WE have received the meteorological *Jahrbuch* of the observatory of the Magdeburg *Journal* for the year 1894. The results are given in the same form as in the previous twelve volumes, and the work is a good sample of the way in which complete observations and means may be condensed into a compact and convenient form. The first part contains eye observations made thrice daily, and the second part contains hourly observations from self-recording instruments with facsimile traces of the sunshine recorder, and also curves of the barograph and thermograph for periods of disturbance, mostly during thunderstorms. The highest shade temperature recorded during the year was 94°·3 in July, and the lowest 0°·9, in January. The total annual rainfall amounted only to 19·4 inches, and the greatest fall in twenty-four hours was 1·6 inches.

AMONG the papers published in the March number of the *Journal* of the Royal Horticultural Society (vol. xix. part 3, 1896), are three to which attention may profitably be directed here. Mr. Francis Darwin has a paper on "Etiolation as a Phenomenon of Adaptation." Mr. A. W. Sutton contributes an account of the introduction and cultivation of the potato, illustrated by numerous figures. He has made some grafting experiments with the potato and tomato, and describes his results in his paper. As a result of introducing a tomato graft upon a potato stem, the potato roots, maintained in growth by tomato foliage, produced a crop of potatoes in the pot, while the tomato foliage above ground produced a crop of tomatoes, nourished by the potato roots in the pot. In a short paper, Dr. Maxwell Masters describes a number of substitutes for larch. He shows that there are many conifers which more or less fully realise the characteristics of an ideal substitute for larch trees.

WHEN Henri St. Claire Deville, in company with Debray, Morin, and Rousseau Bros., erected the first plant specially designed for the manufacture of aluminium, forty years ago, they did not foresee the greatness of the future of the industry they founded. A sign of the growth of the industry in the United Kingdom is the appearance of a monthly periodical, *Aluminium and Electrolysis*, which will be concerned with all matters pertaining to the manufacture and use of the metal. France and the United States have for some time led the way in aluminium manufacture, and have had their special journals, but no paper primarily devoted to the interests of aluminium has hitherto been published in the United Kingdom. The addition to the ranks of industrial journals is made at an opportune time, for, after a period of quiet, once more increased attention is being given to aluminium in Great Britain.

IT is not given to many scientific discoveries to command so much popular attention as Röntgen's discovery of the X-rays; and the demand for information on the subject has resulted in a copious supply of lectures and literature, while the desire to revel in the marvellous has been gratified by a plenitude of photographs of invisible objects, published in various forms. Messrs. Valentine and Sons have added to their series of collotype view-books a brochure containing reproductions of eight Röntgen photographs taken by Profs. E. Waymouth Reid and J. P. Kuenen at University College, Dundee. A brief description is given of the method of work, and of each photograph. Another publication on the same subject, by August Dittmar, has been published by Mr. F. Bauermeister, Glasgow. This pamphlet contains a general statement of the elementary principles which result in the production of kathode rays and Röntgen photography, illustrated with eleven text-figures and one photograph obtained by means of X-rays.

AMONGST the products of the reaction at 400°-500° of hydrobromic acid upon phosphoryl trichloride, M. Besson (*Comptes rendus*, April 11) has succeeded in isolating the missing phosphoryl chlorobromide $POClBr_2$. This is a solid substance at the ordinary temperature, melting at 30°, and distilling under normal atmospheric pressure at 165°. Its boiling-point is not fixed, however, as it slowly decomposes into the chlorobromide $POCl_2Br$ of Menschutkin and phosphoryl tribromide, a property which renders its isolation by fractional distillation difficult. Besides these two chlorobromides and the tribromide, M. Besson obtained considerable quantities of solid phosphorus pentabromide from the product of the original reaction. The formation of this substance is remarkable, as it involves the replacement of the oxygen of the phosphoryl group by bromine with elimination of water, whereas at ordinary temperatures the inverse change is known to take place with great vigour.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus*, ♂) from India, presented by Mr. Owen L. Hancock; a Red and Blue Macaw (*Ara macao*) from Central America, presented by Mr. Eugene E. G. Jones; a Dusky Duck (*Anas obscura*, ♀) from North America, presented by Mr. W. H. St. Quintin; an Indian Elephant (*Elephas indicus*, ♂) from India, two Red-beaked Weaver Birds (*Quelea sanguinirostris*) from West Africa, a Java Sparrow (*Padda oryzivora*) from Java, a Rose-breasted Grosbeak (*Hedymeles ludovicianus*) from North America, a Lesser Black-backed Gull (*Larus fuscus*), British, deposited; a Caffer Cat (*Felis caffra*) from South Africa, purchased.

OUR ASTRONOMICAL COLUMN.

