

ceptible is the same for a ball as for a fine point. It occurs with extremely smooth surfaces, and so cannot be attributed to discharges in consequence of roughness of surface. With equal potential the loss of electricity has the same magnitude, whatever the dimensions of the balls used as conductors. In air saturated with vapours of insulating substances, the loss of electricity of a conductor is nearly the same as in dry air.

THE large Russian ironclad *Tchesme*, now being finished at Sebastopol, and having a displacement of over 10,000 tons, is to have boilers heated with petroleum. If the results correspond to what the Sebastopol engineers expect, the example is likely to be followed elsewhere. In this connection we may note an account in *La Nature* of November 5, of a gas-boat, as it may be called, the *Volapuk*, recently constructed by M. Forest, in which a gas-engine of six horse-power is driven, not by coal-gas, but by air charged with carbureted hydrogen, by passage through petroleum-oil. There are two pistons, and the explosive mixture is ignited by means of a spark from a magneto-electric arrangement. The engine consumes six litres of petroleum-oil per hour, giving a speed of sixteen kilometres per hour.

AMONG the various uses of celluloid, it would appear (according to the *Annales Industrielles*) to be a suitable sheathing for ships, in place of copper. A French Company now undertakes to supply the substance for this at 9 francs per surface-metre and per millimetre of thickness. In experiments by M. Butaine, plates of celluloid applied to various vessels in January last were removed five or six months after, and found quite intact and free from marine vegetation, which was abundant on parts uncovered. The colour of the substance is indestructible; the thickness may be reduced to 0.0003 metre; and the qualities of elasticity, solidity, impermeability, resistance to chemical action, &c., are all in favour of this use of celluloid.

THE following interesting observations with regard to the mobility of loess have been made by M. Potanin during his last journey through the region south of the Ordos. As wind steadily moves the shifting sands, so also water steadily moves the loess, transporting it from higher to lower levels. The underground water which filtrates through the loess, begins by making in it a kind of cavern; then a circular crevice appears on the surface over the cavern, and a cylindrical vertical hollow, which soon becomes a deep well, is formed through the thickness of the upper layers of the loess. The whole surface of the loess deposits is dotted with such wells, very dangerous to cattle. By and by the formerly cylindrical well begins to extend in the direction in which the underground water flows, and a narrow ravine grows until it joins the main valley. Then masses of loess continually fall down into the ravine, increasing its width. The fall of these masses is favoured by the numerous crevices in the loess, and it is so frequent that natives warn foreigners not to approach the borders of a ravine. Of course the fallen masses are further dislocated by water, and the loess is thus steadily transported at a remarkable speed to lower levels.

HITHERTO it has been generally supposed that the glaciers of the Caucasus are far from having the same development as those of the Alps. It appears, however, from the last researches of Abich, that, although no glaciers of the Caucasus are as long as the Aletsch and Unteraar glaciers, or the Mer de Glace, there are a great many of them. From tables compiled by M. Smirnof in a recent issue of the *Bulletin of the Moscow Naturalists' Society*, it appears that the average lowest levels of the Caucasus glaciers are: 2504 metres in the Elburz Chain; 2176 metres in the chain to the west of the Adai-kokh; 2266 metres in the high valley of the Ingur; 2898 metres on the eastern slope, and 2238 on the northern slope, of the Kazbek; from 2428 to 2658 metres in Daghestan; 2776 metres on the Great Ararat; and as much as from 3162 to 3194 metres on the Shah-dagh. Comparing

these heights with those reached by the lower extremities of glaciers in other highlands, M. Smirnof concludes that in the main Caucasus ridge the altitudes of the snow-line and the glaciers are intermediate between the corresponding altitudes in the Alps and those in the chains of Central Asia (Thian Shan and Hindu Kush); and that in the western parts of the Caucasus the altitudes of the perennial snow-line are nearer to those of the Austrian Alps. There is some analogy between West Caucasus and the Himalayas, inasmuch as the lowest limits of perennial snow in both chains are higher on the northern slope than on the southern.

A "PANORAMA-BIJOU" (or toy panorama), has been recently brought before the French Société d'Encouragement, by M. Benoit. It is meant to give a succession of connected views of photographed scenery, &c. Externally the instrument appears as a cylindrical case with a handle projecting from its curved surface. The observer looks through a lens, in the axis, towards a mirror inclined 45°, which reflects a panoramic view fixed round the interior of an inner cylinder which is rotated by clockwork. The back of the case is of ground glass, admitting diffuse light. The instrument may be found a suitable companion to the stereoscope on the drawing-room table.

FROZEN fish are now imported into France, and a Society formed in Marseilles for the purpose of developing the trade (the Société du Trident) has a steamer and a sailing-vessel engaged in it. The steamer *Rokelle* lately came into Marseilles with some 30,000 kilogrammes of frozen fish in its hold, the temperature of which is kept at 17° C. below zero by means of a Pictet machine (evaporating sulphurous acid). The fish are caught with the net in various parts of the Mediterranean and Atlantic. After arrival they are despatched by night in a cold chamber. Experiment has shown that fish can be kept seven or eight months at low temperature without the least alteration. These fish are wrapped in straw or marine Algae, and have been sent on to Paris, and even to Switzerland.

