At Greenwich on July 28

Sun rises, 4h. 20m. ; souths, 12h. 6m. 14·0s. ; daily decrease of southing, 1·3s. ; sets, 19h. 53m. : right asc. on meridian, 8h. 31·6m. ; decl. 18° 54′ N. Sidereal Time at Sunset, 16h. 20m.

Moon (New on July 28, 0h.) rises, 4h. 27m. ; souths, 12h. 33m. ; sets, 20h. 28m. : right asc. on meridian, 8h. 58·4m. ; decl. 19° 51′ N.

Planet.	Rises. h. m.	Souths. h. m.	Sets. h. m.	Right asc. and declination on meridian. h. m.	° ′
Mercury..	3 13 ...	11 19 ...	19 25 ...	7 44·6 ...	22 4 N.
Venus ...	1 1 ...	8 56 ...	16 51 ...	5 20·5 ...	20 20 N.
Mars ...	3 10 ...	11 18 ...	19 26 ...	7 43·1 ...	22 20 N.
Jupiter ...	17 38 ...	21 31 ...	1 24*...	17 58·1 ...	23 22 S.
Saturn ...	5 46 ...	13 11 ...	20 36 ...	9 36·7 ...	15 27 N.
Uranus ...	11 12 ...	16 42 ...	22 12 ...	13 8·6 ...	6 38 S.
Neptune..	23 56*...	7 45 ...	15 34 ...	4 9·8 ...	19 23 N.

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

July.	h.	
28 ...	5 ...	Mercury in conjunction with and 0° 14′ south of Mars.
28 ...	20 ...	Mercury at least distance from the Sun.
29 ...	7 ...	Saturn in conjunction with and 2° 16′ south of the Moon.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′		h. m.	
Algol	3 1·0 ...	40 32 N. ...	Aug. 2,	1 50	*m*
R Ursæ Majoris ...	10 36·8 ...	69 22 N. ...	,, 3,		*M*
W Virginis	13 20·3 ...	2 48 S. ...	July 31,	22 0	*m*
X Boötis	14 19·0 ...	16 50 N. ...	Aug. 2,		*M*
R Camelopardalis.	14 26·0 ...	84 20 N. ...	July 31,		*M*
δ Libræ	14 55·1 ...	8 5 S. ...	Aug. 1,	2 32	*m*
U Coronæ	15 13·7 ...	32 3 N. ...	,, 3,	0 20	*m*
U Ophiuchi... ...	17 10·9 ...	1 20 N. ...	July 28,	23 17	*m*
			Aug. 3,	0 2	*m*
X Sagittarii... ...	17 40·6 ...	27 47 S. ...	July 28,	23 0	*M*
			Aug. 2,	3 0	*m*
U Sagittarii... ...	18 25·6 ...	19 12 S. ...	July 29,	0 0	*M*
U Aquilæ	19 23·4 ...	7 16 S. ...	,, 31,	22 0	*m*
η Aquilæ	19 46·8 ...	0 43 N. ...	Aug. 3,	3 0	*M*
T Vulpeculæ ...	20 46·8 ...	27 50 N. ...	July 31,	22 0	*M*
δ Cephei	22 25·1 ...	57 51 N. ...	,, 30,	0 0	*M*

M **signifies maximum;** ***m*** **minimum.**

Meteor-Showers.

	R.A.	Decl.	
Near δ Andromedæ ...	8 ...	32 N. ...	Swift ; streaks.
,, δ Cassiopeiæ	20 ...	58 N. ...	,, ,,
The *Perseids*	33 ...	55 N. ...	,, ,,
The *Aquarids*	340 ...	13 S. ...	Max. July 28.

GEOGRAPHICAL NOTES.

AN expedition is about to start for the exploration of Central Australia. Baron von Müller is interesting himself in the expedition, which will be under the command of the experienced explorer, Mr. Tietkens, who will also look specially after the botany and mineralogy. The point of departure will be Alice Springs, on the central telegraph line, and the country round Lake Amadeus will be carefully examined.

