Tr.*, *Ven.*, *Fiume*).
Croat., Volina. Klinka (*Spalato*).
Habit. More or less common all the year round,
 throughout the Adriatic.
Quality. 3.
41. *RAJA QUADRIMACULATA*, Risso.
Raja circularis, Couch.(?)
Raja miraletus, Couch.(?)
 The Sandy Ray, Couch.(?)
 The Cuckoo Ray, Couch.(?)
 Der vierfleckige Rochen.
 Razza quattrocchi (*It.*).
Note. Identity hardly confirmed; in any case a
 very rare species in these waters. Prof.
 Kolombatović has met with it at Spalato.
 Couch distinguishes his *R. circularis* or Sandy
 Ray, from his *R. miraletus* or Cuckoo Ray,
 whereas Günther cites the two sp. as identical.
 Nos. 36, 37, and 41 are very similar.
- Fam. III. TRYGONIDÆ.
 Gen. I. TRYGON, *Adanson*.
42. *TRYGON THALASSIA*, Column.
Trigone talassia (*It.*).
Croat., šiba. Velik sunj (*Spalato*).
Habit. An Adriatic species, though rare; speci-
 mens from Spalato.
43. *TRYGON BRUCCO*, Bp.
Trygone brucco (*It.*).
Vulg., Matan (*Tr.*).

- Croat.*, Buča. Sunj (*Spalato*).
Habit. Pretty common at all seasons, frequents
 muddy bottoms at the mouths of rivers, and
 in the lagoons.
Quality. 3.
44. *TRYGON PASTINACA*, L.
 The Sting Ray, Fire-Flare, Fiery-Flaw,
 Common Trygon.
 La Pastinaque.
 Der Stechrochen.
 Der Pfeilschwanz.
Trigone pastinaca (*It.*).
Vulg., Matàn, Matana, also (by misapplica-
 tion) Pesce Colombo (*Tr.*, *Fiume*, *Ven.*).
 Colombo (*Cattaro*).
 Muccio, Mucchio, Baracola (*Ven.*).
Croat., as above. Viža, žutulja (*Spalato*).
Habit. As above, but much more common than
 the foregoing sp.
Quality. 3.

Gen. II. PTEROPLATEA, *M. & H.*

45. *PTEROPLATEA ALTAVELA*, L.
Pteroplatea altavela (*It.*).
 Altavela (*Naples*), Altavida, Altavila, Tavila
 (*Sicily*).
Croat., Pazdrk (*Spalato*).
Habit. A species of Neapolitan and Sicilian
 waters, which has been met with in the Gulf of
 Venice, and seems to be indigenous to a
scoglio in the Canale delle Castella, Spalato,
 where two specimens were caught in August,
 September, 1880. It has also been caught at
 Zara.
Season. January, August, September.
Quality. 3.

Fam. IV. MYLIOBATIDÆ.

Gen. I. MYLIOBATIS, *Cuv.*

46. *MYLIOBATIS AQUILA*, L.
 The Whip-Ray, Eagle Ray, Devil-fish, Sea-
 Devil, Toad-fish, Sea-Eagle.

Raie aigle.

Der Adlerrochen.

Miliobate aquila (*It.*).

Vulg., Colombo, Pesce Colombo, also (by misapplication), Matàn (*Tr.*, *Ven.*, *Fiume*), Colombo di Mar (*Fiume*).

Croat., Golub, Golubmorski (*Croat. littoral*), žutulja, Kosir (*Spalato*).

Habit. Common at all seasons, more particularly small ones. The adults are rare.

Quality. 3.

47. *MYLIOBATIS NOCTULA*, Bp.

Der Eulenrochen.

Die Meer Eule.

Miliobate nottola (*It.*).

Vulg., Colombo vescovo (*Tr.*, *Ven.*, *Fiume*).

Vladika (*Cattaro*).

Croat., Golub, Biškup, šiba (*Croat. littoral*),

Golub (*Spalato*), Vladika (*Cattaro*).

Habit. As above, but more common.

Quality. 3.

Gen. II. RHINOPTERA, *Kuhl.*

48. *RHINOPTERA MARGINATA*, Cuv.

Habit. Coast of Dalmatia; rarely met with.

Gen. III. DICEROBATIS, *Blainv.*

49. *DICEROBATIS GIORNÆ*, Lac.

Cephaloptera Giorna, *Cuv.*

The Ox Ray, Horned Ray, Devil-fish, Sea-Devil.

Habit. Accidental in the Adriatic; sp. from Trieste.

Quality. 0.

Order—GANOIDEI.

Sub-Order—CHONDROSTEI. Sturgeons.

Fam.—ACIPENSERIDÆ.

Gen. ACIPENSER, *Art.*

50. *ACIPENSER NACCARI*, Bp.

The Adriatic Sturgeon.

L'Esturgeon.

Der Adriatische Stör.

Storione cobice (*It.*).

Vulg., Coppèse (*Tr.*, *Fiume*).

Còpese (*Ven.*).

Sporcella (*Tr.*).

Croat., štirium.

Habit. A species confined to the Adriatic; inhabits the rivers Pô, Isonzo, and other water-courses of the Gulfs of Venice and Trieste;* frequents also the lagoons of Venice in autumn.

Season. March, April, November, December; more or less common at all seasons.

Quality. Flesh inferior to that of the common Sturgeon.

51. *ACIPENSER NARDOI*, Heck.

Described by Heckel as a distinct sp., but Günther cites it as synonymous with the foregoing sp. (*See Catalogue of Fishes in the British Museum, Vol. VIII. page 336.*)

Nomenclature and remarks as above apply equally to this sp.; the two species are generally sold together.

52. *ACIPENSER NASUS*, Heck.

The specimen described by Heckel was 26 in. long (Heck. and Kner, "Süsswasserf.," p. 360). Prof. Brandt rejects this and other sp. established by Heckel (Bull. Ac. Sc. St. Petersburg, 1869, p. 171), and considers this sp. as synonymous with *A. naccarii*. (*See*

* Has been caught in the rivers Brenta, Adige, Piave, Livenza, Bacchiglione and Tagliamento.

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Gen. II. LABRAX, C. & V.

57. *LABRAX LUPUS*, Cuv.

The Basse, Common Basse.

Le Loup, Loubine.

Der Seebarsch, Wolfsbarsch, Gemeiner Wolfsbarsch.

Labrace, Spigula ragno (*It.*).*Vulg.*, Branzin (*Ven.*, *Tr.*, *Fiume*, *Cattaro*).Varolo, Variolo (*Ven.*).Ragno (*Tuscany*).Baicolo (*when young*) (*Ven.*, *Tr.*, *Fiume*).*Croat.*, Luben, Lubin, Lubanj, Ljubljaj, Smudut, Agača.*Habit.* General, all over the Adriatic; enters the brackish waters and mouths of rivers.*Season.* Common all the year round; best in autumn.*Quality.* 1.

Gen. III. LUCIOPERCA, Cuv.

58. *LUCIOPERCA SANDRA*, Cuv.

The Pike-perch.

Le Sandre.

Der Sander, Zander, Sandbarsch, Hechtbarsch, Schiel, Schill.

Lucioperca sandra (*It.*).*Hungarian*, Fogas (*mature*), Süllö (*young*).*Croat.*, Smudj, šilj.*Habit.* Has a northern extension; its southernmost limits are the rivers Isonzo and Adige.*Quality.* 1.

Gen. IV. CENTROPRISTIS, C. & V.

59. *CENTROPRISTIS HEPATUS*, Gm.*Serranus hepatus*, C. & V.

Le Serran.

Der Beutelbarsch.

Schiarrano sacchetto (*It.*).*Vulg.*, Sacchetto (*Ven.*, *Tr.*, *Fiume*).*Croat.*, Pinzulić, Sanketice (*Croat. littoral*).Vučić, čučina (*Spalato*).*Habit.* General; throughout the Adriatic.*Season.* Always common.*Quality.* 3; *Minutaja* (mixed fish).

Gen. V. ANTHIAS, Schn.

60. *ANTHIAS SACER*, Bl.

Le Barbier.

Der Röhling.

Canario largo (*It.*).*Croat.*, Kirnjavelika. Kirnja mala (*Spalato*).*Habit.* Dalmatia, Lissa, Comisa.*Season.* May, September, November. Very rare.*Quality.* 3.

Gen. VI. SERRANUS, Cuv.*

(Sea-Perches proper.)

61. *SERRANUS SCRIBA*, C. & V.

Der Schriftbarsch, Buchstabenbarsch.

Sciarrano scrittura (*It.*).*Vulg.*, Perga, Sperga, Merlo di mar (*Tr.*).Sperga, Perga, Merlo di mar, Donzela, Papagà (*Ven.*).Perha (*Fiume*).*Croat.*, Lenica, Smokvača, Kanjac. Pirka (*Spalato*).*Habit.* General; Venice, Trieste, Quarnero.*Season.* Always common.*Quality.* 2.62. *SERRANUS CABRILLA*, C. & V.

The Comber, the Smooth Serranus.

Der Sagebarsch.

Sciarrano cabrilla (*It.*).*Vulg.*, Perga dalmata, Cánissi, Cánizzi (*Tr.*).Perha (*Fiume*).Sperga, Donzella, Cortesan de caorle, Schiavon, Cràgnizi (*Ven.*).*Croat.*, Pirka (*Dalmatia*).Kanjac (*Spalato*).*Habit.* Eastern shores of the Adriatic; frequents the deep on sandy bottoms.*Season.* Spring, autumn; common.*Quality.* 2.* *Serranus acutirostris*. (See No. 356.)

63. *SERRANUS GIGAS*, C. & V.
The Dusky Serranus, or Dusky Perch.
Le Méron.
Der braune Serran, grosser Sägebarsch.
Sciarrano gigante (*It.*).
Vulg., Chierna (*Tr.*, *Cattaro*), Cherne (*Fiume*).

Croat., Kerna, Kirnja prava. Kraja (*Spalato*).

Habit. An Atlantic sp.; Trieste, Fiume, Spalato; frequents deep water on rocky beds.

Season. Winter; occasional; common at Spalato, where it attains to a weight of 18 kilos.

Quality. 1.

Gen. VII. POLYPRION, C. & V.

64. *POLYPRION CERNIUM*, Cuv.
The Stone-Basse, Wreck-fish, Couch's Polyprion.

Die gefleckte Vielsäge.

Cerniola (*It.*).

- *Vulg.*, Scarpena di sasso (?), Scarpena salvatico (?) (*Ven.*, *Tr.*).

Habit. A northern species, frequenting depths of 500 fathoms; Cherso, Fiume, Spalato.

Season. Very rare; March, May, August.

Quality. 1.

Gen. VIII. APOGON, Lac.

65. *APOGON IMBERBIS*, L.

Apogon rex mullorum, Cuv.

Apogone (*It.*).

Croat., Kirnja mala. Matulić (*Spalato*).

Habit. South of Dalmatia, Spalato; in deep waters.

Season. Very rare; not uncommon at Spalato in winter.

Gen. IX. DENTEX, Cuv.*

66. *DENTEX VULGARIS*, C. & V.

The Sparus, Dentex, Toothed Gilthead, Four-toothed Sparus.

Spare dentée.

Der Zahnbrassen.

Dentale comune (*It.*). .

Vulg., Dental (*Ven.*, *Tr.*, *Fiume*).

Croat., Zubac, Zubatac.

Habit. General.

Season. Always; chiefly autumn; common.

Quality. 1.

- DENTEX GIBBOSUS*, Cocco.

Abnormity of the foregoing sp.

Vulg., Dentale della corona (*Sebenico*).

Croat., Zubatac od krune, Zubatac krunaš.

Habit. Sebenico.

Season. October.

Quality. 1.

Gen. X. MÆNA, Cuv.

67. *MÆNA VULGARIS*, C. & V.

Mendole, Cackarel. La spare Mendole.

Der Laxirfisch.

Menola comune (*It.*).

Vulg., Menola schiava (*Tr.*, *Fiume*).

Menola, M. chiava, Pontio (*Ven.*).

Croat., Modrak, Modraš, Trog, Gira.

Gira oblica (*Spalato*).

Habit. General.

Season. Common in summer and autumn.

Quality. 3.

68. *MÆNA JUSCULUM*, C. & V.

Menola schiava (*It.*).

Habit. Venice.

Season. Rare; autumn.

Quality. 3.

69. *MÆNA ZEBRA*, Brünn.

Mæna Osbeckii, C. & V.

Menola zebra (*It.*).

Vulg., Menola schiava, Bufalo de aspreo, Sparo bastardo (*Ven.*).

Habit. General; chiefly in southern waters.

Season. May, September; common.

Quality. 3.

* *Dentex filosus* and *Dentex macrophthalmus*. (See Nos. 357, 358.)

Gen. XI. SMARIS, *Cuv.*70. *SMARIS VULGARIS*, C. & V.

Der weisse •Schauzenbrassen, gemeiner Picarel.

Menola zeroło (*It.*).

Vulg., Menola, Marida, Maridola (*Tr.*, *Ven.*, *Fiume*).

Menoloto, Ghirsa, Garizzo, Menola bianca (*Ven.*).

Croat., Oblica biela, Mendula biela, Milvica (?), Oštruja, Cicavica. Oštruja (*female*), Pèrč (*male*) (*Spalato*).

Habit. General.

Season. Common in summer.

Quality. 3.

71. *SMARIS ALCEDO*, C. & V.

Menola alcedine (*It.*).

Vulg., Menola (*Tr.*, *Ven.*), Garizzo (*Ven.*).

Croat., Oblica.

Modrulj (*Spalato*).

Habit. General.

Season. February, May; not so common as the foregoing sp.

Quality. 3.

72. *SMARIS MAURII*, Bp.

Menola del Mauri (*It.*).

Vulg., Menola (*Tr.*, *Ven.*, *Spalato*).

Habit. Trieste, Venice, Spalato.

Season. August, October; rare.

Quality. 3.

73. *SMARIS GRACILIS*, Bp.

Menola gracile (*It.*).

Vulg., Agon or Agone d'Istria, Maridola (*Ven.*, *Fiume*).

Croat., Oliga.

Habit. Has a southern extension.

Season. April, May, February, September; rare.

Quality. 3; best of the genus.

Fam. II. MULLIDÆ—Red Mulletts.

Gen. MULLUS, *L.*74. *MULLUS BARBATUS*, *L.*

The Red Mullet, or Surmullet.

Le Mulle Rouget, le Rouge Barbet.

Die rothe Meerbarbe, der Rothbart.

Triglia minore (*It.*).

Vulg., Barbon (*Ven.*, *Tr.*, *Fiume*, *Cattaro*).

Cavazioi (young) (*Ven.*).

Croat., Barbun, Trlja, Bèrkavica.

Pujoglavica (*Spalato*).

Habit. General.

Season. Always common; best in March, April, August, September, December.

Quality. 1.

75. *MULLUS SURMULETUS*, *L.*

The Striped Surmullet.

Le Surmullet.

Die gestreifte Meerbarbe.

Der grosse Rothbart.

Triglia maggiore (*It.*).

Vulg., Triglia, Tria (*Ven.*, *Tr.*, *Fiume*, *Cattaro*).

Barbon de nassa (*Fiume*).

Croat., Trlja. Sgrčenice (*Spalato*).

Habit. General.

Season. Always common; best in January, March, October, September. Probably not a distinct species, but the female of the preceding.

Quality. 1.

Fam. III. SPARIDÆ—Sea Breams.

Group I. *Cantharina*.Gen. I. CANTHARUS, *Cuv.*76. *CANTHARUS VULGARIS*, C. & V.

The Sea Bream, Old-Wife, the Black Bream.

La Sarde Grise.

Der braune Brassen.

Cantaro comune (*It.*).

Vulg., Cantera, Cantara (*Tr.*, *Ven.*, *Fiume*).

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84. *SARGUS ANNULARIS*, L.
Der kleine Geissbrassen.
Sargo annulare (*It.*).
Vulg., Sparo, Sparetto (*Tr.*, *Fiume*, *Cat.*).
Sparo, Sparolo (*Ven.*).
Croat., špar.
Habit. General.
Season. Common in summer; best in Sept.
Quality. 2.
- Gen. V. CHARAX, *Risso.*
85. *CHARAX PUNTAZZO*, C. & V.
Puntazzo.
Der schwarzgebändete Brassen.
Carace acuto (*It.*).
Vulg., Spizzo, Spizzo bastardo (*Tr.*).
Sargo d'Istria (*Ven.*).
Pesce morti, Magna morti (*Fiume*).
Croat., Pič.
Habit. General.
Season. Autumn and winter; common.
Quality. 3.
- Group III. *Pagrina.*
- Gen. VI. PAGRUS, *Cuv.**
86. *PAGRUS VULGARIS*, C. & V.
The Braize or Becker, Pandora, King of the Sea Bream.
Der rothliche Goldbrassen, der grosse Rothbrassen.
Pagro vulgare (*It.*).
Vulg., Pagaro, Tabaro, Sparo d'Istria, Alboro pagnesco (*generic term*) (*Ven.*).
Cantarella (*Tr.*).
Croat., Pagar, Pagrun.
Habit. General, but scarce.
Season. May, June, October.
Quality. 1.
87. *PAGRUS ORPHUS*, C. & V.
Couch's Sea Bream.

Le pagre Orphe.
Note.—A very rare sp.

Gen. VII. PAGELLUS, C. & V.

88. *PAGELLUS ERYTHRINUS*, C. & V.
The Erythrinus, the Red, or Spanish Sea Bream.
Der rothe Goldbrassen, der kleine Rothbrassen.
Pagello fragolino (*It.*).
Vulg., Ribon, Ribone (*Tr.*).
Arboro (*Fiume*, *Cattaro*).
Madagia, Madagiola, Arboro, Alboro, Alboretto (*Ven.*).
Croat., Arbun.
Habit. General and common.
Season. Most common in September; best in March and May.
Quality. 1.
89. *PAGELLUS CENTRODONTUS*, C. & V.
The common Sea Bream, the Sharp-toothed Sea Bream, the Red Gilt-head.
Pagello rosso (*It.*).
Habit. A southern species; Dalmatia, Venice; Rarely met with in the north of the gulf.
90. *PAGELLUS BOGARAVEO*, C. & V.
Pagello bogaraveo (*It.*).
Croat., Grbić (*Spalato*).
Habit. General, but scarce, on rocky beds.
91. *PAGELLUS MORMYRUS*, C. & V.
Der Marmorbrassen.
Pagello mormora (*It.*).
Vulg., Mormoro, Mormiro, Mormora* (*Tr.*, *Ven.*, *Fiume*).
Croat., Ovca (*Croat. littoral*).

* *Pagrus Ehrenbergii*. (See No. 360.)

* Not to be confused with *Gadus minutus*, which is also known by this name.

Arkaj, Ovčica (*Spalato*).

Habit. General, but scarce; common at Spalato at all seasons.

Quality. 2.

PAGELLUS ACARNE, Cuv.

Questionable as belonging to the Adriatic fauna; at any rate very rare. (*See* No. 361.)

Gen. VIII. CHRYSOPHRYS, Cuv.

92. *CHRYSOPHRYS AURATA*, C. & V.

The Gilt-head. Spare Dorade.

Der gemeine Goldbrassen.

Orada comune (*It.*).

Vulg., Orada, Dorada.

Croat., Ovrata, Lovrata, Lovratica, Podlanica.

Komarča (*Spalato*).

Habit. General and common.

Season. Most common in summer and autumn.

Quality. 1.

Fam. IV. SCORPÆNIDÆ—Scorpions.

Gen. I. SEBASTES, C. & V.

93. *SEBASTES IMPERIALIS*, C. & V.

Sebastes dactylopterus, *De la Roche*.

Sebaste imperiale (*It.*).

Vulg., Scorfano de funnale (*Naples*).

Habit. General, but very scarce; Dalmatia, Cherso, Trieste; inhabits great depths.

Gen. II. SCORPÆNA, *Arledi*.

94. *SCORPÆNA PORCUS*, L.

Der kleine, oder braune Drachenkopf.

Scorpena nera (*It.*).

Vulg., Scarpena, Scarpena negra, Scarpon (*Tr.*, *Ven.*, *Fiume*, *Cat.*).

Croat., Cèrni škarpoč.

Cèrna škarpena (*Fiume* and *littoral*).

škarpun, bodeljka (*Spalato*).

Habit. General and common.

Season. Always; particularly April to June, September and October.

Quality. 2.

95. *SCORPÆNA SCROFA*, L.

Der grosse Drachenkopf.

Der rothe Drachenkopf.

Scorpena rossa (*It.*).

Vulg., Scarpena, Scarpena di sasso (*Tr.*, *Fiume*).

Scarpena rossa (*Ven.*).

Croat., Cèrveni škarpoč, cèrjena škarpena (*Croat. littoral*).

škarpina, bodeljka (*Spalato*).

Habit., *Season*, and *Quality.* Same as the foregoing sp.

Fam. V. SCIÆNIDÆ—Meagres.

Gen. I. UMBRINA, Cuv.

96. *UMBRINA CIRRHOSA*, L.

The Umbrina.

L'Ombre.

Der Bart-umber.

Ombrina corvo (*It.*).

Vulg., Corbo (*Tr.*, *Ven.*, *Fiume*).

Ombrella, Corbel* (*Tr.*).

Corbetto, Ombrela (*Ven.*).

Croat., Kurben, Kurbeš (*Fiume*), Havba (*Croat. littoral*).

Kèrb, Grb, Crnelj (*Spalato*).

Habit. General and common; brackish waters.

Season. Spring and summer.

Quality. 2.

Gen. II. SCIÆNA, *Art.*

97. *SCIÆNA AQUILA*, Lac.

The Maigre, Meagre, Shade-fish.

Le Maigre, Poisson royal.

* Nardo applies the name *Ombrella* to the young, and *Corbo* to the mature sp.

Der Seeadler.

Sciena aquila (*It.*).

Vulg., Ombra, Ombria (*Ven.*).

Croat., Grb. Kèrb (*Spalato*).

Habit. General; brackish waters, mouths of rivers; Venice.

Season. April; rare.

Quality. 2.

Gen. III. CORVINA, *Cuv.*

98. *CORVINA NIGRA*, *Cuv.*

Sciæna umbra, *L.*

Le Corbeau.

Der schwarze Schattenfisch.

Corvina locca, Corvo di fortiera (*It.*).

Vulg., Corbo di sasso (*Ven.*, *Fiume*).

Corbel, Corbel di sasso, Ombrella (*Tr.*).

Ombrela (*Ven.*).

Cavalla.

Croat., Kurben, Kurbeš, Kurben od kamenâ (*Croat. littoral*).

Kavala (*Spalato*).

Habit., *Season*, *Quality.* Same as the Umbrina.

Fam. VI. XIPHIIDÆ—Sword-fishes.

Gen. I. XIPHIAS, *Art.*

99. *XIPHIAS GLADIUS*, *L.*

The Sword-fish, the common or Sicilian Sword-fish.

Espadon.

Der gemeine Schwertfisch.

Pesce Spada (*It.*).

Vulg., Pesce Spada (*Tr.*, *Ven.*, *Fiume*, *Cat.*), Spadon (*Tr.*, *Ven.*).

Croat., Riba sablja, Jaglun, Obična sablja (*Croat. littoral*).

Habit. General, but rare in the north.

Season. June, August, September.

Quality. 2.

Gen. II. HISTIOPHORUS, *Lac.*

100. *HISTIOPHORUS BELONE*, *C. & V.*

Tetrapterus belone, *Raf.*

Tetrapturo muso corto (*It.*).

Vulg., Acura imperiale (*Taranto*).

Croat., Jaglun (*Spalato*).

Habit. Very rarely met with; is occasionally caught at Spalato at all seasons of the year; Canale delle Castella.

Fam. VII. TRICHIURIDÆ.*

Gen. I. LEPIDOPUS, *Gouan.*

101. *LEPIDOPUS CAUDATUS*, *Euphr.*

Trichiurus ensiformis, *Vand.*

The Scabbard-fish, Scale-foot.

Der Degenfisch.

Lepidopo argentino (*It.*).

Vulg., Spada argentina (*Tr.*, *Fiume*).

Arzentin, Serpentin, Spada arzentina, Spada di arzento (*Ven.*).

Croat., Riba sablja, Zmijčnjak (*Croat. littoral*).

Zmijicà morska (*Spalato*).

Habit. General, but very rare; Venice, Zaole, Trieste, Spalato.

Gen. II. TRICHIURUS, *L.*

102. *TRICHIURUS LEPTURUS*, *L.*

The Hair-tail, Silvery Hair-tail, Blade-fish.

Habit. Quite accidental; a sp. is in the Trieste Museum, caught off the Dalmatian coast.

Fam. VIII. CARANGIDÆ.†

Gen. I. TRACHURUS, *C. & V.*

103. *TRACHURUS TRACHURUS*, *L.*

Scomber Trachurus, *L.*

Caranx Trachurus, *C. & V.*

* *Thyrsites pretiosus.* (See No. 362.)

† *Temnodon saltator.* (See No. 363.)

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Caprisco aspro (*It.*).

Vulg., Tariolo (*Sicily*).

Habit. Fiume, Spalato; very rare.

Fam. IX. CYTTIDÆ—John Dorys.

Gen. ZEUS, *Art.*

111. ZEUS FABER, L.

The Dory, John Dory.

Dorée, Poule de mer. Zée forgeron. Janitor

(*Latin*) the door-keeper, *i.e.*, Saint Peter.

Der gemeine Sonnenfisch oder Spiegelfisch.

Pesce San Pietro (*It.*).

Vulg., Sanpiero, Pesce Sanpiero (*Tr.*, *Ven.*,
Fiume, *Cat.*).

Croat., Petar (*Croat. littoral*).

Kovač (*Spalato*).

Habit. General and common.

Season. Always.

Quality. 2.

112. ZEUS PUNGIO, C. & V.

Habit. Dalmatia.

Remark. Considered by many authors to be identical with the foregoing species.

Fam. X. STROMATEIDÆ—Black-fish.

Gen. I. STROMATEUS, *Art.*

113. STROMATEUS FIATOLA, L.

Der gemeine Pampel oder Deckfisch.

Lampuga dorata (*It.*).

Vulg., Figo (*Tr.*, *Fiume*, *Cat.*).

Pesce figa (*Ven.*).

Croat., Smokvača, Piška od mora (*Croat. littoral*).

Smokva (*Spalato*).

Habit. General and not uncommon.

Season. Summer.

Quality. 3.

114. STROMATEUS MICROCHIRUS, Bp.

Der gestreifte Pampel oder Deckfisch.

Lampuga fasciata (*It.*).

Vulg., Figo (*Tr.*, *Fiume*, *Cat.*).

Pesce figa (*Ven.*).

Habit, Season, Quality. As the foregoing sp.

Gen. II. CENTROLOPHUS, *Lac.*

115. CENTROLOPHUS POMPILUS, C. & V.

The Black-fish, Black Ruffe, Black Perch, Pompilus.

Merle, Serran de Provence.

Holocentre noir.

Centrolofo pompilo (*It.*).

Vulg., Figa (*Tr.*).

Fanfano (*Ven.*).

Habit. Brackish waters, mouths of rivers, lagoons of Venice; Dalmatia, Trieste.

Season. July, August; rare.

Quality. 3.

116. CENTROLOPHUS CRASSUS, C. & V.

Centrolofo grosso (*It.*).

Season. April; very rare.

Fam. XI. CORYPHÆNIDÆ—Dolphins.*

Gen. I. CORYPHÆNA, *Art.*

117. CORYPHÆNA HIPPURUS, L.

Dolphin, by misapplication.

Corifena cavallina (*It.*).

Vulg., Cataluzzo (*Tr.*).

Croat., Lančeska (*Croat. littoral*).

Habit. General, but rare.

Season. Single specimens sometimes caught in June, July, August.

Quality. 2.

118. CORYPHÆNA PELAGICA, L.

Habit. Trieste; very rare; summer.

Gen. II. BRAMA, *Risso.*

119. BRAMA RAII, Bl. & Schn.

Ray's Sea-bream, Rayan Gilt-head, Ray's Toothed Gilt-head.

Spare castagnole.

* *Schedophilus Botteri.* (See No. 364.)

Der gemeine Bramen.
 Der Seebrassen des Ray.
 Brama occhiuta (*It.*).
Vulg., Cataluzzo, Castagnola (*Tr.*).
 Ociada bastarda, Nodola (*Ven.*).
Croat., Lančeska.

Habit. Dalmatia, Trieste; a rare sp.

Season. Summer.

Quality. 1.

Gen. III. AUSONIA, *Risso.*

120. *AUSONIA CUVIERI*, *Risso.*

Luvarus imperialis, *Raf.*

Der Hahnenfisch.

Ausonia del Cuvier (*It.*).

Vulg., Pesce Gallo (*Tr.*).

Remark. A very rare sp.; occasionally caught in the Gulf of Trieste; has been caught at Spalato.

Fam. XII. SCOMBRIDÆ.

Gen. I. SCOMBER, *Art.*

121. *SCOMBER SCOMBER*, *L.*

The common Mackerel.

Le Macquereau.

Die gemeine Makreele.

Scombro comune (*It.*).

Vulg., *Scombro* (*Tr.*, *Fiume*, *Cattaro*).

Sgombro, *Garzariol (young)* (*Ven.*).

Pesce blu (family term).

Croat., *Lokarda*, *Skuša*, *Skuš*, *Vèrnut* (*Croat. littoral*).

Golčić (young).

Skuša, *Sguša pastrica* (*Spalato*).

Habit. General and common.

Season. April to October.

Quality. 1.

122. *SCOMBER PNEUMATOPHORUS*,

Delar.

Die grossäugige oder blasentragende Makreele.

Vulg., *Lanzardo* (*Tr.*).

Garzariola (*Ven.*).

Remarks. On the authority of *Bp.*, *Grube*, *Plucar*, *Canestrini* requires confirmation; at all events only occasional.

123. *SCOMBER COLIAS*, *L.*

The Spanish or Coly Mackerel.

Die mittellandische Makreele.

Scombro macchiato (*It.*).

Vulg., *Lanzardo* (*Tr.*, *Ven.*, *Fiume*, *Cat.*).

Croat., *Plavica* (*Croat. littoral*).

Lokarda, *Skuša bilica* (*Spalato*).

Habit. General, but rare; common at Spalato.

Season. July to September.

Quality. 2; inferior to the common mackerel.

Gen. II. THYNNUS, *C. & V.*

124. *THYNNUS VULGARIS*, *C. & V.*

Scomber Thynnus, *L.*

The common Tunny.

Scombres Thon.

Der gemeine Thunfisch.

Tonno comune (*It.*).

Vulg., *Ton*, *Pesce Ton*, *Tonina* (*Tr.*, *Ven.*, *Fiume*, *Cattaro*).

Pompilo, *Pompin*, *Trompeto*, *Trompilo*, *Trompin* (*Ven.*).

Croat., *Tuna*, *Tun*, *Tunina* (*Croat. littoral*).

Tunj, *Trup ili tunj* (*Spalato*).

Habit. General and common.

Season. Summer.

Quality. 1.

125. *THYNNUS THUNNINA*, *C. & V.*

Tonno tonnina (*It.*).

Vulg., *Tonnina* (*Tr.*, *Fiume*).

Carcàna (*Ven.*).

Croat., *Tunina* (*Croat. littoral*).

Habit. General and common.

Season. September, October.

Quality. 1.

126. *THYNNUS PELAMYS*, C. & V.Scomber pelamys, *L.*

The Bonito.

Scombres Bonite.

Der Bonit, der atlantische Bonit.

Tonno palamida (*It.*).*Vulg.*, Palamida (*Tr.*, *Ven.*, *Fiume*, *Cat.*).Palamia (*Ven.*).*Croat.*, Palanda, Polanda (*Croat. littoral*).Palamida (*Spalato*).*Habit.* Trieste.*Remark.* An Atlantic sp. which is only occasionally met with in the Adria.*Quality.* 1.127. *THYNNUS ALALONGA*, Risso.Scomber alalonga, *L.*

The Germon, or Long-finned Tunny.

