

definite direction, to other parts of the coast, and that the fish supply of a given area of the territorial waters on the east coast may be derived, not from the spawning areas *ex adverso*, but from those situated further north.

#### THE LIFE-HISTORIES AND DEVELOPMENT OF THE FOOD FISHES.

The report contains an important paper by Prof. M'Intosh, giving the results of his continued investigations on the eggs, young, and development of several of the food fishes, the work having been carried on, as in previous years, at St. Andrews Marine Laboratory. The principal investigation relates to the development of the turbot, which has now for the first time been elucidated, fertilised eggs having been procured from the hatchery. The ripe egg of the turbot has an average diameter of 1.0287 mm., and is perfectly buoyant, floating at the surface of still water or suspended midway, and it possesses a prominent oil-globule. The embryonic fish, which is of a reddish colour, emerges from the egg about the sixth or seventh day, so that the period is short before hatching occurs. The larvæ in a few days become active and dart rapidly through the water, and they are hardy; the yolk-sac becomes absorbed about the seventh day, and thereafter they feed for themselves, being extremely quick in noticing the movements of the minute crustaceous and other forms in the water around them. Prof. M'Intosh states that no form hitherto observed at St. Andrews appeared to be more hardy, or to undergo the vicissitudes of temperature and manipulation with greater impunity than the young turbot; there are grounds, therefore, for expressing the hope that they may yet be reared in great numbers from the post-larval to the adolescent and adult condition in suitable enclosures. The various stages in the development of this valuable form are described and figured. Another species whose development is described is the long rough dab, the pelagic eggs of which are found in considerable abundance in March and April.

Mr. H. Charles Williamson contributes an elaborate paper on the reproduction of the common eel, which has been, and still is, in many respects, involved in considerable obscurity. He gives a very full account of the reproductive organs, both as described by other naturalists, and as observed by himself in a number of specimens examined at St. Andrews; and the paper includes a description of the migrations of the eel, and all that has been ascertained about its spawning. It is a remarkable fact that the ripe egg of the eel has never yet been discovered.

Mr. Williamson also gives a detailed account of the distribution of the pelagic eggs and larvæ of various species of food fishes, obtained in tow-nets, including those of the plaice, haddock, cod, whiting, saithe, sprat, dab, turbot, gurnard, long rough dab, flounder, &c. In another paper he describes the variation in the size of the eggs of a number of the food fishes. Dr. Fullerton has also furnished an elaborate description of the larval and post-larval development of the brain in the lesser sand-eel (*Anmodytes tobianus*), accompanied by illustrations. The important subject of the rate of growth of fishes is at present receiving considerable attention in connection with fishing questions. In the present report Mr. Arthur T. Masterman gives the result of his researches on the subject at St. Andrews, dealing especially with the rate of growth of the plaice.

Mr. Harald Dannevig also furnishes an account of the experiments he has made in regard to the influence of variations of temperature in accelerating or retarding the development of the eggs of fishes. The species dealt with were the plaice, cod, haddock, whiting and flounder.

Finally, the report contains a paper, by Mr. Thomas Scott, on the fauna of the Firth of Forth area and of inland waters; Mr. A. J. Herbertson contributes an elaborate paper, accompanied by numerous tables, dealing with the physical observations on the temperature and density of the sea; and Dr. Wemyss Fulton gives an account of the scientific fishery work and the condition and regulation of the sea fisheries in other countries possessing them, and of the principal methods employed to protect and develop them.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Dr. A. R. Forsyth, F.R.S., Sadlerian Professor of Pure Mathematics, has been appointed by the Council of the Senate a member of the Governing Body of Eton College, in the room of Dr. Ferrers, F.R.S., resigned.

NO. 1362, VOL. 53]

An Isaac Newton Studentship in Astronomy and Physical Optics will be vacant in the ensuing Lent term. The studentship is of £200 per annum for three years. Candidates must be at least B.A.s of the University, and under the age of twenty-five on January 1, 1896. Their names should be sent to the Vice-Chancellor between January 14 and 24 next, together with statements as to course of study or research proposed in each case.

The Observatory Syndicate report that they have abandoned the expectation of receiving public subscriptions for the proposed photographic telescope. They now contemplate the erection of a triple apochromatic telescope, the objective of which is to be furnished by Messrs. Cooke, of York, at a cost of £550. The tube of the instrument will be hinged, the larger part of the tube with the eye-piece lying in the polar axis. The rays from the objective at the end of the short movable part of the tube will fall on a flat mirror at the hinge, and be thence reflected to the eye-piece. The flat mirror will be furnished as a gift by Dr. Common, and Sir Howard Grubb is to be entrusted with the construction of the tube at a cost of £1100. The necessary moneys it is proposed to draw from the Sheepshanks Funds, and the Syndicate ask the Senate to sanction this appropriation.

Prof. Ewing, F.R.S., has been appointed Chairman of Examiners for the Mechanical Sciences Tripos, 1896. Among the annual appointments of members of the various Boards and Syndicates are the following:—Mr. Glazebrook, F.R.S., General Board of Studies; Mr. W. Gardiner, F.R.S., and Mr. W. Bateson, F.R.S., Botanic Garden Syndicate; Mr. Love, F.R.S., Library Syndicate and Observatory Syndicate; Mr. Heycock, F.R.S., Museums Syndicate; Dr. Hobson, F.R.S., Proctorial Syndicate, and Mathematical Board; Mr. Capstick, Highest Grade Schools; Prof. Bradbury and Dr. Shore, State Medicine; Dr. D. Hill, Agricultural Science; Mr. Shaw, F.R.S., Fire Prevention, and Board for Physics and Chemistry; Dr. A. MacAlister, Special Board for Medicine; Dr. Gaskell, F.R.S., Board for Biology and Geology.

It is proposed to invite representatives of the chief educational authorities and institutions to meet in Cambridge during the ensuing Long Vacation, in order to confer on questions arising out of the Report of the Royal Commission on Secondary Education. The Vice-Chancellor, on behalf of the University, will convene the conference.

THE Calendar of the University College, Nottingham, for the fifteenth session, 1895-96, has been issued.

THE following are among recent appointments:—Dr. J. Munk to succeed Dr. Gad at the Berlin Physiological Institute; Dr. Paul Kempf and Dr. Wilsing, of the Potsdam Astrophysical Observatory, to be Professors; Prof. Theel, of Stockholm, to be Director of the Natural History Museum there; Dr. Strahl, of Marburg, has been appointed to the chair of Anatomy in Giessen University.

THE *London Technical Education Gazette*—the official organ of the Technical Education Board of the London County Council—contains the following satisfactory announcement:—"It has been part of the policy of the Technical Education Board in connection with higher education, and will be, if possible, through the proposed Teaching University of London, when that University is established, to secure for students who can devote their evenings only to study, a course of instruction of the highest type in all branches for which provision is now made for day students in the universities and university colleges, and to provide that the teachers of these classes shall be the same professors as take the day classes, or others of equal standing. As a step in this direction the Board has arranged with the authorities of University College for the conduct of four courses of lectures and practical work in the departments of Mechanical Engineering, Electrical Engineering, Chemistry, and Applied Mathematics."

#### SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, November 7.—Mr. A. G. Vernon Harcourt, President, in the chair.—The following papers were read:—On flame temperatures and the acetylene theory of luminosity, by A. Smithells. The author criticises adversely Lewes's theory of the luminosity of hydrocarbon flames on the ground of ex-