will be included much fresh material and many illustrations reproduced from medieval originals. The work will treat of mining, quarrying, building, metal-working, pottery, clothmaking, leather-working, fishing, brewing, and the control of industry.

THE latest catalogue (No. 228) of Messrs. W. Heffer and Sons, Ltd., Cambridge, is an important one. It contains upwards of 1300 titles of second-hand works classified under the following headings: scientific periodicals and transactions of scientific societies, standard scientific books, standard sets and periodicals in English, historical and general literature, foreign literature, oriental literature and journals, and addendum.

THE new announcement list of Messrs. Longmans and Co. gives particulars of the three following books which should be of interest to engineers: "Reinforced Concrete Design," by G. P. Manning, in which the subject-matter is treated from the point of view of the engineer designer. It will include the theory and practice of design as generally admitted and employed at the present day; "Applied Elasticity," by Dr. J. Prescott, written to fill a gap which has existed between the two extremes of English text-books on elasticity. Strict mathematical methods are used wherever these are not too cumbersome, and approximate methods are used to simplify the cumbersome methods; and "The Principles of Irrigation Engineering, with special reference to South Africa," by F. E. Kanthack.

MESSRS. EDWARD ARNOLD AND CO. announce the early publication of "Outlines of Palæontology," by Prof. H. H. Swinnerton, of the University College, Nottingham, in which palæontology is dealt with as a definite branch of science and not as an adjunct to stratigraphical geology, or as a mere division of zoology. The method of treatment adopted arises from the difficulty felt by students of geology and zoology and by others interested in the problems of animal life and evolution in past ages in being able to visualise all the salient characters for which a number of generic or specific names stand sufficiently clearly and completely for the purpose of making mental comparisons. This fact has been borne in mind by the author, and consequently most problems are discussed in terms of organs and structures rather than of organisms and species.

Our Astronomical Column.

TWO COMETS.—A telegram from the Cape announces that Comet Doubiago-Bernard has been observed there, and that the following orbit has been deduced:

$$T = 1923, \text{ Nov. } 17{\cdot}70$$
$$\omega = 254^\circ\ 32'$$
$$\Omega = 227\ \ 36$$
$$i = 114\ \ 17$$
$$\log q = 9{\cdot}8976$$

The comet will return north early next year and may possibly be visible with large instruments in February and March. It travelled to nearly 70° S. Decl.

Herr Reinmuth, assistant to Prof. Max Wolf at Königstuhl, Heidelberg, detected a cometary object on October 31 at $8^h\ 44{\cdot}5^m$ local M.T. in R.A. $1^h\ 15^m\ 4^s$, N. Decl. 22° 31′. Daily motion is probably -32^{sec}, north 28′, but as the discovery was made photographically the motion may possibly have been in the reverse direction. The photographic magnitude is given as 13·0. The discovery was made in the course of the minor planet work that is regularly carried on at Königstuhl.

POLARITIES OF SUNSPOTS.—Much interest was caused at the meeting of the Royal Astronomical Society on November 9 by the reading of notes by Prof. Hale and Mr. Ellerman announcing that the Mt. Wilson observations confirmed the reversal of the polarity law for the constituent spots of double groups in the sunspots of the new sunspot cycle. The evidence now suggests that the law persists throughout one 11-year cycle, and is reversed for the following one.

Prof. Newall pointed out that this means the substitution of a 22-year cycle for solar changes, instead of the previously accepted 11-year cycle. He noted that the discovery increased the difficulty in obtaining a mechanical explanation of sunspot phenomena, since the magnetic polarities depend on the directions of the vortex motions round the spots.

THE FIREBALL OF NOVEMBER 3.—This object was observed at 6.53 P.M. at Bristol, Bodmin (Cornwall), and other places, though very few observations of a satisfactory kind have come to hand. Mr. W. F. Denning writes that the real path of the object was directed from north to south, the beginning of the luminous course of the meteor being over the region of Torquay, and the end over the English Channel about 64 miles S.S.E. of Start Point. The radiant point was at 160°+59° near β Ursæ Majoris, from which point a bright meteor was also seen on October 14 last. This shower appears to be continuous during the last three months of the year. In any case it has been repeatedly observed from the second week of October up to the last week in December.

In the spring months of March and April the same radiant in Ursa Major is manifested with great distinctness. This long continuance or frequent repetition in meteoric radiation deserves further investigation.

SUNSPOTS AND CHANGES IN SOLAR RADIATION.—Prof. Abbot's announcement of the short-period changes in solar radiation was made several years ago. He examines (Proc. Nat. Acad. Sci., U.S.A., Oct. 1923) how far a connexion can be traced between visible changes on the solar disc and the radiation changes. His results are as follows:

1. The appearance of sunspots is accompanied by high radiation, presumably owing to the uprush of hotter matter from the interior.

2. Lower radiation generally occurs just after the central transit of spots.

3. Generally a disturbed solar surface means high radiation, a quiescent surface low radiation.

With regard to (2), he refers to Guthnick's observations of the brightness of Saturn. The fluctuations could be made to accord with the variations of radiation, on the supposition that the radiation is different in different directions, a time-correction being necessary for the difference of longitude of the earth and Saturn. It is suggested that above sunspots there are veiling rays, analogous to the coronal rays, which cause absorption of radiation.