

IN the course of a paper published in the June number of the *American Naturalist* on the advantages presented by the common skate as a subject for demonstration to anatomical classes, Dr. H. W. Rand takes occasion to emphasise the importance of selecting generalised, in place of specialised, species for such demonstrations. A skate or a dog-fish is thus to be preferred to a bony fish, and similarly a salamander to a frog. As regards the choice between a skate and a dog-fish, although the former is a much more specialised type than the latter, it has the advantage of being more easily obtained and of being available for the greater part of the year. Moreover, its very specialisation happens to be an advantage to it as an object for demonstration, for not only does its flattened form render it admirably suited for dissection, but most of its organs are brought more or less nearly into one horizontal plane, so as to be capable of demonstration almost as if drawn in a diagram. Apropos to this article is a second, by Messrs. Rand and Ulrich, on posterior connections of the lateral vein in the skate. To the same issue Mr. E. W. Berry contributes an article on fossil sedges and grasses, with the description of a new *Carex*; and Mr. J. A. Cushman one on the fossil crabs from the well known Miocene beds of Gay Head, Mass., described long ago by Dr. E. Hitchcock, and subsequently by Sir C. Lyell.

AN interesting paper on the gradual dissociation of mellitic acid is contributed by A. Quartaroli to the current number of the *Gazzetta Chimica Italiana*, vol. xxxv. p. 470. The author has measured the rate at which cane sugar is inverted by mellitic acid and by the corresponding mono-, di-, tri-, tetra-, and penta-sodium salts in one-tenth molecular solution. If the velocity constant for the free acid is represented by 100, the values for the various salts in the order given are respectively 40.5, 14.3, 2.2, 1.5, and 1.04. These numbers may be taken as a measure of the relative tendencies to ionisation of the six successive acid hydrogen atoms. Taking the ratio of the first to the second, of the second to the third, &c., the series 2.47, 2.82, 6.49, 1.47, 1.43 is obtained. These numbers are interesting, and the occurrence of a maximum value in the middle of the series suggests that the dissociation of mellitic acid is of abnormal character.

DURING the past week the Royal College of Surgeons of Edinburgh has been celebrating its four hundredth anniversary. The college, which is the oldest medical or surgical corporation in the United Kingdom, dates from July 1, 1505. The Royal College of Physicians of London, the next in point of age, was officially established some thirteen years later, *i.e.* in 1518. The current number of the *Lancet* contains an interesting account of the older institution.

THE third number of the second volume of the Investigations of the Departments of Psychology and Education of the University of Colorado has reached us. Among other contributions, those in which Prof. Francis Ramaley deals with the teaching of botany and zoology, and Prof. Chas. A. Lory with the teaching of physics, are of special interest.

WE have received a copy of "Southern Rhodesia, Information for Settlers," a small handbook issued by the British South Africa Company. The title sufficiently indicates the nature of the contents of the book, but it is worth noting that many of the numerous illustrations are of considerable geographical interest and value.

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THE report of the Royal Cornwall Polytechnic Society for 1904 has just been published, and bears testimony to the continued vitality of the society. One of the chief features of the society's activities during the year was its exhibition, in connection with which addresses and papers were given on electrical research, practical bee-keeping and management, and the geology, minerals and mines of Lelant, St. Ives, and Zennor. The first and last of these communications are to be found in the report before us, as is also an informing paper by Mr. C. C. Bignell on the aphides with their food plants; the volume likewise contains a detailed report of the work accomplished at the Falmouth Observatory.

THE new number of the *Quarterly Review* contains only two papers dealing with scientific subjects, one on the national coal-supply, the other, by Sir Charles N. Eliot, on the Buddhism of Tibet. Both communications are very informative and eminently readable.

MESSRS. R. AND J. BECK, LTD., of Cornhill, have just issued a catalogue of microscopes and apparatus specially suited for metallurgical work.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN AUGUST:—

