

15°, 30°, 45°, and its interest would appear to lie, not so much in the use of groups for teaching trigonometry, but rather in the possibilities of using trigonometry for illustrating the elementary study of groups.

In a paper on the chemical actions of light, M. P. Villard describes in the *Journal de Physique* (vi., May) certain continuation phenomena. An interesting experiment is illustrated showing the effect of green light on photographic papers containing tartaric acid. A sheet of such paper was under-exposed under a stereoscopic negative; one part was then submitted to green and another to violet light. On the green part an excellent image developed, while the violet rays completely fogged the other part. The use of green glass in intensifying prints thus finds a ready explanation.

In the *Journal of the Asiatic Society of Bengal* (1907, vol. iii., No. 2) Prof. P. C. Rây describes the preparation of a silver mercurous-mercuric nitrate by the action of a solution of mercurous nitrite on silver nitrite. The compound formed has the composition $Hg^{II}(Hg^I, Ag)_2(NO_3)_2$, and is of interest as showing that univalent mercury has the power isomorphously to replace silver. In an article on the "Pursuit of Chemistry in Ancient India," published in the *Modern Review* of Allahabad, Prof. Rây shows, by reference to old Sanskrit writings, the antiquity of the knowledge of chemistry in this country, particularly as regards metallurgical processes and the preparation of medicaments. The existence of an enormous wrought-iron pillar at Katub, near Delhi, which dates back to about A.D. 400, and is larger than any forged in Europe until quite recently, is a striking illustration of the high state of development of the arts in ancient India prior to their decay caused by the introduction of a new caste system under the later religious teachers.

THE uncertainty which still exists regarding the latent heat of fusion of ice forms the subject of a paper by Mr. L. F. Guttman in No. 4 of the *Journal of Physical Chemistry*. The values obtained by Regnault (79.2) and by Bunsen (80.0) for this fundamental constant differ by more than 1 per cent., and it is contended that Bunsen's result is vitiated by the fact that the value obtained for the density of solid ice at 0° is very variable and uncertain, depending, apparently, on the age of the ice. The value 75.59, re-calculated from Regnault's determinations by introducing certain corrections for the specific heat of ice and water, is considered to represent most accurately the true value for the latent heat of fusion of ice. It would appear, however, that Mr. Guttman, while referring to the recent work of M. Leduc on the same subject published in the *Comptes rendus* (1906, vol. cxlii., p. 46), has overlooked the more detailed account given by the same author of his investigations in the *Journal de Physique* (see NATURE, vol. lxxiv., p. 41). The difficulties raised by Mr. Guttman were there dealt with, and, after introducing all necessary corrections, a value of 79.2 was deduced for the latent heat as being in harmony, not only with Regnault's determinations, but also with the corrected values calculated from Bunsen's data.

MESSRS. C. E. MÜLLER, ORME AND CO. have sent us their flow extraction cup apparatus. This apparatus is an improved form of the Soxhlet extractor. Two forms of cup are used; in one case the cup has a siphon, so that the substance which is being extracted is kept covered by the solvent, and a continuous flow of the pure hot solvent is kept running directly through the substance. The other cup, which has a perforated bottom, is placed

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in an outer cup, which is so arranged that the inner cup stands about 1 cm. above it. By this means the cup is kept continuously surrounded by the hot solvent. We have tested this apparatus, and find the extraction to be both rapid and efficient. The cups are of glass, and are therefore very convenient for weighing the substance both before and after extraction. There is also an arrangement for distilling off the solvent after the extraction is completed.

THE 1907 issue of "The Statesman's Year-book" provides, in the convenient form one has learnt to expect in this invaluable annual, the latest available statistics concerning the States of the world. In some cases the information comes up to within a few weeks of publication. One of the most important of the new features of the volume is the section, which has been entirely re-written, relating to the armies of the various States. Diagrams and tables are included exhibiting the comparative growth of the leading navies in the past with a forecast of the future. Maps are also given showing the Anglo-French Nigerian boundary, the Turko-Egyptian boundary (1906), the new boundary of Aden protectorate, and the increase in value of land and property in Great Britain. This is the forty-fourth publication of the annual, and Dr. J. Scott Keltie, its editor, is to be congratulated on maintaining its high standard of accuracy and usefulness.

A BIOGRAPHICAL sketch of the life and writings of Linnæus by D. H. Harms, appeared in the *Naturwissenschaftliche Wochenschrift* of May 19.

OUR ASTRONOMICAL COLUMN.

COMET 1907c (GIACOBINI).—Circular No. 97 (June 6) from the Kiel Centralstelle gives a set of elements and an ephemeris for the faint comet discovered by M. Giacobini on June 1. From the ephemeris it is seen that the comet is travelling eastwards through Leo, and will pass about 1½ degrees north of δ Leonis on June 14; its brightness is decreasing slowly.

