TEACHERS and students of botany often find it difficult to obtain the plants or other botanical material required by them for examination. A pamphlet received from Messrs. James Backhouse and Son, Ltd., The Nurseries, York, reminds us that this firm has a special scientific department for the purpose of supplying living and preserved material for use in classes or private study. Practically every specimen or preparation required in a course of botany is kept on hand ready for dispatch, and if it is not in stock it will be obtained. The facilities thus afforded for obtaining botanical material should promote the study of botany in schools and encourage investigation by private students.

SINCE the classical work of Bunsen on the cacodyl compounds, many attempts have been made to prepare monomethylarsine, the analogue of methylamine, hitherto without success. In the *Berichte* for November 9, Messrs. A. W. Palmer and W. H. Dehn give an account of the preparation of this substance in a pure state. Indications of the existence of such a compound were obtained three years ago, by the reduction of methyldichlorarsine, but as this is costly and difficult to prepare, a more suitable starting point was found in cacodylic acid. This on reduction with amalgamated zinc dust and hydrochloric acid gives the $CH_3.AsH_2$, which is separated from the hydrogen which accompanies it by passing through a U-tube surrounded by a mixture of solid carbon dioxide and ether. Monomethylarsine is a colourless, mobile liquid, which boils under ordinary atmospheric pressure at 2° C. and possesses the penetrating objectionable smell of cacodyl. It rapidly attacks indiarubber, and combines immediately with oxygen, without, however, catching fire spontaneously, in this respect differing from dimethylarsine. The production of monophenylarsine from monophenylarsenic acid is described in the same paper.

IN continuing his researches on ammonium amalgam M. Moissan has arrived at some interesting results which he describes in the current number of the *Comptes rendus*. Sodium amalgam was allowed to act upon ammonium iodide in solution in liquid anhydrous ammonia at a temperature of about −39° C. Under these conditions the sodium amalgam reacts upon the ammonium iodide and becomes more fluid, without the formation of any gas. The sodium iodide formed together with the excess of sodium were then removed by liquid ammonia at a temperature of −40° and then with ether at −80° C. The solid ingot thus produced was then placed in a tube kept at −90° and connected with a mercury pump. It was found that a perfect vacuum could be maintained in the apparatus without any gas being given off by the ingot. The temperature was then allowed to rise, when a mixture of ammonia and hydrogen gases in the proportion of two of the former to one of the latter was given off. All these facts would appear to point to the conclusion that the radical NH_4 is actually present in the metallic mass prepared at −39°, but M. Moissan believes that this is not really the case, there being a possibility that a metallic ammoniacal hydride is formed. He has found that when sodium amalgam reacts with a solution of ammonia in water, there is a slow evolution of gas without foaming. If, however, sodium hydride in solution in sodium amalgam is placed in the same liquid, there is at once a foaming mass produced, which may last for two or three days. Further experiments are promised in this direction.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*) from South Africa, presented by the Lord Dunleath; a Toque Monkey (*Macacus pileatus*) from Ceylon, presented by Mrs. de Koop; a White-crowned Mangabey (*Cercocebus aethiops*) from West Africa, presented by Mr. S. J. Dean; a Grecian Ibex (*Capra aegagrus*), South-East European, presented by Mr. B. A. Isaac; a Common Water Buck (*Cobus ellipsiprymnus*) from South Africa, four Viscachas (*Lagostomus trichodactylus*) from Buenos Ayres, a Black-headed Oriole (*Oriolus melanocephalus*), an Orange-headed Ground Thrush (*Geocichla citrina*), two Indian Shamas (*Cittocincla macrura*) from India, deposited.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN DECEMBER.

Dec. 3. 13h. Juno in conjunction with moon. Juno 0° 14′ S.
4. 22h. Venus at greatest elongation, 47° 15′ E.
9. 9h. Uranus in conjunction with the sun.
11–13. Epoch of the Geminid meteoric shower (radiant 109° + 33°).
13. 23h. Mars in conjunction with Saturn. Mars 1° 18′ S.
14. 6h. 43m. to 7h. 39m. Moon occults β Capricorni (mag. 3·4).
15. Venus. Illuminated portion of disc = ·445.
Mars. Illuminated portion of disc = ·980.
16. 9h. 46m. Minimum of Algol (β Persei).
17. 3h. Mars in conjunction with Jupiter. Mars 0° 52′ S.
18. 7h. 24m. to 8h. 9m. Moon occults λ Piscium (mag. 4·7).
19. 6h. 35m. Minimum of Algol (β Persei).
22. 1h. Sun enters Capricornus. Winter commences.
22. 2h. Neptune in opposition to the sun.
23. 5h. 53m. to 6h. 12m. Moon occults ε Tauri (mag. 3·7).
27. 10h. 42m. to 11h. 50m. Moon occults A^2 Cancri (mag. 5·8).
31. 9h. Juno in conjunction with the moon. Juno 0° 18′ N.