- Aug. 2. 1h. Mercury at greatest elongation ($27^{\circ} 18' E.$).
 " 2. 12h. 28m. to 14h. 6m. Transit of Jupiter's Sat. III. (Ganymede).
 " 4. Pallas in opposition to the sun.
 " 11-13. Epoch of Perseid meteoric shower (Radiant $45^{\circ} + 57^{\circ}$).
 " 12. Saturn. Major axis of ring = $43'' \cdot 82$, Minor axis = $7'' \cdot 47$.
 " 14. 10h. Venus in conjunction with Neptune, Venus $0^{\circ} 48' S.$
 " 14. Partial eclipse of the moon visible at Greenwich. 14h. 39m. First contact with shadow. 15h. 41m. Middle of the eclipse. 16h. 43m. Last contact with shadow. Magnitude of eclipse = $0 \cdot 292$. Moon sets 16h. 53m.
 " 15. 9h. Saturn in conjunction with moon, Saturn 1h. 43m. S.
 " 15. Venus. Illuminated portion of disc = $0 \cdot 680$, of Mars = $0 \cdot 854$.
 " 16. 11h. 49m. Minimum of Algol (β Persei).
 " 19. 8h. 38m. Minimum of Algol (β Persei).
 " 22. 21h. 0m. Saturn in opposition to the sun.
 " 23. 12h. 5m. to 12h. 46m. Moon occults σ^2 Tauri (Mag. 4.8).
 " 30. Total eclipse of the sun, partly visible at Greenwich. 11h. 49m. a.m. Beginning of the eclipse. 1h. 3m. p.m. Middle of the eclipse. 2h. 15m. p.m. End of the eclipse. Magnitude of eclipse = $0 \cdot 786$. Sun's altitude at noon = 48° .

PHOTOGRAPHS OF THE MARTIAN CANALS.—Since the opposition of Mars in 1901, persistent efforts have been made at the Lowell Observatory to secure photographs of the planet on which the canals could be seen definitely. After making a number of exposures with a camera in which the film was continuous, so that a large number of short exposures—as in the bioscope—could be made on the one film, Mr. Lampland succeeded in obtaining negatives which demonstrate indubitably the actual existence of the "canals" Nilosyrtris, Pyramus, Casius, Protonilus, Astaboras S., and Thoth. In addition to these, the "regions" Syrtis Major, Mare Erythræum, Mare Icarium, Hellas and the north polar cap, and the "oasis" Lucus Ismenius are plainly discernible. A photographic print from a negative secured on May 11 at 19h. 44m.—48m. (G.M.T.) on which these features are visible is affixed in the *Lowell Observatory Bulletin*, No. 21, accompanied by a drawing made by Mr. Lowell immediately before the exposure was made. Other photographs secured

show other canals, and Mr. Lampland is to be congratulated, in company with Mr. Lowell, upon thus securing unquestionable evidence of the actual existence of these features.

A point of special interest to planet observers is that whilst trying to obtain these photographs the observers found that the restriction of the aperture employed, by its elimination of the evil effects of atmospheric vibrations, more than counterbalanced the inconvenience caused by the diminution of light-gathering power and the consequent increase of the length of the exposures, a result which confirms the conclusion previously arrived at by Mr. Lowell from visual observations.

DUTCH OBSERVATIONS OF THE CORONA.—Parts iii. and iv. of Prof. Julius's report on the observations made by the Dutch expedition in Sumatra during the total solar eclipse of May 18, 1901, minutely describe the apparatus and the methods of procedure employed in examining the coronal radiations for polarisation effects and for the determination of the amount of heat radiated by the eclipsed sun.

A double-image polarimeter of the Cornu pattern, slightly modified, was employed to examine the polarisation at different points of an image of the corona. The points examined were situated at different distances from the sun's limb, and the position of each was carefully recorded. The results showed that the coronal rays were more strongly polarised at some distance from the limb than nearer to it, whilst at greater distances the polarisation again decreased. A discussion of some experiments, performed after the eclipse, on the depolarising effect of haze and clouds showed that this effect was practically negligible.

The observations of the total heat radiated by the eclipsed sun were made with a thermopile pointed directly to the corona, but clouds robbed the observations of any definite result. So far as they go, the resulting figures show that the heat radiated at totality is not so great as that received from the full moon, and that a very striking increase occurred after the third contact.

THE NORTH POLAR SNOW-CAP ON MARS, 1904-5.—Observations of the north polar cap of Mars were made at the Lowell Observatory by Messrs. Lowell and Lampland during the period November, 1904, to May, 1905, and the observers' notes for each night are given in full in No. 20 of the *Lowell Observatory Bulletins*.

One remarkable feature observed was a white collar which surrounded the cap during the latter half of January. Mr. Lowell explains this phenomenon by the conjecture that it is a belt of spring haze which surrounds the cap during the hotter months of the melting, the cap proper being bordered by a blue belt of material (probably water) produced by the melting of the snow. Several subsidiary patches of snow were left behind by the receding polar cap, and became prominent features.

Of these, one in longitude 206° was especially marked, and was recorded in exactly the same longitude by Schiaparelli in 1888, and independently at the Flagstaff Observatory in 1901 and 1903.

