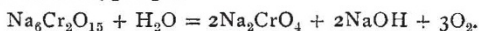


MESSRS. WEST, NEWMAN, & CO., have just published a book by Mr. S. T. Dunn on the flora of South-West Surrey, including Dorking, Godalming, Farnham, and Haslemere. The last flora including this district was Brewer's, dated 1863. Another county flora is in preparation by Mr. W. H. Beeby. It need scarcely be said that Mr. Dunn's little book is not intended to take the place of these more complete floras, but it will serve as a portable field guide to visitors.

THE sodium salt of the as yet little-known perchromic acid has been isolated by Dr. C. Häussermann in the state of well-defined crystals, and is described in a communication to the current number of the *Journal für Praktische Chemie*. The possibility of the existence of an acid-forming oxide of chromium higher than the trioxide  $\text{CrO}_3$  has formed a subject of discussion for many years. It was long considered that the deep blue coloration produced upon adding hydrogen peroxide to a solution of chromic acid was due to the formation of the hydrate of a peroxide of chromium. Both the first observer of this interesting reaction, Barreswill, and Ascher in a subsequent memoir, considered the peroxide to possess the composition  $\text{Cr}_2\text{O}_7$ , corresponding to the heptoxide of manganese,  $\text{Mn}_2\text{O}_7$  present in the permanganates. Fairley has since attributed to the blue compound the composition  $\text{CrO}_6 \cdot 3\text{H}_2\text{O}$ . Latterly, however, Moissan has adduced evidence in support of the view that the substance is nothing more than a molecular compound of chromic anhydride with hydrogen peroxide,  $\text{CrO}_3 \cdot \text{H}_2\text{O}_2$ . The work of Häussermann is therefore particularly interesting as showing that, whatever may be the truth concerning the blue compound above referred to, a higher acid of chromium is capable of existence. Moreover, it is not without some significance that the formula of the anhydride derived by Häussermann from the analyses of his sodium salt coincides with that,  $\text{CrO}_6$ , attributed by Fairley to the oxide present in the blue compound. Häussermann finds that when sodium peroxide is added in small quantities at a time to chromic hydrate suspended in a small quantity of water and maintained at a low temperature by means of an ice bath, a somewhat violent reaction occurs, rendering constant agitation necessary; the chromic hydrate dissolves, a brownish-yellow solution being produced. When this liquid is allowed to stand undisturbed for a time in a cold room, brilliant brownish red, transparent, monoclinic crystals separate. These crystals are found upon analysis to possess the composition  $\text{Na}_6\text{Cr}_2\text{O}_{15} \cdot 28\text{H}_2\text{O}$ . They rapidly effloresce upon exposure to the air, falling to a brown powder. They lose the whole of their water of crystallisation when placed in a desiccator over oil of vitriol, or when heated to  $100^\circ$ . At a temperature of  $170^\circ$  they explode with some violence, leaving behind a quantity of sodium chromate mixed with sodium hydrate. The anhydrous salt is tolerably stable and is only very slowly attacked by cold water. Hot water, however, immediately decomposes it with formation of a solution of sodium chromate and sodium hydrate and liberation of three molecular equivalents of oxygen gas.



Analyses of the anhydrous salt agree with the formula  $\text{Na}_6\text{Cr}_2\text{O}_{15}$ , indicating an anhydride of the composition  $\text{Cr}_2\text{O}_{12}$  or  $\text{CrO}_6$ . It is most interesting that, upon the addition of dilute sulphuric acid to the salt, the deep blue coloration above alluded to is at once produced, as if it were due to the formation of the free acid, the hydrate of  $\text{CrO}_6$ . In a few minutes oxygen commences to be evolved, and chromic sulphate is formed in the solution. Alkalies are practically without action upon the salt, which would thus appear to be stable in alkaline solution.

