

temperatures so that the eggs could be carried through the tropics and would hatch at about the end of the journey to New Zealand.

Prof. J. Cossar Ewart and Dr. H. C. Williamson made the preliminary experiments and Mr. Anderton devised the water-cooling and circulating apparatus, which was fitted up in a cold room on an ordinary commercial vessel. As fishery zoologists well know, it is not easy to collect large numbers of healthy, fertilised herring eggs, but this was successfully done at Lowestoft by Mr. Anderton, and the ova were made to adhere to glass plates, which were then transferred to the apparatus on board ship. The water was kept at a temperature a little above 0° C. and was circulated over the eggs. The experiment would have been quite successful but for a breakdown in the tank arrangements of the ship. It has not been repeated, though it is now evident that the method presents no insuperable difficulties. The young turbot and the pregnant edible crabs and lobsters were taken out to New Zealand without any difficulty and were successfully "planted" there.

So far there is no proof, however, that these species have established themselves in their new environment. The ingenuity displayed in these experiments and the eminently practical methods employed are of much interest and well deserve permanent record.

University and Educational Intelligence.

EDUCATIONAL legislation in America in 1919 and 1920 is reviewed by one of the specialists of the Washington Bureau of Education in Bulletin No. 13 of 1922. Of the many problems connected with education which have been dealt with by the State Legislatures since the war, several are, or have lately been, subjects of controversy in this country. The proportions in which the cost of supporting schools is shared between the general tax-payer and the rate-payer have been changing at the expense of the former throughout the States, "including the South, where the State, as such, is already relatively a very large contributor and where the need is rather for the further development of local educational spirit." In the State of New York the increase in appropriations for schools amounted to over twenty million dollars, which was added for the purpose of raising teachers' salaries. Texas appropriated four million dollars for the same purpose. Many of the States passed salary laws more or less on the lines of the "Burnham scales." Under an Iowa act, for example, a schedule of minima is prescribed, the lowest being 50 dollars a month, while a teacher who has received a degree upon completion of a four-year college course and holds a State certificate must be paid not less than a hundred dollars a month, and after two years of successful experience not less than a hundred and twenty. Teachers' superannuation systems are of recent origin in the United States, very few having been established earlier than the beginning of the present century. Nearly half of the States now have systems established by law for the entire State, and nearly a third have laws for certain cities only. Tendencies in recent pension laws are in general towards a larger participation of public funds in the support of the system, a more thorough application of scientific actuarial data, and more business-like administration. Extensions of the age limits of compulsory education have been effected recently in many States, the upper limit being in many cases raised to sixteen, while the lower limit is commonly seven or eight years.

Calendar of Industrial Pioneers.

August 20, 1769. Gabriel Jars died.—A native of Lyons and born in 1732, Jars acquired a practical knowledge of mining under his father, and after studying at the *École des ponts et chaussées*, made a long tour of inspection of the mines of England, Scotland, Sweden, Holland, Austria, and other countries, the results of his observations appearing in his "*Voyages métallurgiques*" published after his death.

August 21, 1884. Henry Wimshurst died.—For many years a shipbuilder at Millwall, Wimshurst was an ardent supporter of Pettit Smith in his endeavours to introduce screw propulsion, and, with the aid of friends, in 1838 he built the *Archimedes*, the vessel which first demonstrated the value of the screw for propelling ships in the open sea, and in 1839 he built the *Novelty*, the first screw steamer to make a commercial voyage.

August 23, 1836. Louis Marie Henri Navier died.—A distinguished professor of engineering, known for his mathematical investigations, Navier was an engineer in the *Corps des ponts et chaussées*, and at the time of his death was professor of analysis and mechanics in the *École Polytechnique*.

August 24, 1860. Jesse Hartley died.—The son of the master bridge-builder to the county of York, Hartley succeeded to his father's position, and in 1824 became engineer to the Liverpool docks, in which capacity he planned and executed with complete success the most extensive dock works in the world.

August 25, 1819. James Watt died.—Acknowledged to be the greatest engineer of modern times, Watt made his great discovery of the separate condenser in 1765, while engaged on the repair of a model of a Newcomen atmospheric steam engine for Glasgow University. This improvement in the steam engine was followed by his patents of 1769, 1781, 1782, and 1784, which collectively transformed a rude and imperfect contrivance into an efficient and powerful machine, providing the miner with his pump, the smelter with his blast, and the weaver with his power-house. From his early boyhood Watt was given to scientific pursuits, and all his work was the result of the application of scientific principles to practical problems. Born in Greenock, he became instrument maker to Glasgow University, and after some years of civil engineering, in 1775 entered into partnership with Matthew Boulton, the founder of the Soho Manufactory. Watt died at Heathfield House, close by Soho, and was buried in Handsworth Church.

August 25, 1862. James John Berkley died.—Trained under Bidder and Robert Stephenson, Berkley in 1849 was appointed Chief Resident Engineer of the Great Indian Peninsular Railway, and as such projected and carried through with the highest skill the line of railway from Bombay to Calcutta.

August 26, 1845. Philippe Henri de Girard died.—Famous as a chemist, a mechanic, and technologist, Girard was born on February 1, 1775, and after the French Revolution had soda factories at Marseilles and Paris. The offer by Napoleon in 1810 of a prize of a million francs for flax machinery led Girard to devise new machinery and establish flax mills, but he received no prize. After the Restoration he lived mainly in Austria and Poland, promoting steam navigation on the Danube, and carrying out extensive operations in manufactures, metallurgy, and practical engineering at Warsaw.

E. C. S.