MARS.—In Bulletin No. 26 of the Lowell Observatory Prof. Lowell gives the results of the observations of the south polar cap of Mars made during the favourable presentation of 1905.

Owing to the adverse tip of the planet's axis and the distance of Mars from the earth at the suitable season of the Martian year, the mapping of the southern cap has not previously been attempted. The present communication gives the latitudes of the edge of the snow in successive longitudes as determined from some two hundred drawings. The extent of the snow cap as seen during the presentations from May 10 to August 14 is shown on three diagrams.

The observations indicate that during the beginning of the opposition cloud or mist enveloped the cap, for not until May 15 was the edge of the cap continuously recognised, although snow was seen, in latitude 31° 8' S., on January 25.

In a telegram, published in Circular No. 97 from the Kiel Centralstelle, Prof. Lowell announces that Mr. Lamp-land has photographed the Martian canals Thoth and Astaboras.

A THIRD ASTEROID NEAR JUPITER'S ORBIT.—From a determination of the orbital elements of the minor planet 1906 VY, Herrn Vladimir Heinrich finds that in this object we have a third member of the Jupiter group of asteroids. According to the elements yet determined, the length of the semi-major axis of the orbit is about 5.19 astronomical units (*Astronomische Nachrichten*, No. 4181, p. 88, June 1).

RADIAL VELOCITIES OF ε AND ζ CYGNI.—Observations made at Bonn during 1904-5-6 indicate that the period of the radial velocity of ε Cygni is possibly shorter than that exhibited by the Lick observations of this star. Prof. Küstner finds a variation, of the radial velocity in regard

to the sun, ranging from -6.1 km. (September 23, 1906) to -15.3 km. (October 29, 1904).

The velocities determined for ζ Cygni vary only from $+14.3$ km. to 15.7 km. (*Astronomische Nachrichten*, No. 4181, p. 87).

MINOR PLANETS DISCOVERED DURING 1906.—In No. 21 (p. 261, May 23) of the *Naturwissenschaftliche Rundschau* Prof. Berberich discusses the minor planets discovered during 1906. In all, the discovery of 126 of these objects was announced, but of these thirteen were undoubtedly objects which had been seen before, whilst sixty-nine await further observation. The orbits of twenty are now known to be elliptical, whilst twenty-one others are probably so; in three cases a circular orbit fits the observational results better. Prof. Berberich gives a comparison between the orbital elements now determined and those previously calculated for the asteroids shown to be identical with bodies discovered earlier. The magnitudes, designations, and details of discovery are also given for those probably having elliptical paths.

THE SPECTRUM OF SATURN.—The results of a photographic study of the spectrum of Saturn, made by Mr. V. M. Slipper during the autumn of 1905, appear in Bulletin No. 27 of the Lowell Observatory. The spectra were taken on plates especially sensitised to the orange-red, and extend to λ 6563. The comparison spectrum, photographed on either side of the planet's spectrum, was that of the moon at about the same altitude, so that differential effects of the earth's atmospheric absorption were eliminated. The following absorption bands appear in the Saturnian spectrum, their relative strengths being in the order given:— $\lambda\lambda$ 6193, 5430, 6145, 645, 577.

The first named is a very strong band, broad and symmetrical, and traceable down to the band at λ 6145. None of these bands is to be found in the spectra of the rings, although a much weaker absorption than that producing λ 6193 should be indicated if it existed. This points to the conclusion that if the rings possess any atmosphere at all it is much rarer than that surrounding the ball of the planet. No trace of absorption due to the presence of aqueous vapour is shown on the spectrograms.

Mr. Slipper also gives an interesting comparative table of the spectra of the four outer planets, Saturn, Jupiter, Uranus, and Neptune, which indicates that the planets which are similar telescopically have similar spectra. The excellent plate accompanying the paper shows reproductions of the spectra of these four planets taken with various comparisons.

OXFORD UNIVERSITY OBSERVATORY.—The thirty-second annual report of the Savilian professor of astronomy, dealing with the period May 1, 1906, to April 30, 1907, contains but little which is of general interest.

The proof-reading and printing of the astrographic results for the Oxford zone have occupied the time of the staff fully during the past year, and will, with the necessary re-measurement and checking, continue to do so for some few years; consequently, no other serious piece of work can be undertaken. Vols. i. (zone $+31^\circ$) and ii. (zone $+30^\circ$), and the greater part of vol. iii. (zone $+29^\circ$), are now printed, the two former being also bound.

