MESSRS. GAUTHIER-VILLARS (Paris) have recently added three new works to their already large list of photographic treatises. One is the "Manuel de Phototypie," by M. Bonnet, giving full details of the various processes for the rapid reproduction of photographs, such as is now demanded for many purposes. The formulæ are stated very clearly, and the apparatus required is sufficiently illustrated by diagrams. The treatise is thoroughly practical, and will be very valuable to all interested in the subject, whether as amateurs or for trade purposes. The second—"Temps de Pose"—is by M. Pluvinel, and deals with the difficult question of the time of exposure. It is shown that what is generally regarded as a rule-of-thumb process can be reduced to a scientific one. The various functions of the duration of the exposure are first considered mathematically, and it is then shown how the results of the investigations are to be applied practically, the method being illustrated by worked-out examples. To simplify matters, tables are given showing the different elements, such as coefficient of brightness, for all ordinary photographic subjects. The treatise is chiefly interesting as a scientific contribution, as few photographers will care to take the trouble of working out the time of exposure, now that they have found that good work can be done by judgment alone. The third book is in two volumes, and treats of the various "film" processes ("Procédés Pelliculaires," by George Balagny). It claims to give a full account of all that has been said and done in connection with the subject since the introduction of photography, and as far as we can judge, this claim is fully justified. Every detail of the subject is considered in a very practical manner. One of the most interesting applications of flexible films mentioned is the registration of flash signals in "optical telegraphy."

THE "Year-book of Photography" (Piper and Castle) for 1890 fully bears out the good reputation gained by its predecessors. In addition to the information relating to the various photographic societies, there are several articles on the advances in photographic processes which have been made during the past year, and other useful notes. One of the most interesting articles is that by the editor on photography in natural colours, from which we learn that "processes of practical value, to achieve the end, are likely to be discovered by the exercise of ability and perseverance." The only important omission we notice is a record of the remarkable achievements in astronomical photography. The volume contains a portrait and short biographical notice of Edmond Becquerel. The whole forms an invaluable book of reference to all photographic matters, with the exception referred to.

MESSRS. GEORGE BELL AND SONS have published "The School Calendar and Hand-book of Examinations, Scholarships, and Exhibitions, 1890." This is the fourth year of issue, and great pains have been taken, as in former years, to secure that the information brought together shall be full and trustworthy. A preface is contributed by Mr. F. Storr.

THE sixteenth part of Cassell's "New Popular Educator" has been issued. It includes a map of Australasia.

THE Proceedings of the International Zoological Congress, held in Paris last summer, will be ready for distribution in a fortnight.

A NEW and very simple method of synthesizing indigo has been discovered by Dr. Flimm, of Darmstadt (*Ber. deut. chem. Ges.*, No. 1, 1890, p. 57). In studying the action of caustic alkalies upon the monobromine derivative of acetanilide, $C_6H_5.NH.CO.CH_2Br$, a solid melting at 131°·5, it was found that when this substance was fused with caustic potash a product was obtained which at once gave an indigo blue colour on the addition of water, and quite a considerable quantity of a blue solid resembling indigo separated out. The best mode of carrying out the operation is described by Dr. Flimm as follows:—The monobromacetanilide is carefully mixed with dry caustic potash in a mortar, and the mixture introduced into a retort and heated rapidly until a homogeneous reddish-brown melt is obtained This is subsequently dissolved in water, and a little ammonia or ammonium chloride solution added, when the liquid immediately becomes coloured green, which colour rapidly changes into a dark blue, and in a short time the blue colouring matter is for the most part deposited upon the bottom of the vessel in which the operation is performed. The fused mass may also conveniently be dissolved in dilute hydrochloric acid, and a little ferric chloride added, when the formation of indigo takes place immediately. The collected blue colouring matter may be readily obtained pure by washing first with dilute hydrochloric acid and afterwards with alcohol. That this blue substance was really common indigo was proved by the fact that it yielded several of the most characteristic reactions of indigotin, such as solubility in aniline, paraffin, and chloroform, its sublimation, and the formation of sulphonic acids, which gave similar changes of colour with nitric acid to those of indigotin. The final proof was afforded by its reduction to indigo white and re-oxidation to indigo blue by exposure to air. Moreover, the absorption spectrum of the colouring matter was found to be identical with the well-known absorption spectrum of indigo. Hence there can be no doubt that indigo is really formed by this very simple process. The chemical changes occurring in the reaction are considered by Dr. Flimm to be the following:—Indigo blue is not produced directly, but first, as a condensation product of the monobromacetanilide, indoxyl is formed, $C_6H_4\begin{matrix}NH\\ COH\end{matrix}\!\!>\!\!CH$, or more probably a pseudo-indoxyl of the isomeric constitution $C_6H_4\begin{matrix}NH\\ CO\end{matrix}\!\!>\!\!CH_2$. This intermediate substance then passes over by oxidation into indigo, $C_6H_4\begin{matrix}NH\\ CO\end{matrix}\!\!>\!\!C=C\!\!<\!\!\begin{matrix}NH\\ CO\end{matrix}\!\!>\!\!C_6H_4$, two molecules each losing two atoms of hydrogen by oxidation, and then condensing to form indigo. It was not found possible to isolate the intermediate pseudo-indoxyl, owing to its extreme instability; indeed, the all-important point to be observed in the practical carrying out of the synthesis by this method is that the fusion must be performed quickly and the temperature raised rapidly to a considerable height, the whole process occupying only a few minutes. The yield of pure indigo under the conditions yet investigated is not very large, amounting to about four per cent. of the weight of the original anilide.

