cannot be used in contact with air, but in an enclosed vessel (protected by a current of purified air whenever it is opened) the rise of conductivity is only 0·004 gemmho per hour in contact with clean electrodes, or 0·01 gemmho in contact with electrodes that have recently been used for dilute salt-solutions. The value of this new development in measuring the conductivity of very dilute solutions is too obvious to require further emphasis.

THE second number has reached us of a new periodical, *Zeitschrift für Betonbau*, dedicated to the science of construction in reinforced concrete; it contains descriptions of various works carried out in this material, besides theoretical investigations from various engineers. The most novel feature of this number is a description of a swimming bath 25 metres long and 12 metres wide, containing 510 tons of water. This is supported on three points on the top of low piers, and is housed in a large building, the construction of which is described. A large bridge near Pressburg, with one span of 30 metres and another of 18·40, is described, and the computations of bending moments and reactions leading to the determination of the necessary reinforcement are set out very fully. The character of this paper bears ample testimony to the thorough manner in which Austrian and German engineers are taking up the designs of structures in this material.

Engineering for June 20 contains an illustrated account of the Hamburg-Amerika liner *Imperator*. This vessel left the mouth of the Elbe on Wednesday, June 11, for her first regular voyage. Her dimensions are approximately 50,000 tons register, 880 ft. in length, 98 ft. in beam, and 63 ft. in depth from main deck to keel. The depth from the upper boat-deck to keel is 101 ft. 8 in. The *Vaterland* was launched recently for the same company, and a third sister vessel is on the stocks; these vessels will be only slightly greater than the *Imperator*. The horse-power of the latter is 62,000, derived from Parsons turbines, and the speed is 22·5 knots. The vessel is equipped with eighty-three boats, sufficient for 5500 people, *i.e.* 300 more than she will carry, counting both passengers and crew. The boat-lowering gear is very complete; there is one electric motor on the boat-deck for every three boats, and there are special arrangements for maintaining horizontal the boat while being lowered. In addition to the commodore, the ship carries four captains, who have commanded large steamers successfully, and one of these will be always on watch, while the fourth takes general control of the crew.

THE Cambridge University Press has arranged for the issue of a series of volumes under the general title of "The Cambridge Psychological Library," to be edited by Dr. C. S. Myers, University lecturer in experimental psychology and director of the psychological laboratory. Among the volumes already arranged are:—"Psychology," Prof. James Ward; "The Nervous System," Prof. C. S. Sherrington, F.R.S.; "The Structure of the Nervous System and the Sense Organs," Prof. G. Elliott Smith, F.R.S.; "Psychology in Relation to Theory of Knowledge," Prof. G. F. Stout; "Mental Measurement," Dr. W. Brown; and "Collective Psychology," Mr. W. McDougall, F.R.S.

MESSRS. JOHN WHELDON AND CO. have just issued an ornithological catalogue containing titles and other particulars of more than 1500 books and papers, and including selections from the libraries of several eminent ornithologists.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR JULY:—

July 1. 15h. 26m. Saturn in conjunction with the Moon (Saturn 6° 30′ S.).
3. 16h. om. Venus at greatest elongation west of the Sun.
5. 3h. om. Jupiter at opposition to the Sun.
,, 13h. 39m. Mercury in conjunction with the Moon (Mercury 3° 49′ S.).
7. 3h. om. Mercury at greatest elongation east.
16. 15h. 29m. Jupiter in conjunction with the Moon (Jupiter 4° 47′ N.).
18. 13h. om. Neptune in conjunction with the Sun.
,, 13h. 49m. Uranus in conjunction with the Moon (Uranus 3° 24′ N.).
20. 6h. om. Mercury stationary.
21. 12h. 52m. Venus in conjunction with Saturn (Venus 1° 18′ S.).
28. 3h. 12m. Mars in conjunction with the Moon (Mars 5° 41′ S.).
,, 20h. om. Uranus at opposition to the Sun.
29. 6h. 12m. Saturn in conjunction with the Moon (Saturn 6° 42′ S.).
,, 19h. 30m. Venus in conjunction with the Moon (Venus 7° 40′ S.).

MINOR PLANETS.—The April number (vol. ix., No. 9) of *The South African Journal of Science* contains an article by Mr. Robert T. A. Innes, entitled "The Minor Planet MT. 1911: and on Minor Planets in General." The Union Observatory at Johannesburg devotes a considerable portion of its time to these small bodies, and the work it does is shown in relation to the minor planet problem in general. This article will be found of particular interest to those whose astronomical work lies in other directions, for Mr. Innes writes generally on the subject of these bodies, and particularly of MT. 1911. To mention one or two points of prominent interest, he states that in 1893 no minor planet would be given a permanent number until five observations were available, but to-day such a number is not allotted until observations spread over six weeks are available, and a satisfactory orbit is computed. Reference is made to Eros, to the nearly simultaneous publication of Sir David Gill's result of the solar parallax determination from observations of the minor planets Victoria, Iris, and Sappho, the value he obtained being 8·802″ ± 0·005″, and to Hinks's value of 8·806″ ± 0·004″ from his fine Eros work. Dr. Metcalf's method of minor planet search, that of guiding the telescope so that the plate remains approximately at rest with regard to the usual motion of the minor planet while the stars trail, is mentioned, and numerous other important items, such as the different groups of minor planets, the arrangements for organised effort, the discovery of Palisa's MT. 1911, and its subsequent rediscovery.