MIRA CETI.—For some years past it has been found that the predicted maxima of this famous variable star, based upon a period of 331 days, have been several weeks in advance of the actual maxima, and it would seem that the time has arrived when a new discussion of its light-curve should be undertaken. According to the ephemeris, the last maximum was due on December 9, but the greatest brightness did not occur until towards the end of January, as shown by the following summary of the observations (*Bull. Soc. Ast. de France*, April):—

Date.	Mag.	Date.	Mag.
Nov. 1-11	9·0	Jan. 15	3·7
15-30	8·2	18	3·5
Dec. 1-10	7·8-7·5	20	3·2
15-31	7·5-6·5	Feb. 1	3·2
Jan. 1	6·0	15	3·4
7	4·8	20	3·6
9	4·2	March 1	3·8
10	3·8	10	4·2

According to M. Dumenil (*Comptes rendus*, March 30), the magnitude at maximum during the last twelve periods has varied between 2·5 and 4·7. This fact, in conjunction with the apparent irregularity of the light-curve, indicates that there is more than one source of variability. On the meteoritic hypothesis the variations are produced by two or more swarms of meteorites revolving round a larger central swarm, and passing through its outlying parts near periastron. On this supposition it may be possible to analyse the light-curve of Mira so as to determine the part played by the individual sources of variation, each of which may be perfectly regular.

AN EXHIBITION OF ASTRONOMICAL PHOTOGRAPHS.—An international exhibition of astronomical photography will form part of the Berlin Industrial Exhibition to be held this year, from May 1 to October 15. Herr F. S. Archenhold, who is arranging the collection, has just sent out a circular asking for contributions of photographs of astronomical instruments of historic interest, of plans and buildings of observatories, as also the reproductions of astronomical drawings and kindred subjects (such as spectra, luminous night-clouds, &c.), lantern-slides $8\frac{1}{2}/10$ cm. in size, or larger, also separate heliogravures already published in the annals of observatories, may be sent in to complete the photographic collection. In all cases, where it is not especially requested that they shall be returned, photographs will be retained and preserved as a complete collection, which, together

with the models of telescopes, made especially for this purpose in the mechanical department of the Grunewald-Sternwarte, will form the foundation for an astronomical museum. It is requested that every photograph shall be furnished with the name of the observatory sending it in, also the exact particulars as to date and time of exposure, method of developing, name of object, and any thing of interest connected therewith. It would also be desirable to state on the backs of the photographs, if, and in what publication, any further particulars may be found concerning the same subject. Though the exhibition opens on May 1, any pictures, which owing to the distance of the observatory sending them, should not arrive by that date, can be received at any subsequent period. As, however, a catalogue is to be completed by July 1, it will be to the interest of exhibitors to see that their contributions arrive in Berlin on July 15 at latest. Particulars as to the number and extent of intended contributions should be sent as early as possible to Herr F. S. Archenhold, Grunewald-Sternwarte, bei Berlin.

THE SUN'S ROTATION.—Two methods have hitherto been chiefly employed to determine the period of the sun's rotation, namely, observations of sun-spots and determinations of the displacements of lines in the spectrum of the sun's limb. A third method, depending upon the movements of faculæ, has recently been utilised by W. Stratonoff (*Ast. Nach.*, 3344). His results are based upon an investigation of 400 photographs of the sun, taken during 1891–1894, and the number of daily angular movements available for discussion amounts to 1024, after rejecting those in which identifications on successive photographs were at all uncertain. All the facts which are brought together clearly indicate that faculæ in different heliographic latitudes move with different velocities, and that the rate of movement diminishes in passing from the equator towards the poles. In the zone 10°–19° the retardation amounts to 0°·37 per day as compared with the equatorial angular velocity, while in the zones 20°–29° and 30°–40° it is 0°·47 and 1°·0 respectively. The law of variation of the velocity of the faculæ with the latitude is much more complex than in the case of spots; from 0° to 8° the angular velocity is almost constant, from 9° to 16° it decreases very rapidly, between 16° and 25° it remains nearly uniform, while from 25° to 34° it again diminishes quickly. Similar results are obtained for both solar hemispheres. The faculæ appear to move more rapidly than the spots in all solar latitudes from 0° to 40°, as shown by the following mean values:—

Heliographic latitude.		Diurnal angle of rotation. Faculæ.		Spots.
° °		°		°
0–9	...	14·61	...	14·30
10–19	...	14·24	...	14·15
20–29	...	14·14	...	13·83
30–40	...	13·61	...	13·40

The spectroscopic measurements made by Dunér indicate that the photosphere rotates even more slowly than the spots, and the following comparison shows the relation of the surface rotation with that of the faculæ:—

Heliographic latitude.		Diurnal angle. Stratonoff.		Dunér.
°		°		°
0	...	14·61	...	14·14
15	...	14·24	...	13·66
30	...	13·87	...	13·06

So far as the available data permit any conclusions to be drawn, it thus appears that there are three distinct laws of rotation for what in all probability correspond to three different solar levels.