THE additions to the Zoological Society's Gardens during the past week include thirteen Cuning's Octodons (*Octodon cuningi*) from Chili, presented by Mr. W. H. Newman; five Common Dormice (*Muscardinus avellanarius*), British, presented by Mr. Florance Wyndham; a Large Hill-Mynah (*Gracula intermedia*) from India, deposited; a Dingo (*Canis dingo*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

OBJECTS FOR THE SPECTROSCOPE.

Sidereal Time at Greenwich at 10 p.m. on February 6 = 7h. 7m. 56s.

Name.	Mag.	Colour.	R.A. 1890.	Decl. 1890.
			h. m. s.	° ′
(1) G.C. 1515	—	—	7 17 14	+69 14
(2) 51 Geminorum ...	5·5	Yellowish-red.	7 7 3	+16 21
(3) *v* Geminorum ...	4	Yellow.	7 27 26	+32 8
(4) *α* Geminorum ...	2	White.	7 11 48	+16 44
(5) DM. + 3°·1381 ...	9	Reddish-yellow.	6 38 54	+ 3 24
(6) U Monocerotis ...	Var.	Orange.	7 25 32	− 9 33

Remarks.

(1) The spectrum of this nebula has not yet, so far as I know, been recorded, but the observation will not be difficult, if one may judge from the description given by Herschel, namely: "Very bright, pretty large, round, much brighter in the middle, mottled as if with stars."

(2) This star has a spectrum of the Group II. type, Dunér describing it as very beautiful. He states that all the bands, 1-9, are very wide and dark. The observations most likely to extend our knowledge of the group of bodies to which this star belongs are (1) observations of the bright carbon flutings (see p. 305); (2) comparisons with the flame spectra of manganese, magnesium, and lead; (3) observations made with special reference to the presence or absence of absorption lines, of which Dunér makes no mention.

(3) Gothard classes this with stars of the solar type. The usual differential observations are required.

(4) A star of Group IV. The usual observations of the relative intensities of the hydrogen and metallic lines (*b*, D, &c.), as compared with other stars, are required.

(5) A rather faint star of Group VI., in which the character of band 6 (near λ 564), as compared with the other carbon bands (9 and 10), requires further attention. Secondary bands should also be looked for.

(6) This variable is stated by Gore to have a continuous spectrum, but it seems probable that lines or flutings will be found if the star be examined under the most favourable conditions—that is, when near maximum. Rigel was formerly said to have a "continuous" spectrum, but the lines are now by no means difficult to see. The star ranges from magnitude 6 at maximum to 7·2 at minimum, and the period is 31-50 days (Gore). A. FOWLER.

TOTAL SOLAR ECLIPSE OF 1886.—Dr. Schuster has thus summarized the spectroscopic results he obtained at this eclipse (Phil. Trans., vol. 180, 1889):—

(1) The continuous spectrum of the corona has the maximum of actinic intensity displaced considerably towards the red, when compared with the spectrum of sunlight.

(2) While, on the two previous occasions on which photographs of the spectrum were obtained, lines showed themselves outside the limits of the corona, this was not the case in 1886.

(3) Calcium and hydrogen do not form part of the normal spectrum of the corona. The hydrogen lines are visible only in the parts overlying strong prominences; the H and K lines of calcium, though visible everywhere, are stronger on that side of the corona which has many prominences at its base.

(4) The strongest corona line in 1886 was at λ = 4232·8; this is probably the 4233·0 line often observed by Young in the chromosphere.

(5) Of the other strong lines, the positions of the following seem pretty well established:—

4056·7	**4084·2**	4089·3	**4169·7**	**4195·0**	**4211·8**
4280·6	4365·4	**4372·2**	4378·1	4485·6	4627·9

The lines printed in thicker type have been observed also at the Caroline Island and Egyptian Eclipses.

(6) A comparison between the lines of the corona and the lines of terrestrial elements has led to negative results.

