

whilst the other is left untreated. Smaller tanks are also used for breeding. The purpose of the organic enrichment is to bring about the multiplication of minute flagellates which we now know to be the food of the free-swimming larval oyster. Oysters placed in the tanks liberate their shelled larvæ which in both treated and untreated tanks settle as spat, but in the enriched tank the number settling is found to be much greater. Very heavy spatfalls were obtained in the tanks on limed tiles in both 1937 and 1938, and the commercial possibilities of this method of obtaining the settlement are clearly demonstrated. In both these years there was a nanoplankton consisting almost entirely of very small flagellates, and the ability of the oyster larvæ to feed on such flagellates has been confirmed by laboratory feeding experiments, which have also shown that they can not utilize non-motile green and blue-green algæ during the free-swimming period. The higher concentration of flagellates in the treated tanks is favourable to rapid growth and settlement of the larvæ.

The length of the larval free-swimming period under tank conditions varies between seven and fourteen days, ten days being the average. Between a temperature of 16° and 22° C. the length of the free-swimming period does not vary more than a day or two and, after liberation, food supply rather than temperature appears to be the critical factor. Temperature, however, affects the spawning, but the relation under tank conditions is complex. Spawning does not usually occur below 17° C. A sudden rise of 2°-3° C. around a temperature of 16°-17° C. is likely to produce spawning among ripe females. Sustained high temperatures (19°-20°) may have the same result.

It is interesting that some of the experimental larvæ reached an enormous size (0.35 mm.) before attachment, the usual size being 0.18-0.20 mm. on liberation and 0.28-0.31 mm. on settling.

The bulk of the limed tiles on which the spat has settled is removed to shallow tanks filled with water from the estuary. In this way they get the much larger amount of food necessary in the fixed stage. Later the tiles are planted out in the Menai Straits, where the oysters grow rapidly. Most of the spat planted in August 1938 was only three weeks old, but it is believed that such early planting does not lead to maximum survival. It seems that it is best to delay the planting out until the individual spat are about 5 mm. across. Unless the settling season is unusually late it is found that spat planted out in the autumn should be large enough to detach from the tiles by the following May or June. A size of 2 cm. should be reached in ten months. After detachment the spat is placed fairly thickly in shallow wire-covered trays, raised on the bottom. Growth is rapid. These oysters should be ready for planting on firm bottom without protection when twenty months old, the average size of a good sample of brood from the Conway tanks at this age being about 5 cm. Samples of such broods have been sold to the oyster growers and have done well after transplanting.

It is encouraging to realize that the tank breeding process may be put forward as a possible means of replenishing the stocks of home-grown oysters on British beds, and that Mr. Cole is justified in his statement that "the results of these three years (1936, 1937 and 1938) taken together, fully warrant the conclusions that a commercial crop of oyster spat can be obtained annually, with reasonable certainty".

SCIENCE NEWS A CENTURY AGO

The Steamship *President*

THE *Annual Register* for 1839 records that on October 7, "Several thousand persons went to Limehouse to view the immense steamship the *President*, built by Messrs. Curling and Young for the British and American Steam Navigation Co., and intended to run between New York and London. The *President* is of greater power and tonnage than the *British Queen* (the former being of 600 horse power and 2,336 tons, the latter 500 horse power and 2,016 tons), and was built in the same dock, and not upon a slip; so that she had to be floated out of dock, and not launched. At high tide, however, which happened to be a low tide, there was not enough water to float her, and she remained fast aground aft. Mrs. Laird, wife of the African explorer and projector of Atlantic navigation by great steamships, performed the ceremony of christening, amidst the cheers of the multitudes on the banks and on the river. . . . On Monday the 9th, the water being sufficient, the *President* was floated into the river and towed to Blackwall."

The *President* was the largest of the pioneer Atlantic steamships, but her career was a very short one. She left New York on March 11, 1841, on her third homeward voyage, and foundered next day in a gale, all aboard being lost.

Royal Cornwall Polytechnic Society

THE seventh annual meeting of this Society was held on October 8, 1839, in the Polytechnic Hall, Falmouth, Sir C. Lemon, M.P., being in the chair. Several premiums were awarded for mechanical and scientific inventions and improvements. Among the notices in the report was a reference to Prof. Moseley's suggestion for calculating the "Efficiency of Steam Engines", a matter of great interest to all Cornish engineers. His proposal was to use a small cylinder, of about six inches diameter, connected with the large cylinder of the engine, the piston in the small cylinder being acted upon by a spring. Prof. Henry Moseley (1801-72), F.R.S., whose writings on mechanics, etc., were well known, was professor of natural philosophy in King's College, London, and afterwards one of the first of Her Majesty's inspectors of schools, and canon of Bristol. He was the father of H. W. Moseley (1844-91), Linacre professor at Oxford and grandfather of the physicist H. G. J. Moseley (1887-1915), who was killed in Gallipoli during the Great War.

