

Burgess. They find that at temperatures about  $1500^{\circ}$  C. platinum departs farthest of all the substances tried from radiating as a perfectly black body, while carbon most nearly approximates to a black body. All the filaments used are thus selective radiators, and are more efficient luminous radiators than a black body, the order being for the same temperature—platinum, tantalum, tungsten, carbon. The superiority of tantalum and tungsten over carbon filament lamps is to some extent due to this fact, which is further emphasised by the higher temperature at which they can be worked, the light emitted varying nearly as the twelfth, while the energy supplied varies only as the fifth, power of the temperature.

THE Health Education League of Boston, Massachusetts, has sent us two copies of new booklets published in continuation of the series noticed in a recent number of NATURE (September 12, p. 508). In one of the booklets (No. 12) Dr. M. H. Bailey deals with "Emergencies," and in the other Miss A. F. Rogers and Dr. J. H. McCollom describe "Microbes: Good and Bad."

A SECOND edition of Prof. J. Reynolds Green's "Introduction to Vegetable Physiology" has just been published by Messrs. J. and A. Churchill. The price of the work is ros. 6d. net.

A SECOND edition (third impression) of Mr. W. P. Workman's "School Arithmetic," which is a school course adapted from "The Tutorial Arithmetic," has been published by Mr. W. B. Clive.

WE have received from Mr. C. Baker, of High Holborn, London, the October issue of his classified list of second-hand instruments and of new pieces of apparatus recently introduced. The catalogue contains a description of more than a thousand pieces of apparatus, together valued at more than 600*l.* Those who are contemplating the purchase of microscopes, telescopes, spectrosopes, and other physical apparatus would do well to examine this catalogue.

THE general committee of the Dr. Fream memorial fund has confirmed the following resolution, which was passed at a recent meeting and accepted by the Board of Agriculture and Fisheries:—"That the Fream Memorial Fund shall be invested in the name of the Board of Agriculture and Fisheries or of an official trustee selected by the Board, and shall be administered by the Board of Agriculture and Fisheries, and that the income shall be applied by way of a Fream memorial prize of books to be competed for in each year by students in the science of agriculture, and so that as long as an examination is held by the National Agricultural Examination Board for the national diploma in agriculture the prize shall be awarded to the person who obtains the highest marks in such examination." A sum of about 200*l.* is available for the purpose of the memorial.

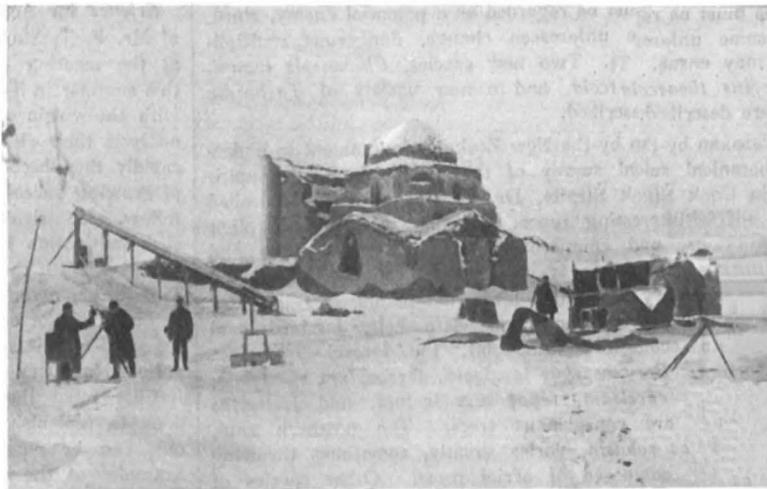
PHOTOGRAPHERS will study with interest the new edition of the catalogue of photographic apparatus and materials recently issued by Messrs. Marion and Co., Ltd., of Soho Square, London. The full descriptions and carefully tabulated particulars as to sizes and prices contained in this well-illustrated list should render the choice of material easy and expeditious.

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## OUR ASTRONOMICAL COLUMN.

THE PHYSICAL NATURE OF METEOR TRAINS.—An interesting discussion of the nature of meteor trains is published in No. 2, vol. xxvi. (p. 95, September), of the *Astro-physical Journal* by Prof. C. C. Trowbridge. Prof. Trowbridge, believing that valuable information concerning the upper layers of the earth's atmosphere may be thereby deduced, has compiled a catalogue of observed meteor trains, and for several years has made a comparative study of the data, at the same time making a study of the phenomena of gas phosphorescence. The discussion of altitudes leads to the conclusion that there is a definite layer of the earth's atmosphere, probably some fifty to sixty miles high, where the conditions are favourable to the production of the peculiar glow constituting a meteor train. Prof. Trowbridge believes that the secondary appearance of duality, so frequently observed in meteor trains, is due to the probable tubular form of the trains. The train itself is probably a tube of gas and particles of meteor dust, rendered phosphorescent by some temperature or electrical effect produced by the meteor's passage. The rate of diffusion and the colour of meteor trains agree with similar phenomena observed in phosphorescent air in the laboratory.

