Electricity and Engineering

An Electric Barometer.

In this barometer, which is described by Robert Goldschmidt, the variations in the height of a mercury column resulting from the changes of atmospheric pressure are caused to modify the resistance of a filament of low specific conductivity inserted in an electric circuit. A thin U-shaped carbon filament is fused into the closed end of a barometer tube and its terminals are connected to two binding posts on the outside of the tube. When the tube is filled with mercury, the curved part of the filament is more or less immersed in it, according to the atmospheric pressure to which the mercury column is subjected. The parallel branches of the filament traverse the vacuum of the barometer. The current passing through the two branches of the filament and the mercury meets with more or less resistance, accordingly as the mercury column is higher or lower. It is not sufficient, however, in order to obtain an indication of the changes in atmospheric pressure, to measure the variations of the total resistance of the carbon filament, as temperature changes also influence the level of the mercury column. This cause of error may be eliminated by using a second mercury column in a tube closed at both ends, in which the mercury level is influenced only by temperature changes of the surrounding medium. In this second tube, which operates as a thermometer, a carbon filament is arranged as in the first, and its resistance is modified by changes in the height of the mercury column. Thus, while the changes of resistance in the barometric tube correspond at the same time to variations of atmospheric pressure and temperature, the indications of the thermometric tube relate to temperature changes only. If the resistances composed of the two filaments are arranged in series like two branches of a Wheatstone bridge and compensated by resistances in the lower branch of the same bridge, a galvanometer connected in the usual manner across the bridge will remain at zero, when at an equal atmospheric pressure the temperature causes a change in the height of the mercury in both tubes at the same time. The relation of the compensating resistances will evidently vary according to the thickness of the filaments used in the tubes, their relative dimensions, and the changes of the mercury level produced by the same temperature variation in each tube. In order to indicate the variation of atmospheric pressure it is only necessary to insert in that branch of the bridge containing the thermometric filament, for instance, an adjustable resistance, such as a high-resistance wire mounted over a graduated scale, which, by means of a sliding contact, may be inserted more or less in the circuit. By regulating this resistance so that the galvanometer remains at zero, one adds to or takes from it exactly the same amount of resistance that has been added to or taken from the carbon filament in the barometric tube by variations of atmospheric pressure only. These variations are thus read on the graduated scale of the adjustable resistance. It is easy, by means of the arrangement described, to read variations of one-ten-thousandth of a millimeter in the height of the barometric mercury column. Curves obtained by means of this apparatus were found to correspond always with those at the Eccles Observatory.—Translated and abstracted from *Bulletin Mensual*, Societe Belge d'Electriciens (Brussels) for *Electrical Review*.

A Pleasant Novelty.

The "electric table-cloth" is the latest addition to the "smart" dinner table. It looks harmless enough—a simple table cover of grey felt, covered with an ordinary damask table cloth. The "regulation" silver candlesticks are placed on the table—an unusual brilliance streaming from under their dainty shades, and the uninitiated may wonder how candles can produce such a dazzling light. But there is more in it than meets the eye, for running down the sides of each candlestick is an almost invisible wire with a tiny pronged end. This prong fastens into the table-cloth, and as it touches the cloth the electric connection is complete, and the electric candles are lighted. Wherever the candlesticks are placed, as soon as the prong touches the electric cloth a brilliant light streams forth. This magical cloth can only be a luxury at present, but judging from the progress of the times, it may be within the means of hostesses, who do not possess princely incomes, before very long.

Professor Ayrton.

The intelligence of the death of Professor W. E. Ayrton, F.R.S., which occurred in the early morning of the 8th December, will be deeply regretted throughout the world of electrical engineering and physical science. As Professor of Physics at the Central Technical College since the foundation of that renowned institution in 1884, Professor Ayrton was most intimately connected with the early training of a very large number of engineers, a great proportion of whom now occupy leading positions in every part of the world, and who will all receive the sad news with painful surprise, for the deceased Professor was only sixty-one years of age, and was one who always took the liveliest interest in the work and welfare of his pupils engaged in the world of business.

Educated at University College, London, Mr. Ayrton entered the Indian Government Telegraph service in 1867, and from 1873 to 1878 was Professor of Natural Philosophy and Telegraphy at the Imperial College of Engineering, Japan, where he was intimately associated with Professor J. Perry. The results of the electrical and physical researches of this collaboration are known to everyone connected with electrical matters.

Professor Ayrton was president of the mathematics and physics sections of the British Association in 1888, president of the Physical Society, 1891-92, and president of the Institution of Electrical Engineers in 1892.

The electric locomotive is fast demonstrating its superiority over its steam rival in America, more especially for tunnel work. Many of the largest tunnels are being fitted for them.

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Electric generators were first adapted to be coupled to reciprocating engines, and hence were designed for comparatively slow speed. When it came to coupling the generator to a turbine it was necessary to operate it at a lower speed than was economical, so as to accommodate it to the slow-speed generator. Recently generators adapted for high-speed service have been designed and a special type of turbine, known as the double-flow turbine, is used to operate these generators. There are several 10,000-kilowatt two-pole machines now under construction adapted to operate at 1500 revolutions per minute.

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The value of electricity for heating purposes is illustrated in a new electric glue pot which has recently been placed on the market. The economy of the device lies in the fact that the maximum amount of heat may be applied instantly when needed, while the glue may be kept warm at all times by a reduced flow of current through the heating coils The glue pot consists of a cup in which the glue is placed, and which is set in a casing filled with water. The electric heater is attached to the pot immediately below the water. A hot-water receptacle is provided in which the brushes may be kept.

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While a further trial is to be given to the surface contact tramway section of the London County Council, under the direction of Mr Mordey, the general future of this method of current collection appears to be much less favourable than was anticipated a year or two ago. The National Electric Construction Company, which has had experience of the Dolter system at Mexborough and Torquay, is now endeavouring to persuade the Oxford Corporation to vary the terms of its agreement for tramway construction in that city, so that instead of surface contact the conduit system shall be used in the centre of the town and the overhead elsewhere. So far the corporation is somewhat emphatically opposed to the change, and it will be interesting to observe future developments, as Oxford is certainly not a promising site for conduit construction throughout, while, on the other hand, the famous High street is probably more picturesque without trolley wires. If the proposed surface contact system is unsound, therefore, there seems to be no reasonable alternative to the company's proposal.