Electro-magnetism as a Motive Power

DR. JACOBI, said the *Athenæum* of October 12, 1839, in a letter to Faraday thus alludes to this subject:

"In the application of electro-magnetism to the movement of machines, the most important obstacle always has been the embarrassment and difficult manipulation of the battery. This obstacle exists no longer. During the past autumn, and at a season already too advanced, I made, as you may perhaps have learned by the gazetter, the first experiments in navigation on the Neva, with a ten-oared shallop furnished with paddle-wheels, which were put into motion by an electromagnetic machine. Although we journeyed during the entire day, and usually with 10 or 12 persons on board, I was not

well satisfied with this first trial, for there were so many faults of construction and want of insulation in the machines and battery, which could not be repaired on the spot, that I was terribly annoyed. All these repairs and important changes being accomplished, the experiments will shortly be commenced. The experience of the past year, combined with the improvements of the battery, give as the result, that to obtain the force of one horse (steam-engine estimation) it will require a battery of 20 square feet of platina distributed in a convenient manner, but I hope that from 8 to 10 square feet will produce the effect. If heaven preserves my health, which is a little affected by continual labours, I hope that within a year of this time I shall have equipped an electro-magnetic vessel of from 40 to 50 horse-power."

The author of these experiments, the first made on electric propulsion, was Moritz Herman von Jacobi (1801-1875), who for many years was a professor at St. Petersburg.

Medical School at Athens

THE issue of the *London Medical Gazette* of October 12, 1839, contains the following information: "An attempt is making at Athens, the present capital of the modern Greek Empire, to organize a medical school, by several well-educated and respectable Bavarian physicians and surgeons, who are attached to the Court, and whom King Otho has induced to settle in his country. . . . They had from nine to twelve pupils, natives of the country, who were lectured to by a German in the modern Greek language; the professors, from a residence of several years in the country, being able to impart instruction to their pupils in their native tongue. Although it is the merest beginning of a medical school, it is nevertheless praiseworthy and honourable in its present founders, and may be the germ of an institution which shall move onward hand in hand with the regeneration of poor fallen Greece. . . . Athens possesses at this moment a most excellent military hospital, arranged upon the modern European plan, capable of containing very comfortably several hundred patients. Also a highly respectable and well-arranged cabinet of Natural History."

Subterranean Forest

THE *Gentleman's Magazine* for October 1839 contains the following information: "The capacious bonding pond, which is now being excavated at South Stockton, has led to the discovery of an extensive subterranean forest. The timber is chiefly oak. A yew tree, of considerable size, has been found, the wood of which is sound and good and fit for the turner's lathe. Many of the oaks are of large dimensions, and it is expected that some of them will be suitable for the purpose of building. Whilst examining this forest, Dr. Young of Whitby, with some friends discovered one of the oaks to have been cut in two, which had evidently been done previous to its being covered by the earth. He supposes the forest must have been cut down by the Roman soldiers, as they were in the habit of laying timber on the low swampy grounds for the purpose of making roads. Be this as it may, it is certain the hand of man has been exercised on the timber, and it may form a fertile subject for the lover of ancient history and the geologist to speculate on".

APPOINTMENTS VACANT

APPLICATIONS are invited for the following appointments on or before the dates mentioned:

ASSISTANT I (reference B.401) and ASSISTANT II (reference B.402) at Air Ministry Headquarters—The Under Secretary of State, Air Ministry, Department ZA (B/127), Harrogate, Yorks (October 13).

COMMISSIONED ORDNANCE MECHANICAL ENGINEERS in the Indian Army Ordnance Corps—The Secretary, Military Department, India Office, S.W.1 (quoting O.M.E. Recruitment) (October 17).

ASSISTANT ENGINEER for the Drainage and Irrigation Department, Malaya—The Crown Agents for the Colonies, 4 Millbank, S.W.1 quoting M/5765).

METEOROLOGICAL ASSISTANTS (Male) in the Meteorological Office—The Under-Secretary of State, S.2.B.(Met.), Department Q.J., Air Ministry, Adastral House, Kingsway, W.C.2.

