

and they cover all the vessels previously classed by the society excepting the large Cunard steamers *Lusitania* and *Mauretania*. The most important modification in the new rules is in the basis for determining the "transverse number" and the "longitudinal number." The former number is now to be found by adding the breadth and depth only, and the latter by multiplying the length by the sum of the breadth and depth. It is also of importance to notice that all the sections in the tables conform to the standards of the Engineering Standards Committee. This is a very wise move, and is much to be commended. Another step in the right direction has been taken in the adoption of a unit for scantlings of one-fiftieth of an inch instead of one-twentieth as in the old rules. This not only conforms with the decimal system, but, as 0.02 inch is practically half a millimetre, a close connection with the metrical system is secured. As Lloyd's Register covers between 70 per cent. and 80 per cent. of the world's shipping for insurance purposes, the new rules cannot fail to influence the shipbuilding and steel industries in this and most foreign countries.

A NOTE in the *Bulletin de l'Institut Pasteur* for May 30 (vii., No. 10, p. 453) announces the discovery by Carlos Chagas, of Rio de Janeiro, of a new human trypanosome parasite (*T. cruzi*), conveyed by a bug (*Conorrhinus*), and causing an often fatal illness among miners and others in the State of Minas.

THE Bulletin of the Johns Hopkins Hospital for June (xx., No. 219) contains an interesting historical essay, by Dr. Gerster, on the life and times of Gerhardt van Swieten, physician to the Empress Maria Theresa, who was born in Leyden in 1700 and died in 1772 at Schönbrunn.

A COMPREHENSIVE note on the cartography of the Philippine Islands is given by Prof. Guido Cora in *Bollettino della Soc. Geogr. Ital.* as a notice of the recent map of the islands compiled from original sources by Mr. C. W. Hodgson.

WE have received from the Nottingham Free Public Library a copy of a simply arranged supplementary science catalogue of the central lending library dealing with books in most branches of science published between 1901 and the present year.

MR. R. B. HENDERSON, assistant master at Rugby School, has written an introduction to the study of moths and butterflies for the Rugby School Natural History Society, entitled "The Scaly-winged." It will be published immediately by Messrs. Christophers.

WE have received vol. vi. of "Contributions from the Jefferson Physical Laboratory." It consists of a reprint of twelve papers which have appeared in the Proceedings of the American Academy of Science or in other periodicals during the past twelve months. Five of these papers have already been noticed in these columns.

IN the announcement in NATURE of May 27 (p. 375) of the resignation by Mr. H. H. Clayton of his position at the Blue Hill Meteorological Observatory, it was stated that he had been in charge of the observatory since 1894. This statement does not express the position exactly. Mr. Clayton has served for many years as observer or meteorologist, and his researches have added to the reputation of the observatory, but the director is Prof. Lawrence Rotch, who founded the observatory in 1885, and provides for its material support.

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THE June number of the *Stonyhurst Magazine* contains an illustrated description of the Milne seismograph used in the National Antarctic Expedition in H.M.S. *Discovery* under Captain R. F. Scott, R.N., in 1904. The seismograph is now a permanent loan to the observatory at Stonyhurst from the Antarctic committee of the Royal Geographical Society. The instrument stands at Stonyhurst on a solid stone pillar fixed in 12 inches of concrete; its position is lat. 53° 50' 40" N. and long. 9m. 52.68s. W. of Greenwich. A new recording apparatus has been secured, and there is every reason to hope that useful observations will be made at the new station.

#### OUR ASTRONOMICAL COLUMN.

COMET 1909a, BORRELLY-DANIEL.—Further observations of comet 1909a have revealed no striking features either in its form or in its behaviour. In No. 4334 of the *Astronomische Nachrichten* M. Chofardet records the observations made at the Besançon Observatory, and states that on June 17 and 19 the comet was of magnitude 11.0 or 12.0, had a round, diffused head of 1.5' diameter, and a vague condensation which could be seen occasionally by oblique vision.

A NEW FORM OF COMPARISON PRISM.—In all spectroscopic work where a comparison prism placed over the slit is used, the dark band between the compared spectra, produced by the edge of the prism, constitutes an inconvenience which may prove a source of error. To remedy this defect, Prof. Louis Bell has employed a specially designed compound prism, in which the light from one of the sources is reflected from the fine edge of a thin layer of silver, whilst that from the other source is allowed just to miss the edge. Thus the line of demarcation is practically eliminated. The method of preparing such compound prisms is described, and illustrated by diagrams, in No. 4, vol. xxix., of the *Astrophysical Journal* (p. 305).