LEONID METEORS, NOVEMBER 1901.—Mr. G. C. Thompson sends the results of observations at Penarth of Leonid and sporadic meteors on the nights of November 14–15 and 15–16. Between November 14, 11.35 p.m., and November 15, 1.55 a.m., four bright Leonids were observed, all exhibiting characteristic green streaks, four probable Leonids, without streaks or train, one of doubtful origin, and four sporadic meteors. On the night of November 15–16 no meteors were observed until after midnight, but between 12.20 a.m. and 12.50 a.m. one bright Leonid was seen, two probable Leonids, and four sporadic meteors.

Mr. J. R. Henry, writing from Dublin, says "there was a distinct display here of meteors from the Leonid radiant on the morning of November 15. During a watch kept from 10.20 to 11.15 on the night of November 14 only three meteors of the first or second magnitude were observed. The first was a fine bolide which passed a few degrees to the right of Gemini towards Leo at about 10.55. The watch was resumed at 12 o'clock under somewhat restricted conditions as regards position, which faced the east. From 1 to 3.30 meteors shot steadily from the Sickle at the rate of about twelve per hour for those of the first or second magnitude. No sporadic shooting stars above the third magnitude were noted in this part of the sky. The brightest meteor, equal to Sirius, was observed at 2.40 a.m. It passed somewhat slowly from the Sickle to a position 20° below Procyon. A brilliant flash illuminated the eastern horizon at 3.30 a.m."

MOTION OF THE GREAT RED SPOT ON JUPITER.—In *Popular Astronomy*, vol. ix. pp. 448–490, Mr. W. F. Denning discusses the observations secured of the position of the great red spot during the period 1894–1901, illustrating the result by a curve showing the drift in longitude of about 50° in that time. An observation made on 1901 September 5 is interesting from the fact that it was exactly seventy years after that of 1830 September 5, when H. Schwabe at Dessau first drew the hollow. During this interval of 2,208,980,280 seconds the planet has made 61,813 rotations, giving a mean period of 9h. 55m. 36·56s.

The observations at Bristol have mostly been made with a power of 312 on a 10-inch reflector.

PRELIMINARY INVESTIGATION OF THE DIAMETER OF MARS.—Prof. T. J. J. See, in continuation of his work on planetary diameters, gives the results of old and new measures of the disc of the planet Mars in *Astronomische Nachrichten*, Bd. 157, No. 3750. The measures published from 1651–1901 are tabulated and divided into two categories, according to their being determined with the wire micrometer or the heliometer. The values obtained in these two ways are markedly different, the mean diameter from the wire micrometer being 9·678, that from the heliometer 9·338, at mean distance. This discrepancy has been usually attributed to irradiation. A considerable number of experimental trials have been made at the Washington Observatory in order to get a trustworthy value for the correction due to this cause, and the results obtained from a recent series of determinations, using liquid screens in the eyepiece, are given. The polar diameter of the planet is thus estimated as

$$9''\cdot222 \pm 0''\cdot013$$
$$= 6687 \text{ km.} \pm 10 \text{ km.}$$

Assuming an oblateness of 1 in 200, the equatorial diameter may be taken as $= 9''\cdot30 = 6743$ km.

DEFINITIVE ORBIT ELEMENTS OF COMET 1899 I.—Mr. C. J. Merfield, of Sydney, has computed the definitive elements of the orbit of this comet from the available observations during the period 1899 March 4–August 10.

Elements.

Epoch of osculation 1899 March 12.
T = 1899 April 12·978010 G.M.T.

$$\left.\begin{aligned} \omega &= 8^\circ\ 41'\ 46''\cdot48 \\ \Omega &= 24\ 59\ 59\cdot93 \\ i &= 146\ 15\ 30\cdot29 \end{aligned}\right\} 1900\cdot0$$
$$\log q = 9\cdot5139795$$
$$\log e = 0\cdot0001521$$
$$e = 1\cdot00035029.$$

In the course of the article many hitherto isolated descriptions of the varying appearances of the comet during its period of visibility are brought together. Throughout March 1899 the comet appeared as a nebulous mass 4′ or 5′ of arc in diameter, with a central condensation. After perihelion passage many changes commenced to be presented. Prof. Perrine, at Lick, observed the nucleus to be double, and obtained measures of the components, the distance between them increasing from 12″–18″ of arc during the period 1899 May 11–14. This feature was later confirmed by Prof. Barnard, who measured the two nuclei with the Yerkes refractor, and found the separation to increase from 29″–38″ of arc during 1899 May 20–23. This increasing distance would appear to be partly due to an actual separation of the two portions of the nucleus, but this has not yet been examined sufficiently to be decisive.

