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

July.	Star.	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image.
			h. m.	h. m.	° °
31	*f* Tauri	4	23 44	0 22†	25 297
Aug.					
2	B.A.C. 1351	6½	2 20	3 6	112 205
2	63 Tauri	6	2 44	near approach	158 —
4	χ^3 Orionis	6	1 52	2 4	346 319
4	χ^4 Orionis	5	1 58	2 36	109 195

† Occurs on the following morning.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′			h. m.	
U Cephei	0 52·4	81 16	N.	July 30,	20 30	*m*
				Aug. 4,	20 9	*m*
Algol	3 0·9	40 31	N.	July 31,	2 24	*m*
				Aug. 2,	23 13	*m*
U Monocerotis	7 25·5	9 33	S.	,, 1,		*M*
U Canis Minoris	7 35·3	8 39	N.	July 31,		*m*
U Virginis	12 45·4	6 10	N.	Aug. 1,		*M*
R Hydræ	13 23·6	22 42	S.	,, 1,		*m*
δ Libræ	14 55·0	8 4	S.	,, 2,	23 52	*m*
U Coronæ	15 13·6	32 3	N.	,, 2,	4 0	*m*
U Ophiuchi	17 10·9	1 20	N.	July 29,	3 36	*m*
		and at intervals of			20 8	
W Sagittarii	17 57·9	29 35	S.	Aug. 1,	1 0	*m*
Z Sagittarii	18 14·8	18 55	S.	,, 4,	1 0	*M*
U Sagittarii	18 25·3	19 12	S.	July 30,	0 0	*M*
S Vulpeculæ	19 43·8	27 1	N.	Aug. 4,		*m*
η Aquilæ	19 46·8	0 43	N.	,, 2,	3 0	*M*
R Sagittæ	20 9·0	16 23	N.	,, 2,		*m*
X Cygni	20 39·0	35 11	N.	,, 4,	1 0	*m*
T Vulpeculæ	20 46·7	27 50	N.	,, 2,	2 0	*M*
				,, 3,	3 0	*m*
δ Cephei	22 25·0	57 51	N.	July 30,	2 0	*M*

M signifies maximum; *m* minimum.

Meteor-Showers.

	R.A. °	Decl. °		
Near δ Andromedæ	7	31	N.	Swift; streaks.
The *Perseids*	33	55	N.	Swift; streaks.
Near β Persei	48	42	N.	Very swift; streaks.
	350	52	N.	Very swift.

GEOGRAPHICAL NOTES.

THE *Mittheilungen* of the Vienna Geographical Society for June has a paper by Dr. Hans Meyer on the German East African possessions which is likely to attract some attention at the present juncture. No attempt is made to give either the area or the population of this ill-defined region, which, however, is stated to comprise the central section of the East African coastlands, terraces, and plateaux for a distance north and south of about 550 geographical miles, and 150 east and west between the Swaheli coast and the water-parting towards the Congo basin. It is conterminous towards the north with the new British East African protectorate, from which it is separated by a conventional line passing from Lake Victoria Nyanza in an oblique direction along the north foot of Mount Kilima-Njaro to the coast at about 5° S. lat. below Mombasa. Southwards the frontier is marked by the Rovuma River, and another conventional line running thence west to Lake Nyassa, while on the east side it is made to reach the Indian Ocean, thus apparently absorbing the ten mile zone of coastlands reserved to the Sultan of Zanzibar by the Anglo-German Convention of October 29, 1886. It is described as orographically and hydrographically the most diversified region in the whole of Africa, including within its limits the highest summit (Kilima-Njaro) as well as the head-waters of streams flowing north to the Nile, west to the Congo, and south to the Zambesi basin. Hence it presents a great variety of climate and vegetation, but nevertheless, except in a few favoured spots, it is not to be compared in productiveness with the rich tropical lands of the Eastern Archipelago. Its prospects as a future field of German colonial enterprise are spoken of in depressing terms. Both servile and free labour in the interior are stated to be alike impracticable, and for the present at least it will be impossible to develop any great commercial activity except on the fertile and more thickly-peopled, but also mostly fever-stricken coastlands. Hence a foundation for the future development of the colony is stated to have been laid by the recently-accomplished transfer of the administration of the seaboard from the Sultan of Zanzibar to the German East African Company's agents. But it is added that even here, without State aid, it will be difficult successfully to compete with their English rivals, who have been longer in possession of the field, and who have at their disposal more capital and resources of all kinds.