THE TSETSE FLY-DISEASE.[1]

FOR forty-six years the Tsetse fly has been notorious as a terrible scourge to live-stock, and the most formidable of impediments to colonisation in Equatorial and South Africa. First brought into prominent notice by the explorers Gordon-Cumming Oswell and Captain Vardon, it was described by Westwood[2] in 1850, under the name *Glossina morsitans*, from specimens collected by the last-named traveller. The genus, an ally of our common blood-sucking *Stomoxys*, contains six described African species, for all of which Tsetse appears now to serve as a common name.

The peculiarities of the fly and "fly-disease" have been made familiar by most other African travellers, Livingstone, Andersson, Chapman, Selous, &c. The Tsetse (Fig. 1) is a dipterous insect, of no striking appearance, grey, with darker stripes on the thorax, and a pale or yellowish abdomen furnished with two dark spots on the anterior portion of each segment; it is rather larger than the house-fly, but is narrower when at rest, the wings overlapping. The mouth-parts form a powerful, piercing and suctorial beak. Local in distribution, the fly occurs in numerous detached regions of Africa south of the Equator, its headquarters appearing to be along the Zambesi and its tributary the Chobe. "Fly-country" is hot, moist and low alluvial ground, along river-banks, covered with forest or scrub vegetation, and uninhabited save by wild animals. Within its sharply-defined limits, which may extend along one bank only of a river, the Tsetse swarms; it is extremely active, and eagerly attacks man or animals for the purpose of sucking blood. On man no effect is produced beyond temporary irritation, of which the extent has been very variously described, probably in accordance with the idiosyncrasy of the victims. Wild animals do not suffer; but domestic animals, which have entered fly-districts, are seized in the course of a few days with fever and wasting, and almost invariably die. Horses and dogs rapidly succumb, while goats, donkeys and unweaned calves are said by some travellers to be resistant; this, however, is not generally true of the two former kinds. Slight non-fatal attacks confer no immunity, but some native breeds of dogs enjoy partial protection, although a certain number of pups

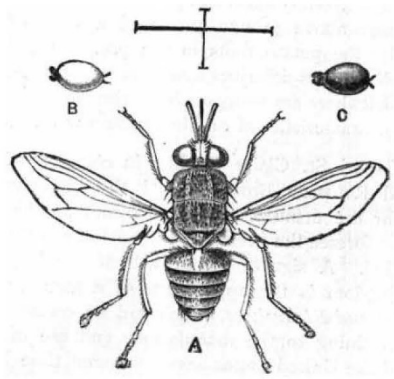

FIG. 1.—A, Tsetse fly (*Glossina* sp.), Transvaal; B, larva; and C, puparium of a Tsetse (after Bruce).

in each litter perish. Books of African travel are full of records of horses, teams of oxen, or herds of native cattle having been destroyed by entering fly-districts, and on one occasion a Masai army, proceeding to the attack of a neighbouring tribe, was effectually routed by having incautiously crossed fly-country.

For some years the accounts of fly-disease were not seriously questioned, until in 1870 a Mr. St. Vincent Erskine[1] endeavoured to show that it was due solely to change of grass or climate, and severely criticised Livingstone's account, forgetting that the proper course lay in attempting to reconcile the apparent discordance between his own and other observations. Since then Hartmann, Marno, Falkenstein and other travellers who found either the fly present and disease absent (as on the Loango coast), or the reverse, have further discredited the earlier statements, and so eminent a dipterologist as Van der Wulp,[2] in summarising the evidence, has concluded that the Tsetse is not injurious, or that its ill-effects are exaggerated. Nevertheless travellers, especially in the Zambesi district, whilst adding nothing to our knowledge, have constantly reaffirmed the connection between the fly and the disease.

One or two naturalists have indeed hit the truth, and among them Schoch, who in an ably-reasoned little paper[3] concluded that the facts pointed, not to the action of a specific fly-virus, as was originally supposed, but to the transmission of a bacterial

[1] "Preliminary Report on the Tsetse Fly-Disease, or Nagana, in Zululand." By Surgeon-Major David Bruce, A.M.S. (Bennett and Davis, Field Street, Durban.)
[2] *Proc. Zool. Soc. Lond.*, 1850, pp. 258–270.

[1] Paper read before the Nat. Hist. Assoc. of Natal, reported in *The Entomologist*, v. p. 217.
[2] *Tijdschr. Ent.*, 1884, pp. 143–150.
[3] *Mitth. Schweiz. ent. Ges.*, 1884, pp. 685–686.