AT the establishment of the National Fish-Culture Association, Delaford Park, the American char, *S. fontinalis*, spawned as early as October 15. The thriving capacity of these beautiful fish is becoming yearly more and more marked. Their rate of growth at Delaford has been extraordinarily rapid.

DR. R. BALTZER, Professor of Mathematics at Giessen University, died at Giessen on November 7. He was born January 27, 1818.

ON October 22 a monument to Prof. Oswald Heer was unveiled in the Zürich Botanical Gardens. The bust of the great Swiss naturalist has been executed in a masterly manner by Prof. Hoerbst.

THE additions to the Zoological Society's Gardens during the past week include fifty-nine Pleurodele Newts (*Molge waltii*), seven Marbled Newts (*Molge marmorata*) from Spain, presented by the Lord Lilford, F.Z.S.; two Moufflons (*Ovis musimon* ♂ ♀) from Sardinia, two Barbary Wild Sheep (*Ovis tragelaphus* ♂ ♀) from North Africa, two South American Flamingoes (*Phani-copterus ignipalliatu*s) from South America, deposited; ten Silky Bower Birds (*Ptilonorhynchus violaceus*) from New South Wales, eight received in exchange, and two deposited; an African Wild Ass (*Equus taniopus*) born in the Gardens.

#### OUR ASTRONOMICAL COLUMN.

AMERICAN OBSERVATORIES.—It is reported that the Dearborn Observatory of the Chicago Astronomical Society is to be removed to Evanston, Ill., the North-Western University at Evanston having made an advantageous offer with respect to it. A large astronomical Observatory is proposed to be erected in connection with the Lake Forest University, Governor Ross,

President of the Board of Trustees of the University, having guaranteed the cost. A new Observatory has been established at Smith College, Northampton, Mass., and Miss Mary E. Byrd, formerly assistant at Carleton College Observatory, has been appointed Director. The equipment of the Observatory at Carleton College, Northfield, Minn., is proceeding rapidly, the new meridian-circle by Repsold is already erected, and one of the two large steel domes is in place. The telescope it is to cover, an 8½-inch refractor by Alvan Clark, will, it is expected, be ready for use within a few days. Mr. Grinnell, the founder of Grinnell, Iowa, has furnished funds for the erection of an Observatory to be attached to the Iowa College, and the building is being rapidly brought to completion. The new Observatory is to have an 8-inch equatorial by the Clarks. Prof. Asaph Hall is to act as the Consulting Director of the Washburn Observatory, whilst Prof. George Comstock will have the more immediate superintendence of the institution as Associate Director.

U OPHIUCHI.—Mr. S. C. Chandler gives, in No. 162 of *Gould's Astronomical Journal*, an investigation of the light-curve of this well-known Algol-type variable, the result of which seems to indicate a curious but well-marked retardation in the increase of brilliancy some half-hour or so after minimum is passed. A similar irregularity has been noticed in the light-curve of S Cancri, and occasionally in that of Algol. It is clearly of great importance to ascertain whether this is merely subjective, due to some habit of observation, or a real peculiarity of the star itself. If the latter, it would throw considerable doubt on the satellite theory, which at present seems on the whole the most plausible explanation of variability of the Algol type.

THE NEW ALGOL VARIABLES.—Mr. Chandler also gives an ephemeris for the minima of the two new Algol-type variables, viz. R Canis Majoris, R.A. 7h. 14'3m., Decl. 16° 11' S., and Y Cygni, R.A. 20h. 46'6m., Decl. 34° 10' N., as follows:—Y Cygni, Nov. 26, 22h. 42'5m.; Nov. 29, 22h. 36'1m.; Dec. 2, 22h. 29'7m. R Canis Majoris, Nov. 29, 18h. 48'3m.; Nov. 30, 22h. 4'2m.; Dec. 2, 1h. 20'1m. Greenwich civil time, reckoning from midnight to midnight.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 NOVEMBER 27--DECEMBER 3.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on November 27

Sun rises, 7h. 40m.; souths, 11h. 47m. 44'8s.; sets, 15h. 56m.: right asc. on meridian, 16h. 12'0m.; decl. 21° 8' S. Sidereal Time at Sunset, 20h. 21m.  
Moon (Full on November 30, 15h.) rises, 15h. 5m.; souths, 21h. 52m.; sets, 4h. 50m.\*: right asc. on meridian, 2h. 17'7m.; decl. 8° 30' N.