Le Germon, Alilonghi.

Aile-longue.

Tonno alalunga (*It.*).*Habit.* Frequents deep water, seldom approaching the shore.*Season.* September; but only accidentally met with.*Quality.* 1.

Gen. III. PELAMYS, C. & V.*

128. *PELAMYS SARDA*, C. & V.Scomber pelamys, *Brinn.*Scomber Sarda, *Bloch.*

The Pelamid.

La Pélamide.

Der mittellandische Bonit.

Palamida sarda (*It.*).*Vulg.*, Palamida (*Tr.*, *Ven.*, *Fiume*, *Cat.*).*Croat.*, Polanda (*Croat. littoral*).Polandra (*Spalato*).*Habit.* Not uncommon in Dalmatia, Spalato; in other waters it is rare.*Season.* August to October.*Quality.* 2.* *Pelamys unicolor.* (See No. 365.)

Gen. IV. AUXIS, C. & V.

129. *AUXIS VULGARIS*, C. & V.Scomber rochei, *Risso.*

The Plain Bonito.

Tambarello comune (*It.*).*Vulg.*, Sgionfetto (*Tr.*).Tambarello (*Ven.*).Tombarello (*Fiume*).

Goffo, Letterato.

Croat., Tumbarel (*Fiume*).Trup (*Croat. littoral*, *Spalato*).*Habit.* General, but rare.*Season.* September, October.*Quality.* 1.Gen. V. ECHENEIS, *Art.**130. *ECHENEIS REMORA*, *L.*

The Sucking-fish, Remora, Mediterranean Remora.

Le Remora.

Der kleine Schildfisch.

Echeneide remora (*It.*).*Croat.*, Ustavica (*Croat. lit.*).*Habit.* General, but rare; Trieste.*Quality.* 0.

Fam. XIII. TRACHINIDÆ.

Group I. *Uranoscopina.*Gen. I. URANOSCOPIUS, *L.*131. *URANOSCOPIUS SCABER*, *L.*

The common Star-gazer.

Der gemeine Sternseher.

Uranoscopio scabro (*It.*).*Vulg.*, Bocca in cao (*Tr.*, *Fiume*, *Ven.*, *Cat.*).Bocca in capo (*Tr.*).Toti, Chiachia (*Ven.*).*Croat.*, čač, čač muški (*Fiume*).Bezmeč, Batofina (*Spalato*).*Habit.* General and common.*Season.* Always; January, May to July, September.*Quality.* 2.* *Echeneis scutata.* (See No. 366.)

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Scazzone, Ghiozzo (*It.*).
Vulg., Marson, Cavedon (*Trentino*).
 Magnarone, Magnerone (*Verona*).
 Marzion, Marsion, Marson (*Treviso*).
 Chiavedon (*Gorizia*).
Sloven, Menkišek, Kápč (*Carniola*).
Croat., Balavac, Peš, Peša.

Habit. Fresh-water courses of northern and central Italy; Trentino, Adige, Izonso, Garda.
Quality. 2.

Gen. II. LEPIDOTRIGLA, *Gthr.*

139. *LEPIDOTRIGLA ASPERA*, C. & V.

Trigla aspera, C. & V.
 Trigla cavillone, *Lac.*
 Capone caviglione (*It.*).
Vulg., Anzoletto (*generic*) (*Tr.*).
 Anzuletta (*generic*) (*Fiume*).
 Turchello insanguinà (*Ven.*).
Croat., Ankulete, Anzuleta (*generic*) (*Croat. littoral*); čučina (*Spalato*).

Habit. General; not common.

Season. January, February, April to June, August, September.

Remark. One of the smallest sp. of the genus.

Quality. 3.

Gen. III. TRIGLA, *Art.*

140. *TRIGLA PINI*, Bl.

Triglia cuculus, *L.*
 The Elleck, The Red, or Cuckoo-Gurnard.
 Capone imperiale (*It.*).
Vulg., Anzoletto (*Tr.*).
 Anzoletto, A. commune, A. piccolo (*Ven.*).
Croat., Ankulete, Anzuleta.

Habit. General; common.

Season. Always; March.

Quality. 3.

141. *TRIGLA LINEATA*, L.

T. lastoviza, *Brunn.*
 T. adriatica, *L.*

The streaked Gurnard, French or rock Gurnard.

Rouget camard.

Der gestreifte See- oder Knurr-hahn.

Capone ubbriaco* (*It.*).

Vulg., Anzoletto, Angioletto, Ubriago, Musoduro (*Tr.*).

Anzoletto, Musoduro (*Ven.*).

Anzoletta, Testa grossa, Testa dura (*Fiume*).

Croat., Lastavica, Glavuje (?) Kokot.

Habit., Season, Quality. Same as foregoing sp.; very common.

142. *TRIGLA HIRUNDO*, Bl. & L.

Lucerna Venetorum, *Will.*
 Trigla corax, *Bp.*
 The Tubfish, The Sapphirine Gurnard.
 Trigle hirondelle.
 Der grosse See- oder Knurr-hahn.
 Die Meerschwalbe.
 Capone galinella (*It.*).
Vulg., Anzoletto, Lucerna † (*Tr., Ven., Fiume*).
 Maziola (*Ven.*).
 Laterna, † Fanale † (*Lig.*).
Croat., Lučenka, Lučerna, Prasica (*Croat. littoral*).

Habit. General and common.

Season. Always; best in January, May, August; the most common of the genus in Spalato waters.

Quality. 2; best of the genus.

143. *TRIGLA GURNARDUS*, L.

The Grey Gurnard.
 Capone gorno (*It.*).
Vulg., Anzoletto (*Tr., Ven.*).
Croat., Lastavica.

Habit. General; rare; Trieste.

Quality. 3.

* Signifies "inebriated," owing to its reddish hue.

† Owes these names to the great phosphorescence it produces.

144. *TRIGLA CUCULUS*, Bl.T. milvus, *Lac.*

Bloch's Gurnard.

Die Seeweihe.

Capone caviglia (*It.*).*Vulg.*, Anzoletto (*Tr.*, *Ven.*).Anzoletto grande (*Ven.*).*Croat.*, Lastavica.*Habit.* General; not uncommon.*Season.* Best in January, May, August.*Quality.* 3.145. *TRIGLA LYRA*, L.

The Piper, Lyra, Crowner, Sea-hen.

Die Meerleyer.

Capone organo (*It.*).*Vulg.*, Anzoletto (*Tr.*).Turchello, Succhetto (*Ven.*).Anzoletto grande (*Ven.*).Turchello (*Fiume*).*Croat.*, Lućerna (*Croat. littoral*).Kokot (*Spalato*).*Habit.* Istria, Dalmatia; rather rare.*Season.* April, March, October.*Quality.* 3.

Fam. XVI. CATAPHRACTI—Flying Gurnards.

Gen. I. PERISTETHUS, *Kaup.*146. *PERISTETHUS CATAPHRACTUM*, L.

Peristedion cataphractum, C. & V.

Trigla cataphracta, *L.*

The Mailed Gurnard.

Le Malarmat.

Der Gabelfish.

Der gabelige, See- oder Knurr-hahn.

Peristedione forcuto (*It.*).*Vulg.*, Anzoletto, Angioletto del mare, o di mar, Forcato (*Tr.*).Anzoletto della Madonna (*Ven.*).*Croat.*, Turčin (*Spalato*).*Habit.* General; Dalmatia, Cherso; inhabits great depths; rare in the north.*Season.* Common at Spalato in winter.*Quality.* 0.Gen. II. DACTYLOPTERUS, *Lac.*147. *DACTYLOPTERUS VOLITANS*.

C. & V.

Trigla volitans, *L.*

Der Flughahn.

Pesce rondine (*It.*).*Vulg.*, Pesce barbastrillo, o barbastella, Rondinela (*Ven.*).Rondinella (*Fiume*).*Croat.*, Lastavica, Leteći kokot (*Croat. littoral*).Poletuša, Lastavica prava (*Spalato*).*Habit.* General, but rare; Dalmatia, Lissa, Trieste.*Season.* April to July, September.*Quality.* 0.

Fam. XVII. GOBIIDÆ.

Gen. I. GOBIUS, *Art.**148. *GOBIUS NIGER*, L.

The Black Goby, Rock-fish, Rock Goby.

Gobie boulerot.

Die schwarze Meergrundel.

Ghiozzo nero (*It.*).*Vulg.*, Guatto (*generic term*).Guatto giallo (*Tr.*, *Fiume*).Paganello di mar (*Ven.*).*Croat.*, Glavoč (*generic term*).žuti gulj, glavoč od rupa (*Croat. littoral*).Glamoč žuti (*Spalato*).*Habit.* General and common.*Season.* Always.*Quality.* 3; *Minutaja* (mixed fish).149. *GOBIUS AURATUS*, Risso.The Yellow Goby, *Couch.** *Gobius Lesueurii*, *G. Buchichii*, *G. Zebra*, *G. pusillus*. (See Nos. 367—370.)

- Ghiozzo dorato (*It.*).
Vulg., Guatto (*Tr.*, *Fiume*).
 Marsion (*Ven.*).
Croat., Glamoč žutac (*Spalato*).
Habit. General, but rare; Dalmatia, Lésina, Spalato, Trieste.
150. *GOBIUS JOZO*, L.
 Die blaue Meergrundel, Blaugrundel, Seestint.
 Ghiozzo comune (*It.*).
Vulg., Guatto, Guatto di fango (*Tr.*, *Fiume*).
 Paganello di mar, Paganello bianco, Gô, Menuaja mora (*Ven.*).
Croat., Gulj od blata, Cèrnjak, Glavoč cèrni (*Croat. littoral*).
 Batovina, Glamoč bilac, Glamoč lučni (*Spalato*).
Habit. General and common.
Season. Always.
Quality. 3; *Minutaja* (mixed fish).
151. *GOBIUS MARTENSII*, Gthr.
 Gobius Bonelli, *Nardo*.
 Gobius Fluviatilis, C. & V.
 The Fresh-water Goby.
 Ghiozzo comune (*It.*).
Vulg., Marsion d'aqua dolce (*Ven.*).
 Bottola (*Trentino, Verona*).
 Lardel, Lardello, Goffo (*Treviso*).
Habit. Tagliamento, Isonzo, Adige, Treviso, Garda; common.
Season. February, March, September, October.
Quality. 2.
152. *GOBIUS PANIZZÆ*, Verga.
 Ghiozzo del Panizza (*It.*).
Vulg., Marsion (*Ven.*).
 Marsionsini (*Treviso*).
Habit. Brackish waters and lagoons; Venice, Comacchio; watercourses of Venice; common.
Season. April.
Quality. 2.
153. *GOBIUS PUNCTATISSIMUS*, Canestr.
 Ghiozzo punteggiata (*It.*).
Habit. Same as foregoing; Tagliamento, Sile.
Season. February, April, May.
Quality. 2.
154. *GOBIUS QUAGGA*, Heck.
Habit. Spalato.
Season. June; very rare.
155. *GOBIUS KNERII*, Steind.
Habit. Zaole (Trieste), Lésina (Dalmatia).
Note. An Adriatic species.
Season. May; rare.
156. *GOBIUS PAGANELLUS*, L.
 Paganellus Venetorum, *Will.*
 The Paganellus.
 Die Paganell-Grundel.
 Ghiozzo paganello (*It.*).
Vulg., Guatto, G. di sasso (*Tr.*, *Fiume*).
 Paganello (*Ven.*, *Tr.*, *Fiume*).
 Paganello de porto, Paganello vergà (*Ven.*).
Croat., Gulić, Kamenski gulj (*Croat. littoral*).
 Plahut* (*Fiume*).
 Glamoč, Pornpujak (*Spalato*).
Habit. General; common.
Season. Always.
Quality. 2; *Minutaja* (mixed fish).
157. *GOBIUS OPHIOCEPHALUS*, Pall.
 Gobius lota, C. & V.
 Die marmorirte Meergrundel.
 Ghiozzo gò (*It.*).
Vulg., Guatto (*Tr.*, *Fiume*).
 Gò (*Ven.*). Guatto giallo (*Spalato*).
Croat., Gulj (*Croat. littoral*).
 Glamoč puričaš (*Spalato*).
Habit. General; common.
Season. Always.
Quality. 2; *Minutaja* (mixed fish).

* Denotes timidity.

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The Dragonet, Fox, Skulpin, Sordid Dragonet, Gemmeous Dragonet, Yellow Skulpin.

Die Goldgrundel.

Fuchsgrundel.

Callionimo lira (*It.*).

Habit. Trieste.

Season. Quite exceptionally met with in summer, if not, indeed, altogether questionable.

168. *CALLIONYMUS MACULATUS*, Raf.

Callionimo macchiato (*It.*).

Vulg., Guatto (*Tr.*, *Fiume*).

Lodra, Lodrin (*Ven.*, *Tr.*).

Croat., Miš (*Spalato*).

Habit. Rare at Trieste and Venice; common at Spalato.

Season. March, July to September.

Quality. 3.

169. *CALLIONYMUS FESTIVUS*, Pall.

Callionymus dracunculus, *Risso*.

Callionimo dragoncello (*It.*).

Vulg., as foregoing sp.

Habit. General, but rare; Venice.

170. *CALLIONYMUS BELENUS*, *Risso*.

Die Belen.

Callionimo belenno (*It.*).

Vulg. as foregoing sp.; also Schilin (*Ven.*).

Croat., Miš, žabarić (*Spalato*).

Habit. Venice, Trieste, Spalato, Ravenna; pretty general and common.

Quality. 3; *Minutaja* (mixed fish).

171. *CALLIONYMUS MORISSONII*, *Risso*.

Habit. Trieste, Venice; very rare.

Season. Summer.

Remark. Identity questionable; Perugia cites this as a distinct sp.; Canestrini considers it to be identical with *C. Belenus* (*Risso*); whereas

Bonap. and Günther consider it identical with *C. festivus* (*Bp.* not *Pall.*), synonymous with *C. phaëton* (*Gthr.*)

Fam. XVIII. CEPOLIDÆ—Band-fishes.

Gen. CEPOLA, *L.*

172. *CEPOLA RUBESCENS*, *L.*

The Band-fish, Red Band-fish, Red Snake fish.

Der gemeine Bandfisch, Rother Bandfisch.

Cepola rosseggiante (*It.*).

Vulg., Pesce cordéla (*Tr.*, *Fiume*).

Pesce spada, Spada rossa (*Tr.*).

Spada da Quarnero, Lanspada (*Ven.*).

Croat., Ugorača (*Croat. littoral*), Mačinac (*Spalato*).

Habit. General.

Season. Common at all seasons.

Quality. 3.

Fam. XIX. BLENNIIDÆ—Blennies.

Gen. I. BLENNIUS, *Art.**

173. *BLENNIUS GATTORUGINE*, *Bl.*

The Gattoruginous Blenny.

Der gestreifte Schleimfisch.

Bavosa gattorugine (*It.*).

Vulg., Strega, Gattorusola (*Tr.*), Gattarozola (*Ven.*), Baba (*Fiume*) (*generic terms*).

Croat., Kokot, Baba (*Croat. littoral*) (*generic terms*).

Barbir, Babak (*Spalato*).

Habit. General and common; enters brackish waters; lagoons of Venice.

Season. Always.

Quality. 3.

174. *BLENNIUS TENTACULARIS*, *Brunn.*

Der Meerhirsch.

* *Blennius Canevæ* and *B. trigloides*. (See Nos. 373, 374.)

- Bavosa cornuta (*It.*).
Croat., Babica, Barbaroga (*Spalato*).
 The same remarks apply to this as to the foregoing sp.; belongs to the class of *Minutaja*.
175. *BLENNIUS ROUXI*, Cocco.
Vulg., Bausa janca (*Sicily*).
Croat., Kraljica (*Spalato*).
Habit. Not uncommon at Spalato in the spring; not found in the north.
176. *BLENNIUS VULGARIS*, Pollini.
 The Fresh-water Blenny.
 Cagnetto comune (*It.*).
Vulg., Cagnetto, Cabazza (*Lomb.*).
Croat., Babuka (*Spalato*).
Habit. Izonso, Adige (?), Lake of Vrana (Dalmatia, not Cherso), River Giadro, near Salona, Lake Bačina (Dalmatia); is also found in the sea.
Quality. 1.
177. *BLENNIUS VARUS*, Bp.
 Cagnetto varo (*It.*).
Habit. Fresh-water courses of Venice.
Remark. Canestrini holds this to be a variety of the foregoing sp.
178. *BLENNIUS PALMICORNIS*, C. & V.
 Blennius sanguinolentus, *Pall.*
 Bavosa palmicorne (*It.*).
Croat., Balavica (*Spalato*).
 The remarks on *B. tentacularis* apply to this sp.
Habit. General and common; Spalato, Lésina, Rimini.
179. *BLENNIUS BASILISCUS*, C. & V.
Habit. Very rarely met with in the Adriatic.
180. *BLENNIUS SPHYNX*, C. & V.
Habit. Lésina (Dalmatia), Trieste, Zaole; rare.
181. *BLENNIUS PAVO*, Risso.
 Bavosa cristata (*It.*).
Vulg., Gallo, Gattarozola marina (*female*), Gattarozola colla cresta (*Ven.*).

Croat., Pivac, Baba krunašica (*Spalato*).
 The remarks on *B. tentacularis* apply equally to this species.

182. *BLENNIUS OCELLARIS*, L.
 Ocellated Blenny, Butterfly-fish.
 Papillon de mer, Blennie Lièvre.
 Der geangelte Schleimfisch.
 Schmetterlingfisch.
 Bavosa occhiuta (*It.*).
Vulg., Strega, Gattorusola d'aspreo, G. di mar, Lampusa (*Tr.*).
 Gattarozola dall'occiàl, Pesce occhial, Gattina piccola (*Ven.*).
 Smida (*Fiume*).
Croat., Baba, Kokot.
 Babica od dubine (*Spalato*).
 The same remarks apply to this sp. as to *B. gattarugine*.

183. *BLENNIUS GALERITA*, L.
 Montagu's Blenny, Diminutive Blenny.
Habit. Dalmatia (Lésina, Lissa, Curzola); but very rare.

184. *BLENNIUS PHOLIS*, L.
 Phocis lævis, *Flem.*
 The Smooth Blenny, the Shanny, Shan, Smooth Shan.
 Die Meerlerche.
 Der kleinste Schleimfisch.
Vulg., Gattorusola senza cresta (*Tr.*, *Ven.*).
 Lampusa (*Tr.*).
 Gattarozola bavosa, o chiossa (*Ven.*).
Remark. Canestrini and other authors are not satisfied as to the identity of this species, although it is cited by Perugia, Martens, and others. In any case, it seems doubtful whether it is the *Shanny* of British waters, or a southern representative variety of this fish.*

* See "Martens' Reise nach Venedig," ii. p. 419; and "Catalogo dei Pesci dell' Adriatico," by Alberto Perugia, p. 16, No. 190.

Gen. II. CRISTICEPS, C. & V.

185. *CRISTICEPS ARGENTATUS*, Risso.Blennius variabilis, *Raf.*Clinus variabilis, *Canestr.*

Der silberne Schleimfisch.

Clino variabile (*It.*).*Vulg.*, Spirolottu, Sperdetto, Spirda (*Sicily*).*Habit.* Dalmatia, Trieste; southern extension.*Season.* Summer; very rare.Gen. III. TRIPTERYGIUM, *Risso.*186. *TRIPTERYGIUM NASUS*, Risso.Tritterigio caponero (*It.*).*Croat.*, Pivčić (*Spalato*).*Habit.* General; Spalato, Lésina (Dalmatia), Trieste, &c.*Season.* Common in summer.*Quality.* 3; *Minutaja* (mixed fish).

Fam. XX. SPHYRÆNIDÆ.

Gen. I. SPHYRÆNA, *Art.*187. *SPHYRÆNA VULGARIS*, C. & V.Esox Sphyræna, *L.*Sphyræna spet, *Lac.*

The Spet.

Der Pfeilhecht.

Sfirena comune (*It.*).*Vulg.*, Luzzo di mar (*Tr.*, *Ven.*).Merluzzo salvatico (*Tr.*).Pesce schermo (*Fiume*).*Croat.*, Jaglunić, Skaram (*littoral*).Skaran (*Spalato*).*Habit.* General and common.*Season.* Summer.*Quality.* 3.

Fam. XXI. ATHERINIDÆ—Atherines or Sand-smelts.

Gen. ATHERINA, *Art.*188. *ATHERINA HEPSETUS*, L.

The Smelt, Atherine, Sand-Smelt.

Le Sanclét Cabassons de Provence.

Der gemeine Aehrenfisch.

Latterino sardaro (*It.*).*Vulg.*, Anguèla, Gerao, Jaral, Garal (*Tr.*).Anguèla, Anguèla agonada, Agonà, Acquadela (*Ven.*).*Croat.*, Gavon, Gavun (*Croat. littoral* and *Dalm.*).Girica (*generic*).Gaun pravi (*Spalato*).*Habit.* General and common, particularly in summer; frequents brackish waters and the lagoons; it is the most common of the genus.*Quality.* 3.189. *ATHERINA BOYERI*, Risso.Boier's Atherine, *Couch.*Latterino capoccione (*It.*).*Vulg.*, Anguèla (*Tr.*, *Ven.*).*Croat.*, čiga (*Croat. littoral*).Gaun batelj (*Spalato*).*Habit.*, *Season*, *Quality.* As above.190. *ATHERINA MOCHON*, C. & V.

Der kleine Aehrenfisch.

Latterino comune (*It.*).*Vulg.*, as above.*Croat.*, Gaun hrskavac (*Spalato*).*Habit.*, *Season*, *Quality.* As above.

Fam. XXII. MUGILIDÆ—Mulletts.

Gen. MUGIL, *Art.**191. *MUGIL CEPHALUS*, Cuv.

The Grey Mullet.

Le Mulet-Cabot.

Die gemeine Meeräsche.

Der Harder.

Muggine cefalo (*It.*).*Vulg.*, Volpina, Clevolo (*young*) (*Tr.*, *Fiume*).

Mecchiarini, Mecchiati, Volpina, Clevolo

Ceolo, Magna, Magnariazo, Orbeti, Topi,

Volpinetti (*Ven.*).* *Mugil labeo.* (See No. 375.)

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Habit. General; rare; sp. from Dalmatia, Venice, Fiume.

Season. Spring and summer.

Quality. o.

Fam. XXV. GOBIESOCIDÆ—Suck-fishes.

Gen. I. LEPADOGASTER, *Gouan.*

199. *LEPADOGASTER GOUANII*, Lac.

The Small Suck-fish, Cornish Sucker, Ocellated Sucker, Jura Sucker.

Le Barbier, Porte-Ecuelle.

Der Bauchschild.

Lepadogastro del Gouan (*It.*).

Vulg., Taccasasso (*Tr.*).

Pesce ranin (*Ven.*).

Sporcello di sasso, Porchetti (*generic term*) (*Fiume*).

Croat., Ribà prasica, Pizdin-prilipak (*generic terms*) (*Croat. littoral*).

Prilipak, Svičica, Babka (*Spalato*).

Habit. General; not uncommon; Venice, Lissa, Spalato, Zaole, Trieste, Fiume.

Season. March to June, September.

Quality. 3; *Minutaja* (mixed fish).

200. *LEPADOGASTER LISTELLUS*, Nardo.

Vulg., Listello, Sfrizin (*Ven.*).

Habit. Venice; *Minutaja* (mixed fish).

201. *LEPADOGASTER BROWNII*, Risso.

Habit. A few sp. caught off Lésina (Dalmatia).

202. *LEPADOGASTER ACUTUS*, Canestr.

Lepadogaster elegans, *Nardo*.

Der rothe Bauchschild.

Lepadogastro acuto (*It.*).

Vulg., Porchetti (*Ven.*, *Fiume*).

Pesce ranin (*Ven.*).

Taccasasso (*Tr.*, *Fiume*).

Croat. As No. 199.

Habit. Rare; sp. from Trieste.

203. *LEPADOGASTER CANDOLLII*, Risso.

Mirbelia Decandollii, *Canestr.*

The Connemara Sucker.

Vulg., *Croat.* As No. 199.

Habit. General; common; sp. from Venice, Trieste, Spalato.

Season. Winter; in summer it retreats to deep waters.

204. *LEPADOGASTER BIMACULATUS*, Flem.

Lepadogaster Desfontainii, *Risso*.

Mirbelia Desfontainii, *Canestr.*

The Bimaculated Sucker, Doubly-spotted Sucker.

Nomenclature. As above.

Habit. Common and general.

Season. June, September.

Quality. 3; *Minutaja*.

Gen II. LEPTOPTERYGIUS, *Trosch.*

205. *LEPTOPTERYGIUS PIGER*, Nardo.

Gouania piger, *Bp.*

Gouania prototypus, *Nardo*.

Gouania tipó (*It.*).

Habit. A southern sp. occasionally found in the Adriatic; specimens from Lésina (Dalmatia), Trieste, Venice; is not uncommon at the northern head of the island of Bua (Dalmatia).

Fam. XXVI. LOPHOTIDÆ.

Gen. LOPHOTES, *Giorna*.

206. *LOPHOTES CEPEDIANUS*, *Giorna*.

Lophote Cepediano (*It.*).

Habit. Very rare—in fact, accidental; has been met with at Lésina on the Dalmatian coast.

Fam. XXVII. TRACHYPTERIDÆ—Ribbon-fishes.

Gen. TRACHYPTERUS, *Gouan*.

207. *TRACHYPTERUS TÆNIA*, Bl. & Sch.

Falx Venetorum, *Bellon*.

Ribbon-fish.
 Der gemeine Sensenfisch, der weisse Band-
 fisch.
 Trachittero tenia (*It.*).
Vulg., Falce, Pesce Falce (*Ven.*, *Tr.*).
 Spada argentina (*Tr.*).
 Spada d'ariento (*Ven.*).
Croat., Mač (*Croat. littoral*).
 Riba vlasnja (*Spalato*).
Habit. General, though rare; Trieste, Venice,
 Dalmatia.

Season. Summer.

Quality. Flesh said to be excellent, and is much
 consumed at Naples, where it is much
 esteemed.

208. *TRACHYPTERUS REPANDUS*,
 Costa.

Trachittero ritorto (*It.*).

Habit. Has been fished in the Gulf of Trieste,
 and in the Dalmatian Archipelago off Lissa
 and Lésina, but is very rare.

Order—ACANTHOPTERYGII PHARYNGOGNATHI.

Fam. I. POMACENTRIDÆ—Coral-fishes.

Gen. HELIASTES, C. & V.

209. *HELIASTES CHROMIS*, L.

Der Rabenfisch.

Castagnola (*It.*).

Vulg., Fabbro, Pesce fabbro (*Tr.*, *Fiume*).

Caligher, Fabretto, Favaretto (*Tr.*).

Pesce scarpolero, pesce pestafero (*Ven.*).

Croat., Crnjelj, Crnej.

Habit. General and common at all seasons.

Quality. 3; little eaten.

Fam. II. LABRIDÆ—Wrasses.

Gen. I. LABRUS, *Art.*

210. *LABRUS TURDUS*, L.

Der grüne Lippfisch.

Labro tordo (*It.*).

Vulg., Liba (*generic term*) (*Tr.*).

Donzela (*generic*) Papagà (*Ven.*).

Papagallo verde (*Ven.*, *Fiume*).

Verdon (*Fiume*).

Croat., Usnače, Vrana (*generic terms*), Le-
 nica, Zeleni papagal (*Fiume*). Orfanić,
 Vrana zelena (*Spalato*).

Habit. General, but rare.

Season. Spring and autumn.

Quality. 3; *Minutaja* (mixed fish).

211. *LABRUS MACULATUS*, Bl.

Labrus bergylta, *Ascan.*

The Ballan Wrasse, Ancient Wrasse, Old
 Wife.

La Vieille.

Das alte Weib.

Vulg., Liba, Pinco (*Tr.*).

Habit. Trieste; one of the rarest sp. of this
 genus; identity questionable.

212. *LABRUS FESTIVUS*, Risso.

Labro festivo (*It.*).

Vulg., Liba (*Tr.*).

Donzela, Papagà (*Ven.*).

Croat., Drozak, čvrljak (*Spalato*).

Habit. General, but rare; common at Spalato.

Season. Common in autumn.

Quality. 3.

213. *LABRUS MERULA*, L.

Der braune Lippfisch.

Dunkler Lippfisch.

Die Meerschleie.

Labro merlo (*It.*).

Vulg., Liba (*Tr.*).

Donzela, Papagà (*Ven.*).

Tenca di mar (*Tr.*, *Ven.*).

Croat., Luceta morska, Vrana (*Spalato*).

Habit. General and common at all seasons.

Quality. 3.

214. *LABRUS RETICULATUS*, Lowe.

Labrus nereus, *Risso*.

Vulg., Liba (*Tr.*).

Habit. General, but rare.

215. *LABRUS MIXTUS*, L.

The striped Wrasse, Red Wrasse, Cuckoo Wrasse, the Cook Wrasse.

Labre melé.

Der gefleckte Lippfisch.

Meerjunker.

Labro pavone (*It.*).

Vulg., Liba, Donzella di grotta, Donzella di sasso (*Tr.*, *Fiume*).

Donzella, Papagà, Donzella de Quarnero, Cragnisso (*Ven.*).

Croat., Figa (*Spalato*).

Habit. General at all seasons, but rare; not uncommon at Spalato.

Quality. 3.

Female of the above sp.

Labrus carneus, *Ascan*.

The Red Wrasse, trimaculated or three-spotted Wrasse, Flesh-coloured Wrasse.

Der fleischrothe Lippfisch, Vierfleck.

Habit. General and common at all seasons.

Variety of female.

Labrus bimaculatus, L.

The Bimaculated Wrasse.

Der zweigefleckte Lippfisch.

Note. A rare species.

Gen. II. *CRENILABRUS*, *Cuv.*

216. *CRENILABRUS PAVO*, C. & V.

Paon de mer.

Der buntfärbige Lippfisch.

Der Meerpfau.

Crenilabro pavone (*It.*).

Vulg., Liba, Donzella (*Tr.*).

Donzella, Papagà, Pesce spuzza (*Ven.*), Lepa (*Chioggia*), Verdon (*Fiume*).

Croat., Lenica (*Fiume*).

Lumbrak (*Spalato*).

Boculjava gušavica (*Spalato*).

Jebac (*masc.*), Solnjača (*fem.*), Smokva (*generic*).

Habit. General and common at all seasons.

Quality. 3.

217. *CRENILABRUS MEDITERRANEUS*, C. & V.

C. boryanus, *Risso*.

Der borische Lippfisch.

Crenilabro mediterraneo (*It.*).

Vulg., Liba, Leppa, Donzella (*Tr.*).

Donzella, Papagà, Smergo, Gardelin, Pesce cavalier (*Ven.*).

Croat., Knez. Podujka (*Spalato*).

Habit. General and not uncommon at Spalato.

Season. Winter and spring.

Quality. 3.

218. *CRENILABRUS MELANOCERCUS*, *Risso*.

Croat., Modri Irac (*Spalato*).

Habit. A rare sp.; specimens from Trieste and the islands of Lésina, Solta, Bua, and the Canale delle Castella (Dalmatia).

219. *CRENILABRUS CÆRULEUS*, *Nardo* (*Risso?*).

Habit. Trieste, Lésina, Spalato; a rare sp., represented in the Trieste Museum.

220. *CRENILABRUS MELOPS*, *Cuv.*

The Corkwing, Connor or Golden Maid, Golden Wrasse, Gilt-head, Goldsinny, Goldfinny.

Der blaue Lippfisch.

Croat., Smokvica, Spirka (*Spalato*).