REPORTS AND OTHER PUBLICATIONS

(not included in the monthly Books Supplement)

Great Britain and Ireland

Report on the Fish and Fisheries of Lake Rukwa in Tanganyika Territory and the Bangweulu Region in Northern Rhodesia. By C. K. Ricardo. (Published on behalf of the Governments of Tanganyika Territory and Northern Rhodesia.) Pp. 78. (London: Crown Agents for the Colonies.) 6s. [159]

University of Manchester: Faculty of Technology. Prospectus of University Courses in the Municipal College of Technology, Manchester, Session 1939-40. Pp. 418. (Manchester: Municipal College of Technology.) [189]

Proceedings of the Royal Society of Edinburgh, Session 1938-1939. Vol. 59, Part 2, No. 18: Tests of Significance of the Differences between Regression Coefficients derived from Two Sets of Correlated Variates. By Dr. F. Yates. Pp. 184-194. 1s. Vol. 59, Part 2, No. 19: On the Reciprocation of Certain Matrices. By A. R. Collar. Pp. 195-206. 1s. Vol. 59, Part 2, No. 20: Studies on Reproduction in the Albino Mouse. 3: The Duration of Life of Spermatozoa in the Female Reproductive Tract. By Hugo Merton. Pp. 207-218. 1s. Vol. 59, Part 2, No. 21: Reciprocity and the Number 137, Part 1. By Prof. Max Born. Pp. 219-223. 6d. (Edinburgh: Robert Grant and Son, Ltd.; London: Williams and Norgate, Ltd.) [189]

Transactions of the Royal Society of Edinburgh. Vol. 59, Part 3, No. 29: An Early *Diclyconus*, and the Genus *Orbitolina*: their Contemporaneity, Structural Distinction, and Respective Natural Allies. By Lt.-Col. L. M. Davies. Pp. 773-790+2 plates. (Edinburgh: Robert Grant and Son, Ltd.; London: Williams and Norgate, Ltd.) 3s. [189]

Other Countries

Proceedings of the United States National Museum. Vol. 86, No. 3065: Neotropical Flies of the Family Stratomyidae in the United States National Museum. By Maurice T. James. Pp. 695-698. Vol. 87, No. 3066: Ceratopsian Dinosaurs from the Two Medicine Formation, Upper Cretaceous of Montana. By Charles W. Gilmore. Pp. 18. Vol. 87, No. 3067: Two New Parasitic Isopods from the Eastern Coast of North America. By A. S. Pearce and Henry A. Walker. Pp. 19-24. (Washington, D.C.: Government Printing Office.) [189]

Smithsonian Miscellaneous Collections. Vol. 98, No. 20: The Helt Township (Indiana) Meteorite. By Stuart H. Perry. (Publication 3546.) Pp. ii+7+9 plates. (Washington, D.C.: Smithsonian Institution.) [189]

Advisory Committee on Education. Staff Study No. 10: The Land-Grant Colleges. By George A. Works and Barton Morgan. Pp. ix+141. 25 cents. Staff Study No. 18: Educational Service for Indians. By Lloyd E. Blauch. Pp. xii+137. 25 cents. Staff Study No. 19: Research in the United States Office of Education. By Charles H. Judd. Pp. viii+133. 20 cents. (Washington, D.C.: Government Printing Office.) [189]

U.S. Department of the Interior: Office of Education. Vocational Division Bulletin No. 196 (Agricultural Series No. 52): Farm Forestry; Timber Farming including Woods Management and Forest Tree Planting. By W. A. Ross and W. R. Mattoon. Pp. vi+63. (Washington, D.C.: Government Printing Office.) 15 cents. [189]

Transactions of the San Diego Society of Natural History. Vol. 9, No. 10: The Holotype of *Barbatia (Acar) gradata* (Broderip and Sowerby). By Philip W. Reinhart. Pp. 39-46+plate 3. Vol. 9, No. 11: The Silky Pocket Mice of Southern California and Northern Lower California, Mexico, with the Description of a New Race. By Laurence M. Huey. Pp. 47-54. Vol. 9, No. 12: A New Silky Pocket Mouse from Southwestern Utah. By Laurence M. Huey. Pp. 55-56. Vol. 9, No. 13: A New *Perognathus arenarius* from near the U.S.-Mexican Boundary in Lower California. By Laurence M. Huey. Pp. 57-58. Vol. 9, No. 14: Three New Worm Snakes of the Genus *Leptyphlops*. By Laurence M. Klauber. Pp. 59-66. (San Diego, Calif.: San Diego Society of Natural History.) [189]

Bulletin of the American Museum of Natural History. Vol. 76, Art. 4: On the Anatomy and Evolution of the Locomotor Apparatus of the Nipple-tailed Ocean Sunfish (*Masturus lanceolatus*). By Henry C. Raven. Pp. 143-150. (New York: American Museum of Natural History.) [189]