Planet.	Rises.		Souths.		Sets.		Right asc. and declination on meridian.	
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
Mercury..	5 52	10 39	15 26	15 39	15 3'4	14 39	S.	
Venus....	3 10	8 46	14 22	13 9'8	5 23	5 23	S.	
Mars.....	0 59	7 21	13 43	11 45'1	3 33	3 33	N.	
Jupiter...	6 15	10 49	15 23	15 12'8	17 1	17 1	S.	
Saturn....	20 26*	4 13	12 0	8 35'8	19 2	19 2	N.	
Uranus...	3 1	8 36	14 11	12 59'5	5 39	5 39	S.	
Neptune..	15 39	23 20	7 1*	3 46'6	18 7	18 7	N.	

\* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich).

Dec.	Star.	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image.	
					h. m.	h. m.
I ...	119 Tauri...	5½	16 28	17 18	65	248
I ...	120 Tauri...	6	17 0	17 46	38	272

Dec. h. m. Venus at greatest elongation from the Sun, 47° west.

Variable Stars.

Star.	R.A.		Decl.		h. m.
	h. m.	h. m.	h. m.	h. m.	
U Cephei ...	0 52'3	81 16	N.	Nov. 27,	1 27 m
				Dec. 2,	1 6 m
Algol ...	3 0'8	40 31	N.	Nov. 27,	5 57 m
λ Tauri...	3 54'4	12 10	N.	Nov. 29,	4 32 m
				Dec. 3,	3 25 m
U Monocerotis ...	7 25'4	9 33	S.	Nov. 27,	1 m
S Cancri ...	8 37'5	19 26	N.	Nov. 27,	0 41 m
S Boötis ...	14 19'3	54 20	N.	Nov. 29,	M
β Lyræ...	18 45'9	33 14	N.	Dec. 1,	22 0 M
R Lyræ ...	18 51'9	43 48	N.	Nov. 27,	1 M
η Aquilæ ...	19 46'7	0 43	N.	Nov. 27,	2 2 0 M
S Sagittæ ...	19 50'9	16 20	N.	Nov. 27,	1 5 0 m
δ Cephei ...	22 25'0	57 50	N.	Nov. 30,	0 0 m

M signifies maximum; m minimum.

Meteor-Showers.

	R.A.	Decl.	
Near λ Persei ...	6°	50° N.	Very swift.
α Can. Ven. ...	194	42° N.	Very swift; streaks.

GEOGRAPHICAL NOTES.

At the International Exhibition to be held at Brussels next year, a special Section will be devoted to topography, cosmography, geography, and the related sciences. The following are the classes of objects desired for contribution to the Section:—(1) Maps and atlases, topographical, geographical, geological, hydrographical, astronomical, &c.; (2) physical maps of all kinds, plans in relief, terrestrial and celestial globes and spheres; (3) statistical works and diagrams, tables and ephemerides for the use of astronomers and navigators; (4) general, historical, and classical works; (5) instruments, aide-memoires, and articles of equipment for explorers. Among the "desiderata" are the following:—(1) The best map of the Congo, showing the most recent discoveries; (2) the best national map of any country; (3) utilization of the sheets of a topographical map for the preparation of special maps on the same or a different scale; (4) the execution of relief-maps; (5) transference of relief to a plane surface; (6) construction of an apparatus suitable to demonstrate by experiments the various geographical features which may be presented by a river, such as torrents, lakes, cataracts, and rapids, erosions and alluvial accumulations, subterranean streams, islands, and backwaters, freezing and breaking up of ice, floods, deltas, bars, &c.; (7) construction of a tellurium; (8) portable equipment for an explorer; (9) statistical atlases and globes. The Secretary of the Section is Prof. Du Fief, 22 Rue des Palais, Brussels.

In the *Verhandlungen* of the Berlin Geographical Society, No. 8, Dr. Mense describes in some detail a journey up the Kwango, the great southern tributary of the Congo, which he made last December in company with the Rev. G. Grenfell. It contains a good deal of local information.

The November number of the *Alpine Journal* contains Mr. D. Freshfield's diary during his recent visit to the Caucasus, when he ascended some of the highest peaks, and visited some of the principal glaciers. The diary itself and the many excellent illustrations of the peaks and glaciers visited will be found to afford useful geographical information.

At the last meeting of the Paris Geographical Society, Dr. Verneau described the results of his recent missions to the Canary Islands. His special aim was to work out the ethnology of the islands, and for that purpose he has collected many skulls and bones from caves and graves, and made many observations on the present inhabitants. The Guanches he professes to recognize as the direct descendants of a people the type of which is exhibited in the famous prehistoric Cro-Magnon skull—the troglodytes of the Vézère. He maintains that about the end of the Quaternary there must have been a great migration of what he calls the "Cro-Magnon" race from the north to the south, and a section of the migrants found their way to the Canaries. After a lapse of time these were invaded by Numidians and Semites from the north of Africa, people of a superior type and more advanced culture to the Guanches, who were troglodytes. Dr. Verneau has made many collections of anthropological interest from the Canaries, and these are likely to be of much more service to science than his theories.