NOTES from the Marine Biological Station, Plymouth.—Last week's captures include a colony of a tall ( $1\frac{1}{2}$  ins.) variety of the

Hydroid *Coryne vermicularis*, Hincks, the Polyzoan *Pedicellina echinata*, and the Tunicata *Phallusia mammillata* and *Ascidia depressa*. An incursion of the Cladocera *Podon* and *Evadne* has characterised the floating fauna; and with these have been taken Cirrhipede *Nauplii*, *Cyphonautes* larvæ, and countless numbers of minute *Obelia* medusæ. The following animals are now breeding:—The Cephalopod *Sepioloa atlantica*, the Malacostraca *Chelura terebrans*, *Limnoria lignorum* and *Eupagurus Prideauxii*, and the Echinoderm *Echinus acutus*.

THE additions to the Zoological Society's Gardens during the past week include two Great Eagle Owls (*Bubo maximus*), European, presented by Lord Hill; two Barbary Turtle Doves (*Turtur risorius* var.) from the Pescadore Islands, China, presented by Mr. Theodore A. W. Hance, C.M.Z.S.; three Giant Toads (*Bufo marinus*) from Brazil, presented by Mr. Adamson; a yellow-cheeked Lemur (*Lemur xanthonystax*) from Madagascar, a Banded Ichneumon (*Herpestes fasciatus*) from West Africa, deposited; a Black Ape (*Cynopithecus niger*) from the Celebes; two Black-headed Mynahs (*Temenuchus pagodarum*), two Manyar Weaver Birds (*Ploceus manyar*), two Red-headed Buntings (*Emberiza luteola*) from India, purchased; two Dominican Gulls (*Larus dominicus*) bred in the Gardens.

#### OUR ASTRONOMICAL COLUMN.

THE DISCOVERY OF THE NEW COMET.—The new comet seems to have been noted by a number of observers before they had seen its discovery announced. Mr. Edgar Richards writes to us as follows in a letter dated July 13:—

"On Sunday last, the 9th inst., at 9.30 p.m., the members of the Astronomy Club, composed of several of the lady guests of the Cliff House, Minnewaska, N.Y., U.S.A., saw in the north-western heavens a most brilliant comet with well-defined nucleus and bright tail. The comet was in the constellation Lynx, and its tail extended towards the North Star. Its motion was very rapid in a south-westerly direction, and the tail was momentarily increasing in length as long as the comet was visible. The Club suffers from the disadvantage of not possessing a good telescope, so observations have to be made unassisted. No notice in the newspapers of such a comet having been seen and noted, the ladies were filled with enthusiasm to be, as they supposed, its first discoverers."

"Monday night the comet was found to be near the feet of the Great Bear, and much diminished in brilliancy, proving that it was rapidly receding from the earth."

It seems desirable, for the sake of cometary history, to give the following translation of a note by M. Tisserand in *Comptes Rendus*, No. 3.

"On the 10th July last, in the morning, I received a telegram from M. Quénnisset, of the staff of the Juvisy Observatory, announcing that he had the previous night, the evening of the 9th July, discovered a bright comet, visible to the naked eye, whose approximate co-ordinates he gave. I at once transmitted a telegram to Kiel. The following morning, July 11, there came a telegram from Kiel, announcing that the comet had been seen on July 8 at Utah, U.S.A. by Mr. Rordame. It is therefore certain that Mr. Rordame has discovered the comet, but that M. Quénnisset has announced it first. Perhaps it will be convenient to call it the Rordame-Quénnisset comet; there are analogous precedents."

