material in all directions over the plains till vegetation comes and retains it. The uniform character of the pampas loess arises, according to Roth, not from the material and mode of deposition, but chiefly from its transformation under the influence of vegetation. The roots taking up the matters they need, decompose the soil, and the humus arising from the decay of the plants acts on the new material spread over the surface by wind and rain, along with fresh plants, by way of decomposition. A further metamorphosis occurs by water carrying down matter through the porous layers, with the result of new combinations, and a harder, more compact loess in the lower parts. From observations of marine Tertiary beds of (probably) Miocene age in Entre Rios, over typical pampas loess, Roth infers that the formation of loess began some time in the Eocene period; in diluvial times it grew in intensity, and has gone on till now without interruption.

AN interesting study has been lately made by Herr Tarchenoff (*Pflüger's Archiv*) of electric currents in the skin from mental excitation. Unpolarizable clay-electrodes, connected with a delicate galvanometer, were applied to various parts—hands, fingers, feet, toes, nose, ear, and back; and, after compensation of any currents which occurred during rest, the effects of mental stimulation were noted. Light tickling with a brush causes, after a few seconds' period of latency, a gradually increasing strong deflection. Hot water has a like effect; cold, or the pain from a needle-prick, a less. Sound, light, taste, and smell stimuli act similarly. If the eyes have been closed some time, mere opening of them causes a considerable deflection from the skin of the hand. Different colours here acted unequally. It is remarkable that these skin-currents also arise when the sensations are merely imagined. One vividly imagines, *e.g.*, he is suffering intense heat, and a strong current occurs, which goes down when the idea of cold is substituted. Mental effort produces currents varying with its amount. Thus, multiplication of small figures gives hardly any current; that of large, a strong one. If a person is in tense expectation, the galvanometer mirror makes irregular oscillations. When the electrodes are on hand or arm, a voluntary movement, such as contraction of a toe or convergence of the eyes, gives a strong current. In all the experiments it appeared that, with equal nerve excitation, the strength of the skin-currents depended on the degree to which the part of the skin bearing the electrodes was furnished with sweat-glands. Thus some parts of the back, and upper leg and arm, having few of these, gave hardly any current. Herr Tarchenoff considers that the course of nearly every kind of nerve-activity is accompanied by increased action of the skin-glands. Every nerve-function, it is known, causes a rise of temperature, and accumulation of the products of exchange of material in the body. Increase of sweat-excretion favours cooling, and the getting rid of those products.

A METEORITE of special interest to chemists has been examined by M. Stanislas Meunier. It fell at Migheï, in Russia, on June 9, 1889, and it was evident, from a cursory inspection, that it was of a carbonaceous nature. In external appearance it exhibited a deep greenish-black colour, relieved by numerous small brilliant white crystals; the surface was considerably wrinkled, and blown out into swellings. The material was very friable, and readily soiled the fingers. A section under the microscope was observed to consist largely of opaque matter interspersed with crystals of a magnesian pyroxene and peridote. Fine particles of metallic iron and nickeliferous iron were readily collected by a magnet from the powdered rock, having all the characteristics of meteoric iron. The density of the meteorite was not very high, 2·495. About 85 per cent. of the rock was found to be attacked by acids, the portion so attacked being shown by analysis to consist mainly of a silicate of magnesium and iron having the composition of peridote. On the remaining 15 per cent. being heated in a current of dry oxygen gas, it readily took fire and burnt brilliantly. The products of combustion, which were allowed to pass through the usual absorption tubes containing pumice and sulphuric acid and potash, showed that the meteorite contained nearly 5 per cent of organic matter. In order to obtain some idea as to the nature of the carbonaceous substance present, a quantity of the rock was powdered and then digested with alcohol; on evaporation the alcoholic extract yielded a bright yellow resin, which was readily precipitated from the alcoholic solution by water, and much resembled the kabäite of Wöhler. The most curious chemical properties of the meteorite, however, are exhibited with a cold aqueous extract of the powdered rock. The filtered liquid is quite colourless, but exhales a faint odour due to an organic salt which carbonizes on evaporation to dryness, and may be burnt upon platinum foil. The aqueous extract further contains nearly 2 per cent. of mineral matter possessing properties of a novel character. Barium chloride solution gives a heavy white precipitate, which, however, is not barium sulphate. Silver nitrate gives a voluminous curdy reddish-violet precipitate, reminding one of silver chromate, but of quite a distinct and peculiar tint, and which blackens in a very few minutes in daylight. The substance which exhibits these reactions is unchanged by evaporation to dryness and ignition to redness, readily dissolving in water again on cooling and giving the above reactions. The silver nitrate precipitate, when allowed to stand for some time undisturbed in the liquid, becomes converted into colourless but brilliantly refractive crystals, which polarize brightly between crossed Nicols under the microscope, and which are insoluble in boiling water. The properties of this new substance contained in the water extract appear to approximate most closely to those of certain metallic tellurates, but the new compound appears also to differ in certain respects from those terrestrial salts.