On 1899 June 5 a considerable increase of brightness was noticed by many observers, the nucleus being estim ated by Dr. Hartwig to be 9·5 magnitude and the whole comet about 5·0 magnitude, the diameter of the coma being about 12′ of arc. Dr. Schorr recorded that the nucleus appeared to be excentrically situated. (*Astronomische Nachrichten*, Bd. 157, No. 3747–48.)

THE CHEMISTRY OF THE ALBUMINS.

THE albumins, using this term in its widest and most general sense, form almost the last of the great natural groups of substances which have hitherto presented an impenetrable front to the attack of the synthetic chemist. With the progress of organic chemistry, some, at all events, of the alkaloids, the sugars and the glucosides have yielded up their secrets of constitution and configuration so fully that their synthetic preparation has crowned the labours of the investigator and confirmed the deductions he has drawn from a study of the reactions and transformations of the products found in nature. But the chemistry of the albumins, in which lie locked up the secrets of animal and vegetable growth, of health and disease, perhaps even of life and death, has not yet progressed beyond the preliminary stages of investigation—the establishment of criteria of purity and methods of separation, and the study of reactions and decomposition products. These first studies have, indeed, added much of great value and importance to our knowledge of this supremely interesting class of compounds, but the very complication of the results obtained has produced rather a feeling of mental bewilderment than one of increased insight and comprehension.

In these circumstances the report of a lecture by Prof. Kossel on the "Present Position of the Chemistry of the Albumins," which is contained in a recent number of the *Berichte*, will be of special interest to both physiologists and chemists. The lecture forms one of that series of addresses on special branches of chemistry, delivered by the foremost of those engaged in active work upon them, which has been for some years one of the most valuable and attractive features of the activity of the German Chemical Society, and one well worthy of imitation.

From the admirable account of the subject there given, it appears that in several directions important advances have been made, and we propose here to indicate shortly the nature and tendency of these, after first pointing out some of the difficulties which have not yet been overcome.

In the first place, no entirely satisfactory criterion of chemical individuality has yet been found for the albumins, all the prevailing methods which the chemist has been forced to employ for their purification and separation—precipitation by various reagents, coagulation, differences of solubility, and even crystallisation—being pronounced insufficient to guarantee the individuality of the product. This is due partly to the colloidal nature of these substances, a property which is most probably conditioned by their enormously high molecular weight, and partly to their great tendency to form loose compounds with other substances, and especially with such as occur along with them in the tissues of plants and animals.

A second difficulty lies in the great number of different substances belonging to this class which have been prepared, even with the imperfect methods at present at our command, and in the bewildering complexity of the products of decomposition obtained from many of them by such simple means as hydrolysis.

One instance may suffice to illustrate this point and at the same time serve as an enumeration of the various chemical groups obtainable from a complicated member of the class. Certain nucleoproteids yield on hydrolysis the following products, each of which represents a different group in the molecule of the mother substance:—arginine, histidine, lysine, leucine, asparaginic acid, glutamic acid, pyrrolidinecarboxylic acid, the purine bases, thymine, phosphoric acid, two groups containing sulphur, and separate groups yielding furfuraldehyde, skatole and lævulinic acid; most of these groups are, moreover, with great probability contained several times over in a single molecule.

Fortunately, however, all the albumins are not as complicated as this, and it is by the discovery of simpler members of the class and by a quantitative study of the products of their decomposition—researches almost entirely due to Kossel and his co-workers—that the most substantial advance of recent years has been made. These, the least complex albumins yet known, have been obtained from the spermatozoa of certain fish and have received names denoting their origin, *e.g.* salmin, sturin, clupein, &c. They possess strongly basic properties, turn red litmus blue and form salts with acids, yet unite with this chemical activity the high molecular weight and colloidal properties of the albumins, and have hence been termed the *protamines*. Their comparative simplicity is, however, shown by the nature of the products formed from them by hydrolysis.

The more familiar and complex members of the group, such as casein or egg-albumin, yield on hydrolysis a large number of different products, which may, however, be grouped in four main classes:—

(1) A compound capable of yielding urea. This is invariably found in the form of *arginine*, or guanido-amidovaleric acid, a compound which may be regarded as at the same time a derivative of urea and of diamidovaleric acid.

(2) The diamido-acids, at least three members of which have been recognised, including the group contained in arginine.

(3) The monamido-acids, ten or eleven different acids having all been found.

(4) A number of other products such as ammonia, furfuraldehyde, pyrrolidinecarboxylic acid, humus-like substances, &c.

The proportions in which the representatives of these classes are produced vary greatly for the different albumins, casein, for example, yielding very little arginine (about 5 per cent.) and a large proportion of monamido-acids (75–85 per cent., including at least three or four different acids).

Now the simplest protamines, of which salmin may be taken