CELEBRATION OF THE BICENTENARY OF LINNÆUS.

THE Linné Fest¹ which has just come to an end was a complete success in every way. The meeting was admirably managed, and the delegates were treated with the most generous hospitality. In Upsala² they were especially indebted to the Rector of the University (Dr. Schüeck) and to Mr. Ansel Andersson, of the University library. The last-named gentleman was tireless in his efforts to rattle his troublesome pack, and, indeed, lost his voice in that service, and became as hoarse as a huntsman after a long day. Many of the delegates arrived on

¹ An interesting gathering took place on May 21 at Råshult, the birth-place of Linnæus, where a ceremony was arranged, including a visit to the church in which he was christened. Many delegates attended at the invitation of the Rector of the University of Lund.

² Modern spelling reform has converted the name to Uppsala.

May 22; the remainder reached Upsala by special train on the morning of May 23—the first day of the Fest. At the station they were met by the students of the University, looking uncommonly smart in dress coats and white caps, their fagmen decorated with huge blue and yellow scarves. They struck us as a very fine set of young men as they marched past with their banners and saluted us. The guests were also honoured by the presence of the women students, who wore white caps like those of the men, which they removed in a masculine manner by way of salute to the assembled delegates. At mid-day was held the great meeting in the Aula of the University, when the delegates presented their addresses, heard the oration of the Rector, and listened to Holmgren's hymn in honour of Linnæus and Liljefoss's music to Snoilsky's poem "The Prince of Flowers."

The delegates of each nation formed a group, and the groups went up in alphabetical order, beginning with America and ending with Österrike (Austria), the modified *o* being the last letter in the Swedish alphabet. Each group had a leader, who made a short speech as he passed the Rector's throne, this office being performed for England by Sir Archibald Geikie with conspicuous success. It was a relief to those delegates who are not quite clear about Latin quantities to find that addresses were merely handed in. After their leader's speech the delegates descended into the body of the hall, filed past the Crown Prince and other Royal personages with bows of varying degrees of elegance, and so got safely back to their seats.

Among the delegates were the following well-known men of science:—Prof. Farlow, Harvard; Warming, Copenhagen; Elfving, Helsingfors; Prince Roland Bonaparte, Académie des Sciences, Paris; France being also represented by MM. Flahault, Giard, and Mangin; Profs. Moll, Holland; Wille, Christiania; Borodin and Palladin, St. Petersburg; Casimir de Candolle, Geneva; Engler, Berlin; Goebel, Munich; Haeckel, Jena; Pax, Breslau; Peter. Göttingen; Pfeffer, Leipzig; Wiesner, Vienna. Halle had the distinction of being represented by a mathematician, Prof. Wangerin, who came as the president of the Leopold. Car. Academy. The delegates from "Storbritanien och Irland" were:—Sir A. Geikie, Royal Society; Dr. Bather, British Museum and Zoological Society; Mr. Carruthers, Linnean Society; Mr. F. Darwin, Cambridge and the Royal Society; Mr. Daydon Jackson, who was personally invited; Mr. Morice, Entomological Society; Prof. Poulton, Oxford; Lieut.-Colonel Prain, Kew Gardens; Dr. Rainy, College of Physicians, Edinburgh, and the University; Dr. Church, Edinburgh. The Society of Arts of London was represented by the Swedish professor Sjögren. Great Britain was in the proud position of having more delegates than any other nation. Prof. Bailey Balfour, whose name occurs on the official list, was unfortunately absent.

At the conclusion of the meeting the delegates were presented to the Crown Prince, who afterwards conferred the Order of the Polar Star on some of them, among whom were Mr. Daydon Jackson and Prof. Poulton.

The festivities were not nearly concluded. There was a concert at 4.30 p.m. given in the Botanic Garden by the students, whose remarkably finished singing was much admired.

In the evening the guests were divided between the hospitable tables of the Rector and the Archbishop. At the Rector's party, the toast of the Linnean Society was given by our host, whose generous reference to the Linnean treasures in London was warmly appreciated by the Englishmen present. The evening concluded with a grand reception in the University buildings.

On the following day (May 24) was held a great "promotion" of doctors, which by a revival of ancient custom took place in the cathedral. The building was filled with a great crowd, and the students again gave a picturesque touch by their massed white caps. The proceedings began with the creation of thirty Swedish D.D.'s named by the King and "promoted" by the Archbishop.

Then came Doctors of Law and Medicine, among the latter being Dr. Rainy, of Edinburgh. Prof. Haeckel was in a class by himself as a Jubilee Doctor. Each M.D. was presented with a remarkable headdress, being, in fact, a tall hat covered with pleated black material, and with these they were respectfully crowned by the promoter. A re-