ELECTRICAL NOTES.

KUNDT (*Phil. Mag.*, July 1888) has determined experimentally that there exists a proportionality between the velocity of light, electric conductivity, and conduction of heat in metals. The velocity of red light is proportionately as follows—

Silver	100	Iron	14·9
Gold	71	Nickel	12·4
Copper (impure)	60	Bismuth (crystallized)	10·3
Platinum	15·3		

The order is the same for heat and electricity. These figures were obtained in each instance by determining the index of refraction of each metal, which is the ratio of the velocity of light *in vacuo* to its velocity in the metal. The actual indices obtained were, for red light—

Silver	0·27	Iron	1·81
Gold	0·38	Nickel	2·17
Copper	0·45	Bismuth	2·61
Platinum	1·76		

Thus the velocity of light in silver is ten times that in bismuth. How is the velocity of light affected by temperature? and how is it changed by a magnetic field? Kundt proposes to examine these points.

PROF. ELIHU THOMSON (U.S.A.) states that he has observed as many as six lightning-flashes very quickly following each other along the same path. He kept his head rapidly wagging during a thunderstorm, and his eyes fixed in one direction. Most people have experienced a peculiar throbbing during a flash of lightning; and a succession of rapid currents, sometimes forming letters, are observed on telegraphs. A lightning discharge may therefore have the same oscillatory character as the discharge of a Leyden jar. But no trace of such an effect is visible in the photographs of lightning-flashes unless it be the mysterious dark flashes that have been recorded.

CHAPERON AND MERCADIER (*Comptes rendus*, cvii., June 4, 1888) have shown that the periodic incidence of rays of light upon a cell of silver sulphide, H_2SO_4, and bright silver produces sounds in a telephone by the corresponding variations of E.M.F. They call the effect electro-chemical radiophony. The cell copper-oxide, sodium chloride, copper also forms an electro-chemical radiophone.

E. G. ACHESON (*Electrical World*, N.Y., July 7, 1888) has made some very useful measurements on the sparking distance in air of alternate currents used in electric light working. He finds that it varies with the capacity of the circuit and with the *cube of the E.M.F.* It is expressed by

$$d = \frac{E^3 K}{a},$$

d being the sparking distance in inches, E and K being in B.A. units, and a a constant = 135. Two thousand volts, with 0·0032 microfarad in circuit, sparked about 0·2 inch, and 1000 volts about 0·02 inch. These results are very different from those obtained by Warren De la Rue with his great battery, who found that with direct currents 1200 volts sparked across 0·012 inch and 2400 volts across 0·021 inch, but the capacity present is not given.

ANOTHER of Mr. H. Tomlinson's remarkable papers appears in the *Phil. Mag.* for July. The chief remarkability of these papers consists in their diffuseness. It is almost impossible to extract the new facts out of them. His terms are peculiar. What is "the specific heat of electricity" which changes sign at varying temperatures? The conclusion of this long paper appears to be that the temperature at which permanent magnetism begins to suddenly disappear is not the temperature at which permanent torsion begins to suddenly disappear. We find the mechanical qualities, viz. hardness, elasticity, linear expansion, internal friction, tensile strength, molecular structure, torsion, &c., of iron, steel, and nickel inextricably mixed up with magnetic susceptibility and retentiveness, electric resistance and thermo-electric conditions, specific and latent heat, and varying temperatures.