THE additions to the Zoological Society's Gardens during the past week include a Brown Capuchin (*Cebus fatuellus* ♂) from Guiana, presented by J. H. Bostock; a Common Gull (*Larus canus*), a Black-headed Gull (*Larus ridibundus*), British, presented by Mr. E. Keilich; two Schlegel's Doves (*Chalcopelia puella*) from West Africa, presented by Major C. M. MacDonald; a Common Barn Owl (*Strix flammea*), British, presented by Mr. H. Craig; two Swainson's Lorikeets (*Trichoglossus novæ-hollandiæ*) from Australia, deposited.

OUR ASTRONOMICAL COLUMN.

OBJECTS FOR THE SPECTROSCOPE.

Sidereal Time at Greenwich at 10 p.m., January 9 = 5h. 17m. 32s.

Name.	Mag.	Colour.	R.A. 1890.	Decl. 1890.
			h. m. s.	° ′
(1) Nebula in Orion ...	—	Greenish.	5 29 52	− 5 29
(2) 20 Leporis U.A. ...	6	Reddish-yellow.	5 6 14	−11 59
(3) η Orionis	4	Whitish-yellow.	5 19 0	− 2 30
(4) β Tauri	2	White.	5 19 18	+28 31
(5) 99 Birm.	8	Reddish-yellow.	5 4 25	− 5 38
(6) U Canis Minoris ...	Var.	Reddish?	7 35 22	+ 8 38
(7) T Arietis	Var.	Yellow.	2 42 11	+17 3

Remarks.

(1) The bright lines so far recorded in the visible part of the spectrum of the Great Nebula in Orion are as follows:—

Wave-lengths.		Observers.
5872 (D_3)	...	Dr. Copeland.
559	...	Mr. Taylor.
520	...	,,
500	...	Dr. Huggins.
495	...	,,
486 (F)	...	,,
470	...	Mr. Taylor.
447	...	Dr. Copeland.
434 (G)	...	Dr. Huggins.

The principal line in the photographic spectrum is near wave-length 373, and this seems to be special to certain parts of the nebula, according to Dr. Huggins's researches.

Although so much admirable work has already been done, there is still abundant scope for further investigations. One of the chief points requiring attention at present is the character of the brightest line, near λ 500. Researches on the spectra of meteorites, coupled with previous records of the line as having a fringe on its more refrangible side, led Prof. Lockyer to suggest, in 1887, that it was the remnant of the fluting near λ 500 seen in the spectrum of burning magnesium. Observations have since been made by Prof. Lockyer, Mr. Taylor, and myself, and all agree that the line is not sharp on the more refrangible side. Further observations are suggested. High dispersion is not necessary, or indeed desirable.

Direct comparisons of the chief nebula line with the magnesium fluting are also required, but this is an observation of great delicacy, requiring high dispersion. It must also be demonstrated that under the same conditions of comparison the F line of hydrogen is coincident with the third nebula line.

It has been suggested that the line near 559 recorded by Mr. Taylor is the remnant of the brightest manganese fluting; this can only be decided by direct comparisons.

In my own observations I noted that the F line is not seen in all parts of the nebula, and in this respect it resembles the ultra-violet line. This localization of the lines opens up a new field of work.

(2) This is one of the finest examples of stars of Group II. The bands 1 to 9 are perfectly well seen, but there is no record of the presence or absence of line absorptions. Observations of the carbon flutings are suggested, a spirit-lamp flame being convenient for comparisons. The two flutings to be examined, both for position and compound structure, are those near λ 517 and 474. The latter is a group of five flutings, extending from about λ 468 to λ 474, and under some conditions the point of maximum brightness of the group is shifted from 474 to 468. Comparisons of bands 4 and 5 with the brightest flutings of manganese and lead should also be made.

(3) This is a star with a spectrum of the solar type, of which the usual differential observations are required. The relative thicknesses of the hydrogen and other lines should also be noted.

(4) Gothard describes this star as belonging to Group IV. The usual observations are required.