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Indented-striped Wrasse.
 La Girelle.
 Der Regenbogenfisch.
 Meerjunker.
 Donzella zigurella (*It.*).
Vulg., Donzella, Girella (*Tr.*, *Ven.*), Papagà
 (*Ven.*).
Croat., Knez, Dugnjača, Vladikinja (*Spa-*
lato).
Habit. General and common; amongst the
 rocks covered with *algæ*.
Season. Summer.
Quality. 3.

Variety. Julis speciosus, *Risso*.
Note. Has been met with in Dalmatia.

230. *CORIS GIOFREDI*, *Risso*.
 Julis Giofredi, *Risso*.
 Der Meerjunker.
 Donzella del Giofredi (*It.*).
Vulg., Donzella, Girella (*Tr.*, *Ven.*).
Croat. As No. 229.
Habit. Pretty general, but rare; specimens
 from Fiume, Trieste, Venice, Lésina.
Season. Summer.
Quality. 3; probably the same as the foregoing.

Order—ANACANTHINI.

Fam. I. GADIDÆ—Cod Tribe.

Gen. I. GADUS, *Art.**

231. *GADUS EUXINUS*, Nordm.
 Der südliche Schellfisch.
 Gado pontico (*It.*).
Vulg., Molo, Molo da parangolo.
Croat. Ugotica dugonosica (*Spalato*).
Habit. A sp. of the Black Sea, occasionally
 found in the Adriatic: Venice, Fiume, Zara;
 it has never been caught in the Mediterranean.
 Professor Kolombatović says that in summer,
 at Spalato, it is more common than No. 233.
 A specimen from Dalmatia is in the British
 Museum.

232. *GADUS MERLANGUS*, L.
 Merlangus vulgaris, *Cuv.*
 Merlangus vernalis, *Risso*.
 The Whiting, Le Merlan, Der Merlan.
 Merlango comune (*It.*).
Vulg., Molo, Molo da parangolo (*Tr.*, *Ven.*,
Fiume), Falso molo, Molloso (*Ven.*).
Croat., Pišmolj od parangala.

Habit. Common in the northern waters; Trieste,
 Fiume.

Season. August to September.

Quality. 2.

233. *GADUS MINUTUS*, L.
 The Poor, Capelan, Power Cod.
 Der Zwergdorsch.
 Gado minuto (*It.*).
Vulg., Pesce mollo (*Tr.*, *Fiume*, *Cattaro*).
 Mormoro, Molmolo (*Tr.*).
 Molo, Mormora (*Ven.*).
Croat., Pišmoj, Pišmolj (*generic*), Busbana
 (*Croat. littoral*).
 Tovarčić, Ugotica (*Spalato*).

Habit. Common in the north; Trieste, Fiume,
 Zara and Spalato.

Season. September to April.

Quality. 2.

234. *GADUS LUSCUS*, L.
 The Bib, Pout, Whiting-Pout.
 Le Tacaud.
 Der Steinbolck.
 Gado barbato (*It.*).

* *Gadus pontassou*. (See No. 376.)

Habit. Trieste (Giglioli).

Note. Quite accidental. Two specimens in the Florence Museum of Vertebrates.

Gen. II. MERLUCCIUS, *Cuv.*

235. *MERLUCCIUS VULGARIS*, Flem.

The Hake, Common Hake.

Le Grand Merlus.

Der mittellandische Stockfisch.

Merluzzo comune (*It.*).

Vulg., Merluzzo (*Tr.*, *Ven.*, *Fiume*, *Cattaro*).

Asinello (*Tr.*, *Fiume*).

Lovo (*Tr.*, *Ven.*).

Branzin croato (*Fiume*).

Pesce prete (*Ven.*).

Croat., Oslič, Osal, Tovar morski (*Croat. littoral*). Tovar, Konj morski (*Spalato*).

Habit. General and common at all seasons.

Season. Best in winter.

Quality. 2.

Gen. III. PHYCIS, *Cuv.*

236. *PHYCIS BLENNIOIDES*, Brunn.

Phycis tinca *Bl.*, *Schn.*

The Forked Hake, Greater Forked Beard.

Le Merlu barbu, Barbu.

Fico argentino (*It.*).

Vulg., Figo (*Ven.*).

Sorzo, Sorzo salvatico (*Tr.*).

Habit. Venice, Trieste, Fiume; according to Ninni, it is not so very scarce at Venice.

Season. July, August.

237. *PHYCIS MEDITERRANEUS*, Delar.

Die südliche Meerschleie.

Fico mediterraneo (*It.*).

Vulg., Sorzo, Tenca (*Tr.*, *Fiume*), Figo (*Ven.*).

Croat., Tabinja (*Croat. littoral*, *Spalato*).

Habit. Fiume, Zara, Trieste, Spalato, Lésina,

Venice; rather rare, if not accidental, in the north; deep water; abounds off Lésina.

Season. July, August, September.

Gen. IV. LOTA, *Cuv.**

238. *LOTA VULGARIS*, *Cuv.*

The Burbot, Burbolt, Eel-pout.

La Lotte.

Die Aalrutte, Aalraupe, Aalquappe.

Bottatrice (*It.*).

Vulg., Bottrisa (*Lombardy*).

Sloven, Menèk.

Hung., Menyhal.

Habit. In running courses, lakes, and ponds, in depths of thirty to forty fathoms in Lombardy, Lake of Garda, Lake of Zirknitz (*Carniola*), etc.

Quality. 1.

Gen. V. MOTELLA, *Cuv.*

239. *MOTELLA TRICIRRATA*, *Bl.*

M. communis, *Costa*.

M. vulgaris, *Cuv.*

M. fusca, *Risso & Swainson*.

Galea Venetorum, *Bellon*.

The Three-bearded Rockling, Rockling, Three-bearded Cod or Gade, Whistler, Whistle-fish.

Gade Mustelle.

Die Meertrüsche.

Motella comune (*It.*).

Vulg., Sorzo, Sorcio (*Tr.*).

Sorze, Pesce Sorze, Mare dei gronghi (*Ven.*).

Madre dei gronghi (*Fiume*).

Croat., Grunjeva mati, Tabinja (*Croat. littoral*).

Miš morski, Mater od ugorâ (*Spalato*).

Habit. More or less general, and pretty common at all seasons; Trieste, Venice, Rimini, Fiume, Spalato.

Season. Summer.

Quality. 2.

* *Lota argentea*, *Bp.* (See No. 377.)

240. *MOTELLA MACULATA*, Risso & Sw.
Note. A mere variety of the above sp., to which the foregoing remarks equally apply; a specimen from Dalmatia in the British Museum.

241. *MOTELLA MUSTELA*, Nilss.

Gadus mustela, L.

The Five-bearded Rockling or Cod.

Note. Appears in Perugia's list of the Trieste Museum, though not represented there; mentioned by Nardo as having been observed on the Dalmatian coast. Identity questionable; almost identical with the two former sp.

Fam. II. OPHIDIIDÆ.

Gen. I. PTERIDIUM, *Scopoli.*

242. *PTERIDIUM ATRUM*, Risso.

Pteridio nero (*It.*).

Habit. Almissa, Zirona, Lésina (Dalmatia); very rare; inhabits great depths.

Gen. II. OPHIDIUM, *Art.*

243. *OPHIDIUM BARBATUM*, L.

The Bearded Ophidium.

Ophidie barbu.

Das Bartmännchen.

Ofidio barbato (*It.*).

Vulg., Galiotto, Galera (*Tr.*, *Ven.*), Galia (*Ven.*).

Croat., Huj, Hulj.

Habit. General, and not uncommon.

Season. August, October.

Quality. 3.

244. *OPHIDIUM BROUSONETII*, Müll.

Note. Very similar to the foregoing species.

Habit. Spalato; rare.

245. *OPHIDIUM ROCHII*, Müll.

Note. Very similar to the foregoing sp.

Habit. Southern range; San Benedetto del Tronto.

246. *OPHIDIUM VASSALLI*, Risso.

Habit. Venice, Istria, Spalato; rare.

Gen. III. FIERASFER, *Cuv.**

247. *FIERASFER ACUS*, Brünn.

Der Schlangenaal.

Fiasfero ago (*It.*).

Vulg., Galiotto (*Tr.*, *Ven.*).

Croat., Strmorinac (*Spalato*).

Habit. Lives inside the *Holothuriæ*; Spalato, Bocche di Cattaro; rare.

Gen. IV. AMMODYTES, *Art.*

248. *AMMODYTES SICULUS*, Swains.

Sand-eel, Sand-launce.

Le lançon.

Der Sand-aal, die Schmelte.

Ammodite (*It.*).

Vulg., Cicirelli (*Sicily*).

Habit. Makarska (Dalmatia); very rare at Venice.

Fam. III. MACRURIDÆ.

Gen. MACRURUS, *Bl.*

249. *MACRURUS CÆLORHYNCUS*, Risso.

Macrouro camuso (*It.*).

Vulg., Pesce sorice (*Sicily*).

Habit. Southern coast of Dalmatia(?); very rare.

Fam. IV. PLEURONECTIDÆ—Flat-fish Tribe.

Gen. I. RHOMBUS, *Klein.*

250. *RHOMBUS MAXIMUS*, Cuv.

The Turbot.

Le Turbot.

Die Steinbutte, Dornbutte.

Rombo chiodato (*It.*).

Vulg., Rombo (*Tr.*, *Ven.*, *Fiume*, *Cat.*).

Rombo di sasso (*Ven.*).

Croat., Rumbac, Oblič (*Croat. littoral*).

Oblič (*Spalato*).

Habit. General and common.

* *Fierasfer dentatus*. (See No. 378.)

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Gen. VI. PLEURONECTES, *Art.*259. *PLEURONECTES PLATESSA*, L.Platessa vulgaris, *Bp.*

The Plaice.

Habit. Two specimens were found by Professor Trois in the fish-market at Venice; these appear to be the only ones hitherto caught in these seas.

260. *PLEURONECTES ITALICUS*, Gthr.Platessa passer, *Bp.*

The Italian Flounder.

Le Flet.

Der Flunder.

Pianuzza passera (*It.*).

Vulg., Passera, Passara (*Tr.*, *Fiume*, *Ven.*, *Cat.*).

Passarin, Latesiol (*Ven.*).Passariello (*Lésina*).*Croat.*, Pasera, Pasara (*Croat. littoral*).

Plosnatica, Iverak (*Spalato*). Kalkan (*Narenta*).

Habit. An Adriatic, not Mediterranean species; general, and common in brackish waters, and ascends the rivers; *Narenta*.

Season. Best in May, June.

Quality. 2.

Gen. VII. SOLEA, *Cuv.*261. *SOLEA VULGARIS*, Quensel.

The Sole.

La Sole.

Die Zunge, Zungenscholle.

Sogliola volgare (*It.*).*Vulg.*, Sfoja, Sfoglja (*Tr.*, *Fiume*, *Cat.*).

Sfoglio, Sfoglio nostran, Sfoglio de sasso, Zentil (*Ven.*).

Croat., šfolja, švoja (*Croat. littoral*).Tabinja ili list, Zalistak (*Spalato*).

Habit. General and common; deep sea-beds.

Season. Best in winter.

Quality. 1.

262. *SOLEA OCELLATA*, L.

La Pégouse.

Sogliola occhiuta (*It.*).

Habit. Common at Spalato in deep water; very rare in the north of the Gulf.

263. *SOLEA KLEINII*, Risso.Sogliola turca (*It.*).*Vulg.*, Sfoglio turco (*Ven.*).Sfoja (*Tr.*).

Habit. Venice, Trieste, Spalato, on *algæ* sea-beds; rare.

264. *SOLEA LASCARIS*, Risso (*not Bp.*).

Habit. Trieste, Spalato, on sandy bed; not uncommon.

Note. Many authors confuse this species with *S. lascaris* (*Bp.*), synonymous with *S. impar** (*Benn.* and *Gthr.*), and *S. nasuta* (*Nordm.*); *Gunther* cites the two as distinct species; *Costa* considers it a variety of *S. vulgaris*; *Canestrini* does not cite it at all.

265. *SOLEA VARIEGATA*, *Donov.*Solea mangili, *Risso*.

The Variegated Sole, Thickback, Bastard Sole, Red-backed Flounder.

Sfogliola fasciata (*It.*).*Vulg.*, Sfogietto (*generic for all small soles*);Sfogietto peloso (*Ven.*). Peloso (*Tr.*).

Habit. Venice, Trieste, Zara, Spalato; not uncommon at Spalato.

Season. April, September.

Quality. 3; *Minutaja* (mixed fish).

266. *SOLEA LUTEA*, *Risso*.Sogliola gialla (*It.*).*Vulg.*, Sfogietto, Peloso.

Habit. Ravenna, Trieste, Spalato, Dalmatia; rare.

Season. June.

Quality. 3.

* *Solea impar*. (*See No. 380.*)

267. *SOLEA MINUTA*, Parn.

Little Sole.

La Solenette.

Sogliola minuta (*It.*).*Vulg.*, Sfoglio menuo (*Ven.*).*Habit.* Venice, Trieste; rare.*Season.* September.268. *SOLEA MONOCHIR*, Bp.

Die einflossige Scholle.

Sogliola pelosa (*It.*).*Vulg.*, Peloso, Pataraccia (*Tr.*).Sanchetto peloso (*Fiume*).Peloso, Sfogietto peloso (*Ven.*).*Croat.*, Kosmate šfoljice.*Habit.* General, and not uncommon in summer.*Quality.* 3.Gen. VIII. AMMOPLUOPS, *Gthr.*269. *AMMOPLUOPS LACTEUS*, Bp.Plagusia lactea, *Bp.**Croat.*, Golica (*Spalato*).*Note.* Is met with every winter on the southern coast of Dalmatia; it frequents great depths; it does not appear in the north of the Gulf.

Order—PHYSOSTOMI.

Fam. I. SCOPELIDÆ.

Gen. I. SAURUS, *C. & V.*270. *SAURUS GRISEUS*, Lowe.Saurus lacerta, *C. & V.*Tarantola Romæ, *Will.*Sauro lacerta (*It.*).*Croat.*, Manjur (*Spalato*).*Habit.* Has a southern extension; Lésina (Dalmatia), where, according to Prof. Kolombatović, it is common, and off the islands Zirona and Solta.Gen. II. AULOPUS, *Cuv.*271. *AULOPUS FILAMENTOSUS*, Bl.Saurus lacerta, *Risso.*Aulopo filamentoso (*It.*).*Habit.* Found in Sicilian waters; a specimen caught in the Bocche di Cattaro is in the Trieste Museum.Carpa (*It.*).*Vulg.*, Raina (*Tr., Ven.*).Carpione (*Fiume*).Carpione maschio (*Tr.*).Bulbero, Carpa (*Trentino*).Gobbo, Gobato, Bulbero (*Ven.*).Gobbo, Raina, Rainotto (*young*), (*Treviso*).*Croat.*, Karpiun, Krap obični, šaran.*Sloven*, Karf (*Carniola*).*Habit.* Venetian watershed: Trentino, Isonzo; attains to a length of thirty-two inches and upwards, and, if reared, up to thirty-five to forty pounds' weight; is best in winter; the flesh of the lake and river carp is preferable to that of ponds and stagnant waters, which retains a disagreeable taste and smell.273. *CYPRINUS KOLLARII*, Heck.

La Carpe blanche, Carpe batardée, le Carreau, la Carouche blanche.

Die Karpf-Karausche, der Karusch Karpfen.

Note. A hybrid of the common Carp and *Cypr. carassius*, varying according to whether bred by the female of the one or the other kind.*Habit.* Occurs in the Adige.

Fam. II. CYPRINIDÆ.

Gen. I. CYPRINUS, *L.*272. *CYPRINUS CARPIO*, L.

The Carp, common Carp.

La Carpe, Carpe vulgaire.

Der Karpfen, gemeine Karpfen.

Gen. II. BARBUS, *Cuv.*274. *BARBUS FLUVIATILIS*, Ag.

The Barbel.

Le Barbeau.

Die Barbe, Steinbarbe.

Barbo fluviatile (*It.*).*Sloven*, Mrena, Pohra, Poharža (*young*)
(*Carniola*).

Habit. River Sala, a tributary of the Isonzo, river Piave, river Santerno; this appears to be its southernmost limit; further south, the following species takes its place.

275. *BARBUS PLEBEJUS*, Val.Barbus eques, *Heck & Kner*.Barbo comune (*It.*).*Vulg.*, Barbo, Barbio, Balbio, Barbolo,
Balb, Barb, Barbol.*Croat.*, Mrena (*Dalm.*).

Habit. This is the *southern* Barbel, found in lakes and rivers of Italy and Dalmatia: the Adige, Osbo, or Ospo (near Trieste), Tagliamento, Sile (Treviso), Knin and Xegar (Dalmatia); spawns in April and May; its roe is said to be poisonous; length twelve inches. *B. eques* is cited by Heck. and Kner as a distinct species, but Gthr. considers them identical; it is not found in northern Italy, and in Dalmatia it has hitherto only been found in the river Zermagna; it is smaller than *B. plebejus*—only five inches long.

276. *BARBUS CANINUS*, *Cuv.*Barbo canino (*It.*).

Habit. Tributaries of the Isonzo, and in Istria.

Gen. III. AULOPYGE, *Heck.*277. *AULOPYGE HUGELI*, Heck.*Croat.*, Uklja ostrulja (*Dalm.*).Ostrulj (*Livno*).

Habit. Sign (Dalmatia), and in the rivers Cettina, Rieka, Sabljak, Staiba; it is five inches long, and is good eating.

Gen. IV. GOBIO, *Cuv.*278. *GOBIO FLUVIATILIS*, Flem.

The Gudgeon.

Le Goujon.

Die Grundel, Gressling, Kressling, Gründ-
ling.Gobione (*It.*).*Vulg.*, Gobione, Temalo (*Trentino*).Veccie, Temalo (*Verona*).Veccio, Vecez, Variolo (*Treviso*).Brocciolo, Vanà (*Bologna*).*Sloven*, Krašorka, Gründelc, Globoček
(*Carniola*).

Habit. River Sala (tributary of the Isonzo) in Carniola; Trentino, Adige, Garda, Sile (Treviso), Bologna, and, generally speaking, the watershed of the north of Italy; it attains to a length of four to five inches, and spawns April, May, and June; its flesh is very good and much prized.

279. *GOBIO URANOSCOPIUS*, Ag.

The Wapper.

Le Goujon uranoscope.

Die Steinkresse, Steingressling.

Sloven, špice (*Carniola*).

Habit. Sala (tributary of the Isonzo).

Gen. V. LEUCISCUS, *Rond.* (White-fish).280. *LEUCISCUS AULA*, Bonap.

Der weisse Scharl.

Triotto (*It.*).*Vulg.*, Pessata (*Trentino*).Bruffolo, Brussolo (*Ven.*).Brussolo (*Treviso*).*Croat.*, Maženica (*Dalmatia*).

Habit. More or less general and common in running courses and stagnant waters: lake of Garda, the rivers Trentino, Treviso, Tagliamento, and in Dalmatia.

Quality. Nowhere valued, and therefore little fished for.

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285. *LEUCISCUS ILLYRICUS*, Heck. & Kner.

Croat., Klen, Klenčić (*Dalm.*).

Habit. Rivers Isonzo and Cettina (Dalmatia); attains to a length of thirteen inches.

286. *LEUCISCUS ERYTHROPTHALMUS*, L.

The Rudd, Red-eye.

Le Rotengle, la Rosse.

Das Rothauge, die Rothfeder, Rother Scharl, Rothschweif.

Scardola comune, Piotta, Pesce del diavolo (*It.*).

Vulg., Scardola, Sgardola.

Coe-rosse (*Trentino, Ven.*).

Scardola, Scardoloto del Sil (*Treviso*).

Croat., Krupatka (*Dalm.*).

Habit. All Europe, and has both a northern and a southern extension; found all over Italy, in the Trentino and Venetian watersheds; river Tagliamento, lake of Vrana (island of Cherso); frequents marshy waters and the ditches of rice-fields; spawns in April, May; flesh of little value, eaten only by the poor, or used as food for other fish; ten to twelve inches long and one and a half pound weight.

Varieties or synonymous :—

a. Scardinius dergle, *Heck. & Kner.*

Croat., Drlje (*Dalm.*).

Habit. Rivers Kerka and Zermagna in Dalmatia; like the foregoing species, it is little esteemed as food.

b. *Leuciscus scardafa*, *Bonap.*

Cavezzal (*It.*).

Croat., Peškelj, Keljavac (*Dalm.*).

Habit. An Italian species, found also in Dalmatia, in the marshes of the Narenta, near Fort Opus.

c. Scardinius plotizza, *Heck. & Kner.*

Croat., Plotica (*Dalm.*).

Habit. Jezero Grande near Vergoraz and near Imosky in Dalmatia; fourteen inches long.

287. *LEUCISCUS HEEGERI*, Ag.

Habit. Found in the water-courses of parts of Istria, whence it is brought to market at Fiume, although not much valued as food.

288. *LEUCISCUS MUTICELLUS*, Bonap.

Telestes Savignyi, *Bp.*

Telestes Agassizii, *Heck.*

Die Langen, Laube.

Vairone (*It.*).

Vulg., Vairone (*Trentino, Verona, Lomb.*).

Mozzetta (*Trentino*).

Varone (*Verona*).

Fregarola (*Treviso*).

Habit. Running courses of Italy; Trentino, Sile, etc.; length, four to five inches; flesh insipid and little valued.

Note. Heck. and Kner cite *T. Savignyi* and *T. Agassizii* as different sp., of which the former would appear to be the southern representative; Gthr. cites them as identical.

289. *LEUCISCUS UKLIVA*, Heck.

Habit. River Cettina near Sign, Lake of Imoschi, both in Dalmatia; six inches long.

290. *LEUCISCUS TURSKYI*, Heck.

Habit. Stream Ciccola, near Drnis (Dalmatia); six inches long.

Varieties, or synonymous :—

a. *Squalius microlepis*, *Heck.*

b. *Squalius tenellus*, *Heck.*

Croat., Maklja (*Vergoraz*).

Habit. Narenta, near Vergoraz, Lake of Dusino, near Imosky, both in Dalmatia; seven to eight inches long, seldom twelve inches.

Note. Probably not specifically distinct from *L. Turskyi*, according to Gthr.; Canestrini considers *L. ukliva*, *turkyi*, *microlepis*, and *tenellus* as identical.

291. *LEUCISCUS PHOXINUS*, L.

The Minnow, Pink.

Le Véron, Véron lisse.

Die Pfrille, Pfrill, Elritze.

Sanguinerola (*It.*).

Vulg., Bressanella, Varone (*Trentino*,
Verona).

Lanfresca (*Treviso*).

Fregarola (*Lombardy*).

Hung., Kusz, Csetri.

Sloven, Trigle (*Carniola*).

Croat., Uklja (*Knin*).

Uklja mečica (*Sign*).

Koravica, Tupčić.

Habit. Streams, torrents, rivers, and lakes of the north of Italy; Klincizza (near Trieste), Idria, Treviso; rivers Isonzo, Tagliamento, Adige, Trentino, etc.; in Dalmatia, from Knin, Sign, Xegar, Lake Rastak, island of Veglia (Quarnero); three to four inches long; spawns in spring; flesh little valued as food.

Gen. VI. *PARAPHOXINUS*, *Blkr.*292. *PARAPHOXINUS ALEPIDOTUS*, Heck.

Croat., Uklja mečica, Mečica.

Habit. Rivers Cettina and Narenta (Dalmatia); very similar to the Minnow.

293. *PARAPHOXINUS CROATICUS*, Steindachner.

Croat., Piur.

Habit. Lika, in Croatia.

Gen. VII. *TINCA*, *Cuv.*294. *TINCA VULGARIS*, *Cuv.*

The Tench.

La Tanche.

Die Schleihe, Schley, Schlein.

Tinca, Tenca (*It.*).

Vulg., Tinca, Tenca (*Trentino*, *Ven.*, *Treviso*), Tencoto (*young*) (*Treviso*).

Hung., Czigányhal, Czompó.

Sloven, Karpoz, šlajn (*Carniola*).

Croat., Cvičenica, Linjak, Linj (*Dalmatia*).

Habit. Found all over Italy: Trentino, Lake of Garda, Sile (Treviso), Ravenna, Timao (near Duino), River Sala, Lake Zirknitz (Carniola); general and common; frequents stagnant waters on muddy beds, never strong currents; flesh unhealthy and indigestible, said to produce fever.

Gen. VIII. *CHONDROSTOMA*, *Ag.*295. *CHONDROSTOMA SOETTA*, Bonap. Savetta, Lasca (*It.*).

Vulg., Savel, Soëtta, Savëtta.

Croat., šljivar (*Dalm.*).

Habit. Venetian water-shed, but not common; River Piave (Treviso); attains to a length of twelve to sixteen inches; flesh little prized.

Note. This is the southern representative of *Chr. nasus* (*Ag.*), die Nase, or Näsling, of Germany, le Nez of France.

296. *CHONDROSTOMA GENEI*, Bonap. Lasca del Gené (*It.*).

Vulg., Strilot (*Trentino*).

Strigio (*Verona*).

Strillo, Mercandola, Fregata (*Treviso*).

Stria (*Lombardy*).

Habit. Northern and central Italy, Trentino, Tagliamento, Adige, Po, Ticino; length, seven to eight inches; flesh of little or no value.

297. *CHONDROSTOMA KNERII*, Heck. *Croat.*, Podustva (*Dalm.*).

Habit. Dalmatia, in the Narenta, near Metcovic and Norin; Istria (?).

Note. Similar to No. 296; six to seven inches long.

298. *CHONDROSTOMA PHOXINUS*, Heck.

Habit. Sign (Dalmatia).

Gen. IX. ABRAMIS, *Cuv.* (Breems.)

299. *ABRAMIS BIPUNCTATUS*, Bl.

Alburnus bipunctatus, *Heck. & Kner.*

L'able Eperlan, Le Platet.

Die Laube, Steinlaube.

Habit. Imoschi (Dalmatia).

Note. A species of central Europe, resembling *Alburnus lucidus* (Heck. & Kner) (the Bleak, or Blick), but smaller; it does not exceed four inches in length.

Gen. X. ALBURNUS, *Gthr.*

300. *ALBURNUS ALBURNELLUS*, Martens.

Alburnus alborella, *Heck. & Kner.*

Alburnus fracchia, *Heck. & Kner.*

Der Sonnenfisch.

Avola (*It.*).

Vulg., Alborella, Avola (*Lomb., Trentino*),

Aspio (*Trentino*), Avola, Aola, Pincie (*Ven.*), Pincia (*Treviso*).

Croat., Uklja svitloka (*Dalmatia*).

Habit. The southern representative of the Bleak (*A. lucidus*); its northernmost limit is Bozen (south of Tyrol); it inhabits the Lake of Garda, the rivers Isonzo, Tagliamento, Treviso, and generally the whole of north and central Italy; also Dalmatia: the Lake of Dusino, near Imoschi: at Obrovac, Vergoraz, the Narenta, etc.; found in shoals in lakes and rivers; spawns in June, July; length, four inches; flesh of little or no value, excepting as bait for pike and other fishes.

301. *ALBURNUS SCORANZA*, Heck.

Croat., Skoranza (*Dalm.*).

Habit. Lake of Scutari (Albania).

Gen. XI. NEMACHILUS, *Van Hasselt.*

302. *NEMACHILUS BARBATULUS*, L.

Cobitis barbatula, L.

The Loach, Beardie.

La Loche, Loche franche.

Die Grundel, Bartgrundel.

Cobite barbatello (*It.*).

Vulg., Strega (*Trentino, Verona*).

Forapiere, Foraprie, Forasassi, Forasecchi (*Treviso*).

Hung., Kövi-Csik.

Sloven, Grúdel (*Carniola*).

Croat., čikov, piškor.

Habit. North of Italy: Adige, Lake of Garda, Trentino; in clear running courses; length, four to five inches; spawns in spring; flesh delicate, and valued as food; rare.

Gen. XII. COBITIS, *Art.*

303. *COBITIS TÆNIA*, L.

The Spinous or Spined Loach, the Groundling.

Der Steinbeisser, Steingrundel, Dorngrundel.

Cobite fluviale (*It.*).

Vulg., Cagnola (*Trentino*).

Pesseta, Pessucola (*Treviso*).

Cagnola, Foraguarda, Lampreola (*Verona*).

Ussellina (*Lomb.*).

Lampreda (*Dalmatia*).

Hung., Pavágó, Kircza.

Sloven, štajngeljni (*Carniola*).

Croat., Lizibaba, Legbaba, Govedar.

Habit. North of Italy: Trentino, Lake of Garda; rivers Adige, Tagliamento, Isonzo, Sala (*Carniola*); Istria; also in Dalmatia, at Sign (river Cettina), Imosky, the Narenta; in lakes, rivers, streams, and ditches, on muddy beds, mostly imbedded in the mud; spawns in April, May; seldom exceeds three inches in length; is only eaten by the poor; makes a curious noise when taken out of the water. *Cobitis elongata* is a variety described by Heckel and Kner, found in the

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Fam. VI. SALMONIDÆ—Salmon Tribe.

Gen. I. SALMO, *Art.**

310. *SALMO FARIO AUSONII*, Val.

Trutto fario, *L.*

Salar ausonii (*Heck. & Kner*).

The Trout, Common Trout.

La Truite.

Die Forelle, Steinforelle.

Trota, Trutta, Truta (*It.*).

Vulg., Trutta, Forella (*Fiume*).

Sloven, Postern (*Carniola*).

Croat., Postrva (*Croat. littoral*).

Truta (*Illyr.*).

Pastrva (*Spalato*).

Habit. Fresh-water courses, seldom large rivers; found in almost all fresh-water courses of the Julian Alps: Fiume; spawning commences in October, and lasts till January; ascends the rivers to deposit its spawn.

311. *SALMO DENTEX*, Heck.

The Great Dalmatian Trout.

Croat., Pastrva, Bistranga, Pastèrmka.

Habit. A non-migratory sp. from the rivers of Dalmatia; in the river Kerka, near Knin, in the river Cettina, near Sign, and in the Narenta, between Metcovic and Fort Opus; attains to a length of thirty-six inches; Canestr. mentions it as being found also in the Isonzo.

312. *SALMO GENIVITTATUS*, Heck. & Kner.

Habit. Known from a single specimen only, eighteen inches in length, caught in the river Sala, a tributary of the river Isonzo.

313. *SALMO OBTUSIROSTRIS*, Heck.

River Trout of Dalmatia.

Vulg., Trotta.

Croat., Pastrva, Mladica.

Pastrva pircasica (*Spalato*).

Habit. A non-migratory sp. from the Dalmatian rivers Zermagna, Giadro (Salona), and Verlica, near Imosky, and from the Tiber; rarely exceeding a foot in length.

314. *SALMO CARPIO*, L.

Trutta Benaci lacus, *Aldrov.*

Trout of the Lake of Garda.

Carpione, Trutta del lago (*It.*).

Vulg., Trutta rossa (*Treviso*).

Habit. Lakes of Lombardy and Venice, descends the rivers and enters the sea; river Tagliamento; attains to a length of twenty inches; formerly held to be peculiar to the Lake of Garda (*Lac. Benacus*), after which it has been called, and where it is still best known (as Carpione); flesh much esteemed; spawns in December.

Gen. II. THYMALLUS, *Cuv.*

315. *THYMALLUS VULGARIS*, Nilss.

Thymallus vexillifer, *Ag.*

The Grayling, Umber.

L'Ombre.

Der Asch, die Æsche, Æschling.

Temolo, Temola (*It.*).

Hung. Tomolika. *Sloven*, Lipan (*Carniola*).

Croat., Lipan, Lipljen.

Habit. Rivers of Lombardy and Venice, Carniola and Istria: Tagliamento, Sala, Isonzo, Adige, etc.; clear and shallow streams; attains from one to one and a half pound weight; flesh excellent.