HALLEY'S COMET.—No. 4330 of the *Astronomische Nachrichten* contains two search-ephemerides for Halley's comet. The first is by Dr. Holetschek, who discusses the probable date of perihelion and gives three ephemerides, one for May 16.45, 1910, and the others for thirty days before and after respectively. At the previous apparition, in 1835, the comet was discovered 102 days before the perihelion passage, when its distances from the sun and earth were 1.9 and 2.4 astronomical units respectively; the corresponding distance from the sun will occur, according to Dr. Holetschek's data ( $T = \text{May } 16.45, 1910$ ), on February 3, 1910. The second ephemeris has been computed by Herr L. Matkiewitsch from the data given in the essay which won the *Astronomische Gesellschaft* prize; the positions now given vary considerably, at different epochs, from those previously referred to in these columns (NATURE, No. 2046, January 14, p. 320).

THE POLARISATION OF THE SOLAR CORONA.—In the June number of the *Bulletin de la Société astronomique de France* M. Salet discusses at length the photographs obtained at the 1905 eclipse with a polariscopic camera. These photographs show the coronal radiations to be strongly polarised right down to the moon's edge, thereby indicating that reflected light is being dealt with; but the spectroscopic observations indicate that radiations directly from a light-source are in question. M. Salet suggests that the apparent contradiction may be explained by the theory that the bright radiations observed spectroscopically are due to metallic vapours rendered fluorescent by the intense solar radiation. In this condition metallic vapours give band spectra, and the superposition of these might, if small dispersion were employed, produce the appearance of a continuous spectrum such as has been observed. In support of his theory M. Salet quotes the observation of Sir Norman Lockyer at the eclipse of 1882, that the coronal spectrum appeared to be formed of superposed bands, and directs attention to the discovery of magnetic fields by Prof. Hale, which, with a rotating sun, afford the conditions necessary for his theory.

THE SOLAR CONSTANT AND THE APPARENT TEMPERATURE OF THE SUN.—In a note published in No. 7, vol. lxi., of the *Monthly Notices* (p. 611), Dr. Féry discusses the measurement of the solar constant and of the sun's mean temperature. One of the greatest difficulties in these researches is to evaluate the atmospheric absorption, which in published researches has varied from 1.5 to 4; it is generally accepted now as having the value 2.4.

Having designed an instrument for measuring terrestrial high temperatures, MM. Féry and Millochau applied it to the determination of the solar temperature by Stefan's law. More than 750 observations were made at different altitudes, and at the summit of Mont Blanc the zenith transmission was found to be 0.91; with this correction the temperature at the centre of the sun's disc was found to be  $5550^{\circ}$  absolute, and the mean temperature  $5360^{\circ}$  C. Before dispatching it to India, this instrument was re-standardised at the National Physical Laboratory, and, on a clear, dry day, gave eight concordant readings, from which the temperature at the centre of the disc was found to be  $5153^{\circ}$  absolute; on this day the zenith transmission at Teddington was, therefore, 0.74, or the absorption was 26 per cent.

Employing the accepted value of the constant (2.4), the recent researches give  $5920^{\circ}$  as the mean temperature of the sun; but Dr. Féry thinks this is too high, and, therefore, deduces that the accepted value of the solar constant is too high. The Mont Blanc measures would indicate 1.65 as the value.

#### THE NATIONAL CONSUMPTION OF WATER.

AN important paper on the increase in the national consumption of water was read by Mr. W. R. B. Wiseman before the Royal Statistical Society on April 27. The paper is of considerable interest, and must have entailed a large amount of time and thought on the part of the author. The historical part, which deals with the early history of water supply in England, treats the question, not only from the general point of view, but gives many interesting details of the early methods adopted and the difficulties met with in many individual towns; in fact, it is not too much to say that the early beginnings of the water supply of all the principal towns in England are reviewed shortly in the paper. It is obvious that, as the object of the paper is to deal with the more modern questions which arise in connection with this subject, the author could not devote very much space to historical details. We can, however, judge that on this subject he has only touched the fringe of the information he has acquired, and it may perhaps not be too much to hope that he may return to this part of his subject at a future date.