(5) This is a star of Group VI., in which band 9 is dark, and band 6 pale. Dunér does not record any of the secondary bands. These and absorption lines should be looked for.

(6) This variable has a period of 423 days, and ranges from 8·5 at maximum to 13·5 at minimum (Gore). The spectrum has not yet been recorded. Maximum on January 9.

(7) This is a variable with a spectrum of the Group II. type. The period is 324 days, and the magnitude varies from about 8 at maximum to 9·5 at minimum. The maximum will not occur until January 17, but observations for the bright lines of hydrogen, &c., may be commenced at once. Variations of the widths and intensities of the bands before and after maximum may also be looked for.

A. FOWLER.

IDENTITY OF COMET VICO (1844) WITH BROOKS'S (1889).—In a note on some comets of short period (*Bulletin Astronomique*, November 1889), M. L. Schulhof observes that a comparison of the elements of Vico's comet (1844) given by Le Verrier with those of Brooks's comet (1889) shows a striking similarity. According to Mr. Chandler (*Astronomical Journal*, No. 205), Brooks's comet in May 1886 was at a distance 0·064 from Jupiter, and in heliocentric longitude 185°, whilst Vico's comet found itself about 1885–86, according to the elements of M. Brünnow in heliocentric longitude 162°, and approximately 0·4 from Jupiter. M. Schulhof adds, however, that the only objection to the hypothesis is that the action of Jupiter at a distance 0·4 would hardly have been sufficient to change so considerably the perihelion distance and the time of revolution. It will be sufficient to calculate back the perturbations of Brooks's comet as far as 1885 to definitely settle this question.

An investigation of the elements of Comets Lexell and Finlay has led to the conclusion that they are not identical, but the results found are not to be taken as conclusive, a farther and more exact determination of the elements of Finlay's comet having been undertaken.

OBSERVATIONS OF SOME SUSPECTED VARIABLES.—Observations of Lalande 26980 = 14h. 42·7m. + 6° 28′·9 (1875), by Rev. John G. Hagen, of Georgetown College, give the negative result that there is no proof of variation between the years 1884–89, and although an average of 15 observations a year have been made, the extreme range of magnitude is less than 0·2.

Three stars were found that showed rather a large difference from the Bonn D.M. magnitudes, and were watched from 1886 to 1889. No variation, however, was noticed during these three years. The following are the three stars and the magnitudes found compared with Argelander's:—

		m. m.	m.
D.M. 55°2587	...	7·8 ± 0·1 ;	D.M. = 8·8.
D.M. 44·3368	...	7·6 ± 0·1 ;	D.M. = 7·0.
D.M. 44·3402	...	7·7 ± 0·0 ;	D.M. = 8·1.

SPECTRUM OF A METALLIC PROMINENCE.—Prof. Vogel in a letter to Prof Tacchini (*Mem. Società Spettroscopisti Italiani*, November 1889) observes that the positions of the lines measured in a metallic prominence on June 28 were incorrectly given by Prof. Spoerer in the *Memorie* for October (see NATURE, vol. xli. p. 115), and that the following should be substituted:—

Wave-length.	Origin.	Wave-length.	Origin.
667·6 ...	... Fe	553·4 ...	... Ba, Fe, Sr.
C ...	... H.	531·6 ...	... Ceronium.
649·6 ...	... Ba.	526·9 ...	... Ca, Fe.
646·2 ...	... Ca.	518·8 ...	... Ca, Fe.
D_1 ...	... Na.	b_1 ...	... Mg.
D_2 ...	... Na.	b_2 ...	... Mg.
D_3 ...	... Helium.	b_3 ...	... Fe, Ni.
		b_4 ...	... Mg, Fe.

The above table only contains a small number of the bright lines seen in this eruption.

COMET SWIFT (*f* 1889, NOVEMBER 17).—The following corrected elements are given by Dr. Zelbr (*Astr. Nachr.*, 2944):—

T = 1889 November 29·66411 Berlin Mean Time.

$$\left.\begin{array}{rl} x = & 40^\circ\ 55'\ 52''\cdot8 \\ ☊ = & 331\ 26\ 40\cdot1 \\ \iota = & 19\ \ 3\ 21\cdot1 \end{array}\right\}\ \text{Mean Eq. 1889·0.}$$

$$\begin{array}{rl} \phi = & 39\ \ 8\ 23\cdot1 \\ \log a = & 0\cdot559784 \\ \log \mu = & 2''\cdot710331 \\ \text{Period} = & 6\cdot91 \text{ years.} \end{array}$$