Gen. III. ARGENTINA, *Art.*

316. *ARGENTINA SPHYRÆNA*, L.

The Argentine.

Der toscanische Silberfisch.

Argentina sfirena (*It.*).

Vulg., Arzentin (*Tr., Ven.*).

Croat., Srebèrnica (*Spalato*).

* *Salmo trotta*. (See No. 381.)

Habit. A deep-sea fish rarely met with in the north of the Adriatic; more common in the Mediterranean; it is common at Spalato in winter.

Fam. VII. CLUPEIDÆ—Herring Tribe.

Gen. I. ENGRAULIS, C. & V.

317. *ENGRAULIS ENCRASICHOLUS*, L.

The Anchovy.

L'Anchois.

Der Anshovi.

Sardella comune, Anciuga (*It.*).

Vulg., Sardon (*Tr.*, *Fiume*, *Cat.*).

Sardon, Anchio (*Ven.*),—the name Sardella is sometimes misapplied to this sp.

Croat., Minčion, Inčun.

Brgljun (*Spalato*).

Habit. General and common.

Season. May to September.

Quality. 1.

Gen. II. CLUPEA, Cuv.

318. *CLUPEA AURITA*, C. & V.

Sardinella aurita, C. & V.

Sardinella dorata (*It.*).

Habit. Occasionally, but rarely, found on the coast of Dalmatia; generally mistaken for the Sardine; common in the Mediterranean.

Quality. Inferior; its flesh has a bad flavour.

319. *CLUPEA ALOSA*, L.

Alosa communis, Yarr.

The Shad, Allis-Shad.

L'Alose commune.

Die Else, Else, Maifisch, Mutterhäring.

Alosa comune (*It.*).

Vulg., Sardena (*Trentino*, *Verona*).

Ceppa (*p*), Cheppia (*Ven.*, *Tr.*).

Ciepa (*p*), Sardella salvatica (*Fiume*).

Ceppa (*p*), Agone, Scarabina (*Verona*).

Ceppa (*p*) (*Treviso*).

Ceppa (*p*), Agone (*f*), Ceppino (*†*),
Aciuga (*p*) (*Lomb.*).

Agon de Como (*f*).

Missoltini (*Lake Como, in a salted state*).

Croat., čepa, čipa.

Note. Marked thus (*p*) applied to mature sp.; marked thus (*f*) applied to the half mature sp.; marked thus (*†*) to the fry.

Habit. Frequents the sea and ascends the rivers in spring, entering the lakes for spawning; is caught in the lakes of north Italy in May, June; attains to a length of twelve to sixteen inches; flesh good, excepting at the season of spawning, and in October and November.

Note. This and the *C. finta* are very similar, and they have been generally confused with one another. In fact they have been described as one species by many authors. It therefore becomes doubtful whether it is the *Alosa* proper (the better of the two) we have to deal with here; Gareis doubts the identity, and considers it the less valuable *C. finta* which frequents the eastern shores of the Adriatic; these remarks may, therefore, apply equally to the one or the other of these two species.

320. *CLUPEA FINTA*, Cuv.

The Twaite-Shad, Maid.

La Feinte, Alose Feinte.

Die Finte, der kleine Maifisch.

Nomenclature and Remarks. See above (No. 319).

Note. The species hitherto found at Trieste and represented in the Trieste Museum are all *C. finta*.

Habit. Common in summer at Trieste; at Spalato it makes its appearance in October, and is fished during the winter, and chiefly so in spring, disappearing altogether in summer.

321. *CLUPEA PILCHARDUS*, Walb.

Clupea sprattus, *Brunn.*

Clupea sardina, *Cuv.*

The Pilchard, Sardinia of Commerce,
Gipsy or Crue Herring.

La Sardine, le Céléron.

Der Pilchard, die Sardelle.

Sardina comune (*It.*).

Vulg., Sardella (*Tr.*, *Fiume*, *Ven.*, *Cat.*).

Sardèle, Sardeline (*Ven.*).

Croat., Srdela, Srdjela, Srdjelica.

Habit. General and common; attains to a length of six inches.

Season. May, June, August, September; at Spalato also in the winter.

Quality. 1.

322. *CLUPEA PAPALINA*, Bp.

Clupanodon phalerica, *Risso.*

Die Melet.

Sardina papalina (*It.*).

Vulg., Papalina (*Tr.*, *Ven.*, *Fiume*, *Cat.*, *Spalato*).

Sardellina (*Fiume*).

Croat., šarak, šarakina.

Habit. General and common.

Season. As No. 321.

Quality. Equally as good as No. 321, but smaller; attains to a length of four inches.

Note. Dr. Günther does not cite this sp., which is, however, common in these seas. His nearest description is *C. aurita*, which he gives as synonymous with *C. phalerica* (Risso), but neither the figure of Val., nor the description of Günther, viz., "lower jaw slightly projecting beyond the upper," corresponds with our common *Papalina*, whose lower jaw strongly projects beyond the upper. I am indebted to Dr. de Marchesetti, Director of the Trieste Museum of Natural History, for the above description. Canestrini cites *C. phalerica* as synonymous with this species.

Fam. VIII. MURÆNIDÆ—Eel Tribe.

Gen. I. ANGUILLA, *Cuv.*

323. *ANGUILLA VULGARIS*, Flem.

Anguilla latirostris, *Risso.*

The Eel, common Eel. Elvers (*fry*).

L'Anguille. Cives, Pibales (*fry*).

Der Aal, gemeiner Aal. Elvers (*fry*).

Anguilla, *Inguilla* (*It.*).

Vulg., *Anguilla*, *Bisatto* (*Tr.*, *Ven.*, *Fiume*).

Buratello (*fry*).

Teston (*Ven.*).

Croat., Ogor, Ugor, Angulja, Jegulja, Jamarica, Punjeglavica, Gruj, Gor, Mala jegulja (*fry*).

Habit. General and common; chiefly in the lagoons of Venice and Comacchio and the mouths of rivers; *Fiume*, *Noghera* (near Trieste), *Timavo* (near Duino), etc.; ascend the rivers in January and February (*Montata*), and descend the rivers and enter the sea for spawning from October to December (*Calata*); are reared in the *valli* of the lagoons.

Quality. Those of rivers and lakes are preferable to those of the lagoons.

324. *ANGUILLA EURYSTOMA*, Heck. & Kner.

Croat., Capor (*Dalmatia*).

Note. A variety found in the Narenta (*Dalmatia*).

Gen. II. CONGER, *Kaup.*

325. *CONGER VULGARIS*, *Cuv.*

Conger niger, *Risso.*

The Conger Eel.

Le Congre, Der Meeraal.

Grongo vulgare (*It.*).

Vulg., *Grongo* (*Tr.*, *Ven.*, *Fiume*).

Grongo di grotta (*Fiume*).

Croat., Grum, Grunj (*Croat. littoral*).

Ugor (*Spalato*).

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333. *SIPHONOSTOMA ROTUNDATUM*,
Michah.

- Der abgerundete Nadelfisch.

Habit. Venice ; rare ; eight inches in length.

Season. March, August.

Gen. II. SYNGNATHUS, *Art.*

334. *SYNGNATHUS ACUS*, L.

Syngnathus tenuirostris, *Rath.*

The Great Pipe-fish or Needle-fish, Tangle-fish.

Signato tenuirostre (*It.*).

Vulg., Pesce ago (*Ven.*).

Croat., šilo, *generic.*

Habit. General and common ; sixteen inches in length.

Season. Summer.

335. *SYNGNATHUS RUBESCENS*, Risso.
Signato rossastro (*It.*).

Habit. General and common.

Season. March, May, September.

Note. Dr. Gunther holds this sp. to be synonymous with No. 334 ; attains to twelve inches in length.

336. *SYNGNATHUS TÆNIONOTUS*, Can.
Signato fasciato (*It.*).

Habit. Confined to the Venetian lagoons.

337. *SYNGNATHUS ABASTER*, Risso.
Signato cristato (*It.*).

Habit. Venice ; rare ; attains to five inches in length.

Season. May, August.

338. *SYNGNATHUS AGASSIZII*, Michah.
Syngnathus muræna, *Kaup.*
Signato dell' Agassiz (*It.*).

Habit. Venice ; rare ; six inches in length.

Season. July to September.

339. *SYNGNATHUS BREVIROSTRIS*,
H. & E.

Signato brevirostre (*It.*).

Habit. General and common ; length, five to six inches.

Gen. III. NEROPHIS, *Kaup.*

340. *NEROPHIS OPHIDION*, *Kaup.*
Syngnathus ophidion, *L.*

The Straight-nosed Pipe-fish.

Nerofide cristata (*It.*).

Habit. Has a southern extension ; Spalato, Dalmatia ; rare ; length, seven to eight inches.

Season. May.

341. *NEROPHIS PAPACINUS*, Risso.
N. maculata, *Raff.*

Nerofide macchiata (*It.*).

Habit. Rarer than No. 340 ; Trieste, Spalato ; length, eleven to twelve inches.

Season. Summer.

Gen. IV. HIPPOCAMPUS, *Cuv.*

342. *HIPPOCAMPUS BREVIROSTRIS*,
Cuv.

Hippocampus antiquorum, *Leach.*

The Sea-horse, Short-snouted Hippocampus.

Cheval marin.

Das Seepferdchen.

Pferdeförmiger Nadelfisch.

Hippocampo brevirostre (*It.*).

Vulg., Caval marin (*Tr.*, *Ven.*).

Cavallo storno (*Ven.*).

Caval di mar (*Fiume*).

Croat., Konj morski, Konj od mora (*Croat. littoral*), Konjić morski (*Spalato*).

Habit. General, and common at Trieste ; length, six inches ; rare at Spalato.

Season. Summer.

Quality. o.

343. *HIPPOCAMPUS GUTTULATUS*,
Cuv.

Hippocampo comune (*It.*).

Vulg. As No. 342.

Croat. As No. 342.

Habit. General, and more common than No. 342.

Order—PLECTOGNATHI.

Fam. I. SCLERODERMI—File-fishes.

Gen. BALISTES, *Cuv.*

344. *BALISTES CAPRISCUS*, Gm.
The File-fish, Mediterranean File-fish, Pig-faced Trigger-fish.
Le poupon noble.
Der Hornfisch, Seebock, Schiessfisch.
Balista caprisco (*It.*).
Vulg., Pesce balla, pesce balestra (*Tr.*, *Ven.*, *Fiume*).
Croat., Mihača.
Habit. General; Venice, Trieste; rare; not uncommon in the south (Spalato).
Season. Summer.
Quality. o.

Fam. II. GYMNODONTES—Sun-fishes.

Gen. ORTHAGORISCUS, *Bl. Schn.*

345. *ORTHAGORISCUS MOLA*, L.
Tetrodon mola, L.
The Molebut, Sun-fish.
Le Mole.
Der Mondfisch, Klumpfisch.
Ortagorisco luna (*It.*).

- Vulg.*, Pesce luna, pesce balla (*Tr.*), pesce balla, pesce barila (*Fiume*), pesce luna, pesce rioda, pesce rioda ruvido, (*Ven.*).
Mjesečarka, butac, bucàt mjesečara (*Croat.*).
Habit. General, but rare; sp. from Venice, Trieste, Spalato.
Season. July, August.
Quality. o; attains to a length of upwards of three feet.
346. *ORTHAGORISCUS TRUNCATUS*, Retz.
Truncated Sun-fish.
Der Mondfisch.
Ortagorisco del Planco (*It.*).
Vulg., Girasol (*Fiume*).
Pesce luna, Pesce balla (*Tr.*).
Pesce rioda liscio (*Ven.*).
Croat. As No. 345.
Habit. General, but rare; sp. from Trieste, Curzola, St. Pietro della Brazza, Neum, Czirquenicza, off the island of Solta.
Season. Occasionally caught in July, August, and April.
Quality. o; attains to a length of twenty inches.

Sub-Class—CYCLOSTOMATA.

Fam. PETROMYZONTIDÆ—Lampreys.

Gen. PETROMYZON, *Art.*

347. *PETROMYZON MARINUS*, L.
The Lamprey, Sea Lamprey, Spotted Lamprey.
La Lamproie de mer, la grande Lamproie.
Die Seelamprete, das Neunauge, die Pricke, Meerpricke.
Lampreda marina (*It.*).
Vulg., Lampreda, Lampreda di mar (*Tr.*, *Ven.*, *Fiume*).

- Magna (Mangia) pegola* (*Tr.*, *Fiume*).
Croat., Lamprida, Paklena.
Paklara (*Spalato*).
Habit. General, though rare; ascends the rivers in spring; found in most rivers flowing into the Adriatic; also in Dalmatia (Narenta).
Season. Summer.
Quality. Flesh savoury.

* *i.e.* "Pitch-eater"

348. *PETROMYZON FLUVIATILIS*, L.
The River Lamprey
Lamproie de rivière.
Das Flussneunauge.
Lampreda di fiume (*It.*).
Vulg., Lampreda, Lampredone, Lampreda
d'argento (*Ven.*), Lampreda di sasso,
(*Treviso*).
Hung., Orsóhal.
Sloven, Piškúr (*Carniola*).
Croat., Lamprida, zmijulica. Piškor, potočni
piškor.
Habit. Lake of Garda, river Ticino, and, gene-
rally speaking, in lakes, rivers, streams, and
stagnant waters; also in the lagoons of
Venice; further south it becomes very rare;
length, twelve to eighteen inches.
349. *PETROMYZON PLANERI*, Bl.
Petromyzon branchialis, L. (*the young*).

- The Fringe-lipped Lampern, Planer's Lam-
prey.
La petite Lamproie.
Das kleine Neunauge, die kleine Pricke.
- The Young*:—
The Pride, Sand-piper, Small Lamprey,
Mud Lamprey, Sandpride, Sandprey.
Le Lamprillon.
Die Uhle.
Piccola Lampreda (*It.*).
Vulg., Lampreda piccola, Lampreda di sasso,
(*Treviso*).
Sloven, Pohkaža, *young* (*Carniola*).
Croat., Obloustka, potočni piškor.
- Habit.* All over Italy, watershed of the Adria;
Lake of Garda, Monfalcone; the most com-
mon of the genus.
- Quality.* Flesh good when mature; young used
as bait; attains seven to nine inches in length.

Sub-Class—LEPTOCARDII.

- Fam. CIRROSTOMI.
Gen. BRANCHIOSTOMA, *Costa*.
350. *BRANCHIOSTOMA LANCEOLA-
TUM*, Pall.
Branchiostoma lubricum, *Costa*.

- The Lancelet.
Croat., Suličica.
- Habit.* Appears to be very rare in the Adria;
has been caught off the island of Lésina
(Dalmatia).

NEW FISHES OF THE ADRIATIC.*

- Fam. CARCHARIIDÆ.
Gen. CARCHARIAS.
351. *CARCHARIAS LAMIA*, Risso.
Prionodon lamia, *Risso*.
Habit. Two specimens have been caught in
Dalmatian waters, of which one is in the

- Trieste Museum. (*See* "La Pesca," by Dr.
Carlo de Marchesetti, Trieste, 1882, p. 137.)
352. *CARCHARIAS GLYPHIS*, M. & H.
Prionodon glyphis, *M. & H.*
Habit. One specimen in the Trieste Museum
was caught in Dalmatian waters. (*See* as
above, No. 351.)

* *See* the "Elenco dei Pesci dell' Adriatico" di
Alberto Perugia, Milano, 1881, and "Fische welche in
den Gewässern von Spalato beobachtet und überhaupt
im Adriatischen Meere registriert wurden" von Prof.
George Kolombatović, Spalato, 1882, and "La Pesca
lungo le coste Orientali dell' Adria" del Dr. Carlo de
Marchesetti, Trieste, 1882.

- Fam. LAMNIDÆ.
Gen. ODONTASPIS.
353. *ODONTASPIS TAURUS*, Raf.
Habit. Two specimens were fished in Dalmatian

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Solta, where it had been washed ashore. This is supposed to be the first fish of this species which has been caught in these waters.

Fam. CARANGIDÆ.

Gen. TEMNODON.

363. *TEMNODON SALTATOR*, Bl.
Skipjack.

Habit. In the winter 1879-80 ten specimens were caught in the channel off Almissa (Dalmatia), and one specimen was found in the same year in the Trieste fish-market.—STEINDACHNER, GIGLIOLI. (See "Pesci di Spalato," by Prof. Kolombatović.)

Fam. CORYPHÆNIDÆ

Gen. SCHEDOPHILUS, *Cocco*.

364. *SCHEDOPHILUS BOTTERI*, Steindachner.
S. Berthelotii, *Val.*

Habit. From a single specimen from Lésina in the Viennese Museum. (See Perugia's "Elenco," No. 73.)

Fam. SCOMBRIDÆ.

Gen. PELAMYS.

365. *PELAMYS UNICOLOR*, Gthr.
Habit. Very rare; a dried specimen in the Museum at Trieste. (See Perugia's "Elenco," No. 61.)

Gen. ECHENEIS.

366. *ECHENEIS SCUTATA*, Gthr.
Habit. From a single specimen described by Perugia in his "Elenco," No. 65, and Plate II., now in the Florence Collection of Vertebrates.

Fam. GOBIIDÆ.

Gen. GOBIUS.

367. *GOBIUS LESUEURI*, Risso.
Croat. Popauk (*Spalato*).

Habit. Common at Spalato; inhabits deep water on muddy beds (KOLOMBATOVIĆ); also common in the waters of Istria.—STEINDACHNER & NINNI.

368. *GOBIUS BUCHICHII*, Steindachner.
Croat. Glamočić (*Spalato*).

Habit. This new and quite distinct sp. is common (at Spalato) amongst the rocks on muddy beds partly covered with shingle.—KOLOMBATOVIĆ.

369. *GOBIUS ZEBRA*, Risso.
Croat. Glamoč (*Spalato*).

Habit. Not uncommon in spring along the shores of Spalato.—STEINDACHNER. Common at Trieste.—PERUGIA.

370. *GOBIUS PUSILLUS*, Can.
Habit. Zaole; rare. (See Perugia's "Elenco," No. 93.)

Gen. LATRUNCULUS.

371. *LATRUNCULUS PELLUCIDUS*, Nardo.
Croat. Mlič (*Spalato*).

Habit. Common along the coast from Traü, the Riviera delle Castella, as far as Vranjica, where the sea-water is tempered by the sweet water of the river Giadro.—KOLOMBATOVIĆ.

Season. Common from the commencement of spring to the end of summer; rare during the rest of the year.

Gen. CALLIONYMUS.

372. *CALLIONYMUS FASCIATUS*, C. & V.
Vulg., Guatta.

Habit. First cited by Ninni in the Adriatic; a specimen is in the Trieste Museum from Istria. (See Perugia's "Elenco," No. 103.)

Fam. BLENNIIDÆ.

Gen. BLENNIUS.

373. *BLENNIUS CANEVÆ*, Vinciguerra.*Croat.* Prhna ribica (*Spalato*).*Habit.* A new sp. recently described by Dr. Vinciguerra (Genoa) according to a specimen caught in the Gulf of Genoa. Since found in 1881 by Dr. Kolombatović in the Canale delle Castella, near Spalato; frequents the cavities of large rocks.*Season.* Spring, summer, and autumn.374. *BLENNIUS TRIGLOIDES*, C. & V.*Habit.* Lésina.—GIGLIOLI. (See Perugia's "Elenco," No. 114.)

Fam. MUGILIDÆ.

Gen. MUGIL.

375. *MUGIL LABEO*, Cuv.*Habit.* Rare; Ragusa.—GIGLIOLI. (See Perugia's "Elenco," No. 127.)

Fam. GADIDÆ.

Gen. GADUS.

376. *GADUS POUTASSOU*, Risso.Merlangus albus, *Yarrell*.Couch's Whiting, *Yarrell*.*Habit.* Very rare. Ninni, *loco cit.* (See Perugia's "Elenco," No. 152.)

Gen. HYSIPTERA.

377. *HYSIPTERA ARGENTEA*, Gthr.Lota argentea, *Bp.**Habit.* Professor Stossich mentions this sp. as having been met with at Trieste.

Fam. OPHIDIIDÆ.

Gen. FIERASFER.

378. *FIERASFER DENTATUS*, Cuv.

Drummond's Echiodon.

Habit. Two specimens of this species have been caught at Venice, and one at Spalato; two are in the Trieste Museum.—KOLOMBATOVIĆ.

Fam. PLEURONECTIDÆ.

Gen. ARNOGLOSSUS.

379. *ARNOGLOSSUS BOSCHII*, Risso.*Habit.* Lower Adriatic; quoted by Ninni, "Anacantini Basso Adriatico." (See Perugia's "Elenco," No. 168.)

Gen. SOLEA.

380. *SOLEA IMPAR*, Benn.Solea lascaris, *Bp.*Solea nasuta, *Nordm.*Sogliola dal porro (*It.*).*Vulg.*, Sfoglio dal porro (*Ven.*).*Habit.* According to Ninni this sp. is very common in the lagoons of Venice and in the sea.*Season.* June to October; rarely in winter.*Quality.* Inferior to *S. vulgaris*.*Note.* This sp. is entirely distinct from *Solea lascaris*, Risso (No. 264). (See Günther's "Catalogue of Fishes in the British Museum," also Professor Ninni's "Gli Anacantini del Mare Adriatico," and Professor Kolombatović's "Pesci delle Acque di Spalato.") Professor Stossich does not cite this sp.

Fam. SALMONIDÆ.

Gen. SALMO.

381. *SALMO TRUTTA*, L.*Habit.* A specimen weighing three kilos was caught on the 24th December, 1879, off Vranjica, near Spalato.—GIGLIOLI. According to Professor Kolombatović it appears that, hitherto, no other author has mentioned this sp. as having been found in Mediterranean waters.

Fam. MURÆNIDÆ.

Gen. OPHICHTHYS.

382. *OPHICHTHYS CÆCUS*, L.*Habit.* A specimen was caught off Zirona in October, 1881; the first one cited in the Adriatic. (See Kolombatović, "Fische," p. 50.)

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B. LIST of BRITISH FISHES which are common to the ADRIATIC FAUNA.

24 FRESH-WATER FISHES.

The Sturgeon (*Acipenser sturio*), the Fresh-water Perch, the Bullhead, 2 Sticklebacks, the Burbot, the Carp, the Barbel, the Gudgeon, the Chubb, the Rudd, the Minnow, the Tench, the Loach, the Groundling, the Pike, the Trout, the Grayling, 2 Shads, the Eel, 3 Lampreys.

126 SEA FISHES.

14 *Sharks*, viz. : the Blue Shark, the Tope, the Hammer-head, the Smooth-hound, the Porbeagle, the Fox, the Basking Shark, the Grey Notidanus, 2 Spiny Dogs, 3 Dog-fishes, and the Angel-fish.

10 *Rays*, viz. : 2 Electric Rays, 5 Rays, 1 Sting Ray, and 2 Eagle Rays.

66 *Acanthopterygii*, viz. : the Basse, the Stone-basse, 2 Serranus, the Dentex, 1 Mendole, 2 Red Mulletts, the Black Sea-bream, the Bogue, the Braize, Couch's Sea-bream, the Spanish Sea-bream, the Common Sea-bream, the Gilt-head, the Axillary Bream, the Umbrina, the Meagre, the Sword-fish, the Hair-tail, the

Horse Mackerel, the Derby, the Pilot-fish, the Boar-fish, the John Dory, the Black-fish, Ray's Sea-bream, 2 Mackerels, the Tunny, the Bonito, the Germon, the Pelamid, the Plain Bonito, the Remora, 2 Weevers, the Angler, 6 Gurnards, 1 Flying Gurnard, 7 Gobies, 1 Dragonet, the Band-fish, 4 Blennies, 1 Atherine, 3 Grey Mulletts, the Trumpet-fish, 3 Suck-fishes.

4 *Acanthopterygii Pharyngognathi*, viz. : 4 Wrasses.

18 *Anacanthini*, viz. : the Whiting, the Poor, the Bib, Couch's Whiting, the Hake, the Forked Hake, 2 Rock Lings, the Bearded Ophidium, Drummond's Echiodon, the Turbot, the Brill, the Topknot, the Scald-fish, the Plaice, 3 Soles.

6 *Physostomi*, viz. : the Gar-pike, the Saury-pike, the Anchovy, the Pilchard, the Conger-eel, the Murry.

4 *Lophobranchii*, viz. : 3 Pipe-fishes, 1 Seahorse.

3 *Plectognathi*, viz. : 1 File-fish, 2 Sun-fishes.

1 *Leptocardii*, viz. : the Lancelet.

C. LIST of FIVE FISHES *belonging exclusively to the ADRIATIC FAUNA.*

Reference No. to Systematic List.	Description.	Reference No. to Systematic List.	Description.
42	Trygon thalassia.	163	Gobius quadrivittatus.
77	Cantharus brama.	260	Pleuronectes italicus.
155	Gobius Knerii.		

D. LIST of THIRTY-ONE FISHES *which are only quite accidentally met with in the Adriatic.*

Reference No. to Systematic List.	Description.	Reference No. to Systematic List.	Description.
11	Odontaspis ferox.	122	Scomber pneumatophorus.
353	„ taurus.	126	Thynnus pelamys.
13	Selache maxima.	127	„ alalonga.
354	Scyllium acanthomotum.	366	Echeneis scutata.
24	Echinorhinus spinosus.	165	Gobius elongatus.
37	Raja radula.	167	Callionymus lyra.
45	Pteroplatea altavela.	184	Blennius pholis (?).
49	Dicerobatis Giornæ.	206	Lophotes cepedianus.
355	Acipenser stellatus.	211	Labrus maculatus.
356	Serranus acutirostris.	234	Gadus luscus.
360	Pagrus Ehrenbergii.	377	Hypsiptera argentea.
93	Sebastes imperialis.	241	Motella mustela.
102	Trichiurus lepterus.	259	Pleuronectes platessa.
362	Thyrsites pretiosus.	271	Aulopus filamentosus.
364	Schedophilus Botteri.	381	Salmo trutta. -
120	Ausonia Cuvieri.		

E. LIST of FOURTEEN FISHES *which belong more especially to the*
VENETIAN FAUNA.

Reference No. to Systematic List.	Description.	Reference No. to Systematic List.	Description.
33	Raja asterias.	259	Pleuronectes platessa.
34	„ fullonica.	380	Solea impar.
68	Mæna jusculum.	304	Cyprinodon calaritanus.
165	Gobius elongatus.	333	Siphonostoma rotundatum.
200	Lepadogaster listellus.	336	Syngnathus tænonotus.
376	Gadus poutassou.	337	„ abaster.
246	Ophidium vassalli.	338	„ Agassizii.

F. LIST of FORTY-EIGHT FISHES *which belong more especially to the*
DALMATIAN FAUNA.

Reference No. to Systematic List.	Description.	Reference No. to Systematic List.	Description.
351	Carcharias lamia.	154	Gobius quagga.
352	„ glyphis.	155	„ Knerii.
9	Lamna Spallanzanii.	160	„ guttatus.
353	Odontaspis taurus.	163	„ quadrivittatus.
354	Scyllium acanthomotum.	368	„ Buchichii.
23	Spinax niger.	166	Latrunculus albus.
48	Rhinoptera marginata.	371	„ pellucidus.
355	Acipenser stellatus.	175	Blennius rouxi.
60	Anthias sacer.	183	„ galerita.
62	Serranus cabrilla.	373	„ Canevæ.
66	Dentex gibbosus.	374	„ trigloides.
357	„ filosus.	201	Lepadogaster Brownii.
358	„ macrophthalmus.	206	Lophotes cepedianus.
69	Mæna zebra.	230	Julis speciosus.
82	Sargus vulgaris.	241	Motella mustela.
360	Pagrus Ehrenbergii.	244	Ophidium Broussonetii.
361	Pagellus acarne.	257	Rhomboidichtys podas.
93	Sebastes imperialis.	258	„ mancus.
102	Trichiurus lepturus.	381	Salmo trutta.
362	Thyrsites pretiosus.	318	Clupea aurita.
104	Caranx dentex.	328	Ophichthys imberbis.
112	Zeus pungio.	382	„ cæcus.
128	Pelamys sarda.	329	Muræna helena.
147	Dactylopterus volitans.	350	Branchiostoma lanceolatum.

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I. TABLE of the FRESH-WATER and SEA FISHES, showing the number of Species belonging to each Family.

Names of Families.					Fresh-water Fishes.			Sea Fishes.			TOTAL.			
					Family.	Genus.	Species.	Family.	Genus.	Species.	Family.	Genus.	Species.	
CHONDROPTERYGII—SHARKS.														
1	Carchariidæ (Blue Shark, Tope, Hammerhead, Hound)	...	...	...	...	...	...	1	4	9	1	4	9
2	Lamnidæ (Porbeagle, Fox-Shark, Basking-Shark)	...	...	..	...	...	...	1	5	7	1	5	7
3	Notidanidæ	...	...	...	...	...	...	1	1	3	1	1	3
4	Scyllidæ (Dog-fishes)	..	...	...	...	...	...	1	2	4	1	2	4
5	Spinacidæ (Spiny Dogs)	...	...	...	...	...	...	1	4	5	1	4	5
6	Rhinidæ (Angel-fish)	...	...	...	...	...	...	1	1	2	1	1	2
	TOTAL	...	...	...	...	...	...	6	17	30	6	17	30
RAYS.														
1	Torpedinidæ (Electric Rays)	...	...	...	...	...	...	1	1	3	1	1	3
2	Rajidæ (Rays and Skates)	...	...	...	...	...	...	1	1	12	1	1	12
3	Trygonidæ (Sting-Rays)	...	...	...	...	...	...	1	2	4	1	2	4
4	Myliobatidæ (Eagle-Rays)	...	...	...	...	...	...	1	3	4	1	3	4
	TOTAL	...	...	...	...	...	...	4	7	23	4	7	23
GANOIDEI.														
1	Sturgeons	...	...	...	...	...	...	1	1	7	1	1	7
ACANTHOPTERYGII.														
1	(Percidæ (Perch tribe)	...	...	...	1	2	2	} 1 {	6	9	} 1 {	8	11
	} Pristipomatidæ	3							10	3	10
2	Mullidæ (Red Mullet)	..	...	...	...	...	...	1	1	2	1	1	2
3	Sparidæ (Sea-breams)	...	...	...	...	...	...	1	8	20	1	8	20
4	Scorpænidæ (Scorpions)	...	...	...	...	...	...	1	2	3	1	2	3
5	Sciænidæ (Meagres)	...	...	...	...	...	...	1	3	3	1	3	3
6	Xyphiidæ (Sword-fishes)	...	...	...	...	...	...	1	2	2	1	2	2
7	Trichiuridæ (Scabbard-fishes, Hair-tails)	...	...	...	...	...	...	1	3	3	1	3	3
8	Carangidæ (Horse Mackerels, Pilot-fish, Boar-fish)	...	...	...	...	...	...	1	7	9	1	7	9
9	Cyttidæ (John Dory)	...	...	...	...	...	...	1	1	2	1	1	2
10	Stromateidæ	...	...	...	...	...	...	1	2	4	1	2	4
11	Coryphænidæ (Dolphins)	...	...	...	...	...	...	1	4	5	1	4	5
12	Scombridæ (Mackerel, Tunny, Bonito, Remora)	...	...	...	...	...	...	1	5	12	1	5	12
13	Trachinidæ (Weevers, Star-gazers)	...	...	...	...	...	...	1	2	5	1	2	5
14	Pediculati (Anglers)	...	...	...	...	...	...	1	1	2	1	1	2
15	Cottidæ (Gurnards, Bull-heads)	...	...	...	1	1	1	1	2	7	1	3	8
16	Cataphracti (Flying Gurnards)	...	...	...	...	...	...	1	2	2	1	2	2
17	Gobiidæ (Gobies, Dragonets)	...	...	...	1	1	3	1	3	27	1	3	30
18	Cepolidæ (Band-fishes)	...	...	...	...	...	...	1	1	1	1	1	1
19	Blenniidæ (Blennies)	...	...	...	1	1	2	1	3	14	1	3	16
20	Sphyrænidæ (Spet)	...	...	...	...	...	...	1	1	1	1	1	1
21	Atherinidæ (Atherines)	...	...	...	...	...	...	1	1	3	1	1	3
22	Mugilidæ (Mullet)	...	...	...	...	...	...	1	1	6	1	1	6
23	Gasterostidæ (Sticklebacks)	...	...	...	1	1	2	...	...	...	1	1	2
24	Centriscidæ (Trumpet-fish)	...	...	...	...	...	...	1	1	1	1	1	1
25	Gobiesocidæ (Suck-fishes)	...	..	...	...	..	..	1	2	7	1	2	7
26	Lophotidæ	...	...	...	...	...	...	1	1	1	1	1	1
27	Trachypteridæ (Ribbon-fishes)	...	..	...	...	..	..	1	1	2	1	1	2
	TOTAL	..	...	...	5	6	10	26	69	163	27	73	173
	Carried forward	...	...	...	6	7	17	36	93	216	38	98	233

INDEX to Fresh-water Fishes and Sea Fishes (continued).