VEGETATION AND THE SUN-SPOT PERIOD.—Since 1871 M. Camille Flammarion has each year recorded the dates on which the chestnut trees in the avenue of the Paris Observatory have burst into leaf and flowered. Plotting the results of his observations with the sun-spot curve on the same year-scale, he found that the variation of the dates of the different phases of the annual arboreal phenomena agreed very closely with the latter curve, the leaf-buds bursting and the flowers appearing earlier at those epochs when the sun-spot *maxima* occurred. The details of the observations and the method employed in reducing them are given in the July number of the *Bulletin de la Société astronomique de France*.

VISIBILITY OF THE DARK HEMISPHERE OF VENUS.—In a paper on the influence of the solar-activity variations on the planets, M. Hansky directs attention to the greater visibility of the dark hemisphere of Venus during epochs of maximum solar activity. According to the theory of Arrhenius, electrified ions emitted by the sun cause the phenomena of terrestrial magnetic storms and auroræ. Applying the same theory in the case of Venus, M. Hansky suggests that during the periods of solar maxima the

dense atmosphere of that planet is rendered more phosphorescent, and, therefore, more easily visible, by the increased solar activity. He further suggests that, in order to test this theory, astronomers should observe the planet as often as possible during the present sun-spot maximum (*Bulletin de la Société astronomique de France*, July).

DETERMINATIONS OF METEOR RADIANTS.—Some interesting results of meteor observations are recorded in No. 4032 of the *Astronomische Nachrichten* by M. Eginitis, of Athens, and by Prof. A. A. Nijland, of Utrecht.

M. Eginitis observed the Perseid, Leonid, and Andromedid showers of 1903 and the Perseid shower of 1904. He gives the time of observation, the number, colour, magnitude and relative velocity of the meteors recorded, and the position of the determined radiant on each date, directing special attention to any objects which were, for any reason, extraordinary. On August 11, 1904, several meteors were seen to proceed from a radiant near to α Persei, and these were, in general, whiter and brighter than those from η Persei, the latter being fainter and of a reddish-yellow colour, and generally falling in pairs.

Prof. Nijland's results deal with the Lyrid, Perseid, and Leonid showers of 1902, 1903, and 1904, and he gives the results for each night of observation and the positions deduced for the respective radiants.

THE INSTITUTION OF NAVAL ARCHITECTS.

THE summer meeting of the Institution of Naval Architects was held last week in London, the usual sittings for the reading of papers taking place in the theatre of the Society of Arts. The following papers were on the programme for reading and discussion:—Tactics and strategy at the time of Trafalgar, by Admiral Sir Cyprian Bridge; the ships of the Royal Navy as they existed at the time of Trafalgar, by Sir Philip Watts, Director of Naval Construction; the classification of merchant shipping, illustrated by a short history of Lloyd's Register, by H. J. Cornish, chief ship surveyor to Lloyd's Register; experiments with models of constant length and form of cross section, but with varying breadths and draughts, by Lieut.-Colonel B. Rota, Royal Italian Navy; experiments upon the effect of water on speed having special reference to destroyers recently built, by Harold Yarrow; deductions from recent and former experiments on the influence of the depth of water on speed, by W. W. Marriner; the failure of some large boiler plates, by J. T. Milton, chief engineer surveyor to Lloyd's Register; a comparison of the performances of turbines and reciprocating engines in the Midland Railway Company's steamers, by William Gray.

It was also arranged that visits should be paid to the following works:—Siemens Bros. and Co.'s Telegraph and Electrical Instrument Works, near Woolwich; Vickers, Sons and Maxim Ordnance Works, Erith; J. and E. Hall's Refrigerating Machinery Works, Dartford; Yarrow and Co.'s ship-building yard and marine engine works, Poplar; John I. Thornycroft and Co.'s ship-building yard, marine engine works, and motor-car works, Chiswick. Visits were also paid to the P. and O. mail steamer *India*, lying in the Tilbury Docks, and H.M.S. *Black Prince*, built by the Thames Iron Works, and lying in the Victoria Docks. The last day of the meeting, Friday, July 21, was occupied by a visit to Portsmouth Dockyard.

The first sitting during the meeting, when the three first papers on the list were presented, was held on Wednesday, July 19, the president of the institution, the Right Hon. the Earl of Glasgow, occupying the chair. These papers, as will be gathered by the titles, were chiefly of historical interest. In this centennial year of Trafalgar it was, no doubt, appropriate for the institution, which is so largely naval in its composition, to include in its programme papers of the nature of those contributed by Sir Cyprian Bridge and Sir Philip Watts; but how far they have any scientific bearing on naval strategy or tactics of the present day is a question that is evidently open to discussion. It would appear that a large section of naval officers hold that the lessons of the past era of masts and sails should be applied with little modification