Dr. Lamp has computed the ephemeris given below from these elements:—

1890.	R.A. h. m. s.	Decl. ° ′	1890.	R.A. h. m. s.	Decl. ° ′
Jan. 8 ...	1 19 48 ...	+25 50·9	Jan. 19 ...	1 59 43 ...	+27 46·2
9 ...	23 25 ...	26 2·8	20 ...	2 3 21 ...	27 55·0
10 .	27 2 ...	26 14·4	21 ...	6 59 ...	28 3·5
11 ...	30 39 ...	26 25·7	22 ...	10 36 ...	28 11·8
12 ..	34 17 ...	26 36·7	23 ...	14 14 ...	28 19·8
13 ...	37 54 ...	26 47·5	24 ...	17 51 ...	28 27·4
14 ...	41 32 ...	26 58·0	25 ...	21 28 ...	28 34·8
15 ...	45 10 ...	27 8·2	26 ...	25 4 ...	28 41·9
16 ...	48 48 ...	27 18·1	27 ...	28 40 ...	28 48·7
17 ...	52 27 ...	27 27·7	28 ...	2 32 15 ...	28 55·3
18 ...	1 56 5 ...	27 37·1			

The brightness on Jan. 8 = 0·48 and on Jan. 28 = 0·30, that at discovery being taken as unity.

M. Schulhof notes (*Bulletin Astronomique*, November 1889) that, according to the elements of this comet, it is probably identical with Blanpain's comet (1819), which M. Clausen has shown to be identical with Grischow's comet (1743).

SOLAR SPOTS AND PROMINENCES.—In the November *Memorie della Società degli Spettroscopisti Italiani*, Prof. Tacchini contributes a note on spots and faculæ observed from July to September of this year. A comparison of these observations with those of the preceding quarter shows an augmentation of the phenomena described and a diminution of the frequency of days without spots.

Spectroscopic observations made by Prof. Tacchini during the same period as the above show the mean daily number of prominences to have been 2·93, with an average altitude of

38″·8. This is an increase on the results of the preceding quarter both in the number and height of prominences. Two elaborate plates are included in the *Memorie*, indicating the prominences observed at Rome and Palermo from September to December 1886.

GEOGRAPHICAL NOTES.

THE following news was received a few days ago at St. Petersburg from Colonel Roborovski, the present chief of the late M. Prjevalsky's projected expedition. They crossed the Tian-Shan by the Barskaun and Bedel Passes, and reached the Taushkan-daria. Then they crossed the Kara-teke chain, and when they were on the banks of the Yarkend river, they found out that the Kashgar-daria no longer reaches the Yarkend-daria, but is lost in the irrigation canals of Maral-bash. They followed the Yarkend river, which rolls a mass of muddy water between quite flat banks, covered for some 15 to 30 miles on both sides of the river, by thickets of *Populus euphratica*, *Populus prunosa*, tamarisks, *Halostachus* shrubs, and rushes. Sand deserts spread on both sides,—towards the west to Kashgar, and eastwards to Lob-nor. Many ruins of old cities are met with in the deserts which are never visited by the natives. In the thickets of shrubs which fringe them there are numbers of tigers and wild boars, while amidst the *barkhans* of the deserts the wild camels are freely grazing. From Yarkend, the expedition went south, towards the hilly tracts, where it stayed for a month, and then it moved towards Kotan, whence Colonel Roborovski wrote on October 7. He proposed to winter at Niya, and to search for a pass to Tibet across the border-ridge to which Prjevalsky gave the name of "Russian Ridge." If they succeed they will spend next summer in Tibet.

IN a lecture lately delivered before the Geographical Society of Bremen, Prof. Kuekenthal, of Jena, gave some account of his researches in King Charles Land. Geologically, these islands belong to Spitzbergen, and not, as was formerly supposed, to Francis Joseph Land. During his stay of nearly three months, Prof. Kuekenthal thoroughly investigated this remote district, which is almost unapproachable, the surrounding seas being densely packed with icebergs. The islands are almost entirely without vegetation; only a few mosses struggle for existence on the clay soil. Numerous walrus skeletons are thrown up by the sea. Game is plentiful; Prof. Kuekenthal shot 14 bears (besides bringing back two live specimens), 39 walruses, and as many seals. Many insects and crustaceans were obtained from the land lakes.

THE ANNIVERSARY OF THE ROYAL SOCIETY.