Names of Families.						Freshwater Fishes.			Sea Fishes.			TOTAL.		
						Family.	Genus.	Species.	Family.	Genus.	Species.	Family.	Genus.	Species.
Brought forward						6	7	17	36	93	216	38	98	233
ACANTHOPTERYGII PHARYNGO-GNATHI.														
1	Pomacentridæ (Coral-fishes) ... ..					...	...	...	1	1	1	1	1	1
2	Labridæ (Wrasses) ... ..					...	...	...	1	6	21	1	6	21
TOTAL ... ..						...	...	...	2	7	22	2	7	22
ANACANTHINI.														
1	Gadidæ (Cod tribe)					1	1	1	1	5	12	1	6	13
2	Ophidiidæ (Sand-Eels, &c.) ... ..					...	...	...	1	4	8	1	4	8
3	Macruridæ ... ..					...	...	...	1	1	1	1	1	1
4	Pleuronectidæ (Flat-fishes) ... ..					...	...	...	1	8	22	1	8	22
TOTAL						1	1	1	4	18	43	4	19	44
PHYSOSTOMI.														
1	Scopelidæ ... ..					...	...	...	1	2	2	1	2	2
2	Cyprinidæ (Carp tribe)... ..					1	12	32	...	...	...	1	12	32
3	Cyprinodontidæ... ..					1	1	1	...	...	...	1	1	1
4	Scombresocidæ (Gar-pike, Saury, Flying-fish)					...	...	...	1	3	4	1	3	4
5	Esocidæ (Pike)					1	1	1	...	...	...	1	1	1
6	Salmonidæ (Salmon)					1	2	7	1	1	1	1	3	8
7	Clupeidæ (Herring tribe)					1	1	2	1	2	4	1	2	6
8	Murænidæ (Eel tribe)					1	1	2	1	4	7	1	5	9
TOTAL						6	18	45	5	12	18	8	29	63
LOPHOBRANCHII.														
1	Sygnathidæ (Pipe-fishes, Sea-Horses) ...					...	...	...	1	4	13	1	4	13
PLECTOGNATHI.														
1	Sclerodermi (File-fishes) ... ..					...	...	...	1	1	1	1	1	1
2	Gymnodontes (Sun-fishes) ... ..					...	...	...	1	1	2	1	1	2
TOTAL ... ..						...	...	...	2	2	3	2	2	3
CYCLOSTOMATA.														
1	Petromyzontidæ (Lampreys)					1	1	3	...	...	...	1	1	3
LEPTOCARDII.														
1	Cirrostomi (the Lancelet) ... ..					...	...	...	1	1	1	1	1	1
GRAND TOTAL						14	27	66	51	137	316	57	161	382

PART V.—LIST OF INVERTEBRATA.*

MOLLUSCA.

Class I. CEPHALOPODA.

Fam. OCTOPODIDÆ.

Gen. OCTOPUS, *Cuv.*1. *OCTOPUS VULGARIS*, Lamark.

The Poulp or Octopus.

La Poulpe.

Gemeiner Vielfuss, grosser Tintenfisch,
grosse Sprutte.*Vulg.*, Folpo, Folpo todero, Polpo.Folpi toti (*Ven.*).*Croat.*, Mèrkačić, Hobot, Karakatnica,
Hobotnica, Ubotnica.Muzgavac (*Spalato*).*Habit.* General and common, but not much prized.Gen. ELEDONE, *Leach.*2. *ELEDONE MOSCHATA*, Risso.

Die Bisamsprutte, Bisam Tintenfisch.

Vulg., Folpo, Folpo da risi (*Ven.*), Mus-
cardino, Muscarolo, (*Ven.*).*Croat.*, Mèrkač, Hobotnica, Pèrč.*Habit.* General and common; much prized by
the poor.

Fam. II. LOLIGIDÆ.

Gen. LOLIGO, *Lam.*3. *LOLIGO VULGARIS*, Lam.

The Squid.

Calmar, Rautenförmiger Tintenfisch.

Vulg., Calamajo, Calamaro, Kalimar, Kala-
mar, Totano.*Croat.*, Liganj.Lignja ili obična crna kraka (*Spalato*).Pocuranac (*Fiume*).*Habit.* General and common; the most valued
of the Cephalopods.4. *LOLIGO SAGITTATA*, Lam.

Pfeilformiger Tintenfisch.

Vulg., Calamaro todero, Calamar toto.*Habit.* Not common and little prized; Gulf of
Venice.Gen. SEPIOLA, *Rond.*5. *SEPIOLA RONDELETTII*, Leach.

Kleine Sprutte, Kleiner Tintenfisch.

Vulg., Sepiola, Sepolina, Zottolina, Zottolo,
Calmaretto, Seppetta.*Croat.*, Sipica.*Habit.* General and common, and prized as
food.Fam. III. SEPIADÆ, *d'Orb.*Gen. SEPIA, *L.*6. *SEPIA OFFICINALIS*, L.

Cuttle-fish, Black-fish.

La Seiche.

* This list comprises only the more important kinds,
viz., those which have a commercial value, or boast of a
local name.

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Habit. Sometimes caught in large quantities and brought to market; inhabits depths of twenty-five fathoms on muddy beds; Trieste, Quarnero; general.

Fam. VII. TURRITELLIDÆ, *Clarck.*

Gen. TURRITELLA, *Lam.*

15. *TURRITELLA COMMUNIS*, *Risso.*

Thurmschnecke, Thurmschraube.

Vulg., Campanile.

Croat., Bumburak, bamburač, Tornjić, Kampanil.

Habit. Common in the greater depths (twenty-five to thirty fathoms) on muddy beds; Trieste, Quarnero.

Fam. VIII. TROCHIDÆ, *Adams.*

Gen. I. TROCHUS, *L.*

16. *TROCHUS CONOLUS*, *L.*

Top-shells.

Eckmund.

Vulg., Caragolo (*generic*).

Croat., Narikle, čigraši (*generic*).

Habit. In twenty-five fathoms; Grignano, Punta Grossa, Pirano, Rovigno, Trieste, Quarnero, Dalmatia; not uncommon.

17. *TROCHUS BIASOLETTI*, *Phil.*

Kreiselschnecke.

Caragolo tondo (*It.*).

Vulg., Trottole bianchiccia.

Croat., Nanarica, Nanarić.

Habit. Common on the limestone beds in six to ten fathoms off Sestiane; Quarnero, Zara.

18. *TROCHUS ADRIATICUS*, *Phil.*

Adriatischer Kreisel.

Caragolo (*It.*).

Vulg., Caragoletti da galanterie (*Ven.*).

Habit. Littoral univalves found on *algæ* in the salines of Zaole, Capo d'Istria, Pirano; shells used as women's ornaments.

19. *TROCHUS VARIUS*, *L.*

Geschnecker Eckmund.

Caragolo tondo (*It.*).

Vulg., Naridola.

Habit. Zaole, Barcola, Rovigno, Quarnero; rare.

20. *TROCHUS UMBILICARIS*, *L.*

Caragolo tondo di mar (*It.*).

Habit. Rare; Rovigno, Quarnero, Dalmatia.

21. *TROCHUS ZIZYPHINUS*, *L.*

Jujuben Kreisel.

Caragolo, Naridola grande (*It.*).

Habit. Rare; on sandy beds in twenty fathoms; Capo d'Istria, Pirano, Venice, Zara.

Gen. II. MONODONTA, *Lam.*

22. *MONODONTA FRAGAROIDES*, *Lam.*

Trochus tessellatus, *Gm.*

Bunte Kreiselschnecke.

Naridola (*It.*).

Habit. Littoral univalves found more or less all along the coast adhering to stones; edible.

23. *MONODONTA ARTICULATA*, *Lam.*

Grüne Kreiselschnecke.

Naridola (*It.*).

Habit. As above; Isola, Trieste, Venice, Zara, Curzola.

Gen. III. TURBO, *L.*

24. *TURBO RUGOSUS*, *L.*

Runzeliger Rundmund.

Vulg., Occhio di Santa Lucia.

Habit. Common on limestone beds in eight to ten fathoms; Quarnero, Isola, Pirano; little eaten; shells used as women's ornaments.

Fam. IX. HALIOTIDÆ.

Gen. HALIOTIS, *L.*

25. *HALIOTIS TUBERCULATA*, *L.*

Seeohr, Meerohr, gemeines Meerohr.

Vulg., Orecchio di San Pietro.

Croat., Zlatinka, Puzlatka (*Spalato*).

Habit. Attached to stones in shallow water; Pirano, Zaole; common in the south of Istria; Quarnero.

Fam. X. FISSURELLIDÆ.

Gen. FISSURELLA, *Brug.*

26. *FISSURELLA COSTARIA*, Desh.

Spaltschnecke, Schlitzschnecke.

Vulg., Pantalena, Santalena.

Croat., Priljepak, Razporka, čupka (*Spalato*).

Habit. Isola, Pirano, Rovigno, Dalmatia; edible and pretty common in medium depths, attached to stones.

Fam. XI. PATELLIDÆ.

Gen. PATELLA, *L.*

27. *PATELLA VULGATA*, *L.*

Common Limpet.

Gemeine Schüsselschnecke, Napfschnecke.

Vulg., Pantalena, Santalena.

Croat., Priljepak, Lupar, Bljudica.

Habit. Quarnero.

Fam. XII. CHITONIDÆ.

Gen. CHITON, *L.*

28. *CHITON SICULUS*, Gray.

Käferschnecke.

Vulg., Salisconi cape.

Croat., Babuška, Priljepak.

Habit. Found attached to stones and *Pinnæ*, off Zaole, Capo d'Istria, Pirano, Quarnero; in one to eight fathoms.

Fam. XIII. DENTALIDÆ, *d'Orb.*

Gen. DENTALIUM, *L.*

29. *DENTALIUM ENTALIS*, *L.*

Der Wolfszahn.

Croat., Slonov zub.

Habit. Rare; Pirano, Quarnero, Dalmatia.

Fam. XIV. BULLIDÆ.

Gen. BULLA, *L.*

30. *BULLA LIGNARIA*, *L.*

Meerblasenschnecke.

Vulg., Berolla di mar.

Croat., Zlatenka.

31. *BULLA HYDATIS*, *L.*

Vulg., Oliva.

Croat., Miehurača.

Habit. Near Trieste, amongst *zostera* and *algæ* on limestone beds; Quarnero, Dalmatia.

Fam. XV. APLYSIIDÆ.

Gen. APLYSIA, *L.*

32. *APLYSIA DEPILANS*, *L.*

Sea-hare.

Der Seehase, die Seelunge.

Lepre marino (*It.*).

Vulg., Coghe de mar.

Croat., Morski zec, Zečac.

Habit. Barcola, Servola, in shallow waters; Quarnero, Venice.

Fam. XVI. HELICIDÆ, *Gray.*

Gen. HELIX, *L.*

Gen. CLAUSILIA, *Drap.*

Snail-shells.

Vulg., Buovoli.

Croat., Puži, Pužići, Spuži, generic (*Spalato*).

33. *HELIX SECERNENDA*, Rossm.

Croat., Glevoć.

Habit. Castelli di Spalato.

34. *HELIX VERMICULATA*, Müller.

Croat., Puž, Spuž.

Habit. Castelli di Spalato.

35. *HELIX APERTA*, Born.

Croat., Kravica.

Habit. Castelli di Spalato.

36. *HELIX PONZOLZI*, Michel.
Croat., Crni spuž, Zenski spuž, Pizdarica.
Habit. Ragusa.
37. *HELIX SETIGERA*, Ziegler.
Croat., Gubavac.
Habit. Ragusa.
38. *HELIX SETOSA*, Ziegler.
Croat., Runjavac.
Habit. Montano di Zara.
39. *ZONITES ACIES*, Partsch.
Croat., Magavetàs.
Habit. Castelli di Spalato.
40. *ZONITES ALBANICUS*, Ziegler.
Croat., Pasjak.
Habit. Duave, near Almissa.
41. *HYALINA CELLARIA*, Müll.
Croat., Poljski slemak.
- Class III. ACEPHALA.
Fam. I. OSTREIDÆ, *Brod.*
Gen. OSTREA, *L.*
The Oyster.
L'huitre.
Die Auster.
Ostrica.
42. *OSTREA ADRIATICA*, Lam.
Ostrea stentina, *Payeandean.*
Ostrica dell' Adriatico (It.).
Vulg., *Ostrica di palo.*
Habit. Limestone beds; not in the lagoons or oyster-ponds.
43. *OSTREA LAMELLOSA*, Brocchi.
Ostrea Cynusii, *Payeandean.*
Vulg., *Ostrica a lamelle (It.)*.
Habit. Reared in ponds; attains to large dimensions, and is much prized; Trieste.
44. *OSTREA EDULIS*, L.
Croat., Oštriga; Kamenica (*Spalato*),
generic terms.

Varieties :—

- a. *Depressa*, *Phillipi.*
Ostrica comune depressa (It.).
Vulg., *Ostrichino.*
Habit. Lagoons of Venice and Zaole, attached to wood and the mussels *Pinna* and *Mytilus*; a small sp., but very savoury and much liked.
- b. *Cristata*, *Auct. (?)*, *Born. (?)*.
Ostrica comune cristata (It.).
Habit. Lagoons, ponds, harbours; on limestone and muddy beds; is the only kind which is found in the Quarnero.
- c. *Falcata*, *Chiereghin.*
Ostrica comune falcata (It.).
Habit. As above.

Fam. II. PECTINIDÆ, *L.*Gen. I. PECTEN, *L.*

45. *PECTEN JACOBÆUS*, L.
Scallop.
Pilgermuschel, Jacobsmuschel.
Capa santa, (It.).
Pellegrina di San Giacomo.
Croat., Pokrovača, Jakovska kapica (*Spalato*).
Habit. Grado, Pirano, Quarnero; much sought for on account of the shells, which are exported; general and common.
46. *PECTEN OPERCULARIS*, L.
Pettine operculare (It.).
Vulg., *Canestrello (generic)*.
Croat., Pokrovača poklopita.
Habit. Formerly much more common than at present; lagoons of Venice; edible; one of the most elegant of the genus; Quarnero, Trieste.
47. *PECTEN GLABER*, L.
Glatte Kamm-muschel.
Pettine vario (It.).

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uncommon in these waters, and *M. minimus* (Poli) is common everywhere, and is found attached to rocks, oysters, *modiola*, etc.

Gen. II. LITHODOMUS, *Lam.*

55. *LITHODOMUS LITHOPHAGUS*,
Lam.

The Date-shell.

See- oder Stein-dattel.

Litodomo litofago (*It.*).

Vulg., Dattolo di pietra, Dattolo di mar,
Dattero di mar (*Ven.*).

Pevarone (*Ven.*).

Croat., Pèrstenac, Prstenci, Prstíci (*Spalato*).

Habit. Pretty general and common in the south of Istria and the Quarnero, and on the eastern coast of the Adriatic; rare on the western coast of Istria, and not known at Venice; found imbedded in the limestone rock; is much esteemed as food.

Gen. III. MODIOLA, *Lam.*

56. *MODIOLA BARBATA*, *L.*

Bartige Miesmuschel.

Modiola barbata (*It.*).

Vulg., Mussolo, Muzzolo, Pedocchio peloso,
Peocio peloso (*Ven.*).

Habit. General and common on muddy and sandy beds; little esteemed as food, and only eaten by the poor.

Fam. V. ARCACIDÆ, *d'Orb.*

Gen. I. ARCA, *L.*

57. *ARCA NOÆ*, *L.*

Noah's Ark, Noah's Lighter.

Arche de Noë.

Noah's Arche, Das Schiffchen.

Arca di Noè (*It.*).

Vulg., Coffano di grotta (*Ven.*), Mussolo
(*Tr.*, *Fiume*).

Croat., Kunjka, Mušul, Pizdica; školjak
(*Ragusa*).

Habit. Pretty general and common; has a disagreeable flavour and is only eaten by the poor.

58. *ARCA BARBATA*, *L.*

Fringed Ark.

Bart Arche, Bärtige Arche.

Arche barbue.

Arca barbata (*It.*).

Vulg., Cofano del duro.

Habit. Fissures of rocks; Venice, Cherso, Salvore, Lussin, Dalmatia.

Gen. II. PECTUNCULUS, *Lam.*

59. *PECTUNCULUS GLYCIMERIS*, *L.*

Orbicular Ark.

Veränderliche Sammtmuschel, glatte Arche,
Gogelhopflein.

Arche glycyméride, Bignet, Vovan.

Arca liscia (*It.*).

Vulg., Pié d'asino.

Croat., Konjina, čaška.

Habit. Pretty common on muddy and sandy beds; Isola, Pirano, Pago; rare at Ragusa and Lésina.

Gen. III. NUCULA, *Lam.*

60. *NUCULA MAGARITACEA*, *Lam.*

Vulg., Fave, Sangue de Turco (*It.*).

Habit. Venice, Trieste, Muggia, Pirano, Cherso, Unie, Val Cassione, Zara, etc., on muddy bed; rare.

Fam. VI. CHAMIDÆ.

Gen. CHAMA, *L.*

61. *CHAMA GRYPHOIDES*, *L.*

Gienmuschel.

Vulg., Ostreghetta del duro.

Habit. Pretty common and general; Quarnero.

Fam. VII. CARDIIDÆ, *Brod.*

Gen. I. CARDIUM, *L.*

62. *CARDIUM EDULE*, *L.*

Common Cockle.

- Essbare Herzmuschel.
Cardium commestibile (*It.*).
Vulg., Capa tonda (*Ven.*).
Croat., Kunjka, čančica; Srčavka (*Spalato*).
Habit. General and common, on muddy and sandy beds in shallow water, imbedded in the mud or sand; is the best of the genus, and forms the object of profitable fishing, especially in the lagoons of Venice; it is best in the winter.
63. *CARDIUM CLODIENSE*, Renier.
 Cardio di Chioggia (*It.*).
Vulg., Capa tonda di valle.
Habit. Lagoons of Venice.
64. *CARDIUM RUSTICUM*, L.
 Runzelige Herzmuschel.
Vulg., Capa tonda rigata, Cocciola.
Croat., Kapica, Solinarka.
Habit. One of the most common of the genus at Trieste; found in shallow water on muddy beds at Zaole, Capo d'Istria, Pirano, etc.
65. *CARDIUM TUBERCULATUM*, L.
 Höckerige Herzmuschel.
Vulg., Capa tonda di mar (*It.*).
Croat., Kapica obla, Morska srčavka (*Spalato*).
Habit. Rather rare; Venice, Sestiane, Capo d'Istria, Pirano, Quarnero, Zara, Curzola, Lésina.
66. *CARDIUM CILIARE*.
Habit. Common at Trieste, Zaole, Capo d'Istria, Pirano, Portoré, Cherso, Veglia, Zara, etc.
Note. Other sp., such as *C. aculeatum* (L.), *C. echinatum* (L.), *C. papillosum* (Poli), *C. parvum* (Phil.), are more or less rare.
- Gen. II. ISOCARDIA, *Lam.*
67. *ISOCARDIA COR*, *Lam.*
 Heart-shell.
Vulg., Bibaron de mar.
Croat., čanča.

Habit. Common at Zara and Spalato; a single sp. from Promontore in Istria; Quarnero.

Fam. VIII. VENERIDÆ, *Leach.*

Gen. I. VENUS, *L.*

68. *VENUS GALLINA*, L.
 Strahlige Gienmuschel.
 Venere gallina (*It.*).
Vulg., Bibarazza, Pevarazza.
Habit. Very common on sand-banks and along the shore of the gulfs of Venice, and Trieste, and in Dalmatia; less common in the Quarnero; it is found imbedded in the sand, and is caught by hand or the *voleghetta*, and in deep water by the *cassa*; is good eating, but is only eaten by the poorer classes.
69. *VENUS VERRUCOSA*, L.
 Wartzige Gienmuschel.
Vulg., Bibarazza di mar, Caparozzolo.
Croat., Prnjavica, Ladinka.
Habit. Common all along the coast on sandy beds.
- Gen. II. CYTHEREA, *Lam.*
70. *CYTHEREA CHIONE*, L.
 Spielmuschel.
 Citerea chione (*It.*).
Vulg., Issolon, Issolone.
Croat., Klapun, Klapunica.
Habit. The most common sp. of the genus in the lagoons of Venice and on the sand-banks of Grado; rare on the deeper sand-banks off the coast of Istria (Pirano, Rovigno), and in the Quarnero; Unie, Zara, Lésina; not inferior eating to the other sp.; shells are large, and are exported for miniature painting.
- Gen. III. TAPES, *Mühlf.*
71. *TAPES EDULIS*, *Chemn.*
 Jungfern Gienmuschel.
 Venere commestibile (*It.*).
Vulg., Caparon, Longon.
Croat., Lisanka (*Fiume*).

Pužica (*Novigrad*).

Habit. Common in the lagoons of Venice, imbedded in the muddy or sandy beds; is indigestible, like the other sp. of this genus, and only eaten by the poorer classes.

72. *TAPES DECUSSATUS*, L.

Gegitterte Gienmuschel.

Clovissa of France.

Venere incrocicchiata (*It.*).

Vulg., Caparozzolo (*Trieste*), Caparozzolo dal scorzo grosso (*Ven.*), Capa tonda di mar.

Croat., Kućica, Gajun (*Veglia*), Pripelanka.

Habit. On mixed clay and sand beds, amongst stones in the lagoons of Venice and the Gulf of Trieste and the Quarnero; the best of the genus, and is much esteemed as food at Venice and Trieste, as also in France, especially in the Provence, where it is known by the name of *clovissa*.

Note. *T. aureus* (Gm.) (*vulg.* Longón), and *T. geographicus* (L.), are also sp. which are common, and are prized as food for the lower classes, especially at Venice.

Fam. IX. TELLINIDÆ, *Latreille*.

Gen. I. DONAX, *L.*

73. *DONAX TRUNCULUS*, L.

Gemeine Dreieck-Muschel.

Donace troncata (*It.*).

Vulg., Cazzonello, Calzinei (*Ven.*).

Habit. Common along the littoral of the Gulfs of Venice and Trieste; rare on the eastern coast; Cherso; lives on the sand close to the shore, and is left dry by the receding tide; is little eaten.

Gen. II. TELLINA, *L.*

74. *TELLINA EXIGUA*, Poli.

Croat., Crljene kućice, Crljenice.

Habit. Sands of Grado, Cherso, Lésina, Curzola.

Gen. III. SCROBICULARIA, *Schum.*

75. *SCROBICULARIA PIPERITA*, Schum.

Ottermuschel.

Scrobicularia peverina (*It.*).

Vulg., Caparozzolo sottile, C. dal scorzo sottile (*Ven.*).

Loca, Loca di fango (*Tr.*).

Habit. Common in the Gulfs of Venice and Trieste on clay and mud beds in shallow water, or on the shore, which is only watered at flood tide, as in the salines of Zaole; lives imbedded in the mud, whence it establishes communication with the outer world by means of two siphons, about six inches in length, which extend through the mud; at ebb-tide it is caught by hand or the *voleghetta*, or is dug out with a spade; common in the markets of Trieste and Venice, where it is valued as food, making a good soup; Quarnero, Zara, Spalato, Ragusa.

Fam. X. MACTRIDÆ, *Fleming*.

Gen. I. MACTRA, *L.*

76. *MACTRA LACTEA*, Poli.

Milchweisse Trogmuschel.

Madia candida (*It.*).

Vulg., Bibaron di marina (*Ven.*).

Habit. Inhabits the sand and is often left dry by the receding tide; is little eaten, although not bad food; Venice, Grado, Zaole.

77. *MACTRA STULTOSUM*, Auct.

Maetra corallina, *L.*

Gefärbte Trogmuschel.

Madia corallina (*It.*).

Vulg., Bibaron colorito, B. di marina (*Ven.*).

Croat., Kopanjica.

Habit. As above; Capo d' Istria, Veglia, Zara, Meleda, Curzola, Spalato, Almissa.

Gen. II. LUTRARIA.

78. *LUTRARIA ELLIPTICA*, Lam.

Croat., Skipa (*Novigrad*).

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CRUSTACEA.

Gen. STENORRHYNCHUS, *Lam.*

87. *STENORRHYNCHUS PHALANGIUM*, *Lam.*

Vulg., Zanzaloro (*It.*).

Habit. Venice, Trieste, Pirano, Quarnero, Dalmatia.

Gen. INACHUS, *Leach.*

88. *INACHUS SCORPIO*, *Fabr.*

Vulg., Selmo delle grancéole (*It.*).

Habit. General and pretty common on limestone beds.

Gen. MAIA, *Latr.*

89. *MAIA SQUINADO*, *Latr.*

Sea Spider.

Araignée de mer, Grampelle.

Spinnen-Krebs, Seespinne, gemeiner See-Krebs.

Vulg., Granzon, Granzon falso d'aspreo (*male*), Granzéola (*female*) (*It.*).

Croat., Rakovica, Račnjak, Morski pauk.

Habit. General and common; Trieste, Quarnero.

Gen. LAMBRUS, *Leach.*

90. *LAMBRUS MEDITERRANEUS*, *Leach.*

Vulg., Granzo compasso (*It.*).

Croat., Rakovica, šestilo, krugalo.

Gen. IAXEA.

91. *IAXEA NOCTURNA*, *Chier., Nard.*

Vulg., Granzo di notte (*It.*).

Croat., Rakovica, Noćno krugalo.

Gen. XANTHO, *Leach.*

92. *XANTHO FLORIDUS*, *Leach.*

Schwarzscheerige Strandkrabbe.

Vulg., Forfetula (*It.*).

Habit. Venice, Trieste, Pirano, Lussin, Quarnero, Dalmatia.

93. *XANTHO RIVOLOSUS*, *Risso.*

Vulg., Poréssa salvatica (*It.*).

Habit. Quarnero, Venice, Pirano, Lussin, Dalmatia.

Gen. PILUMNUS, *Leach.*

94. *PILUMNUS HIRTELLUS*, *Leach.*

Vulg., Grancipol, Grancipoletto (*It.*).

Croat., Strigljača.

Habit. Trieste, Portoré, Cherso, Lussin, Dalmatia.

Gen. ERIPHIA, *Latr.*

95. *ERIPHIA SPINIFRONS*, *Desm.*

Italienischer Taschenkrebs.

Vulg., Taska, Grancipóro (*male*), Poressa (*female*) (*It.*).

Croat., Grmalj.

Habit. Venice, Rimini, Trieste, Cherso, Pirano, Dalmatia.

Gen. CARCINUS, *Leach.*

96. *CARCINUS MÆNAS*, *Leach.*

Common Shore-crab, Harry-Crab.

Crabe commun, Cr. enragé, Ménade.

Gemeine Krabbe, Gemeiner Seekrebs.

Vulg., Granzo, Spiantano (*male*), Masanetta, Masinetta (*female*), Molecca, Molecche (*with the soft shell*) (*It.*).

Croat., Rak, obična rakovica, gola rakovica (*Spalato*).

Habit. General and common; Venice, Trieste, Cherso, Dalmatia.

Gen. PORTUNUS, *Fabr.*

97. *PORTUNUS DEPURATOR*, *Leach.*

Ruderkrabbe.

Vulg., Gambero dell' ala, Granzéola, Granzevolo (*It.*).

Croat., Rakovica, Strigjača.

Habit. Venice, Trieste, Quarnero, Dalmatia.

Gen. PINNOTHERUS, *Latr.*

98. *PINNOTHERUS VETERUM*, Bosc.
Erbsenkrabbe, Erbsenschild, Steckmuschelkrebs.

Vulg., Granzetto d' ostriga (*It.*).

Croat., Račić od ostrige.

Habit. Venice, Trieste, Quarnero, Dalmatia.

99. *PINNOTHERUS PISUM*.

Muschelwächter.

Vulg., Piso (*It.*).

Habit. Venice, Trieste, Quarnero, Dalmatia.

Gen. GONOPLAX, *Leach.*

100. *GONOPLAX RHOMBOIDES*, Fabr.

Vulg., Azzalino, Contrapasso (*It.*).

Habit. On limestone beds; Venice, Trieste, Quarnero, Dalmatia.

Gen. GRAPSUS, *Lam.*

101. *GRAPSUS VARIUS*, Latr.

Schwarzer Taschenkreb.

Vulg., Granzo piatto, Grancipóro (*male*), Poressa (*female*) (*It.*).

Croat., Urak.

Habit. Trieste, Lussin, Dalmatia.

102. *GRAPSUS MARMORATUS*, Fabr.

Marmorirte Viereckskrabbe.

Vulg., Granzo piatto (*It.*).

Croat., Urak.

Habit. Trieste, Quarnero.

Gen. ILIA, *Leach.*

103. *ILIA NUCLEUS*, Herbst.

- *Vulg.*, Zucchetto (*It.*).

Habit. Fiume, Cherso, Dalmatia.

Gen. DROMIA, *Fabr.*

104. *DROMIA RUMPHII*, Bosc.

Kugelkreb.

Vulg., Facchino (*It.*).

Croat., Kosmač, Prug (*Spalato*).

Habit. Venice, Trieste, Pirano, Portoré, Lussin, Dalmatia.

Gen. DORIPPE, *Fabr.*

105. *DORIPPE LANATA*, Latr.

Vulg., Facchino piccolo (*It.*).

Habit. Rimini, Ravenna, Venice, Trieste, Quarnero, Spalato.

Gen. CORISTES, *Latr.*

106. *CORISTES DENTALUS*, Latr.

Vulg., Scarpion di grotta (*It.*).

Croat., Scarpion.

Habit. Very rare; Venice, Quarnero, Lésina.

Gen. PAGURUS, *Fabr.*

107. *PAGURUS MACULATUS*, Roux.

The Great Crab.

Grosser rother Taschenkreb.

Vulg., Granzipóro (*male*), Poressa (*female*) (*It.*).

Habit. Trieste, Pirano, Quarnero, Dalmatia.

108. *PAGURUS BERNHARDUS*, L.

Sp. of *Pagurus* in shells of *Murex*.

Hermit-crab.

L'Ermit, Le Soldat.

Einsiedlerkreb.

Pagurus Arten in Gehäusen von *Murex*.

Vulg., Bulli (Bule) col granzo (*It.*).

Croat., Bramburači, Rak-samac.

Habit. Trieste, Pirano, Dalmatia.

Gen. PORCELLANA, *Lam.*

109. *PORCELLANA LONGICORNIS*, Lam.

Vulg., Scarpion de sabbion, Scarpione de sabionao (*It.*).

Habit. Venice, Trieste, Pirano, Cherso, Lussin, Dalmatia.

Gen. GALATHEA, *Fabr.*

110. *GALATHEA RUGOSA*, Fabr.

Vulg., Scampo morte, Scampa falsa a man lunghe (*It.*).