ANNUAIRE DU BUREAU DES LONGITUDES.—In the volume for 1890, MM. Lœwy and Schulhof contribute a list of the comets which appeared from 1825 to 1835 inclusive, and in 1888, being a continuation of the lists given in former years. M. Lœwy also gives a complete table of the appearances of the planets throughout 1890, and ephemerides of a considerable number of variable stars. An elaborate comparison of the various calendars is from the pen of M. Cornu, and under the head of the solar system a rich store of information is included. With the notices we find an account of the meeting of the permanent committee of the photographic chart of the heavens and the Photographic Congress of September last. This year's *Annuaire* is as completely filled with information as it has ever been and doubtless will be as much appreciated by astronomers.

ANNUAIRE DE L'OBSERVATOIRE ROYAL DE BRUXELLES.—The volume for 1890 is the fifty-seventh annual publication from this Observatory. It contains tables of the mean positions of the principal stars and their apparent right ascensions, of the occultation of stars by the moon, and of eclipses of Jupiter's satellites, mention being also made of remarkable phenomena relating to the moon and the planets. M. Folie gives a biographical sketch of his predecessor, J. C. Houzeau, which is embellished with the portrait of this deceased bibliographer. Considerable attention has been paid to the researches on diurnal nutation and the determination of the constant. M. Spee discusses the tabulated observations of the condition of the sun's surface during 1888, and M. Moreau contributes an interesting note on the movement of a solid about a fixed point. A list is also given of the comets and asteroids discovered in 1889, and some of the particulars relating to their orbits.

ROYAL ASTRONOMICAL SOCIETY.—The annual general meeting of the Fellows of this Society will be held at Burlington House on Friday, the 14th inst., for the purpose of receiving the Report of the Council, electing officers for the ensuing year, and transacting other business of the Society. The chair will be taken at 3 o'clock precisely.

Erratum.—In the elements of companion C of Brook's comet (p. 305), read ☊ = 17° 52′ 24″·5, and log *a* = 0 565059.

GEOGRAPHICAL NOTES.

BARON NORDENSKIÖLD has announced in the Swedish Academy of Sciences, that he and Baron Oscar Dickson, with assistance from the Australian colonies, will start on an expedition in the South Polar regions next year.

A RECENT telegram from Tashkent announced that Colonel Pevtsoff and M. Roborovsky had discovered a convenient pass to the north-western part of Tibet, from Nia, and had mounted to the great table-land. The plateau has there an altitude of 12,000 feet above the sea, and the country round is desolate and uninhabited, while towards the south the plateau is well watered and wooded. The Tashkent telegram is so expressed that it might be supposed to mean that two separate passes had been discovered by the two explorers. But the news received from the expedition at St. Petersburg on December 26, and dated October 27, shows that both explorers proposed to leave the oasis of Keria (100 miles to the east of Khotan) on the next day, for Nia (65 miles further east) and there to search for a passage across the border-ridge which received from Prjevalsky the name of the "Russian ridge." This immense snow-clad chain separates the deserts of Eastern Turkestan from the trapezoidal space, the interior of which is quite unknown yet, and which is bordered by the "Russian" ridge and the Altyn-tagh in the north-west; the ridges of Tsaidam and those named by Prjevalsky "Columbus" and "Marco-Polo" in the north-east; the highlands (explored by Prjevalsky in 1879-80) at the sources of the Blue River, in the south-east; and a long, yet unnamed ridge which seems to be a prolongation of the Tan-la, in the south-west. The pass leading to that plateau from Nia, and now discovered by the Russian expedition, is situated some 80 miles to the east of the well-known pass across the Kuen-lun Mountains which leads from Southern Khotan to Lake Yashi-kul. M. Roborovsky's intention is evidently next to move up the Tchertchen river and to endeavour to reach the ridges "Moscow" and "Lake Unfreezing" (11,700 feet high), which were visited by Prjevalsky from the east during his last journey. Having succeeded in finding a pass to Tibet in the south of Nia, Colonel Pevtsoff proposes, as soon as the spring comes, to proceed himself by this pass to the table-land, while M. Roborovsky probably will be despatched to explore the same border-ridge further east, in the south of Tchertchen.

THE *Boletin* of the Madrid Geographical Society for the last quarter of 1889 contains a most valuable memoir by Dr. Fernando Blumentritt, on the intricate ethnology of the Philippine Islands. The author classifies the whole of the native population in three broad divisions—Negrito, Malay, and Mongoloid; the last comprising those tribes which in their physical appearance betray certain Chinese or Japanese affinities. All are grouped in an admirably arranged alphabetical table, where their names, race, language, religion, culture, locality, and numbers are briefly specified in seven parallel columns. With a few variants and cross-references this table contains no less than 159 entries, and thus conveys in summary form all the essential particulars regarding every known tribe in the Philippine Archipelago. From it we gather that the Negritoes—that is, the true autochthonous element, variously known as Aetas, Attas, Atés, Etas, Itas, Mamánuas, &c., and physically belonging to the same stock as the Samangs of the Malay Peninsula—