COMET FINLAY (1886 VII.).—The following is the ephemeris of this comet for the present week:—

1893.		R.A. (app.)			Decl. (app.)
		h.	m.	s.	
July 27	...	5	1	13.6	+21 47 39.8
28	...	5	26.9	...	21 56 13.6
29	...	9	38.5	...	22 4 19
30	...	13	48.3	...	22 11 56.4
31	...	17	56.2	...	22 19 6.1
Aug. 1	...	22	2.4	...	22 25 48.6
2	...	26	6.6	...	22 32 4.6
3	...	5	30	9.0	22 37 54.4

CHANGES IN THE SPECTRUM OF  $\beta$  LYRÆ.—At the Pulkova Observatory, the new spectroscope has been adapted to the large refractor, and among many of the stellar photographs already obtained several are of  $\beta$  Lyræ, the changes in which are described by Belopolsky in the June number of the *Memorie della Società degli Spettroscopisti Italiani*. The measures of position of the lines were made relatively to the solar lines by superposing a solar spectrum on that of the star. A general examination of the plates showed the following details, the most remarkable lines being  $D_3$ ,  $501.4\mu$ ,  $492\mu$ ,  $F$ ,  $471\mu$ ,  $448\mu$ ,  $447\mu$ .  $F$  consisted nearly always of two brilliant rays, one of which would disappear or become very dim, and between these could occasionally be seen a dark line; in the vicinity of  $F$  occasionally is seen also another dark line. The analysis of the changes in the bright  $F$  line indicates that its duplicity depends on one or both of the dark lines, or in other words, that we have here a case of superposition of the bright and dark lines. The period is nearly of 13 days' duration. At the principal minimum of the star, the bright  $F$  becomes single, the dark lines being situated one on the edge and the other alone. At the maximum,  $F$  becomes double, but the component on the violet side is very thin. At secondary minimum,  $F$  is double and symmetrical. Little change takes place at the following maximum, the component on the red side being a little thinner than the other; after this maximum it becomes a dark line.

With regard to the dark  $F$  line, M. Belopolsky says that this seems to consist of two, but it is seldom that they are separated; it is suggested that a second ray may mask the changes in wavelength of the other, thus accounting for the irregular changes.

The Helium line undergoes two changes; sometimes it disappears altogether, while at other times it appears double. Its period of duplicity is put down as 7 days. The group  $448-447\mu$  is defined as very complicated, and presents the same changes as the  $F$  lines, consisting of dark and bright lines and changing their positions like the components of the  $F$  lines. This paper is accompanied by a diagram showing the positions of the star in the curve of brightness at the time of exposure, and also by copies of several of the spectra.

THE VARIABLE STAR Y CYGNI.—Among recent papers on variable stars, that by Prof. N. C. Dunér on the elements of the variable star  $Y$  Cygni is of great importance. (*Kongl. Vetenskaps Akademiens Förhandlingar*, 1892, No. 7). This star is of the Algol type, and its variation is limited nearly exclusively to a small portion of its period during which it descends in a few hours to a minimum, to regain in about the same time its ordinary brightness. Since its discovery by Chandler in 1886, it has been very constantly observed, and it is perhaps on this account that Prof. Dunér can give such a complete story. Considering the odd and even minima separately, he deduces a formula which gives very small values for the residuals obtained from the observed minus calculated times, and to put it shortly he is led to the conclusion that the star  $Y$  Cygni consists of two stars of equal magnitude and brightness, moving in an elliptic orbit, the plane of which passes through the sun, and whose line of apsides makes an angle with the line of sight. The time of revolution is 2 days 23 hours, 54 minutes, 43.26 seconds. Prof. Dunér, at the latter end of this paper, gives the ephemeris and tables of interpolation of the times of the odd and even epochs in Paris mean time.

NEW DETERMINATION OF THE CONSTANT OF UNIVERSAL ATTRACTION.—A new and original method of determining the mass and density of the earth was described in our issue of July 13 (p. 251).