Croat., Smèrt.

Habit. Rimini, Pirano, Quarnero, Dalmatia.

111. *GALATHEA STRIGOSA*, Fabr.

Vulg., Scampa salvatica (*It.*).

Habit. Venice, Trieste, Pirano, Quarnero, Dalmatia.

112. *GALATHEA SCAMPARELLA*, Chier.

Vulg., Scamparello, Scampetto (*It.*).

Croat., Kozlica, Skila, Hlapić.

Gen. PALINURUS, *Fabr.*

113. *PALINURUS VULGARIS*, Latr.

The Rock-lobster, Spiny Lobster.

Languste (von Locusta), Heuschreckenkrebs.

Vulg., Grillo di mar (*It.*).

Langusta, Agusta, Agosta, Ragosta, Aragosta (*Ven.*).

Astice (*Dalmatia*).

Croat., Prug, Pizdoklep, čèrčak.

Habit. Dalmatia; not north of Lussin.

Gen. GEBIA, *Leach.*

114. *GEBIA LITTORALIS*, Leach.

Vulg., Córbole, Scardóbola (*It.*).

Croat., Karlić.

Habit. Venice, Trieste, Cherso, Osseero, Dalmatia, Taranto.

Gen. ASTACUS, *Fabr.*

115. *ASTACUS FLUVIATILIS*, Fabr.

The Crayfish.

Süßwasserkrebs.

Gámbero d'acqua dolce (*It.*).

Croat., Vodni rak, Potoćni rak.

Habit. Lake of Vrana (Cherso).

Gen. HOMARUS, *Edw.*

116. *HOMARUS VULGARIS*, Edw.

The Lobster.

Der Hummer.

Astice, Astese, Astise (*It.*).

Croat., Astič, Jastog.

Habit. Trieste, Cherso; general and common.

Gen. NEPHROPS, *Leach.*

117. *NEPHROPS NORVEGICUS*, L.

The Norway Lobster.

Norwegischer Krebs, Buchstabenkrebs.

Vulg., Scampo (*Fiume, Trieste*).

Croat., Rak.

Habit. Common in the Quarnero; not found elsewhere in the Adriatic.

Gen. CRANGON.

118. *CRANGON VULGARIS*, Fabr.

The Shrimp.

Garnele, Graue Garnele.

Vulg., Schila, Squilla, Skila (*It.*).

Croat., Obični račić.

Habit. Venice, Trieste, Pirano, Dalmatia.

Gen. SCYLLARUS.

119. *SCYLLARUS ARCTUS*, Fabr.

Vulg., Cigala di mar (*It., Fiume*).

Croat., žežalo (*Fiume*).

Habit. Quarnero, Dalmatia.

120. *SCYLLARUS LATUS*, Latr.

Croat., Kuka.

Habit. Lésina.

Gen. PALÆMON, *Fabr.*

121. *PALÆMON SQUILLA*, Fabr.

The Prawn.

Salicoques of France.

Garnat, Garnele, Glashelle Garnele.

Vulg., Gambero, Gambaro, Gambaretto d'acqua salsa, Skilla.

Croat., Kostica, Morski rak, Rak (*Spalato*).

Habit. Trieste, Fiume, Dalmatia.

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Concombres, Cornichons de mer, Meer-
gurken.
Vulg., Cucumero de mar (*It.*).
Habit. Trieste, Portoré.

Gen. ECHINUS, *L.*

134. *ECHINUS MICROTUBERCULATUS*, Blainv.

Sea-urchins.

See-Igel.

Vulg., Castagne de mar, Tartuffoli (*It.*).

Croat., Ježić.

Habit. Trieste, Quarnero.

135. *ECHINUS BREVISPINOSUS*, Risso.

Vulg., Rizzo di mar, Castagna commun de
mar (*It.*).

Croat., Ježina.

Habit. Trieste, Quarnero.

136. *ECHINUS LIVIDUS*, Deslong.

Stein See-igel.

Vulg. As No. 135 (*It.*).

Croat., Jež, Morski jež.

Habit. Trieste, Quarnero.

137. *ECHINUS MELO*, Lmck.

Vulg., Melon de mar, Rizzo melon (*It.*).

Croat. As No. 136.

Habit. Dalmatia, Quarnero.

Gen. ASTERACANTHION, *M. Tr.*

138. *ASTERACANTHION*, *SP.*

Sea-pads, Sea-star, Finger-fish, Star-fish.

Etoiles de mer.

See-sterne.

Stelle marine (*It.*).

Croat., Morska zvjezdica.

139. *ASTERACANTHION RUBEUS*,
M. Tr.

Stella rossa (*It.*).

Croat., Kèrstijež, Kèrstača.

Gen. ASTERISCUS, *M. Tr.*

140. *ASTERISCUS MEMBRANACEUS*,
M. Tr.

Vulg., Pie d'occha (*It.*).

Croat., Guskina noga, Nejasitka (*Spalato*).

141. *ASTERISCUS VERRICULATUS*,
M. Tr.

Vulg., Stelletta (*It.*).

Croat., Križalina.

Habit. Portoré.

Gen. ASTROPECTEN, *Lmck.*

142. *ASTROPECTEN AURANTIACA*, *L.*
Vulg., Stellon, Stella (*It.*).

Habit. Portoré.

Gen. OPHIODERMA, *M. Tr.*

143. *OPHIODERMA LONGICAUDA*,
M. Tr.

Vulg., Selmo a compasso (*It.*).

Habit. Trieste, Portoré.

Gen. SCHIZASTER, *Ag.*

144. *SCHIZASTER CANALIFERUS*, *Lam.*
Vulg., Peto de dolfin (*It.*).

Croat., Dupinska pèrsa.

Habit. Zaole, Quarnero.

Gen. OPHIOTHRIX, *M. Tr.*

145. *OPHIOTHRIX FRAGILIS*, *Müll.*
Vulg., Selmo (*It.*).

Habit. Trieste, Quarnero.

POLYPI.

Gen. ANEMONIA.

146. *ANEMONIA*, SP.

Sea Anemones.

Anémone de mer.

See Anemone.

Anemonia di mare (*It.*).*Croat.*, Moruzga, vlasulja (*generic terms*).

Gen. ACTINIA, L.

147. *ACTINIA*, Sp.

Actinia, Blubber.

Actinie.

See-rose, Aktinie.

Attinia, Rosa di mar, Madrona, Marona (*It.*).*Croat.*, Vlasulja, cvjetulja, vjetrenica, moruzga.148. *ACTINIA VIRIDIS*, L.Attinia verde (*It.*).*Croat.*, Moruzga zelena.*Habit.* Quarnero.149. *ACTINIA RUBRA*, Brug.

Wrinkled Actinia.

Actinie ridée.

Rothe Aktinie.

Attinia rossa, A. porporina, Anemolo rosso marino (*It.*).*Croat.*, Moruzga, vlasulja crvena.150. *ACTINIA EFFŒTA*, L.

Enervated Actinia.

Actinie épuisée, anguleuse, blanche.

Die Seeblume.

Attinia angulosa, bianca (*It.*).*Habit.* Attached to *Murex brandaris*; Trieste.

Gen. RHIZOSTOMUM, Cuv.

151. *RHIZOSTOMUM CUVIERI*, Lam.*Vulg.*, Potta di mar, Potta marina (*It.*).*Croat.*, Modra morska pluća.*Habit.* Trieste.

Gen. PENNATULA, L.

152. *PENNATULA PHOSPHOREA*, Ell.

Sea-pen.

Vulg., Penna di mar, Pennacchiera (*It.*).*Croat.*, Perulja.*Habit.* Quarnero.153. *PENNATULA RUBRA*.*Vulg.*, Pennacchiera rossa (*It.*).*Croat.*, Perulja rumena.

APPENDIX TO THE LIST OF INVERTEBRATES.

A. MOLLUSKS of the Adriatic enumerated by PROFESSOR M. STOSSICH.

a. 13 CEPHALOPODS, viz.:

3 Octopus.	2 Loligo.
2 Eledone.	2 Sepiola.
1 Argonauta.	2 Sepia.
1 Ommastrephes.	

b. 371 GASTROPODS, viz.:

10 Murex.	2 Lachesis.
1 Typhis.	13 Raphitoma.
8 Fusus.	3 Mangelia.
1 Euthria.	8 Defrancia.
1 Triton.	1 Chenopus.
1 Ranella.	2 Cypræa.
1 Pisania.	3 Trivia.
3 Pollia.	1 Erato.
9 Nassa.	3 Ovula.
1 Cyclope.	9 Cerithium.
1 Fasciolaria.	1 Triforis.
1 Voluta.	1 Littorina.
10 Mitra.	6 Fossarus.
4 Columbella.	1 Rissoina.
4 Marginella.	28 Rissoa.
1 Dolium.	12 Alvania.
1 Cassis.	2 Setia.
2 Cassidaria.	3 Cingula.
2 Lamellaria.	2 Amnicola.
8 Natica.	2 Hydrobia.
4 Scalaria.	1 Barleeia.
8 Turbonilla.	3 Turritella.
14 Odostomia.	6 Vermetus.
1 Eulimella.	1 Siliquaria.
3 Aclis.	1 Cæcum.
6 Eulima.	2 Calyptræa.
3 Leiostraca.	2 Crepidula.
2 Solarium.	1 Capulus.
4 Cerithiopsis.	1 Neritina.
1 Conus.	4 Phasianella.
1 Turbo.	1 Scaphander.
1 Collonia.	1 Philine.
1 Cyclostrema.	1 Gasteropteron.
1 Adeorbis.	6 Aplysia.
3 Clanculus.	7 Pleurobranchus.
1 Craspedotus.	1 Umbrella.
2 Monodonta.	2 Tylodina.
12 Zizyphinus.	8 Doris.
13 Trochus.	1 Polycera.
1 Anatomus.	2 Idaha.
2 Haliotis.	2 Tritonia.

GASTROPODS (continued).

3 Fissurella.	1 Tethys.
6 Emarginula.	1 Doto.
1 Gadinia.	3 Æolis.
6 Patella.	1 Elysia.
2 Acteon.	1 Truncatella.
7 Cylichna.	1 Auricula.
1 Volvula.	2 Melampus.
2 Bulla.	1 Asseminia.
2 Haminea.	7 Chiton.
4 Akera.	8 Dentalium.

c. 190 CONCHIFERS, viz.:

2 Pholas.	1 Pandora.
4 Teredo.	4 Mactra.
1 Gastrochæna.	2 Lutraria.
1 Clavagella.	11 Tellina.
1 Solen.	1 Gastrana.
2 Ensis.	2 Lucinopsis.
1 Pharus.	3 Psammobia.
5 Solecurtus.	1 Strigilla.
2 Saxicava.	5 Donax.
1 Corbula.	5 Scrobicularia.
1 Lyonsia.	4 Erycina.
7 Thracia.	1 Mesodesma.
1 Neæra.	3 Cytherea.
2 Dosinia.	1 Scacchia.
12 Venus.	1 Diplodonta.
2 Venerupis.	5 Kellia.
1 Cypricardia.	1 Thyasira.
1 Petricola.	1 Montacuta.
12 Cardium.	2 Galeomma.
2 Lævicardium.	1 Solemya.
1 Isocardia.	1 Astarte.
3 Chama.	4 Cardita.
6 Lucina.	4 Mytilus.
2 Loripes.	2 Crenella.
3 Modiola.	2 Leda.
1 Lithodomus.	10 Pecten.
1 Avicula.	1 Vola.
4 Pinna.	5 Lima.
5 Arca.	1 Spondylus.
3 Pectunculus.	8 Anomia.
2 Nucula.	5 Ostrea.

d. 7 BRACHIOPODS, viz.:

1 Terebratulina.	4 Argiope.
1 Megerlea.	1 Crania.

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C. VERMES of the ADRIATIC, enumerated by PROFESSOR M. STOSSICH.

a. 168 ANNELIDES.

- 1 Tomopteris.
- 2 Eteone.
- 5 Eulalia.
- 1 Carobia.
- 5 Phyllodoce.
- 1 Oxydromus.
- 1 Ophiodromus.
- 3 Podarke.
- 1 Peribœa.
- 1 Fallacia.
- 4 Proceræa.
- 2 Grubea.
- 1 Sphærosyllis.
- 2 Pterosyllis.
- 1 Trypanosyllis.
- 1 Eurysyllis.
- 1 Eusyllis.
- 2 Odontosyllis.
- 1 Ehlersia.
- 1 Syllides.
- 9 Syllis.
- 1 Sylline.
- 4 Glycera.
- 1 Nephthys.
- 10 Nereis.
- 2 Marphysa.
- 4 Eunice.
- 1 Onuphis.
- 1 Lysidice.
- 2 Nematonereis.
- 4 Lumbriconereis.
- 1 Arabella.
- 1 Staurocephalus.
- 1 Spinther.
- 2 Euphrosyne.
- 1 Chrysopetalum.
- 2 Sigalion.
- 1 Leanira.
- 1 Acholoë.
- 1 Hermadion.
- 1 Lepidonotus.
- 1 Lepidasthenia.
- 1 Lagisca.
- 6 Polynoe.
- 1 Hermione.
- 1 Aphrodite.
- 6 Serpula.
- 2 Eupomatus.

ANNELIDES (contd.).

- 1 Placostegus.
- 1 Spirorbis.
- 1 Filograna.
- 3 Vermilia.
- 1 Pomatocerus.
- 3 Protula.
- 10 Sabella.
- 1 Spirographis.
- 1 Lagis.
- 1 Pectinaria.
- 1 Melinna.
- 1 Sabellides.
- 1 Terebellides.
- 1 Polycirrus.
- 1 Myxicola.
- 15 Terebella.
- 1 Siphonostomum.
- 1 Chætopterus.
- 3 Heterocirrus.
- 2 Cirratulus.
- 1 Maldane.
- 4 Clymene.
- 1 Arenicola.
- 1 Dasybrancus.
- 1 Notomastus.
- 1 Armandia.
- 1 Polyophthalmus.
- 1 Enchytræus.
- 1 Pontobdella.

b. 8 GEPHYREA.

- 1 Sipunculus.
- 4 Phascolosoma.
- 1 Aspidosiphon.
- 1 Bonellia.
- 1 Thalassema.

c. 42 NEMATHELMINTHES.

- 11 Echinorhynchus.
- 11 Ascaris.
- 2 Acanthocheilus.
- 1 Heterakis.
- 2 Lecanocephalus.
- 3 Agomonematodum.
- 3 Agomonema.
- 1 Thominx.
- 1 Stelmus.
- 1 Echinocephalus.

NEMATHELMINTHES (contd.)

- 2 Ichthyonema.
- 1 Spiroptera.
- 1 Enchelidium.
- 2 Enoplus.

d. 92 PLATELMINTHES.

- 5 Cerebratulus.
- 1 Meckelia.
- 2 Tubulanus.
- 1 Micrura.
- 1 Polystemma.
- 1 Valencinia.
- 3 Nemertes.
- 1 Tetrastemma.
- 1 Borlasia.
- 1 Gyrator.
- 1 Stylochus.
- 1 Leptoplana.
- 2 Thysanozoon.
- 1 Proceros.
- 1 Polycelis.
- 1 Opisthomum.
- 1 Proporus.
- 1 Otocelis.
- 1 Sidonia.
- 2 Monotus.
- 3 Turbella.
- 2 Vortex.
- 1 Trigonostomum.
- 1 Vorticeros.
- 1 Celidotis.
- 1 Stenostomum.
- 26 Distomum.
- 1 Holostomum.
- 1 Monostomum.
- 1 Gasterostomum.
- 1 Onchocotyle.
- 3 Tetrarhynchobothrium.
- 2 Orygmathobothrium.
- 1 Tetrabothrium.
- 2 Echeneibothrium.
- 1 Phyllobothrium.
- 2 Anthobothrium.
- 1 Polyonchbothrium.
- 2 Calliobothrium.
- 3 Dibothrium.
- 1 Amphicotyle.
- 4 Rhyncobothrium.
- 2 Caryophyllæus.

APPENDIX I.

ALPHABETICAL INDEX *to the Scientific Names.**a.* MAMMALIA AND REPTILES.

(The numbers opposite the names refer to the Systematic List, p. 177.)

Chelonia <i>sp.</i> , 1, 2.	Grampus griseus, 5.	Phoca vitulina, 1.
Delphinus <i>sp.</i> , 3-5.	Pelagius monachus, 2.	Physeter <i>sp.</i> , 6, 7.
Emys Lutaria, 3.	Phoca monachus, 2.	

b. PISCES.

(The numbers opposite the names refer to the Systematic List, p. 179.)

Abramis bipunctatus, 299.	Cantharus <i>sp.</i> , 76-78.	Dactylopterus volitans, 147.
Acanthias <i>sp.</i> , 21, 22.	Capros aper, 110.	Dasibatis <i>sp.</i> , 30-32.
Acantholabrus Pallonii, 226.	Caranx dentex, 104.	Dentex <i>sp.</i> , 66, 357, 358.
Acipenser <i>sp.</i> , 50-55, 355.	„ trachurus, 103.	Dicerobatis giornæ, 49.
Alburnus <i>sp.</i> , 299-301.	Carcharias <i>sp.</i> , 1, 2, 351, 352.	Echineis <i>sp.</i> , 130, 366.
Alopias vulpes, 12.	Carcharodon Rondeletii, 10.	Echinorhinus spinosus, 24.
Alosa communis, 319.	Centrina Salviani, 20.	Engraulis encrasicholus, 317.
Ammodytes sículus, 248.	Centriscus scolopax, 198.	Esox belone, 305.
Ammopleurps lacteus, 269.	Centrolophus <i>sp.</i> , 115, 116.	„ lucius, 309.
Anguilla <i>sp.</i> , 323, 324.	Centropristis hepatus, 59.	„ sphyræna, 187.
Anthias sacer, 60.	Cephaloptera giorna, 49.	Exocæetus <i>sp.</i> , 307, 308.
Apogon imberbis, 65.	Cepola rubescens, 172.	Falx Venetorum, 207.
„ rex mullorum, 65.	Charax puntazzo, 85.	Fierasfer <i>sp.</i> , 247, 378.
Argentina sphyræna, 316.	Chondrostoma <i>sp.</i> , 295-298.	„ dentatus, 360.
Arnoglossus <i>sp.</i> , 253-255, 379.	Chrysophrys aurata, 92.	Gadus <i>sp.</i> , 231-234, 376.
Atherina <i>sp.</i> , 188-190.	Citharus linguatula, 256.	Galeus canis, 3.
Aulopus filamentosus, 271.	Clinus variabilis, 185.	Gasterosteus <i>sp.</i> , 196, 197.
Aulopyge Hügeli, 277.	Clupanodon phalerica, 322.	Gobio <i>sp.</i> , 278, 279.
Ausonia Cuvieri, 120.	Clupea <i>sp.</i> , 318-322.	Gobius <i>sp.</i> , 148-166, 367-370.
Auxis vulgaris, 129.	Cobitis <i>sp.</i> , 302, 303.	Gouania piger, 205.
Balistes capriscus, 344.	Conger <i>sp.</i> , 325, 326.	Heliastes chromis, 209.
Barbus <i>sp.</i> , 274-276.	Coricus rostratus, 224.	Heptanchus cinereus, 15.
Belone acus, 305.	Coris <i>sp.</i> , 229, 230.	Hippocampus <i>sp.</i> , 342, 343.
Blennius <i>sp.</i> , 173-185, 373, 374.	Corvina nigra, 98.	Histiophorus belone, 100.
Box <i>sp.</i> , 79, 80.	Coryphæna <i>sp.</i> , 117, 118.	Hypsiptera, 377.
Brama Raji, 119.	Cottus gobio, 138.	Julis <i>sp.</i> , 228-230.
Branchiostoma lanceolatum, 350.	Crenilabrus <i>sp.</i> , 216-225.	Labrax lupus, 57.
Callionymus <i>sp.</i> , 167-171, 372.	Cristiceps argentatus, 185.	Labrus <i>sp.</i> , 210-215.
	Cyprinodon calaritanus, 304.	Lamna <i>sp.</i> , 8, 9.
	Cyprinus <i>sp.</i> , 272, 273.	Latrunculus <i>sp.</i> , 166, 371.

- Lebias calaritana*, 304.
Lepadogaster sp., 199-204.
Lepidopus caudatus, 101.
Lepidotrigla aspera, 139.
Leptopterygius piger, 205.
Leuciscus sp., 280-291.
Lichia sp., 107-109.
Lophius sp., 136, 137.
Lophotes cepedianus, 206.
Lota vulgaris, 238.
 „ *argentea*, 359.
Lucerna Venetorum, 142.
Lucioperca Sandra, 58.
Luvarus imperialis, 120.
Macrurus coelorhyncus, 249.
Mæna sp., 67-69.
Merluccius vulgaris, 235.
Mirbelia sp., 203, 204.
Motella sp., 239-241.
Mugil sp., 191-195, 375.
Mullus sp., 74, 75.
Muræna sp., 329, 330.
Mustellus sp., 6, 7.
Myliobatis sp., 46, 47.
Myrus vulgaris, 326.
Naucrates ductor, 106.
Nemachilus barbatulus, 302.
Nerophis sp., 340, 341.
Notidanus sp., 14-16.
Novacula cultrata, 227.
Oblata melanura, 81.
Odontaspis sp., 11, 353.
Ophichthys sp., 327, 328, 382.
Ophidium sp., 243-246.
Ophisurus serpens, 327.
Orthogoriscus sp., 345, 346.
Paganellus Venetorum, 156.
Pagellus sp., 88-91, 361.
Pagrus sp., 86, 87, 360.
Paraphoxinus sp., 292, 293.
Pelamys sp., 128, 365.
Perca fluviatilis, 56.
Peristedion cataphractum, 146.
Peristethus cataphractum, 146.
Petromyzon sp., 347-349.
Pholis lævis, 184.
Phrynorhombus unimaculatus, 252.
Phycis sp., 236, 237.
Plagusia lactea, 269.
Platessa passer, 260.
Platessa vulgaris, 259.
Pleuronectes sp., 259, 260.
Polyprion cernium, 64.
Pristiurus melanostomus, 19.
Pteridium atrum, 242.
Pteroplatea altavela, 45.
Raja sp., 30-41.
Rhina sp., 25, 26.
Rhinoptera marginata, 48.
Rhomboidichtys sp., 257, 258.
Rhombus sp., 250, 251.
Salar ausonii, 310.
Salmo sp., 310-314, 381.
Sardinella aurita, 318.
Sargus sp., 82-84.
Saurus sp., 270, 271.
Sayris Camperi, 306.
Scardinius sp., 286.
Schedophilus Botteri, 364.
Sciæna aquila, 97.
Scomber sp., 121-123.
Scombresox rondeletii, 306.
Scorpæna sp., 94, 95.
Scyllium sp., 17, 18, 354.
Sebastes imperialis, 93.
Selache maxima, 13.
Seriola Dumerilii, 105.
Serranus hepatus, 59.
Serranus sp., 61-63, 356.
Siphonostoma sp., 331-333.
Smaris sp., 70-73.
Solea sp., 261-268, 380.
Sphagebranchus sp., 328.
Spinax niger, 23.
Sphyræna vulgaris, 187.
Squalius albus, 283.
Squatina oculata, 26.
Stromateus sp., 113, 114.
Syngnathus sp., 334-339.
Tarantola Romæ, 270.
Telestes sp., 288.
Temnodon saltator, 363.
Tetrapterus belone, 100.
Tetrodon mola, 345.
Thymallus vulgaris, 315.
Thynnus sp., 124-127.
Thyrsites pretiosus, 362.
Tinca vulgaris, 294.
Torpedo sp., 27-29.
Trachinus sp., 132-135.
Trachurus trachurus, 103.
Trachipterus sp., 207, 208.
Trichiurus sp., 101, 102.
Trigla sp., 139-145.
 „ *cataphracta*, 146.
 „ *volitans*, 147.
Tripterygium nasus, 186.
Trutta sp., 310-314.
Trygon sp., 42-44.
Umbrina cirrhosa, 96.
Uranoscopus scaber, 131.
Xiphias gladius, 99.
Xirichthys cultrata, 227.
Zeus sp., 111, 112.
Zygæna sp., 4, 5.

c. INVERTEBRATES.

(The numbers opposite the names refer to the Systematic List, p. 242.)

- Actinia sp.*, 147-150.
Anatifa lævis, 128.
Anemonia sp., 146.
Aphrodite hystrix, 131.
Aplysia depilans 32.
Aporrhais pes pelicani, 14.
Arca sp., 57, 58.
Arenicola piscatorum, 130.
Astacus fluviatilis, 115.
Asteracanthion sp., 138, 139.
Asteriscus sp., 140, 141.
Astropecten aurantiaca, 142.
Bulla sp., 30, 31.
Calamitas navium, 82.
Carcinus mænas, 96.

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APPENDIX II.

ALPHABETICAL INDEX *to the English Names.*

a. FISHES.

(The numbers opposite the names refer to the Systematic List, p. 179.)

- | | | |
|------------------------------|------------------------------|-------------------------------|
| Adder-pike, 135. | Boier's Atherine, 189. | Dragonet, the Gemmeous, 167. |
| Adriatic Sturgeon, 50. | Bone-dog, 21. | " the Sordid, 167. |
| Allis-Shad, 319. | Bonito, 126. | Eagle-Ray, 46. |
| Anchovy, 317. | " the Plain, 129. | Echiodon, Drummond's, 378. |
| Angel-fish, Angel Shark, 25. | Bounce, 18. | Eel, the common, 323. |
| Angler, the common, 136. | Braize, 86. | " the Conger, 325. |
| Argentine, 316. | Brill, 251. | Eel-pout, 238. |
| Atherine, 188. | British Torpedo, 27-29. | Electric Ray, 27-29. |
| " Boier's, 189. | Bullhead, 138. | Erythrinus, 88. |
| Axillary Bream, 361. | Burbot, Burbolt, 238. | Eyed Dog-fish, 19. |
| Balance-fish, 4. | Burton Skate, 40. | File-fish, 344. |
| Band-fish, 172. | Butterfly-fish, 182. | " the Mediterranean, 344. |
| " the Red, 172. | Cackarel, 67. | Fire Flaire, Fiery-Flaw, 44. |
| Barbel, 274. | Capelan, 233. | Fishing Frog, 136. |
| Basse, 57. | Carp, 272. | Flounder, the Italian, 260. |
| " Stone Basse, 64. | Cat-fish, 18. | " the Red-backed, 265. |
| Beardie, 302. | Chub, 283. | Flying-fish, 307, 308. |
| Becker, 86. | Cod, the Three-bearded, 239. | Fox, 12, 167. |
| Bellows-fish, 198. | " the Five-bearded, 241. | Freshwater Perch, 56. |
| Bib, 234. | Comber, 62. | Frog-fish, 136. |
| Bill-fish, 306. | Conger-eel, 325. | Gade, the Three-bearded, 239. |
| Black Bream, 76. | Connor Maid, 220. | Gar-fish, Gar-pike, 305. |
| Black-fin, 135. | Coral-fish, 209. | Gedd, 309. |
| Black-fish, 115. | Corkwing, 220. | Germon, 127. |
| Black-mouthed Dog-fish, 19. | Couch's Polyprion, 64. | Gilt-head, 92, 220. |
| Black Perch, 115. | " Sea Bream, 87. | " the Rayan, 119. |
| Black Ruffe, 115. | Cramp-fish, 29. | " Ray's Toothed, 119. |
| Blade-fish, 102. | Crowner, 145. | " the Red, 89. |
| Blenny, the Diminutive, 183. | Crue Herring, 321. | " the Toothed, 66. |
| " the Freshwater, 176. | Dentex, 66. | Gipsy Herring, 321. |
| " the Gattoruginous, 173. | Derbio, 108. | Goby, the Black, 148. |
| " Montagu's, 183. | Devil-fish, 46-49. | " the Doubly-spotted, 162. |
| " the Ocellated, 182. | Dog-fish, 17-19, 21, 22. | " the Freshwater, 151. |
| " the Smooth, 184. | Dolphin, 117, 118. | " the Paganellus, 156. |
| Boar-fish, 110. | Dory, 111. | " Pennant's Spotted, 164. |
| Bogue, 79. | Dragonet, 167. | " the White, 166. |

- Goby, the Yellow, 149.
Golden Maid, 220.
Goldfinny, Goldsinny, 220.
Grayling, 315.
Grey Mullet, 191-195.
 ,, the Golden, 193.
 ,, the Long-finned, 193.
 ,, the Thick-lipped, 195.
Grey Notidanus, 14.
Groundling, 303.
Gudgeon, 278.
Gurnard, Bloch's, 144.
 ,, the Cuckoo, 140.
 ,, the Elleck, 140.
 ,, the Flying, 147.
 ,, the French, 141.
 ,, the Grey, 143.
 ,, the Lanthorn, 142.
 ,, the Mailed, 146.
 ,, the Piper, 145.
 ,, the Red, 140.
 ,, the Rock, 141.
 ,, the Sapphirine, 142.
 ,, the Streaked, 141.
Hair-tail, 102.
Hake, 235.
 ,, the Forked, 236.
Hippocampus, the Short-snouted, 342.
Hornbeak, 305.
Horse Mackerel, 103.
Hound-fish, 21.
 ,, the Rough, 17.
Huso, 53.
Jack, 309.
John Dory, 111.
King of the Sea Bream, 86.
Lampern, the fringe-lipped, 349.
Lamprey, 347.
 ,, Planer's, 349.
 ,, the River, 348.
 ,, the Sea, 347.
 ,, the Spotted, 347.
Lancelet, 350.
Large Spotted Dog-fish, 18.
Lesser ,, ,, 17.
Loach, 302.
 ,, the Spinous or Spined, 303.
Long-nose, 305.
Luce, 309.
Lyra, 145.
Mackerel, the Coly, 123.
 ,, the common, 121.
 ,, the Horse, 103.
 ,, the Spanish, 123.
Maid, 320.
Maigre, Meagre, 97.
Mediterranean Remora, 130.
Megrim, 253.
Mendole, 67.
Miller's Dog, 3.
 ,, Thumb, 138.
Minnow, 291.
Molebut, 345.
Monk, Monk-fish, 25.
Morgay, 17.
Mullet, the Grey, 191-195.
 ,, the Red, 74.
Murry, 329.
Needle-fish, 334.
Numb-fish, 29.
Nurse-hound, 18.
Notidanus, 14.
Old Wife, 76, 211.
Ophidium, the Bearded, 243.
Otter-pike, 135.
Ox-eye, 79.
Ox-Ray, 49.
Paganellus, 156.
Pandora, 86.
Pelamide, 128.
Penny-Dog, 3.
Perch, 56.
 ,, the Dusky, 63.
Picked Dog-fish, 21.
Pike, 309.
Pike-perch, 58.
Pilchard, 321.
Pilot-fish, 106.
Pink, 291.
Pipe-fish, the Broad-nosed, 331.
 ,, the Great, 334.
 ,, the Straight-nosed, 340.
Piper, 145.
Plaice, 259.
Pompilus, 115.
Poor, 233.
Porbeagle, 8.
Pout, 234.
Power Cod, 233.
Prickleback, 196.
Rays, 27, 49.
Ray, the Bordered, 38.
 ,, the Cuckoo, 37, 41.
 ,, the Eagle, 46.
 ,, the Electric, 27-29.
 ,, the Fuller, 31.
 ,, the Homelyn, 31.
 ,, the Horned, 49.
 ,, the Ox, 49.
 ,, the Painted, 31.
 ,, the Rough, 30.
 ,, the Sand, 31.
 ,, the Sandy, 37, 41.
 ,, the Shagreen, 34.
 ,, the Spotted, 31.
 ,, the Sting, 44.
 ,, the Whip, 46.
Rayan Gilt-head, 119.
Ray's Sea-bream, 119.
 ,, Toothed Gilt-head, 119.
Ray-mouthed Dog, 7.
Red-eye, 286.
Red Gilt-head, 89.
Red Mullet, 74.
Red Snake-fish, 172.
Remora, 130.
Ribbon-fish, 207.
Robin Huss, 17.
Rock Dog-fish, 18.
Rock-fish, Rock Goby, 148.
Rock Ling, 239.
 ,, the Three-bearded, 239.
 ,, the Five-bearded, 241.
Rough Hound, 17.
Rudd, 286.
Sail-fish, 13.
Sand-eel, 248.
Sand-launce, 248.
Sapphirine Gurnard, 142.
Sardine, 321.
Saury, Saury-pike, 306.
Scabbard-fish, 101.
Scad, 103.

