

ment for night load. The temperature of the water in the storage tanks is thus gradually raised during the night, for use throughout the following day. The temperature of the water in the radiators and circulating pipes throughout the building is, however, not so high as that in the storage tanks, a certain proportion of cold water being added in order to bring the temperature down to the desired value. In the morning, when the storage tanks are at their hottest, a larger proportion of cold water is needed than later on in the day, when the temperature of the storage tanks has fallen. By suitably varying the proportion of hot and cold water the temperature of the building can be maintained at a constant predetermined figure.

University and Educational Intelligence.

CAMBRIDGE.—At Trinity College the following have been elected to fellowships: C. F. A. Pantin, M. Black, N. Feather, J. A. Gaunt, and H. D. Ursell.

The Council of Gonville and Caius College has appointed E. P. Weller, University Lecturer in Estate Management, as Bursar.

For the ninth year in succession Trinity College, Cambridge, announces the offer of a Research Studentship open to graduates of other universities who propose to come to Cambridge in October next as candidates for the degree of Ph.D. The value of the studentship may be as much as £300 a year if the pecuniary circumstances of the successful candidate require so large a sum. Applications must reach the Senior Tutor not later than July 1, 1930.

The same College offers, as usual, Dominion and Colonial Exhibitions to students of Dominion and Colonial Universities who wish to come to Cambridge next October as candidates for the degree of B.A., M.Litt., M.Sc., or Ph.D. These Exhibitions are of the titular value of £40, but their actual value is such sum (if any) not exceeding the titular value as the College Council may from time to time hold to be justified by the Exhibitioner's financial circumstances. If it is made clear that the financial need of an exhibitioner cannot possibly be met by the payment to him of the full amount of his titular emolument, the Council has power, if it sees fit and if funds are available, to award him an additional payment. Candidates must apply through the principal authority of their University, and applications should reach the Senior Tutor (from whom further particulars may be obtained) by July 1, 1930.

MANCHESTER.—The following appointments have been made:—Assistant-Lecturer in Botany: Miss Barbara Colson; Demonstrator in Pathology: Mr. Raymond Whitehead; Lecturer in Metallurgy and Assaying: Mr. Cecil Handford; Assistant-Lecturer in Mechanical Engineering: Mr. B. J. Tams.

THE Board of Education has just issued a new list (List 111) of the more important recognised institutions of technical and art education and other forms of further education in England and Wales (London: H.M. Stationery Office, 1929. 4s.). The list includes technical day classes, junior technical schools, etc. The postal address of each institution is given, and, for colleges and technical day classes, an indication of the courses and branches of study followed. Particulars are given of approved schemes in operation for national certificates in mechanical and electrical engineering, chemistry, naval architecture, and gas engineering.

Calendar of Patent Records.

October 20, 1830.—The patent granted on Oct. 20, 1830, to Admiral Sir Thomas Cochrane, afterwards the tenth Earl of Dundonald, for "apparatus to facilitate excavating, sinking, and mining" was an important one in the history of tunnelling, the invention being for the introduction of air under pressure into the tunnel for the purpose of keeping back the water and holding up the face of the excavation. The specification included most of the essential features—such as the air-lock before the working chamber—which have characterised the use of the process since the time of the invention. The system was adopted at first only for shaft sinking, the first application being at Chalonnès on the Loire. It was not until 1879 that it was used for tunnel work, in an attempt to tunnel under the Hudson River at New York, and in the same year at Antwerp.

October 21, 1824.—Portland cement was invented by Joseph Aspdin, a stone-mason of Leeds, and was patented by him on Oct. 21, 1824. Aspdin established a factory to produce the cement at Wakefield in 1825, and the success of the industry may be gauged by the fact that the annual consumption in the world to-day is upwards of thirty million tons. In 1924 a tablet, presented by the American Portland Cement Association, was erected in the Leeds Town Hall to commemorate the centenary of the invention.

October 22, 1832.—George Frederick Muntz, of Birmingham, was granted a patent for his invention of "an improved manufacture of metal plates for sheathing the bottoms of ships and other such vessels" on Oct. 22, 1832. 'Muntz metal' entirely superseded copper sheathing in the mercantile marine, though not in the Navy, and brought the inventor a profit of £70,000. The patent was unsuccessfully attacked in the courts, but an application for its prolongation was refused.

October 23, 1820.—The employment of wrought-iron rails for railways in place of the cast-iron rails formerly in use was mainly due to John Birkinshaw, manager of the Bedlington Iron Works, who on Oct. 23, 1820, was granted a patent for "Improvements in the manufacture and construction of a wrought or malleable iron railroad or way". In the specification he describes as his preferred form a T-section rail to be made in 18-foot lengths.

October 23, 1835.—The process under which the 'Baxter' prints were produced was patented by George Baxter, wood engraver, on Oct. 23, 1835. The first publication was in 1837, when Baxter issued his "Pictorial album or cabinet of paintings containing eleven designs executed in oil colours from the original pictures". The life of the patent was extended for five years.

October 24, 1832.—The first commercially successful hydraulic turbine—which was of the reaction type—was invented by Benoit Fourneyron of Besançon, and patented by him in France on Oct. 24, 1832, under the title of "Roue à pression universelle et continue". The original turbines for the Niagara Falls Power Company were of the Fourneyron type, built in Philadelphia, and they remained in service for fifteen years.

October 24, 1850.—The 'mercerisation' process for treating cotton and cotton fabrics is due to John Mercer, F.R.S., who patented the invention on Oct. 24, 1850. Mercer's specification describes the effect of caustic soda in strengthening the fibre and making it more receptive to dyes, but does not mention the 'lustre' effect, which was not discovered till forty years later by H. A. Lowe. Samples of mercerised cotton received special mention at the Great Exhibition of 1851.