The following further information on the same subject is interesting. The first experiments gave for the value of  $K$ —the constant of gravitation—

$$K = 6.80 \times 10^{-8}.$$

Determining the mass of the earth, by substituting this value of  $K$  in the formula

$$g\mu = K \frac{\mu M}{R^2}$$

when  $M$  and  $R$  represent the mass and radius of the earth respectively, and where

$$g = 981 \text{ and } R = 6.37 \times 10^8 \text{ centimetres,}$$

NO. 1239, VOL. 48]

the value obtained was

$$M = 5.85 \times 10^{27} \text{ grammes,}$$

whence the density of the earth was found to be

$$D = 5.41.$$

We here enumerate the different values that we possess with regard to the earth density—

Plumb-line at Schiehallien (Maskelyne and Playfair)	4.713
„ Arthur's Seat (James)	5.316
Pendulum at Mont Cenis (Carlini and Giulis)	4.94
„ Harton Coal Pit (Airy)	6.565
Torsion-Balance (Cavendish, 1798)	5.48
„ (Reich, 1838)	5.49
„ (Baily, 1843)	5.66
„ (Cornu and Baille, 1872)	5.5 - 5.56

THE CORONAL ATMOSPHERE OF THE SUN.—Prof. Janssen, in *Comptes Rendus*, No. 2, for July 10, communicates an interesting note on the history of facts which have demonstrated the existence of the coronal atmosphere of the sun.

VARIABLE STARS.—In the *Astronomical Journal*, No. 299, M. Paul Yendell publishes more observations of the maxima and minima of variable stars. Among some of those referred to are  $Y$  Ophiuchi,  $X$  Cygni,  $T$  Vulpecellæ,  $X$ ,  $W$ ,  $Y$ , and  $U$  Sagittarii.

### GEOGRAPHICAL NOTES.

THE *Times* has received the following telegram from Dr. Nansen, dated Berlevaag, July 21. Berlevaag is about sixty miles west of Vardö, on the north coast of Norway:—"We are leaving Vardö for Yugor Strait (between Waigatz Island, south of Nova Zembla, and the coast of Russia), where thirty sledge dogs will be waiting for us. We then proceed along the Siberian coast eastward past Cape Chelyuskin to the Olenets river, near the Lena, where another twenty-six dogs will be waiting for us. We then turn northwards, and hope to reach the west coast of the New Siberian Islands in the end of August if the ice is not bad. The latest information about the ice conditions in that quarter is favourable. We then proceed direct northwards until we get fast in the ice. If we meet with new land we shall follow along its west coast northwards. When there is no more open water we shall allow the *Fram* to drift with the ice. Everything has gone on well up to the present. The *Fram* is a splendid strong ship and will stand the ice-pressure well. She is deeply laden with coal, but that is a drawback which will soon be remedied. The accounts of the ice in the White Sea and the Barents Sea are not favourable. There has been much ice, but hope it has now improved; the ice changes quickly. I have good hopes; if we only get through the Kara Sea in good time I feel certain the prospects of success are good.—FRIDTJOF NANSEN."

THE July number of the *Geographical Journal* commences the second volume. Amongst other papers of interest there is one of some importance on South-west Africa by Count Pfeil, who has taken a leading part in settling the interesting German colony at Windhoek, east of Walfisch Bay. Regarding Port Nolloth, he points out the curious fact that the great wagon traffic set up by the copper mines of Ookiep has led to the uprooting for fuel of all the little bushes which formed the sole vegetation of the country. The light soil deprived of its protection has changed into drifting sand, and there is no prospect of this artificial desert being redeemed by natural agencies.

In the last number of the *Scottish Geographical Magazine* there is an abstract of an important paper by Prof. H. Wagner on the teaching of geography in Germany, which gives an admirable *résumé* of the growth to university rank of that study, the adequate recognition of which is confined to Germany, and the true proportions of which have never yet been realised in this country.

IN the *Asiatic Quarterly Review* Prof. Sayce shows that the term Sinaitic peninsula applied to the region between the Gulfs of Suez and Akaba is a misnomer; all the evidence available proving that Mount Sinai really stands somewhere in the ranges of Mount Seir, the exact site being still unknown.