CORDOBA CATALOGUE OF 5791 STARS.—Dr. C. D. Perrine, in the twentieth volume of the Results of the

National Argentine Observatory in Cordoba, presents a catalogue of 5791 stars. The work is the outcome of 28,718 observations made with the 5-in. Repsold meridian circle during the six years 1885–90. The observations are of a general nature over the southern sky, and form a continuation of the general catalogue. Auwers's list of 303 fundamental stars was observed in 1889 by Prof. Updegraff, and the results are included in this catalogue. There is also included a list of sixty-three comparison stars for the minor planet Victoria, observed in 1889 by Prof. Updegraff, and this is given separately, in addition to being included in the regular catalogue. There was no unusual change or condition of the meridian circle during the period mentioned, so far as is known, and the reductions were made in precisely the same manner and with the same system of constants as in the general catalogue. The catalogue also includes the results of a comparison with Boss's Preliminary General Catalogue of the stars common to both.

THE MILKY WAY AND THE DISTRIBUTION OF STARS WITH PECULIAR SPECTRA.—The distribution with reference to the galaxy of the many stars having peculiar spectra classed by the late Mrs. Fleming has been analysed by Mr. T. E. Espin, and the results appear in the March-April number of the Journal of the Royal Astronomical Society. The distribution evidence suggests that the order A, F, G, K, M of the Harvard classification of stellar spectra requires rearranging thus, A, G, M, K, F. The author makes some interesting speculations on the structure of the galactic system.

THE MICROSCOPE SUBSTAGE AND ITS ADJUSTMENTS.

THERE are one or two points, particularly in the substage arrangements, which are distinct and characteristic of English and Continental microscopes. In the English instrument of any pretensions it has always been the custom to provide a centring substage, and this carries both the optical portion of the substage condenser and the iris diaphragm. It has to be assumed, therefore, that the iris diaphragm is centred permanently and accurately to the optic axis of the substage condenser, its perfection therefore depending on the extent to which this assumption is justified.

In the case of the Continental microscope, where a centring substage condenser is provided, it is mounted so that the optical part is centred independently of the iris diaphragm, the latter, in fact, being mounted below the substage condenser and having certain adjustments which are in no way connected with the centring arrangement. It therefore follows that in the Continental type the iris diaphragm may be, and indeed often is, permanently out of centre with the optic axis of the objective. The substage condenser has therefore to be centred in relation to two axes, the centre of the iris diaphragm and the optic axis of the objective, which themselves are not in exact alignment. It is obvious that under such conditions the provision and use of a centring appliance for the adjustment of the optical part of the condenser will never result in correct alignment of the various parts. With the object of overcoming this defect, at least in part, some of the better Continental models have been provided with an independent adjustment to enable the mechanic to centre the condenser to the optic axis, after he has centred the iris diaphragm. The condenser is mounted in a ring provided with three screws, the setting of which admits of the optical part of the condenser being centred, but this is, of course, not an adjustment of which the average user would care to avail himself. In the English arrangement, where the iris diaphragm is correctly centred to the substage condenser, centration of the whole substage fitting results in correct alignment with the remainder of the optical system of the microscope.

For the most critical work, therefore, it would appear that the English method is to be preferred. On the other hand, where a microscope is being used for laboratory work, and is only occasionally being used for the testing of objectives or for critical purposes, there is no doubt that the Continental type has much to recommend it. The fact that the iris diaphragm may be contracted to any desired degree, and may then be shifted laterally so that oblique illumination in any azimuth and in any zone of the field of view can be obtained at will, is a great convenience, and for anything like rapid testing of objectives is almost essential.

In the English stand it becomes necessary to provide stops of various sizes and shapes, which can be placed at the back of the substage condenser, to enable oblique illumination to be obtained in any desired manner.

Where absolute accuracy is required it would appear that an arrangement in which both substage condenser and iris diaphragm are capable of independent centration might be a desideratum. In such a case the iris diaphragm would be centred first, and then the optical part of the substage condenser introduced, and that centred independently. By this means the iris diaphragm, the substage condenser, and the objective would be in exact alignment, and the arrangement would be such that work of the most critical character could be carried out. It must be admitted, however, that the conditions under which such a method would become necessary rarely, if ever, arise, so that a well-made instrument provided with the Continental type of substage, in which the iris diaphragm may be decentred, is a very desirable adjunct to any good microscope.

As an indication of the perhaps unnecessary elaboration that has obtained in English stands, one may mention the provision of a fine adjustment to the substage condenser. It is difficult to conceive under what conditions this becomes necessary. A well-made rackwork should provide all the accuracy of adjustment that is required. If it does not it either implies that the mechanical construction of the microscope leaves something to be desired, or that the user has not acquired the necessary manipulative skill to focus his substage condenser with sufficient accuracy, the latter alternative being the more probable.

AUSTRALIAN METEOROLOGY.

THE Australian Meteorological Bureau has issued a series of interesting maps showing the normal distribution of temperature and rainfall over the Australian continent. The variety of climate which Australia offers is well illustrated by these charts. The mean summer temperature of the south coast of Victoria (between 60° and 65° F. for January) is about the same as the mean summer temperature of London, while 400 miles to the north the heat is tropical, with a mean temperature of more than 80° F., increasing to more than 85° F. in the greater part of the north-west and central regions. The trend of the isotherms near the coasts shows the usual oceanic effect; they bend southwards in the winter and northwards in the summer in passing from continent to ocean. The isotherms are closest together near the southern coast in summer and near the northern coast in winter.