THE President, after giving an account of the scientific work of many Fellows deceased during the past year, addressed the Society as follows:—

On account of the great importance of Joule's labours, both directly, in the advancement of science, and indirectly, through the knowledge thus acquired, in enabling improvements to be made in the practical application of science for industrial purposes, it has been suggested that it might be desirable to raise some public memorial to him, and the Council has appointed a Committee to consider the question.

I have referred, and that very briefly, to some only of the Fellows whom we have lost during the past year, but fuller details both of them, of other Fellows whom we have lost, and of our recently deceased Foreign Members, will be found in the obituary notices which appear from time to time in the Proceedings, according as they are received from the Fellows who have kindly undertaken to draw them up.

Of those who last year were on our list of Foreign Members, we have since lost one who was truly a veteran in science. More than three years have elapsed since the celebration of the centenary of the birth of M. Chevreul, and two more recurrences of his birthday came round before he was called away. He will be known for his researches on the contrast of colours. But his great work was that by which he cleared up the constitution of the fixed oils and fats, and established the theory of saponification. Few scientific men still surviving were even born when this important research was commenced—a research in the course of which he laid the foundation of the method now universally followed in the study of organic compounds, by showing that an ultimate analysis by itself alone is quite insufficient, and that it is necessary to study the substances obtained by the action of reagents on that primarily presented for investigation.

There is one whose name, though he was not a Fellow, I cannot pass by in silence on the present occasion. I refer to Thomas Jodrell Phillips Jodrell, who died early in September, in his eighty-second year. About the time of the publication of the reports of the Duke of Devonshire's Commission, the subject of the endowment of research was much talked of, and Mr. Jodrell placed the sum of £6000 in the hands of the Society for the purpose of making an experiment to see how far the progress of science might be promoted by enabling persons to engage in research who might not otherwise be in a condition to do so. But before any scheme for the purpose was matured, the Government Grant for the promotion of scientific research was started, under the administration of Lord John Russell, then Prime Minister. This rendered it superfluous to carry out Mr. Jodrell's original intention, but he still left the money in the hands of the Society, directing that, subject to any appropriation of the money that he might make, with the approval of the Royal Society, during his lifetime, the capital should, immediately upon his death, be incorporated with the Donation Fund, and that in the meantime the income thereof should be received by the Royal Society. Of the capital, £1000 was several years ago assigned to a fund for the reduction of the annual payments to be made by future Fellows, and the remaining £5000 has now, of course, been added to the Wollaston Donation Fund. By the Fee Reduction Fund the annual payment of ordinary Fellows elected subsequently to the time of the change was made £3 instead of £4, and the entrance fee abolished. As to the Donation Fund, a very wide discretion was, by the terms of the original foundation, left in the hands of the Council as to the way in which they should employ it in the interest of science.

Since the Croonian Foundation for lectures was put on its present footing, it has been made the means of securing for us the advantage of a lecture delivered before the Society by distinguished foreign men of science. In the present year our Foreign Member, M. Pasteur, was invited to deliver the lecture Unfortunately, the state of his health would not allow him to deliver it himself, but at one time he hoped that he would have been able to be present at its delivery. It was ultimately arranged that his fellow-labourer at the Pasteur Institute, Dr. Roux, should deliver the Croonian Lecture in his stead; and several of the Fellows have heard his lucid account, first of the discoveries of M. Pasteur in relation to diseases brought about by microscopic organisms, and then further researches of his own in the same field.

In addressing the Fellows at the anniversary last year, I mentioned that Commandant Desforges had kindly offered to compare that portion of Sir George Schuckburgh's scale, with reference to which the length of the seconds pendulum had been determined by Kater and Sabine, with the French standard metre; and as the ratio of this to the English standard yard was accurately known, the length of the pendulum, as determined by these accurate observers, would thus for the first time be brought into relation with the English yard by direct comparison with accurately compared measures of length. The comparison was shortly afterwards executed, and the scale, which, of course, was very carefully packed for its journey to Paris and back, has long since been replaced in the apartments of the Society. This highly desirable comparison occupied but a few days in its execution; which affords one example of the scientific advantages derivable under an international agreement, from the establishment of the Bureau des Poids et Mesures. Our own country, which for some years held aloof from the Convention, forming the sole exception to the general agreement among nations of importance, joined it some years ago; and we thus have the privilege of availing ourselves, as occasion may arise, of the appliances at the office in Paris for such comparisons of measures of length or weight.

The services of Mr. Arthur Soper, as a special assistant, have been retained during the past session, with advantage to the library. He has completed the much-needed shelf catalogue, and the re-arrangement of the books where necessary. In the course of this work the volumes of a purely literary character