IT is reported from Brisbane, according to the *Colonies and India*, that the Queensland Government has concluded an agreement with Mr. A. Weston to lead an exploring party into the almost untrodden recesses of the northern portion of the colony, with a view to bringing to light scientific treasures supposed to be hidden there. Mr. Weston has accepted the undivided responsibility of leadership. Messrs. Broadbent and Bailey will be associated with him, and will respectively discharge the duties of collecting fauna and flora. The party will explore the region lying to the north-west of Cairns, including the Bellenden Ker Range and the shores of the volcanic lakes. It is also thought that something may be heard of Leichardt's expedition, traces of which are popularly supposed to be yet found in the back country. Mr. Weston has refused to accept any pecuniary assistance from the Government for his services.

M. A. DELCOMMUNE, who has been exploring several of the affluents of the Upper Congo, has arrived in Brussels. He has brought with him a valuable collection of African products, and some 200 views on the Upper Congo.

THE news that Dr. Macgregor, the Administrator of British New Guinea, has reached the summit of the Owen Stanley Range is of much interest. Since Captain Owen Stanley discovered the range, about forty-five years ago, various explorers have attempted to scale it, but all have failed. The summit reached by Dr. Macgregor is over 13,000 feet, and he reports several peaks almost equal in height. As Dr. Macgregor is a good botanist, his journey is likely to yield valuable scientific results.

DR. ALFRED HETTNER, in a communication to the *Verhandlungen* of the Berlin Geographical Society (No. 6, 1889), on his travels in Peru and Bolivia, gives the results of his observations on Lake Titicaca, which are of some interest. The surface of the lake, he states, has in the course of time been subject to great changes of level. The proof of these changes is to be found in the terraces around the lake. In a comparatively recent geological period, Dr. Hettner believes, the level of the lake must have been 20 metres higher than it is to-day, and the lake must have spread over the great part of the plain which now incloses it, perhaps as far as Lake Poopo. At a still earlier period the level of the lake must have been 200 metres above its present level, but between these stages, as many appearances indicate, the lake must have sunk below that level. The highest position of the lake-level is older than the glaciation of the district, and contemporaneous with a period of strong volcanic activity. The 20-metre high terraces may belong to the ice-period. For the idea of a former submersion below the sea Dr. Hettner can find no support ; at the same time, he cannot altogether deny the possibility that at the time of the 200-metre terrace the lake may have had some connection with the ocean.

NITRATE OF SODA, AND THE NITRATE COUNTRY.[1]

II.

WE will now consider the structure of the actual nitrate beds. As before mentioned, there is no nitrate under the flat Pampa ; but exactly where the first slopes of the coast range spring out of the plain, there nitrate is found at a small but variable distance below the surface. The width of the belt varies with the slope of the hill, being greatest where the slope is least, and the vertical height of the highest part of the bed appears to vary from 100 to 120 feet above the plain. It is, however, most important to notice that *the beds of nitrate follow the slope of the Pampa, and not a level line.* For instance, the northern extremity of the Pampa is some hundreds of feet higher than the southern portion, but the nitrate beds follow the spring of the hill from the plain, throughout their whole extent.

A very different sequence of beds lies under the slope of the hills from those alternating layers of mud, sand, and gravel which are found under the level Pampa. The surface covering of loose dust and small stones, extending to a depth of only a few inches, is locally known as *chuca* (see Fig. 3). This seems to be a native word, but I have been unable to ascertain its meaning. Below the *chuca* comes a very hard layer of earth and stones, almost compacted into rock, from 1 to 2 feet thick, which is called *costra* (Span. crust). Under this lies the *caliche*, or true nitrate deposit. This is a bed of from 1 to 3 feet thick, usually of a whitish crystalline structure, containing from 20 to 50 per cent. of nitrate of soda, with a residuum made up chiefly of common salt and earthy matter. *Caliche* is an Indian word, and may possibly come from the Aymara word *callachi*, a shell, or skull.

Passing through the *caliche*, a hard layer of stones and earth, compacted with salt crystals, is usually encountered. The Spanish workmen call this "*congelo*," because it is congealed or concreted by the salt.

After a foot or so of this, there comes finally a bed of soft, loose, *sweet* earth, containing a few very small loose stones, known as *cova*. I could not discover the signification of this word ; but the whole method of working a nitrate bed turns round the properties of the *cova*.

A workman, with three or four chisel-pointed bars of iron, hence called a *barretero*, stands on the surface of the ground, and chips out a round hole, about a foot in diameter, down to the level of the *cova*. This hole is called a *tiro*, or charge for

[1] Continued from p. 188.