- Scald-fish, 253.
 Scale-foot, 101.
 Scorpions, 93-95.
 Sea-Ape, 12.
 „ Bream, 76.
 „ „ the common, 89.
 „ „ Couch's, 87.
 „ „ King of the, 86.
 „ „ Ray's, 119.
 „ „ the Red, or Spanish, 88.
 „ „ the Sharp-toothed, 89.
 „ Cat, 132.
 „ Devil, 46, 49, 136.
 „ Eagle, 46.
 „ Fox, 12.
 „ Hen, 145.
 „ Horse, 342.
 „ Perch, 61.
 „ Snipe, 198.
 Serranus, the Dusky, 63.
 „ the Smooth, 62.
 Shad, 319.
 Shade-fish, 97.
 Shanny, Shan, Smooth Shan, 184.
 Sharks, 1-26.
 Shark, the Angel, 25.
 „ the Basking, 13.
 „ the Beaumaris, 8.
 „ the Blue, 1.
 „ the Dog-fish, 17, 18.
 „ the Fox, 12.
 „ the Great Blue, 10.
 „ the Hammer-headed, 4.
 „ the Long-tailed, 12.
 „ the Notidanus, 14.
 „ the Picked, 21.
 „ the Porbeagle, 8.
 „ the Six-gilled, 14.
 „ the Skate-toothed, 7.
 „ the Smooth-hound, 7.
 „ the Spinous, 24.
 „ the Spotted, 17.
 „ the Tope, 3.
 Shark Ray, 25.
 Silvery Hair-tail, 102.
 Six-gilled Shark, 14.
 Skelly, 283.
 Skipjack, 363.
 Skipper, Skipper-pike, 306.
 Skulpin, 167.
 „ the Yellow, 167.
 Smelt, Sand Smelt, 188.
 Snipe-fish, 198.
 Sole, the Bastard, 265.
 „ the common, 261.
 „ the Little, 267.
 „ the Smooth, 253.
 „ the Variegated, 265.
 Sparus, 66.
 „ the Four-toothed, 66.
 Spet, 187.
 Spiny Dog-fish, 21, 22.
 Spotted Dog-fish, 17, 18.
 Star-gazer, 131.
 Stickle-back, 196.
 „ the Three-spined, 197.
 Sting Bull, 132.
 „ -fish, 135.
 „ Ray, 44.
 Stinkard, 7.
 Stone-Basse, 64.
 Sturgeons, 50-55.
 „ the Adriatic, 50.
 „ the Blunt-nosed, 53.
 „ the Broad-nosed, 53.
 Suck-fish, the Small, 199.
 Sucker, the Bimaculated, 204.
 „ the Connemara, 203.
 „ the Cornish, 199.
 „ the Jura, 199.
 „ the Ocellated, 199.
 Sucking-fish, 130.
 Sun-fish, 13, 345.
 „ the Truncated, 346.
 Surmullet, 74, 75.
 „ the Striped, 75.
 Sword-fish, 99.
 Tangle-fish, 334.
 Tench, 294.
 Thickback, 265.
 Thornback, 30.
 Thornhound, 21.
 Thrasher, Thresher, 12.
 Toad-fish, 46, 136.
 Tommy Logge, 138.
 Toothed Gilt-head, 66.
 Tope, Toper, 3.
 Topknot, Bloch's, 252.
 Trigger-fish, the Pig-faced, 344.
 Trout, the common, 310.
 „ the Great Dalmatian, 311.
 „ River Trout of Dalmatia, 313.
 „ of the Lake of Garda, 314.
 Trumpet-fish, 198.
 „ the Snipe-nosed, 198.
 Trygon, 44.
 Tubfish, 142.
 Tunny, the Bonito, 126.
 „ the common, 124.
 „ the Long-finned, 127.
 Turbot, 250.
 Twaite-Shad, 320.
 Umbrina, 96.
 Viper Weever, 135.
 Wapper, 279.
 Weevers, 132-135.
 Weever, the common, 135.
 „ the Great, 132.
 „ the Lesser, 135.
 „ the Viper, 135.
 Whip Ray, 46.
 Whistler, Whistle-fish, 239.
 Whiting, 232.
 „ Pout, 234.
 „ Couch's, 376.
 Woodcock-fish, 198.
 Wrasse, the Ancient, 211.
 „ the Ballan, 211.
 „ the Cook, 215.
 „ the Cuckoo, 215.
 „ the Flesh-coloured, 215.
 „ the Golden, 220.
 „ the Indented-striped, 229.
 „ the Rainbow, 229.
 „ the Red, 215.
 „ the Striped, 215.
 „ the Three-spotted, 215.
 „ the Trimaculated, 215.
 Wreck-fish, 64.
 Yellow Goby, 149.
 Yellow-tail, 105.

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APPENDIX III.

REFERENCE INDEX to the Italian Local and Vulgar Names of the Adriatic Fauna on the Austro-Hungarian Seaboard and Venetian Estuary.

Acquadela	Atherina hepsetus.	Ástice, Ástese, Astise	{ Homarus vulgaris.
Adano, Adello, Adilo...	Acipenser sturio.		{ Palinurus vulgaris.
Afrodita	Aphrodite hystrix.	Astóra, Astára, Astúra...	Pinna nobilis.
Ago di mar	{ Siphonostoma and Syn-	Attinia	Actinia sp.
	gnathus sp.	„ angulosa	{ „ effœta.
Agon, Agone d'Istria ...	Smaris gracilis.	„ bianca	{ „
Agonà	Atherina hepsetus.	„ rossa	{ „ rubra.
Agone, Agon de Como...	Clupea alosa and finta.	„ porporina.....	{ „
Agosta, Augusta	Palinurus vulgaris.	Avola, Avla.....	Alburnus alburnellus.
Albero bastardo	Oblata melanura.	Azzalino	Gonoplax rhomboides.
Alboro pagnesco	Pagrus vulgaris.	Babba	Blennius gattorugine.
Alborella	Alburnus alburnellus.	Baicolo	Labrax lupus (<i>fry</i>).
Anchio	Engraulis encrasicolus.	Baile	Zygæna maleus.
Anemolo rosso marino...	Actinia rubra.	Balestra	Balistes capriscus.
Anguilla	Anguilla vulgaris.		{ Raja clavata.
Anguéla	Atherina sp.	Barácola	{ „ punctata.
„ agonada	„ hepsetus.		{ „ fullonica.
Angusígola	Belone acus.	„ alba	{ „ punctata.
„ falsa	{ Siphonostoma and Syn-	„ bianca	{ „
„ salvatica...	gnathus sp.	Baracoletta	{ „ „
Anzoletta, Anzuletta ...	Trigla sp.		{ „ marginata.
Anzoletto comune ...	{ Trigla pini.	Barbo, Barbio, Barb,	{
„ piccolo ...		Barbol, Barbolo,	{ Barbus plebejus.
„ grande	„ cuculus.	Barbio, Balb, Bal-	{
„ di mar.....	{ Peristethus cataphrac-	bio	{
„ della ma-	tum.	Barbon.....	Mullus barbatus.
onna.		„ de nassa	„ surmuletus.
Aragosta	Palinurus vulgaris.	Batauro, Botolo	Mugil capito.
Arbon	Pagellus erythrinus.	Bavosa, Baosa	Raja marginata.
Arboro, Alboro, Albo-	{	Berolla del tenero	Nassa reticulata.
retto.	„ „	„ di mar.....	Bulla lignaria.
Arzentin	{ Argentina sphyræna.	Bibaron colorito	Mactra stultosum.
	Lepidopus caudatus.	„ di mar	Isocardia cor.
Asiá, Asiar, Asial ...	{ Acanthias vulgaris and	„ di marina ...	{ Mactra lactea.
	Blainvillii.		{ „ stultosum.
Asinello	Merluccius vulgaris.	Bibarazza.....	Venus gallina.
Aspio	Alburnus alburnellus.	Bibarazza di mar	Venus verrucosa.

Bisatto	Anguilla vulgaris.	Can barbaro	Notidanus barbarus.
„ tegrà	} Muræna helena.	„ bianco	Mustelus vulgaris.
„ indevisa		„ da denti	} Carcharias glaucus Galeus canis. Odontaspis ferox.
Bisse delle cape	} Serpula sp.	Can macchia .....		} Mustelus vulgaris.
„ „ sassi		„ pontisà.....	„ senza denti
Boba, Bobba	Box vulgaris.	„ negro	Galeus canis.
Bocca in cao	} Uranoscopus scaber.	„ turchin	Carcharias glaucus.
„ capo		Bon	Canestrello .....	Pecten sp.
Bosega, Boseghe	Mugil chelo.	„ di mar ...	} Pecten varius.
Branzin	Labrax lupus.	„ da una	
„ croato	Merluccius vulgaris.	recia.....	} Serranus cabrilla.
Bressanella	Leuciscus phoxinus.	Cánissi, Cánizzi, Crag-	
Bruco di mar	Aphrodite hystrix.	nizi	} Serpula sp.
Bruffolo, Brussolo ...	} Leuciscus aula. „ pauperum.	Cannelle	
Brumo, Bisse dei		Teredo navalis.	Canócchia, Canocchia ...	Squilla mantis.
legni.....	Bufalo de aspreo.....	Cantarella	} Pagrus vulgaris. Cantharus vulgaris.
Buovoli	Mæna zebra.	Cantarini .....		Trachurus trachurus.
Buratello	Cyprinus carpio.	Cantara, Cantera, Can-	} Cantharus vulgaris.
Caecchia, Cagnea	Cyclope neritea.	tarina, Cantarina de	
	Pagurus Bernhardus.	aspreo	} Lamna cornubica.
	Murex brandaris.	Cao da oglio	
„ femena	„ trunculus.	Cavo d'ajo	} Mugil capito.
Buovoli	Helix sp.	Caostello, Cavostello	
Buratello	Anguilla vulg. (<i>Elvers</i>).	Caustello	} Solen vagina.
Caecchia, Cagnea	Carcharias Milberti.	Caõa da deo	
	} Selache maxima. Notidanus griseus. „ cinereus. Lamna cornubica. „ Spallanzanii. Carcharodon Rondeletii. Odontaspis ferox.	„ da dito	} Chthamalus stellatus.
Cagnia		„ galene .....		Coronula testudinaria.
		„ lunga	} Solen vagina.
Cagnetto		„ „ nostrana	
		„ „ bianca...	} „ siliqua.
Cagnizza	„ „ colorita		
„ glauca	Carcharias glaucus.	„ „ marina	
„ nasuta	Lamna Spallanzanii.	„ tabachina	} Pecten jacobæus.
„ vera	Carcharodon Rondeletii.	„ santa	
Cagnola	Cobitis tænia.	„ „ piccola.....	„ varius.
Calamajo, Calamaro ...	Loligo vulgaris.	„ tonda	Cardium edule.
„ todero ...	} „ sagittata.	„ „ di mar ...	} „ tuberculatum. Tapes decussatus.
„ toto		Caligher .....		„ „ rigata .....	Cardium rusticum.
Caligher	Heliastes chromis.	Caparon	Tapes edulis.
Campanari	Cerithium vulgatum.	Caparozzolo.....	} „ decussatus. Venus verrucosa.
Campanile	Turritella communis.	„ dal scorzo	
Can	} Generic term for all sharks.	grosso ...	Tapes decussatus.

Caparozzolo dal scorzo } sottile, Caparozzolo } sottile	Scrobicularia piperita.	Corbo, Corbel, Cor- } betto	Umbrina cirrhosa.
Caparozzoletti de mar... Anatifa lævis.		Corbo di sasso, Cor- } bel di sasso	Corvina nigra.
Caragolo Trochus sp.		Córbola	Gebia littoralis.
„ longo Cerithium vulgatum.		Cortesan de caorle	Serranus cabrilla.
Caragoletti da galan- } terie	Trochus adriaticus.	Cragnisso.....	Labrus mixtus.
Carcána Thynnus thunnina.		Cucumero de mar ... }	Holothuria sp. Cucumaria sp.
Carpa, Carpione, C. } maschio	Cyprinus carpio.	Dattolo, Dattolo di } mar, Dattolo di Sa- } bion, Dattero di mar }	Pholus dactylus.
Carpione Salmo carpio.		Dattolo di pietra, Dat- } tolo di mar, Dattero } di mar	Lithodomus. Lithophagus.
Castagne commun de } mar	Echinus brevispinosus.	Dental	Dentex vulgaris.
Castagne de mar..... }	„ microtubercula- } tus.	Dentale della corona ... }	„ gibbosus.
Castagnola Brama raji.		Diavolo di mar	Lophius piscatorius.
Cataluzzo..... }	„ „ } Coryphæna hippurus.	Donzella	Serranus scriba. Labrus sp.
Caval marin..... }	„ „ } Hippocampus sp.	Donzella di grotta, } Donzella di sasso, } Donzella di Quar- } nero	Labrus mixtus.
Cavalo storno		Dorada	Chrysophrys aurata.
Cavalla..... Corvina nigra.		Dotregan.....	Mugil auratus.
Cavazioi Mullus barbatus (fry).		Fabbro, Fabretto, Fa- } varetto	Heliastes chromis.
Cavedo, Cavedano Leuciscus cavedanus.		Facchino	Dromia Rumphii. „ piccolo „ lanata.
Cavedon, Chiavedon ... Cottus gobio.		Falce	Trachypterus tænia.
Cavezzal Leuciscus scardafa.		Falso molo	Gadus merlangus.
Cavezzale, Cavazzino ... Leuciscus cavedanus.		Fanale	Trigla hirundo.
Caz marin, Cazzo del } mar	Holothuria tubulosa.	Fanfano	Naucrates ductor. Centrolophus pompilus.
Cazzonello, Calzinei ... Donax trunculus.		Fave.....	Nucula margaritacea. Stromateus sp.
Ceppa, Ceppino, } Cheppia, Ciepa ... }	Clupea alosa and finta.	Figo	Centrolophus pompilus. Phycis sp.
Cherne, Chierne Serranus gigas.		„ di mar.....	Polyclinum ficus.
Chiachia Uranoscopus scaber.		Folpo, Folpo todero, } Polpo toti	Octopus vulgaris.
Cievolo, Ccolo Mugil cephalus.		Folpo, Folpo da risa ...	Eledone moschata.
Cigala de mar Scyllarus arctus.		Foraguarda	Cobitis tænia.
Cocciola Cardium rusticum.		Forapiere, Forasassi, } Forasecchi	Nemachilus barbatulus.
Coe-rosse..... }	Leuciscus erythroptal- } mus.	Forcato	Peristethus cataphrac- } tum.
Coffano del duro..... Arca barbata.		Forella.....	Salmo fario.
„ di grotta „ Noæ.		Forfetula	Xantho floridus.
Coghe de mar..... Aphysia depilans.			
Colombo	Myliobatis aquila. Trygon pastinaca.		
„ de mar Myliobatis aquila.			
„ vescovo „ noctula.			
Contrapasso..... Gonoplax rhomboides.			
Copiza Spondylus gaederopus.			
Coppése, Copése..... Acipenser sp.			

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Lasca	Chondrostoma soëtta.	Mercandola	Chondrostoma genei.
Lastúra	Pinna nobilis.	Merlo de mar	Serranus scriba.
Laterna	Trigla hirundo.	Merluzzo	Merluccius vulgaris.
Latesiol	Pleuronectes italicus.	„ salvatico	Sphyræna vulgaris.
Lepa, Leppa	{ Crenilabrus pavo.	Molecca, Molecche.....	Carcinus mænas.
	„ mediterraneus.	Mollosa	Gadus merlangus.
Letterato	Auxis vulgaris.	Molo	„ <i>sp.</i>
Liba	Labrus <i>sp.</i>	„ da parangolo... {	„ euxinus and mer-
Limone de mar	Cynthia papillosa.		langus.
Listello	Lepadogaster listellus.	Moretta	Galeus canis.
Lizza	Lichia <i>sp.</i>	Mormoro, Mormora, {	Pagellus mormyrus.
„ bastarda.....	„ glauca.	Mormiro	
Loca	{ Scrobicularia piperita.	Mormoro, Mormora, {	Gadus minutus.
„ di fango		Molmolo	
Lodra, Lodrin.....	Callionymus <i>sp.</i>	Moro	Raja macrorhynchus.
Longon	Tapes edulis.	Mozzetta	Leuciscus muticellus.
Lotregan	Mugil auratus.	Muccio, Mucchio	Trygon pastinaca.
Lovo	Merluccius vulgaris.	Murena, Morena.....	Muræna helena.
Lucerna	Trigla hirundo.	Murice.....	{ Murex brandaris and
Luzziolo	Crenilabrus rostratus.		trunculus.
Luzzo, Lusso	Esox lucius.	Muscardino, Musca-	{ Eledone moschata.
„ di mar	Sphyræna vulgaris.	rolo	
Madagia, Madagiola ...	Pagellus erythrinus.	Musicanti	Trachurus trachurus.
Madre dei gronghi, {	Motella tricirrata.	Musoduro	Trigla lineata.
Mare dei gronghi... }		Mussolo, Muzzolo ...	{ Modiola barbata.
Madrona, Marona	Actinia <i>sp.</i>		Arca Noæ.
Magna, Magnariazo ...	Mugil capito.	Naridola	{ Trochus varius and other
Magna morti	Charax puntazzo.		<i>sp.</i>
„ pegola	Petromyzon marinus.	„ grande	Trochus zizyphinus.
Magnarone	Cottus gobio.	Nodola	Brama raji.
Manico da coltello	Solen vagina.	Nonno, Nano	Cyprinodon calaritanus.
Maride, Maridole	Smaris <i>sp.</i>	Occiada, Occhiada, {	Oblata melanura.
Marsion	{ Gobius auratus, Paniz-	Ochiá	
	zæ, and other <i>sp.</i>	Ociada.....	Cantharus orbicularis.
Marson, Marsion.....	Cottus gobio.	„ bastarda	Brama raji.
Marsion d'acqua dolce...	Gobius fluviatilis.	Occhio di Santa Lu-	{ Turbo rugosus.
„ de mar	„ minutus.	cia	
Martello	Zygæna malleus.	Oliva	Bulla hydatis.
Matán, Matana	{ Trygon <i>sp.</i>	Ombra, Ombria	Sciæna aquila.
	Myliobatis aquila.	Ombrela, Ombrella... {	Umbrina cirrhosa.
Mazanetta, Masinetta...	Carcinus mænas.		Corvina nigra.
Mazinette	Mugil capito.	Orada	{ Chrysophrys aurata.
Maziola	Trigla hirundo.		Leuciscus pigus.
Mechiati, Mechiarini ...	Mugil cephalus.	Orada dell' Adese	„ „
Melon de mar.....	Echinus melo.	Orbetti.....	Mugil cephalus.
Menole	Mæna and Smaris <i>sp.</i>	Orecchio di San Pietro...	Haliotis tuberculata.
Menola schiava (chi-	{ Mæna vulgaris and other	Ostreghetta del duro ...	Chama gryphoides.
ava)	<i>sp.</i>	Ostrica a lamelle.....	Ostrea lamellosa.
Menoloto'.....	Smaris vulgaris.	„ comune cris-	{ „ edulis, <i>var.</i> cris-
Menuaja mora.....	Gobius jozo.	tata	tata.

Ostrica comune de- pressa, Ostrichino	}	Ostrea edulis, <i>var.</i> de- pressa.	Pesce bandiera	Alopias vulpes.			
Ostrica comune fal- cata		}	Ostrea edulis, <i>var.</i> fal- cata.	„ barbastrillo ...	Exocoetus volitans.		
Ostrica di palo			Ostrea adriatica.	„ barbastella ...	Dactylopterus volitans.		
Ostura		Pinna nobilis.	„ barila.....	Orthagoriscus mola.			
Ovi di mar		Cynthia microcosmus.	„ blu.....	Scomber and Thynnus <i>sp.</i>			
Paganello.....	}	Gobius paganellus.	„ can	Generic term for sharks.			
„ di porto ...		}	„ jozo.	„ „ spinarol ...	Acanthias vulgaris and Blainvillii.		
„ verga			}	„ niger and jozo.	„ cavalier	Crenilabrus mediterraneus.	
„ bianco.....				}	„ cruentatus.	„ colombo	Myliobatis aquila. Trygon pastinaca.
„ di mar.....					}	Pagrus vulgaris.	„ cordéla
„ insanguiná ...	}					Thynnus pelamys. Pelamys sarda.	„ fabbro
Pagafo		}				Pinna nobilis.	„ falce
Palamida, Palamia ...			}			Fissurella and Patella <i>sp.</i>	„ figa
Palóstrega di porto				}		Labrus <i>sp.</i> Serranus scriba.	„ gallo
Pantalena.....					}	Labrus turdus.	„ luna
Papagà.....	}					Clupea papalina.	„ manzo
Papagallo verde		}				Pleuronectes italicus.	„ martello
Papalina			}			Arnoglossus <i>sp.</i> Citharus linguatula. Solea monochir.	„ mollo
Passara, Passera, Pas- sarin, Passariello...				}		Arnoglossus Grohmanni.	„ morti.....
Pataraccia					}	Mytilus edulis.	„ nello
„ mora	}					Modiola barbata.	„ occhial
Pedocchio, Peocchio, Peocio, Peocio di mar		}				Pecten jacobæus.	„ pantofola
Peocio peloso			}			Solea variegata. „ monochir.	„ perseghin
Pellegrina di San Gia- como				}		Phrynorhombus uni- maculatus.	„ pestafero
Peloso					}	Pennatula <i>sp.</i>	„ pettine
Peloso	}					Serranus scriba. „ cabrilla.	„ porco.....
Peloso		}				Perca fluviatilis.	„ prete
„ di grotta			}			Syngnathus acus.	„ ranin
Penna di mar, Pen- nacchiera.....				}		Zygæna maleus.	„ rioda
Perga					}	Balistes capriscus. Orthagoriscus mola.	„ „ liscio
„ dalmata	}						„ „ ruvido.....
Perha		}					„ rospo
Perso di fiume			}				„ sanpietro
Persico, Persego				}			„ scarpolero.....
Pesce ago					}		„ schermo
„ baile	}						„ sorcio
„ balla		}					„ sorze
			}				„ spada.....
				}			„ spin
					}		„ spuzza
	}						„ ton
		}					„ tremolo.....
			}				„ trombetta
				}			„ violin.....
					}		„ volpe.....

Pesseta, Pessucola	Cobitis tænia.	Rombo	} Rhombus maximus.
Peto de dolphin	Schizaster canaliferus.	„ di sasso	
Pevarazza... ..	Venus gallina.	Rondinella	} Exocoetus volitans.
Pevarone	Lithodomus lithophagus.	„ .....		} Dactylopterus volitans.
Piè d'asino	Pectunculus glycimeris.	Rosa di mar	} Retepora cellulosa.
„ d'occha	} Asteriscus membran- accus.	„ .....		} Actinia sp.
Piede de caval		Pinna nobilis.	Rospo
Pigo..... ..	Leuciscus pigus.	„ di mar	} Lophius piscatorius.
Pincia, Pincie	Alburnus alburnellus.	„ di fango	
Pinco	Labrus maculatus.	Sacchetto	Centropristis hepatus.
Piso	Pinnotherus pisum.	Sagri, Sagrin	Squatina oculata.
Polpo	Octopus vulgaris.	Sajon	} Leuciscus pigus.
Pompilo, Pompin	Thynnus vulgaris.	„ colle broche ...	
Pontio	Mæna vulgaris.	Saletto de fosso	Orchestia littorea.
Porcella	Dolium galea.	Salissoni cape	Chiton siculus.
Porcelletta, Porzelletta...	Cassidaria echinophora.	„ delle rive	Ligia italica.
Porchetti	Lepadogaster sp.	Salpa	Box salpa.
Poréssa	} Pagurus maculatus.	Sanchetto	Arnoglossus laterna.
		„ peloso	Solea monochir.
		„ salvatica.....	Xantho rivolosus.
Porpora, Porco	Murex trunculus.	Sangue de Turco	Pectunculus glycimeris.
Porzella, Porzellata.....	Acipenser sturio (<i>fry</i>).	Sanpiero	Zeus faber.
Potta di mar	} Rhizostomum Cuvieri.	Santalena.....	Fissurella and Patella sp.
„ marina			
Quattro occhio	} Raja miraletus.	Sardella, Sardéle, Sar- deline	} Clupea pilchardus.
Quattr' ^o occhio.....			
Ragno	} Trachinus draco.	Sardelina	„ papalina.
„ bianco		} Labrax lupus.	Sardella salvatica, Sar- dena.....	„ alosa and finta.
„ di mar	} Trachinus draco.		Sardon .....	Engraulis encrasicolus.
„ nero		} „ araneus.	Sargo .....	Sargus Rondeletii.
„ di grotta	} „ radiatus.		„ d'Istria .....	Charax puntazzo.
„ pagano.....		„ „	Saron, Suro, Suero .....	Trachurus trachurus.
Ragnola	Trachinus vipera.	Savetta, Savel, Soëtta ...	Chondrostoma soetta.
Ragosta	Palinurus vulgaris.	Scagiotto	Gobius Ruthensparri.
Raina, Rainotto	Cyprinus carpio.	Scampa salvatica.....	Galathea strigosa.
Rasa.....	Raja sp.	Scamparello, Scam- petto	} „ scamparella.
„ spinosa	clavata.	Scampo morte.....	
„ di sabbia	macrorhyncus.	Scampa falsa a man lunghe	} „ rugosa.
Rasetta	„ punctata and other small rays.	Scampo .....		Nephrops norvegicus.
Ribon, Ribone	Pagellus erythrinus.	Scarabina.....	Clupea alosa and finta.
Rizzo de mar	} Echinus lividus and brevispinosus.	Scardóbola	Gebia littoralis.
„ melon		Echinus melo.	Scardola, Sgardola, } Scardoloto del Sil }	Leuciscus erythro- pthalmus.
Rombetto di grotta...	} Phrynorhombus uni- maculatus.	Scarparo	Raja miraletus.
			Scarpena
		„ negra, Scar- pon	„ porcus.
		Scarpena de sasso ...	} „ scrofa.
		„ rossa.....	

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Tremolo occià.....	}	Torpedo narce.	Varagnolo	}	Trachinus draco and vi- pera.
„ a macchie negre			Varolo, Variolo		
Triglia, Tria		Mullus surmuletus.	Veccio, Veccie, Vecez...		Gobius fluviatilis.
Trompeto, Trompilo, Trompin	}	Thynnus vulgaris.	Verdon	}	Labrus turdus.
Trotta bastarda			Leuciscus cavedanus.		Crenilabrus pavo.
Trottolo bianchiccia ...		Trochus Biasoletti.	Vermi dei legni		Teredo navalis.
Trutta		Salmo fario.	Verzelata.....		Mugil saliens.
„ rossa.....		„ carpio.	Vescola		Arenicola piscatorum.
Turchello.....		Trigla lyra.	Violin		Rhina squatina.
„ insanguinà ...		Lepidotrigla aspera.	Volpe		Alopias vulpes.
Ubriago		Trigla lineata.	Volpina, Volpinetti.....		Mugil cephalus.
Uovi di mar		Cynthia microcosmus.	Zamarugolo.....		Aporrhais pes pelicani.
Vairone, Varone	}	Leuciscus muticellus.	Zanzaloro.....	}	Stenorrhynchus phalan- gium.
		„ phoxinus.	Zentil		Solea vulgaris.
Varagno bianco		Trachinus draco.	Zottolo.....	}	Sepia Rondeletii.
„ nero		„ araneus.	Zottolina		
„ pagán		„ radiatus.	Zucchetto		Ilea nucleus.

KEY TO THE PRONUNCIATION OF CROATIAN WORDS.

The c is pronounced like the German z, English *tzet*.

č like *tshay* (English).

ć like the Italian ci, in *cielo*.

š like the English *sh*.

z as in English.

ž like the French j, as in *jour*.

nj like the French gn, in *signal*.

lj like the French l mouillé, or the Italian *gli*.

gje like *je-ay* (Eng), *gie* (Ital.).

gjo like *je-oh* (Eng.), *gio* (Ital.).

gja like *je-ah* (Eng.), *gia* (Ital.).

gju like *je-uh* (Eng.), *giu* (Ital.).

è before an r, as in *cèrna*, *pèrc*, etc, is not pronounced
at all.

APPENDIX IV.

REFERENCE INDEX to the *Croatian Local and Vulgar Names of the Adriatic Fauna on the Austro-Hungarian Seaboard.*

Agáca	Labrax lupus.	Boculjava gušavica	Crenilabrus pavo.
Angulja	Anguilla vulgaris.	Bodeljka	Scorpæna sp.
Ankulete, Anzuleta.....	Trigla sp.	Bramburači	Pagurus Bernhardus.
Arbun	Pagellus erythrinus.	Brgljun	Engraulis encrasicholus.
Arkaj, ovčica	Pagellus mormyrus.	Brizgavac.....	Holothuria tubulosa.
Astič	Homarus vulgaris.	Buča	{ Raja marginata.
Babaš	Mugil cephalus.		{ Trygon sp.
Baba	{ Blennius gattorugine.	Bučát mjesečarka	Orthogoriscus mola.
	{ Blennius ocellaris.	Bugva, Bukva, Buba ...	Box vulgaris.
Baba krunašica	Blennius pavo.	Bulja	Perca fluviatilis.
Babica	Lepodogaster sp.	Bumbarak	{ Turritella communis.
Babica od dubine	Blennius ocellaris.	Bamburač	
Babka	Blennius tentacularis.	Busbana	Gadus minutus.
Babuka	Blennius vulgaris.	Butac	Orthogoriscus mola.
Babuška	Chiton siculus.	Butovka	Pinna nobilis.
Balavac	{ Mugil capito.	čač, čač muški.....	Uranoscopus scaber.
	{ Cottus gobio.	čača	Lophius piscatorius.
Balavica	Blennius palmicornis.	čanča	Isocardia cor.
Barakula	{ Raja clavata and mira-	čančica	Cardium edule.
	{ letus.	Capor	Anguilla eurytoma.
Barakulica	Raja punctata.	čaška	Pectunculus glycymeris.
Barbaroga	Blennius tentacularis.	ćepa, ćipa	Clupea alosa and finta.
Barbir	Blennius gattorugine.	čèrčak	Palinurus vulgaris.
Barbun	Mullus barbatus.	Čèrna škarpena	{ Scorpæna porcus.
Batofina	Uranoscopus scaber.	Čèrni škarpoč	
Batovina	Gobius jozo.	Čèrjena škarpena ...	{ Scorpæna scrofa.
Bavuš	Mugil saliens.	Čèrveni škarpoč	
Bazak	Leuciscus basak.	Čèrnjak ...	Gobius jozo.
Bèrkavica	Mullus barbatus.	četiri oči	Raja miraletus.
Bezmek	Uranoscopus scaber.	Cicala	Anatifa lævis.
Bilizna, Bilizma	{ Seriola Dumerilii.	Cicavica	Smaris vulgaris.
	{ Lichia amia.	Ciepa	{ Mugil cephalus.
Biškup.....	Myliobatis noctula.	ćipal glavotni ...	
Bistranga, pastrmka ...	Salmo dentex.	Cievnjak	Serpula sp.
Bitinica	Lichia amia.	čiga	Atherina boyeri.
Bjelica	Lichia amia.	čigraši	Trochus sp.
Bljudica	Patella vulgata.	čikov	Nemachilus barbatulus.

