

cesses," for no one can properly appreciate any subject unless he is acquainted with at least the outlines of its history. The tables given in this almanac are so numerous that some of the older ones have occasionally to be omitted to make room for others, but the omission is largely compensated for by a list of those not included, with the most recent year of the almanac in which each may be found.

A CHEMICAL examination of a Babylonian glass vase of a date approximately 1000 B.C. is described in the *Chemiker Zeitung* of November 15 by Dr. F. Rathgen. It appears to have been formed by the application of soft glass to the outside of a clay shape, and has been but little attacked by the soil-water. The glass was white and opaque, the presence of microscopic white fused spherules being observed. Analysis gave silica, 73.32; alumina, and ferric oxide, 11.78; calcium oxide, 5.86; potassium and sodium oxides, 4.46; and cupric oxide, 3.88. The vase was decorated by oval to circular lenticular pieces of glass fused on the body. A piece of magnesite from the same period showed borings which indicate the use of a tubular boring instrument with the addition of an abrasive, possibly quartz. Such instruments, belonging to the Neolithic period, have previously been described. A finger-ring of metallic tin is also referred to. A method of detecting indigo in coloured fabrics, depending on its sublimation in a current of carbon dioxide at 230° C., showed its presence in the garment of an

Egyptian princess of the year 1000 B.C. *Indigofera argentea* occurs in Egypt.

GENERALLY speaking it is found more economical to utilise the whole of the available head in a reservoir system intended for domestic water supply to overcome the frictional resistance in the supply mains, rather than to attempt to use it also as a source of power. Occasionally, however, where multiple reservoirs are used, and where these are at different elevations, or where a constant flow of compensation water is available, it is possible to develop an appreciable amount of power at the expense of a head which would otherwise be wasted. An interesting example of this is to be found in connection with the water-works of the Bradford Corporation in the higher reaches of the Nidd. Here advantage has been taken of an existing high-level reservoir at the head of the Nidd Valley. The new reservoir is now under construction at a lower level, and the discharge from the higher reservoir is being utilised to drive a hydro-electric plant, which will supply the power required for operating the ropeways, cranes, crushers, and other machines required for the building of the dam, and for lighting the improvised village where the workers will live. The power-house contains two 300 h.p. turbines, each directly coupled to a three-phase alternator of 200 kw. capacity at 2200 to 2400 volts. Messrs. Vickers, Ltd., have been responsible for the construction of the hydro-electric scheme.

Our Astronomical Column.

THE JANUARY METEORS.—Mr. W. F. Denning writes:—"The opening nights of every New Year are marked by an abundance of meteors, though they vary in number at different returns, and are sometimes altogether obscured by clouds. The best time to look for them at their next appearance will be in the two hours preceding 7 a.m. on January 4, but they may also be plentiful on the morning and evening of January 3. This particular shower furnishes conspicuous objects with long flights of moderate speed. The radiant point is usually in 230°+54°, and this is near the northern horizon at about 8.30 p.m. An hour before sunrise, however, the position is high in the north-east and situated far more favourably for the distribution of meteors.

"This particular system has not been hitherto associated with any known comet, but it is highly probable that it is connected with some body of this kind which existed in past times, and possibly exists to-day."

The shower appears to have become definitely visible at an earlier period than usual at this return.

On December 20 a bright meteor was seen by Miss Cook at Stowmarket and by Mr. F. Sargent at the University Observatory, Durham. A comparison of the recorded paths indicates the radiant point at 229°+60° and the height of the object from 72 to 55 miles over the region of Surrey.

On December 23 several meteors, including a brilliant one at 8 p.m., were observed from Bristol from the same shower, and there seems no doubt that the display of Quadrantids is prolonged over a rather considerable period, though it furnishes a really abundant display over a few hours only.

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THE FURTHEST CLUSTER.—The cluster N.G.C. 7006 has the distinction of being the most remote celestial object of which the distance has been determined in a manner that inspires some confidence. Dr. Harlow Shapley and Miss B. W. Mayberry contribute an article on it in *Proc. Nat. Acad. Sci.*, May, 1921. It is on a line from α to γ Delphini, prolonged to twice the distance between them. The distance in kiloparsecs by five independent methods is given as follows:—

Distance kp.	Method.
67	Parallax-diameter correlation.
71	Photog. magnitude brightest 25 stars.
62	Photo-vis. magnitude brightest 38 stars.
63	Integrated visual magnitude.
69	Median magnitude of 11 Cepheids.

The mean of all the methods gives 66.4 kiloparsecs, or 217 thousands of light-years.

The first and fourth methods have little *a priori* weight, and are merely used because experience shows that the linear magnitudes and absolute luminosities of globular clusters vary only between narrow limits.

In the fifth method the measured median magnitude is 18.96, and the assumed absolute magnitude is -0.23, derived from the study of similar stars in other clusters.

The assumption that there is no sensible absorption of light in the intervening space is supported by the fact that the colour indices of the brighter stars are quite comparable with those of stars in the sun's neighbourhood. Absorption would tend to make them redder.