THE PULKOWA ECLIPSE EXPEDITION TO TURKESTAN, JANUARY, 1907.—An interesting account of the expedition



Observing Station of the Eclipse Expedition at Ura-tyube, Russian Turkestan.

dispatched from the Nicholas Central Observatory, Pulkowa, to observe the eclipse of January 13, 1907, is given in No. 18, vol. ii., of the *Mitteilungen der Nikolai-Hauptsternwarte zu Pulkowo*. The site chosen for the observation of the eclipse was near the small town of Ura-tyube, in the Samarkand district of Turkestan, and there the various instruments were erected on December 31, 1906. The accompanying illustration, reproduced from the *Mitteilungen*, gives some idea of the conditions under which the observers worked, and shows the instruments in position. The long tube on the left is the coronagraph of 5 inches aperture and 43.5 feet focal length, with which M. Hansky hoped to obtain photographs showing details of the inner corona and prominences; as may be seen, this instrument was pointed directly to the sun's place at the moment of mid-totality. With the photographic refractor of short focus, it was planned to obtain five photographs of the corona with various coloured screens and on different plates. In addition to these, an attempt was to be made to photograph the spectrum of the corona from C to the ultra-violet, and M. Hansky also proposed to carry out photographic photometric researches.

Heavy snowfall prevented this programme from being carried out on the day of the eclipse, but some interesting observations of the terrestrial colour effects and the shadow-bands were made. M. Hansky also discusses some

observations of the zodiacal light made by him whilst at Ura-tyube.

**DANIEL'S COMET.**—The spectrum of Daniel's comet (1907d) was photographed, with an objective-prism camera, at the Nice Observatory on several nights during July and August by M. H. and L. Chrétien, and is discussed by the former in No. 13 of the *Comptes rendus* (p. 549, September 23). A prism of  $62^\circ$  was employed, mounted in front of an objective of 10 cm. aperture and 47 cm. focal length, the spectrum of Capella being photographed on each plate for the purpose of comparison.

The following sets of bands were found, quite sharp and easily measurable, on plates secured on August 16 and 18:—387.0, 388.2; 398.9; 401.2, 402.0; 411.1, 413.8, 419.0; 420.0, 421.3; 425.8, 427.5; 430.1, 431.6, 433.5; and 450.3, 454.2; those at 401, 426, and 450 are very similar in character. The spectrum of the tail comprises three groups of radiations, the mean wave-lengths of which are 401.6, 426.7, and 452.2 respectively. An examination of the plates shows that each of these is composed of two condensations, the separation of each couple being 1.9, 1.7, and 3.9  $\mu$  respectively.

Mr. Gillman, of Aguilas (Spain), has forwarded to us another chart depicting the results of his eye-observations made on September 4, 5, and 11. On the last-named date he was able to trace the tail of the comet to a distance of about  $17\frac{1}{2}^\circ$  from the head in a direction a little north of west.

**THE SPECTROSCOPIC BINARY  $\alpha$  DRACONIS.** Since July, 1906,  $\alpha$  Draconis has been under observation at the Dominion Observatory, Ottawa, for radial-velocity determinations, and in No. 4, vol. i. (p. 237, July-August), of the *Journal of the R.A.S. (Canada)*, Mr. Harper discusses the observations, with those of other observers, and derives a set of elements for the orbit of this binary. The observed velocities range from  $-54$  km. to  $+56$  km., and Mr. Harper's elements are as follows:—period = 51.38 days, velocity of the system =  $-16.7$  km., eccentricity = 0.42, longitude of periastron ( $\omega$ ), from descending node =  $198^\circ$ ,  $T = 1906$  July 11d. oh., and semi-major axis = 30,057,900 km.

**ENGINEERING AT THE FINSBURY TECHNICAL COLLEGE.**

THE completion of a new wing of the City and Guilds Technical College at Finsbury was the occasion, on Wednesday, October 2, of a large gathering of distinguished members of the City companies to witness the opening ceremony. Mr. Baker, chairman of the Colleges Extension Committee, in inviting the Lord Mayor to declare the new wing open, gave an interesting account of the history of the City and Guilds of London Institute, which, founded in 1878 and incorporated by Royal Charter in 1900, has raised and expended nearly three-quarters of a million pounds for the promotion of technical education.