Črljene kućice	} Tellina exigua.	Glevoć	Helix secernenda.
Črljenice		Glista drva	} Teredo navalis.
Črnelj, crnej	Umbrina cirrhosa.	Glistice	
Črnjelj	Heliastes chromis.	Gof	Seriola Dumerilii.
Črni spuž	Helix Ponzolzi.	Gola rakovica	Carcinus mænas.
Črnorep	Oblata melanura.	Golčić	Scomber scomber (fry).
čučina	} Centropristis hepatus.	Golica	Ammopleurops lacteus.
		} Lepidotrigla aspera.	} Myliobatis noctula.
čuk	Rhina squatina.			} „ aquila.
čupka	Fissurella costaria.	„ morski	„ „
Čvičenica	Tinca vulgaris.	Govedar	Cobitis tænia.
čvrljak	Labrus festivus.	Grb	} Umbrina cirrhosa.
Cvjetulja	Actinia sp.			} Sciæna aquila.
Daguja	Mytilus edulis.	Grbić	Pagellus acarne.
Divi	One of the Mugil sp.	Grbić	Pagellus bogaraveo.
„ pišmoj	Gadus minutus.	Grdobina ..	Lophius piscatorius.
Dlakuša	Aphrodite hystrix.	Grmalj	Eriphia spinifrons.
Drhtuja	Torpedo sp.	Grum, Grunj	Conger sp.
Drlje	Scardinius dergle.	Gruj, Gor	Anguilla vulgaris.
Drozak	Labrus festivus.	Grunjeva mati	Motella tricirrata.
Dugnjača	Coris sp.	Gubavac	Helix setigera.
Dugonosica	Crenilabrus rostratus.	Gulić	Gobius paganellus.
Dupinska pèrsa	Schizaster canaliferus.	Gulj od blata	„ jozo.
Fanfan	Naucrates ductor.	Guskina noga	} Asteriscus membrana-
Figa	Labrus mixtus.			} ccus.
Fratar	Sargus Rondeletii.	Havba	Umbrina cirrhosa.
Fratrić, oluz	„ vulgaris.	Hinjuša	Crenilabrus ocellatus.
Gajun	Tapes decussatus.	Hlapić	Galathea scamparella.
Gaovica	Leuciscus adpersus.	Hobot	Octopus vulgaris.
Gaun batelj	Atherina Boyeri.	Hobotnica	} Eledone moschata.
„ hrskavac	„ mochon.			} Octopus vulgaris.
„ pravi	„ hepsetus.	Hudobina	Lophius piscatorius.
Gavun, gaun, gavon...	} Atherina hepsetus and	Huj, Hulj	Ophidium barbatum.
		} other sp.	Iaglun .....	Histiophorus belone.
Gèrgeč	Gasterosteus aculeatus.		Igla .....	Belone acus.
Gira	} Mæna vulgaris.	Igla diva	} Siphonostoma and Syn-
Girica	Atherina sp.	Inac	} Crenilabrus griseus, and
Glamoč bilac	Gobius jozo.			} tinca.
		„ lučni	„ jozo.		Inćun .....	Engraulis encrasicholus.
„ pločar	„ capito.	Iskra	Nassa reticulata.
„ purićaš	„ ophiocephalus.	Iverak	Pleuronectes italicus.
„ žutac	„ auratus.	Jaglica	Belone acus.
„ žudij	„ cruentatus.	Jaglun	Xyphias gladius.
„ žuti	„ niger.	Jaglunić	Sphyræna vulgaris.
Glamočić	Gobius Buchichii.	Jaja od mora	Cynthia microcosmus.
Glavoč, Glamoč, Gulj...	„ sp.	Jakovska kapica	Pecten jacobæus.
„ cèrni	„ jozo.	Jaram, joron, jorona ..	Zygæna malleus.
„ od ruba	„ niger.	Jastog	Homarus vulgaris.
Glavuje	Trigla lineata.	Jebac	Crenilabrus pavo (male).

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Liganj, Lignja ili obična crna kraka	{ Loligo vulgaris.	Modrak, Modraš.....	Mæna vulgaris.
Linj, Linjak.....	Tinca vulgaris.	Modri Inac	{ Crenilabrus melano-
Lipan, Lipljen.....	Thymallus vulgaris.		cercus.
Lisanka	Tapes edulis.	Modrulj	Smaris alcedo.
Lisica	Alopias vulpes.	Morska šljuka	Centriscus scolopax.
Lizibaba, Legbaba	Cobitis tænia.	„ zmija	Myrus vulgaris.
Ljuštura	Pinna nobilis.	„ srčavka	Cardium tuberculatum.
Lokarda	{ Scomber Scomber	„ zvjezdica.....	Asteracanthion <i>sp.</i>
	„ colias.	Morski djavol	Lophius piscatorius.
Lovrata, Lovratica	Chrysophrys aurata.	„ gulj.....	Gobius cruentatus.
Luben, Lubin, Lubanj,	{ Labrax lupus.	„ jež	{ Echinus lividus and
Ljubljaj			melo.
Lučenka, Lučerna ..	{ Trigla hirundo.	„ kurac	Holothuria tubulosa.
	„ lyra.	„ pauk	Maia squinado.
Luceta morska	Labrus merula.	„ rak	Palæmon squilla.
Lumbrak	Crenilabrus pavo.	„ zec	Aplysia depilans.
Lupar	Patella vulgata.	Morun, Moruna	Acipenser huso.
Mač	Trachypterus tænia.	Moruzga	Murex brandaris.
Mačak crni	Scyllium canicula.	Moruzga	Anemonia and Actinia <i>sp.</i>
Mačak naški	„ stellare.	Mrena	Barbus plebejus.
Mačka	„ canicula.	Mržnjak	Mugil saliens.
Mačin	Acantholabrus Pallonii.	Mulj, Muljal	Mugil <i>sp.</i>
Mačinac	Cepola rubescens.	Murina, Mrina	Muræna helena.
Mačka šargasta	Scyllium stellare.	Mušul	Arca Noæ.
Magavetas	Zonites acies.	Muzgavac	Octopus vulgaris.
Maklja	Squalius tenellus.	Nanarić, Nanarica	Trochus Biasoletti.
Mala jegulja	Anguilla vulg. (Elders).	Narikle	Trochus <i>sp.</i>
Manjak	Seriola Dumerilii (<i>fry</i>).	Nejasitka	{ Asteriscus membra-
Manjur	Saurus griseus.		ceus.
Mater od ugorâ	Motella tricirrata.	Noćno krugalo	Iaxea nocturna.
Matulić	Apogon imberbis.	Obična rakovica	Carcinus mænas.
Maženica	Leuciscus aula.	„ sablja	Xyphias gladius.
Mečica	Paraphoxinus alepidotus.	Obični kamotoč	Pholas dactylus.
Mendula biela.....	Smaris vulgaris.	„ lupar	Anatifa lævis.
Mèrkač	Eledone moschata.	„ račić	Crangon vulgaris.
Mèrkačić	Octopus vulg.	„ šašanj	Teredo navalis.
Metja	One of the Mugil <i>sp.</i>	Oblič	Rhombus maximus.
Mjehurača	Bulla hydatis.	Oblica	Smaris <i>sp.</i>
Migavica	Pecten glaber.	„ biela	„ vulgaris.
Mihača.....	Balistes capriscus.	Obloustka	Petromyzon Planeri.
Milvica.....	Smaris vulgaris.	Ogor	Anguilla vulgaris.
Minčion	Engraulis encrasicholus.	Oliga	Smaris gracilis.
Miš	{ Callionymus maculatus	Oluz.....	Sargus vulgaris.
	and belenus.	Orfanić ..	Labrus turdus.
Miš morski	Motella tricirrata.	Osata	Oblata melanura.
Mjesečarka	Orthogoriscus mola.	Osal, Oslič	Merluccius vulgaris.
Mladica	Salmo obtusirostris.	Ostrieš.....	Perca fluviatilis.
Mlič.....	Latrunculus pellucidus.	Oštriga.....	Ostrea <i>sp.</i>
Modra morska pluća ...	Rhizostomum Cuvieri.	Oštruja	Smaris vulgaris (<i>female</i>).
		Ostrulj	Aulopyge Hügeli.

Ovca, Ovčica	Pagellus mormyrus.	Piur	Paraphoxinus croaticus.	
Ovrata	Chrysophrys aurata.	Pivac	Blennius pavo.	
Pagar, Pagrun	Pagrus vulgaris.	Pivčić	Tripterygium nasus.	
Pagar prljaš	„ Ehrenbergii.	Pizdarica	Helix Ponzolzi.	
Paklena, Paklara	Petromyzon marinus.	Pizdica	Arca Noæ.	
Palamida, Palanda, {	Thynnus pelamys.	Pizdin-prilipak	Lepadogaster <i>sp.</i>	
Polanda	Pelamys sarda.	Pizdoklep	Palinurus vulgaris.	
Pas	Generic term for sharks.	Pjeskožil	Arenicola piscatorum.	
„ butor	} Galeus canis.	Plahut	Gobius paganellus.	
„ crni			Plavica	Scomber colias.
„ crnomanjast			Plosnatica	Pleuronectes italicus.
„ riba			Plotica	Leuciscus plotizza.
„ sa zubi			Plotice	Leuciscus <i>sp.</i>
„ spadun	Alopias vulpes.	Pocuranac	Loligo vulgaris.	
„ ženka	Carcharodon Rondeletii.	Podlanica	Chrysophrys aurata.	
Pasara, Pasera	Pleuronectes italicus.	Podujka	{ Crenilabrus mediterraneus.	
Pas bulaš	Mustelus vulgaris.	Podustva	Chondrostoma Knerii.	
Pasjak	Zonites albanicus.	Pokrovača	Pecten jacobæus.	
Pasnica	{ Carcharias glaucus.	„ gladka	„ glaber.	
	{ Carcharodon Rondeletii.	„ poklopita	„ opercularis.	
Pastèrmka	Salmo dentex.	Poletuša	{ Dactylopterus volitans.	
Pastrva	Salmo <i>sp.</i>		{ Exocoetus volitans.	
Pastrva pirgasica	„ obtusirostris.	Polig bieli	Raja punctata.	
Pastirica	Lichia <i>sp.</i>	„ košćati	„ clavata.	
Patarache	Citharus linguatula.	Poljski slemak	Hyalina cellaria.	
Pauk	Trachinus draco.	Popauk	Gobius Lesueurii.	
Pavlinka	Crenilabrus ocellatus.	Pornpujak	„ paganellus.	
Pazdrk	Pteroplatea altavela.	Postrva	Salmo <i>sp.</i>	
Pèrč	{ Smaris vulgaris (<i>male</i>).	Potočni rak	Astacus fluviatilis.	
	{ Eledone moschata.	Prasac	} Centrina Salviani.	
Peritska	Pinna nobilis.	„ morski		
Pèrstenac	Lithodomus lithophagus.	Prasica	Trigla hirundo.	
Perulja	Pennatula phosphorea.	Pravi	One of the Mugil <i>sp.</i>	
Peš, peša	Cottus gobio.	Pravi jesetar	Acipenser sturio.	
Peškelj	Leuciscus scardafa.	Prhna ribica	Blennius canevæ.	
Peškvela	Leuciscus rubella.	Pripelanka	Tapes decussatus.	
Pestelj	Holothuria tubulosa.		} Fissurella <i>sp.</i>	
Petar	Zeus faber.	Priljepak		} Patella <i>sp.</i>
	} Sargus vulgaris.				} Chiton siculus.
Pic		Charax puntazzo.	Prilipak	Lepadogaster Gouanii.
Pilača	Lima inflata.	Prnjavica	Venus verrucosa.	
Pinzulić	Centropristis hepatus.	Prstenci	} Lithodomus lithophagus.	
Pirka	{ Serranus cabrilla.	Prstići		
	„ scriba.	Prug	{ Dromia Rumphii.	
Piška od mora	Stromateus fiatola.		{ Palinurus vulgaris.	
Piškor	Nemachilus barbatulus.	Pujoglavica	Mullus barbatus.	
Piškor, potočni piškor {	Petromyzon fluviatilis	Punjeglavica	Anguilla vulgaris.	
	and Planeri.	Pustenka	Aphrodite hystrix.	
Pišmoj, Pišmolj	Gadus <i>sp.</i>	Putnik	Mugil chelo.	
Pišmolj od parangala ...	Gadus merlangus.			

Puži, Pužići	Helix <i>sp.</i>	šilo	{ Siphonostoma and Syngnathus <i>sp.</i>
Pužica	Tapes edulis.	Sipa	Sepia officinalis.
Puzlatka	Heliotis tuberculata.	Sipica	Sepiola Rondeletii.
Račić od ostrige	Pinnotherus veterum.	Skaram, skaran	Sphyræna vulgaris.
Račnjak	Maia squinado.	škarpina	Scorpæna scrofa.
Ranje bele	Trachinus draco.	škarpoč	„ <i>sp.</i>
Ranjen	„ <i>sp.</i>	škarpun	„ porcus.
Rak	{ Carcinus mænas. Nephrops norvegicus.	Skila... ..	Galathea scamparella.
Rakovica	{ Maia squinado. Lambrus mediterraneus. Iaxea nocturna. Portunus depurator.	Skipa ..	Lutraria elliptica.
Rak-samac	Pagurus Bernhardus.	Sklat	Rhina <i>sp.</i>
Raža	Raja punctata.	Sklat od purica	Rhina squatina.
Ražica	Raja punctata.	školjak	Arca Noæ.
Ražina dračava	„ clavata.	škorak	Arenicola piscatorum.
Razporka	Fissurella costaria.	škoravi cievnjak	Serpula <i>sp.</i>
Riba lesica	Alopias vulpes.	Skuš, skuša, sguša	Scomber scomber.
„ od pjene	Naucrates ductor.	šljanak	{ Solen vagina.
„ prasac	Centrina Salviani.	šljanci	}
„ prasica	Lepadogaster <i>sp.</i>	šljivar	Chondrostoma soëtta.
„ sablja	{ Xyphias gladius. Lepidopus caudatus.	Slonov zub	Dentalium entalis.
„ vlasuja	Trachypterus tænia.	Smrt	Galathea rugosa.
Rumbac	Rhombus maximus.	Smokva	{ Crenilabrus <i>sp.</i> Stromateus fiatola.
Runjavac	Helix setosa.	Smokvača	{ „ „ Serranus scriba.
Salpa	Box salpa.	Smokvica	Crenilabrus melops.
Sankete	Arnoglossus laterna.	Smudj	Lucioperca sandra.
Sanketice	{ „ „ Centropristis hepatus.	Smudut	Labrax lupus.
šarak, šarakina	Clupea papalina.	Sokot, Sklat	Rhina squatina.
šaran	Cyprinus carpio.	Solinarka	Cardium rusticum.
šarena drhtulja	Torpedo <i>sp.</i>	Solnjača	Crenilabrus pavo.
šarg, šarag	Sargus Rondeletii.	špar	Sargus annularis.
škarpion	Coristes dentalus.	Spirka	Crenilabrus melops.
Skoranza	Alburnus scoranza.	Spuži	Helix, <i>sp.</i>
šenac	Mytilus edulis.	Srčavka	Cardium edule.
šeputnjača	Retepora cellulosa.	Srdjela, srdela	{ Clupea pilchardus.
šestilo	Lambrus mediterraneus.	Srdjelica	}
šfoj	Arnoglossus Grohmanni.	Srebrnica	Argentina sphyræna.
šfolja kosmata	{ Phrynorhombus unima- culatus.	Strigljača	{ Pylumnus hirtellus. Portunus depurator.
šfolja, švoja	Solea vulgaris.	štiriun	Acipenser <i>sp.</i>
Sgrčenice	Mullus surmuletus.	Stirjaš	Mugil capito.
Sguša bilica ..	Scomber colias.	Strmorinac	Fierasfer acus.
„ pastrica	„ scomber.	štuka	Esox lucius.
šiba	{ Trygon thalassia. Myliobatis noctula.	Suličica	{ Branchiostoma lanceola- tum.
šilj	Lucioperca sandra.	Sunj	Trygon brucco.
		šur, širun, šnjur	Trachurus trachurus.
		Sužanj mačak	Scyllium stellare.
		Svač	Rhombus lævis.

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GENERAL INDEX.

ADRIA	page 1	Bobera	page 108
Adriatic gulf, its limits	1	Boccaporta	101
„ seal	27	Bocche di Cattaro	49
Agonera	108	„ false	67
Agugliara	115	„ di Segna	3
Ali	113	Bogue, the	28, 38, 74
Alzana	102, 117	Bombina	110
Ancona	6	Bora	2
Anchovy, the	29, 85	Boreal forms	23, 37
Anglers, or fishing frogs	30, 79	Botarga	81
Anguellerà	107	Brackish waters, forms of the	38
Aphyes	81	Bragagna, Bragagnello	100, 119
Arbe, island	2, 7	Bragotto, Bragottin di mar	121
Arctic forms	37	Bragozzo, Bragozzetto	101, 103
Argano	100	Brancarella	132
Argentine, the	84	Brazza, channel	7
Arte, Arti... ..	104	„ island	67, 68
Asturera	133	Brazzera di Capo d' Istria	100
Atherines	15, 26, 38, 80	Brill, the	38, 83
Atri	1	Brindisi	6
Aulona	6	Brioni, islands	64
Aussa, river	2	Broschetti	114, 138
Austrian coast, its limits	2	Buccari	62, 65
BAICOLERA	110	Buccarica... ..	65
Bait	107, 134	Budello	105
Bait for Sardine fisheries... ..	107	Bukvare	108
Band-fishes	29, 80	Burchio, Burchiello	103, 129
Barbonera	111	Burton, Capt. R. F.	41, 88, 90
Barca	100	Buso, cape	2
„ di Muggia	100	Busto	119
Barcola	49	CAGNERA	108
Barriaghi	129	Calamotta, channel	67
Basket-traps	128	Calata	125
Basse, the	32, 38, 71	Canapa, Canapin... ..	104
Battello	99, 103	Canavaca	132
Battelletto, Battellazzo	103	Canna	123, 130
Bed, sea-bed	8	Caorlina	103
Bivalves	87	Capelan, the	29, 82
Black-fishes	33, 38, 77	Capo d' Istria	62, 63
Blennies	26, 38, 80	Carlopagò... ..	2
Boar-fish	28, 76	Carpenter, Dr.	7

Cassa	page 120	Deep-bed, fishes of the	page 29
Castelmuschio	65	Delfinera	133
Cattaro, channel of	67, 68	Dentalà	131
Cephalopods	28, 30, 87	Dente, Punta del	64
Cerbere, Cerberao	109, 110	Dentex, the	28, 72
Cerchietti	119	Depths	6, 9
Cerchio, cerchiello	122	Derbio, the	33, 76
Cetina, river	67	Diatomaceæ	12, 17
Cevènte	3	Distribution of fauna	10
Characteristic species of the various zones	34	„ “extended”	35
Chelonia caretta	27	„ “limited”	35
Chiara	119	Districts of the Aust.-Hungarian fisheries	62
Chiaroni	109	Division of profits	138
Chiaviche	124	Dobrigno, bay of	15
Chioggia fisheries, value of craft and gear	60	Dolphins	33, 77
Chioggiotti fishermen	45, 49, 64, 117	Dosana	3
Chorology	10	Dragonets	80
Cievolame	81	Draw-nets	113
Cievolera	108	Dražice	2
Cimarol	101	Drezze	123
Cio	99	Drift-nets	105
Circle-nets	111, 113	„ fisheries	106
Cittanuova	63	Duino	63
Cladophora	10		
Clares	88	EASTERN shore of the Adriatic, its limits	1, 2
Cod tribe, the	29, 82	Ecdysis of the shore-crabs	93, 129
Cogòlo	117, 123	Echinoderms	94, 145
Complaints against trawling	43	Eckel, G. R. von	96
Conger-eel, the	17, 29, 86	Eel tribe, the	27, 38, 39
Cocchia, cocchia	64, 117	Enca	119
Coral fisheries	97, 98, 121	Enteromorpha	10
Corallines	12	Epidaurus	67
Coralline zone	20	Esca	134
Cornalia	27	“Extended” distribution	35
Correnti	3		
Corteghe	105	FACIES	10
Coscioni	121	Fango	8
Crabs	93	Fasana	64
Crapano, island	63	File-fishes	38, 87
Crustaceans	91	Fiocina, Foscina	133
Cucchiaia	120	Fishing gear, value of	129
Currents	3	Fish-market	141
Curzola, island	67	„ ponds, fish-weirs	122, 123
Cusidura	123	„ reared in the valli chiuse	127
Cystoseira	14, 16, 17	Fisheries, their character	40
		„ value of	154, 158
DAÏLA	63	Fishes, recapitulation of	37
Dalmatia, its breadth	41	Fishing craft	99, 155, 165
Dalmatian coast, its limits	2	„ frog, the	30, 79
Dandolo	114	„ gear	165
Declivity, fishes of the	28		

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KERKA, river	page 67	Meleda, island	page 9, 67
Kirzi	65	Mendole	63, 73
Knots	105	Meshes	105
Koescher	122	Mezzana	119
Kolombatović, Professor G.	82	Mezzo, channel	67
Kustenland	2	Migavica	120
LAGOONS of Venice	86, 123	Migratory fishes	26, 29, 30
„ fish reared in the	81	Ministry of Commerce	41, 44
Lagosta, island	62, 68	Minutaja, or Misto	135, 142
Laminarian zone	17	Molebut, the	34, 38
Lampreys	32, 38, 39, 87	Mollusks	87
Lancelet, the	87	Monfalcone	62
Lavoriero	123	Monk, the	27
Legislation	47	Montata	124
Leme, channel	64	Molinello	119
Lenza	131	Morlacca, channel	3
Lésina, island	62, 67, 68	Moulting of crabs	93, 129
Leuto	100, 114	Mounting the nets	105
Ligazzi	3	Muggia	62, 63
“ Limited ” distribution of fauna	35	Murry, the	86
Line-fishing	130	Mussels	89
Linguetta, Cape	1	Mussolera... ..	121
Lino	104	NAMES applied to fishermen	135
Lissa, island	7, 62, 67, 68	„ „ the various methods of	
Littoral rovers	26	„ „ fishing	136
„ squatters	27	Nappa sottile	109
„ zone, the exposed	10	Narenta, river	67
„ „ the submerged	12	Nasse	128
Lobsters	17, 92	Nazádra	99
Lorenz, Dr. J. R.	10, 25, 26	Nephrops Norvegicus	22
Luksch, Professor J.	5	Nets	104
Luminiero	114	„ where made	104
Lussinpiccolo, island	62, 64	Ninni, Professor A. P.	52
MACARSKA	3, 62, 67	Nonnati	80
Mackerel, the	32, 38, 77	Northern forms, isolated colonies of	23
Maglia	105	Norway lobster, the	22, 65, 91, 144
Maltempo, channel	3	Nudibranchs	90
Mandracchio	2	Nullipores	12, 17
Marano	63	Number of well-defined species of fish	
Marazzi, Vice-Consul Count Antonio	46, 51, 158, 159	and other sea produce which come to	
Marchesetti, Dr. C. de	57, 85	market	98, 141
Marea	3	Occhi della catena	101
Mare Adriaticum	1	Octopus, the	28, 30, 87
„ Superum	1	Oližnica	120
Marotta	129	Ombla, river	67
Meagre, the	75	Opposition to the Chioggiotti	49
Megline	62	Oprara	122
Meleda, channel	67	Ordega	121
		Ordegno di pesca del corallo	121

Organisation of the fisheries ...	page 62	Pipe-fishes ...	page 17, 29, 38, 86
Orsero ...	62	Pirano ...	63
Oscellaria ...	11	Piston, Pobug ...	133
Ostreghera ...	120	Plaice, the ...	84
„ a piombo ...	121	Planca, promontory ...	2
Ostreoculture ...	88	Ploča ...	2
Otranto ...	1	Poklopnica ...	108
Outliers ...	23	Pola ...	62, 64
Oysters ...	17, 87	Political conditions of the Adriatic sea-coast ...	41
Oyster fisheries of Stagno ...	68	Pomo, scoglio ...	9
PACCIUGO ...	107	Pompilus, the ...	76
Palanda ...	116	Poor, the ...	29, 82
Palandara da posta ...	113	Popovnica ...	110
„ tiro ...	116	Portoré ...	62
Pali ...	88	Portellata ...	103
Pannola ...	130	Posta, poste ...	105, 114
Panza ...	113	Posta di bobbe ...	108
Paper sailor, the ...	31	„ di ton ...	111
Parangale ...	131	Poverty of the inhabitants of the coast ...	40
„ a vela ...	131	Preluca ...	65
Parenzo ...	62, 64	Produce of the fisheries ...	69, 161, 166, 169, 170
Pareti ...	113	Promontore, Cape ...	6, 64
Passelera ...	110	Promontorium Diomedis ...	2
Pastello ...	107	„ Solentinum ...	1
Pelagic fishes ...	26, 30	Prongs ...	133
Pelagosa, island ...	2, 67	Prostica ...	108
Pelamide, the ...	33	Proximity of land, its influence on the temperature of the water ...	4
Perch ...	38	Punta Croce, channel ...	23
„ tribe, the ...	71	Punta d' Ostro ...	6
Pesca a spavento, a ludro ...	133, 136	Puschia ...	132
„ a volo ...	115	QUARNERO ...	6
Pesce bianco ...	81, 125	Quarnerolo ...	6, 23
„ da strame ...	81, 127	Quatrefages ...	18
„ di grotta ...	28	Quieto, river ...	63
„ nobile, fino ...	135, 142	RADAZZE ...	121
„ novello ...	121, 124	Radiates ...	94
„ ordinario, salvatico ...	142	Ragusa ...	2, 7, 62, 67, 68
„ populo ...	83, 135, 142	Ragusavecchia ...	67, 68
„ rosso ...	73	Ravenna ...	6
Peschera ...	65	Rays ...	29, 70
Pesson ...	123	Ray's Sea-bream ...	33, 77
Pesto ...	107	Recapitulation of the fauna ...	34
Petter's "Dalmatia" ...	27	Red Mullet, the ...	33, 38, 73
Phoca monachus ...	27	Regulations for fishing under the French ...	48
„ vitulina ...	27	„ seine-fishing in Dalmatia ...	114, 137
Pike, the ...	37, 39, 84	Remora, the ...	33, 78
Pilchard, the ...	29, 32, 85		
Pillela, Piela ...	119		
Pilot-fish, the ...	33, 38, 76		
Piombi ...	105		

Resta	page 100	Sars, Professor G. O., on the spawning of	
Rete	105	fishes	page 118
„ a fermo	111	Scabbard-fish, the	76
„ a strascino (strascico)	117	Scald-fish, the	29
„ da chiusa	111	Scandaglio	100
„ d' angudella	107	Scares	133
„ di barboni	111	Scattaroni	123
„ di can	108	Schiletto	101
„ di capparozzoli	121	Sciabica (žabica)	116
„ di guatti	111	Sciassa	123
„ d' imbrocco, da incetto	105	Scirocco	2
„ d' insacco	109	Scogli	2
„ da posta	105	Scogliani	2
„ di sardelletti	107	Scoglio Sant' Andrea	67
„ di sfoglie	111	Scombrera	108
„ semplice, nude	105	Scorpions	28, 75
„ trammacchiate, tramagliate... ..	105, 109	Scorza de pin mazená	104
„ tramezzata	110	Scuri	137
„ vestite	105, 109	Sea-anemones	95
Reti raschianti	117	Sea-brems	27, 28, 74
Revest, Consul Dr. Nic.... ..	53	Sea-horses	28, 38, 87
Rezzola, rezzuola	116	Sea-perches	28, 71
Ribbon-fishes	82	Sea-urchins	95
Rights of fishing	46	Seals	27
Rizzajo, Rizzagio, Rizzagno	122	Seine-nets... ..	113
Rockling, the	29, 38, 82	Seine fishing <i>versus</i> Drift-net fishing	115
Romagnuoli	64	Seasons	5
Rovers	25, 28	„ of fishing	68
Rovigno	62, 64	Sebenico	66
Rovigo	1	Secche	122
SABAKA (žabaka)	120	Sedentary fishes	8, 25, 26
Sabakone (žabakun)	116	Segna (Zengg)	7, 62
Sacco	113	„ channel	6, 7
Saccolava	121	Segnale	131
Salmon tribe, the... ..	84	Selve, island	2
Saltarello	109	Selce	62
Salting of fish	148	Senello	108
Saltiness of water	6, 9	Sepparola	132
Salvore	63	Serpents de mer	31
San Giacomo	65	Serragli, Serragie	123
Sand-banks	8	Serranus, the	28, 29, 72
Sand-eel, Sand-launce, the	83	Set-nets	109, 111
Sandoli	99	Sfogliante	111
Sansego	62	Shad, the	38, 39, 86
Santa Maria di Leuca	1	Sharks	30, 33, 69
Sardellera	103, 105	Shore fishes	8, 25
Sardines de Nantes	150	Skipjack, the	76
Sardine, the	29, 32, 85	Sloke plants	10
„ fisheries, the	86, 106, 114, 137	Snares	128
Sardonera... ..	107	Sole, the	29, 38, 83
		Spalato	1, 62, 66

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VALLI	<i>page</i> 2, 3, 86, 119, 123	Weevers	<i>page</i> 29, 78
„ a grigioli 124	Whiting, the	29, 82
„ chiuse 124	Whiting-pout, the	29, 82
„ chiuse arginate ... ..	... .. 124	Willow basket-traps ... ..	... 128
„ di Brenno ... ..	... .. 68	Winds ... ..	... 3
„ semi-arginate ... ..	... .. 124	Wolf, Professor J. ... ..	... 5
Valligiani, Vallicultori	123, 124	Wrasses	17, 26, 28, 82
Valloni ... ..	... .. 2	YARRELL'S "British Fishes" ... ..	... 72
Vallone di Muggia ... ..	... .. 63	Yellow-tails ... ..	... 33
Value of Aust.-Hung. fishing craft, 103, 165, 170		Yield of the valli chiuse ... ..	... 127
„ „ „ fishing gear, 129, 165, 170		„ of the Aust.-Hungarian fisheries, 156, 158	
Veglia, island ... ..	... .. 65	„ of the fishing by Italian boats on	
Venetian fisheries, fishing craft, &c.	61	the Aust.-Hungarian coast	159
Venetian lagoon fisheries ... 86, 123, 127		„ of the fisheries of the Hungarian-	
„ regulations concerning the fish-		Croatian littoral	160
eries ... ..	... .. 47	ZARA	62, 66
Venice, imports and exports of fish at	60	Zel ... ..	... 121
Verse ... ..	... .. 128	Zerer ... ..	... 108
Vertebrates ... ..	... .. 25	Zermagna, river ... ..	... 67
Vertical currents ... ..	... .. 7	Zlarin, island ... ..	... 63
„ distribution ... ..	... .. 35	Zocco ... ..	... 123
Vivajo, Viera ... ..	... .. 129	Zone I. ... ..	... 10
Voiga ... ..	... .. 105	„ II. ... ..	... 10
Volega, Vuoega ... ..	... .. 122	„ III. ... ..	... 12
Vollari ... ..	... .. 109	„ IV. ... ..	... 15
Volosca ... ..	... .. 65	„ V. ... ..	... 17
Voyageurs ... ..	... .. 26	„ VI. ... ..	... 20
Voz ... ..	... .. 65	„ VII. ... ..	... 25
Vrulja, bay ... ..	... .. 3	Zoppolo ... ..	... 99
WANT of capital ... ..	... .. 43	Zostera ... ..	... 8
„ of markets... ..	... .. 42	Zuri, island ... ..	... 9, 68
„ of salt ... ..	... .. 45		
„ of ice ... ..	... .. 45		

THE END.