The life of Sir Hugh Myddelton and the description of the work carried out by him of bringing the water from the springs of Chadwell and Amwell, in Hertfordshire, by means of the New River, for the supply of London are well known to most of us, and possibly the author of this paper may have material for the making of a story as interesting and romantic in connection with other towns.

The author says he was "tempted" to investigate the estimates of the population in the pre-censal period in order to determine whether the great increases in the population in the nineteenth century were abnormal or otherwise, as upon the answer to the query one must be guided in the provision of water supplies for future populations. As was to be expected, he found such an inquiry not of great value. He has, however, put together some interesting information as regards the growth of many towns, and has dealt with the reasons for the very rapid growth of several of them. From a general review, the conclusion arrived at is that "the nineteenth century was in no wise abnormal, and that a steady increase in the already considerable population may be expected throughout the twentieth century."

The author describes at some length the methods adopted for checking the waste of water in early days, and particularly the system adopted in Liverpool in 1868 of localising the waste by metering the supply in various districts.

Of course, the supply of water per head of population is the important question when dealing with the amount of water required, and the tables given of the supplies in a large number of towns show the variations which exist, and which extend from about sixty gallons as a maximum to below ten gallons as a minimum, leaving out one special case with small population which runs up to 124 gallons per head. The numbers all relate to total supply, which includes domestic, trade, and municipal demands. The statistics given show much greater uniformity of supply in the different towns than would have been anticipated, and it is evident from them that waste of water is carefully looked after in England, and all possible precautions taken to avoid it. If the consumption is compared with what is common in many of the large towns in the United States, where the water supply goes up to 200 gallons and more per head, it will be evident that the precautions taken in England have given very satisfactory results. The opposition to the use of water meters in the United States is probably the reason why leakage and waste continue on a large scale. This opposition is principally due to the view that, on sanitary grounds, it is not well to restrict the supply of water, but, as Mr. F. P. Stearns stated in his presidential address to the American Society of Civil Engineers, "no one has yet demonstrated the sanitary advantages of a leaky faucet or a defective ball-cock."

Table No. 5 is a valuable one. It gives, first, the population of more than 120 cities, towns, or districts in England for two or three years, with intervals, sometimes large and sometimes small, between the years. It then gives the total supply in each of these water areas during the years mentioned, dividing it up under the heads of domestic, trade, and municipal, the daily supply per head of population then following under the same heads.

Considerable space is devoted to the reasons which have caused an increase in the supply of water per head for domestic, trade, and municipal purposes. As regards domestic, it is, of course, well known that the displacement of old methods of sewage disposal by the introduction of the water-carriage system was the first cause of the great increase of the water supply. The increased and increasing use of fixed baths must also largely augment the consumption, as the water used for a bath by one person may vary from thirty to one hundred gallons. The author gives various other reasons for the increase in the domestic supply. As regards municipal supply, attention is directed to the increase in consumption due to the public baths, wash-houses, street conveniences, &c. The author states that he has endeavoured for some time past to collect data which will give some idea of the relative proportion of the water supply needed for particular works or industries, but the results have been too meagre to justify definite conclusions. He, however, deals in a general way with the amount of water used in a large number of industries, among which are breweries, distilleries, paper works, textile industries, and many others, and the information given is of an interesting character. The conclusion is that, on the whole, the rate of increase of water supply is greater in recent times than in those more remote. There probably would have been no doubt about this conclusion in anyone's mind, but, although this may be the case, it does not detract from the value of the information which has been collected in this paper to prove it.

The moral drawn is that, with the increasing amount of water required, there will be an increasing competition for the remaining first-class upland reservoir sites, which will become fewer and fewer as time goes on, and it is therefore desirable that steps should be taken at an early date to create some central authority "which should be charged with the duty of water conservancy in its widest application, and for that purpose should engage in a close and exact study of the water resources of the country." The author then goes more fully into the details which ought to be dealt with by such a body.

This proposal is, of course, not new, although of great importance. It was dealt with by Mr. E. P. Hill in a paper which he read at the Institution of Civil Engineers on November 27, 1906. In the beginning of that paper he said, "the water supply of the country is really a