The growth of the Finsbury Technical College has for some years necessitated the work being carried on in three unconnected buildings, and in order to bring all departments under one roof, with greatly improved facilities for their work, the institute set aside 10,000l. from its reserve fund, and the Corporation and Guilds of London contributed an equal amount, while a generous friend of the college contributed 10,000l. for equipment. With this sum the committee was able to carry out a long cherished scheme of centralisation and extension, and it was particularly fortunate in having Sir William White as one of its number to advise on all matters relating to the engineering equipment. Mr. Baker also referred to the

and distinguished connection of Prof. Silvanus Thompson and Prof. Meldola with the college, and in conclusion expressed the pleasure of the company at the presence of the Lord Mayor and Sheriffs to open the new wing.

The Lord Mayor, who was received with great enthusiasm, then declared the building open, and delivered an address to the students on the development of character.

Mr. Yarrow, in proposing a vote of thanks, briefly referred to the advantages which the two-year course at Finsbury offered to students, especially those who had served an apprenticeship in an engineering works, and said that in his opinion the Finsbury Technical College fills a special need, which is not supplied by other existing institutions, excellent though many of these are.

Sir John Wolfe-Barry, chairman of the executive committee, seconded the vote of thanks, and after acknowledgment by Sir William Treloar the company proceeded to view the building. On arriving at the engineering laboratory, the Lord Mayor pressed a button, setting the machinery in motion, and afterwards made a tour of inspection with the company, which included Sir Edward

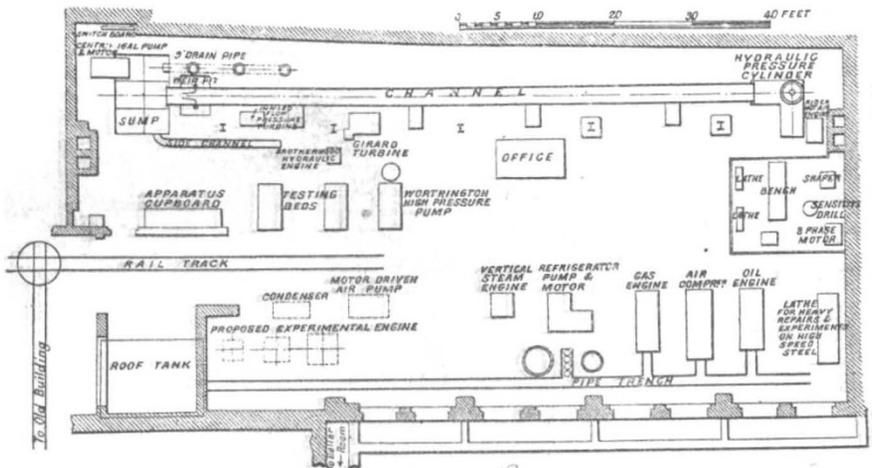


FIG. 1.—Plan of the Engineering Laboratory at the City and Guilds Technical College, Finsbury.

Clarke, Sir William White, Sir John Watney (secretary of the institute), Sir A. B. W. Kennedy (president of the Institute of Civil Engineers), Sir Philip Magnus, M.P., Mr. A. C. Morton, M.P., Prof. Unwin, Prof. Dalby, Mr. T. H. Blakesley, Mr. Ralph Palmer, Mr. S. S. Gladstone, and Mr. Soper (assistant secretary of the institute).

The engineering laboratory, shown on the accompanying plan, is about 100 feet long and 45 feet wide, and is a well-lighted room having walls faced with white tiles from the window levels, those below being brown glazed. Along one side a cast-iron channel of square section, 2 feet wide and 80 feet long, is sunk into the floor. This channel is free from end to end, so that, when occasion requires, the whole length can be utilised for experiments on towing, wave motion, and the like. There are also two smaller channels, parallel to the main one, for draining water into the measuring tanks without disturbing the main channel.

The measuring tanks are six in number, having a combined capacity of about 4000 gallons, and all the water collecting therein can be raised to a tank on the roof by a centrifugal pump delivering 200 gallons a minute against a head of 90 feet; the water is distributed anew by a 5-inch falling main and branches. The usual arrangements of weirs, float gauges, and the like are provided for measuring the water in the channel, and a Venturi meter can also be inserted in the pipe line.

At the other end of the channel is a hydraulic cylinder of special design, capable of giving horizontal and vertical jets up to 2 inches in diameter under any head not exceeding 300 feet. This cylinder is suspended by cross girders