

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 APRIL 4-10

(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 April 4

Sun rises, 5h. 30m.; souths, 12h. 3m. 0'os.; sets, 18h. 36m.; decl. on meridian, 5° 46' N.; Sidereal Time at Sunset, 7h. 28m.
Moon (New) rises, 5h. 43m.; souths, 12h. 2m.; sets, 18h. 32m.; decl. on meridian, 3° 6' N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	5 23	12 27	19 31	11 37 N.
Venus ...	3 59	9 20	14 41	8 20 S.
Mars ...	14 40	21 46	4 52*	11 56 N.
Jupiter ...	16 54	23 7	5 20*	1 44 N.
Saturn ...	9 7	17 19	1 31*	22 50 N.

* Indicates that the setting is that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich)

April	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
			h. m.	h. m.	
8 ...	Aldebaran ...	I	17 8	17 54	175 257
9 ...	130 Tauri... ..	6	23 49	0 21†	175 251
10 ...	26 Geminorum... ..	5½	22 25	23 18	143 285

† Occurs on the following morning.

Saturn, April 4.—Outer major axis of outer ring = 40"·9
outer minor axis of outer ring = 18"·3; southern surface visible.

April 9 ... 4 ... Mercury in inferior conjunction with the Sun.

Variable-Stars

Star	R.A.	Decl.	h.	m.
	h. m.	°		
Algol	3 0·8	40 31 N.	Apr. 10,	2 49 m
T Canis Minoris	7 27·7	11 59 N.	...	9, M
S Cancri	8 37·4	19 27 N.	...	5, 0 25 m
T Virginis	12 8·8	5 24 S.	...	4, M
R Virginis	12 32·7	7 37 N.	...	10, M
W Virginis	13 20·2	2 47 S.	...	9, 19 10 m
δ Libræ	14 54·9	8 4 S.	...	4, 4 44 m
				8, 20 26 m
U Coronæ	15 13·6	32 4 N.	...	5, 21 54 m
S Coronæ	15 16·8	31 47 N.	...	10, M
U Ophiuchi	17 10·8	1 20 N.	...	4, 2 19 m
		and at intervals of	20 8	
X Sagittarii... ..	17 40·4	27 47 S.	Apr. 7,	2 30 m
			10,	0 0 M
U Sagittarii	18 25·2	19 12 S.	...	5, 21 40 m
			...	8, 21 30 M
β Lyræ	18 45·9	33 14 N.	...	4, 2 20 M
S Vulpeculæ	19 43·7	27 0 N.	...	8, M
η Aquilæ	19 46·7	0 7 N.	...	5, 21 30 m
δ Cephei	22 24·9	57 50 N.	...	4, 4 50 M
			...	7, 21 40 m

M signifies maximum; m minimum.

Stars with Remarkable Spectra

Name of Star	R.A. 1886°	Decl. 1886°	Type of spectrum
	h. m. s.	°	
D.M. - 0° No. 2668 ...	13 6 55	1 9·2 S.	III.
D.M. + 47° No. 2053 ...	13 18 13	47 35·8 N.	III.
R Hydræ	13 23 29	22 41·4 S.	III.
83 Ursæ Majoris ...	13 36 25	55 15·5 N.	III.
ι Draconis	13 48 6	65 17·2 N.	III.
D.M. + 38° No. 2501 ...	13 55 31	38 25·5 N.	III.
D.M. + 44° No. 2325 ...	14 3 22	44 23·8 N.	III.
169 Schjellerup	14 19 4	26 13·4 N.	III.
V Bootis... ..	14 25 10	39 22·1 N.	III.
R Bootis... ..	14 32 10	27 13·9 N.	III.
LL. 26918	14 40 23	15 36·6 N.	III.
342 Birmingham	14 55 46	66 23·2 N.	III.

BIOLOGICAL NOTES

CRAYFISH.—The Museum of Comparative Anatomy at Harvard having an uncommonly rich collection of the genera and species of the family Astacidae, Mr. Faxon presents us with a revision of the group, which falls little short of being a well-illustrated monograph. In the first part, which has just reached us, we find the crayfishes of the northern hemisphere treated of, and in a second part the author promises to write of those of the southern hemisphere. As will be known to all readers of Huxley's work, "The Crayfish," the family Astacidae (which in a strict sense is equivalent to the genus Astacus, as limited by Milne-Edwards) falls naturally into two subordinate groups. These groups of Huxley's Faxon makes into sub-families: (1) the Potamobiinae, comprising the crayfishes of Europe, Asia, and North America; and (2) the Parastacinae, comprising those of the southern hemisphere, viz. those of South America, Fiji Islands, New Zealand, Tasmania, Australia, and Madagascar. The Potamobiinae are treated of in this memoir, and include the genera Astacus and Cambarus. The Parastacinae will be treated of in a second memoir. Of the genus Cambarus, established by Erichson in 1846, fifty-two species are accepted by Faxon, and all of these except one are American forms, ranging from Lake Winnipeg to Cuba and Guatemala, from New Brunswick to Wyoming Territory (in Mexico to the Pacific Ocean). The genus Cambarus would not seem to have been developed under the influences affecting cavern life, though several cave and blind species are known, and in Europe it would appear that one solitary species still lingers in the underground waters of some of the Carniola caves. It seems strange that on so interesting a question any doubt should remain, and yet it is true that, except a short notice in the Berlin *Entomologische Zeitschrift*, by Dr. G. Joseph, of a specimen of a crayfish referred to Cambarus, and labelled, as found, "Aus der Grotte von St. Kanzian bei Metaun," we know nothing of this interesting form, which must, if the determination is correct, be taken as an indication that at one time species of Cambarus inhabited the European rivers. Of the genus Astacus fourteen species are given. These occupy three widely-separated geographical areas: (1) Western North America, from the Rocky Mountains to the Pacific Ocean; (2) the western portion of the Europeo-Asiatic continent from the Ural Mountains and the basin of the Sea of Aral to the Spanish peninsula and (?) Ireland; (3) Eastern Asia, in the Amoor River system, and in Japan. No Astaci are known from any part of Siberia between Lake Baikal and the Urals, or from any of the Siberian rivers flowing into the Arctic Ocean. To this memoir an interesting note on the fossil forms referred to Astacidae and a table showing the geographical distribution, as far as has been ascertained, of the species of Cambarus and Astacus are appended.—["A Revision of the Astacidae," by Walter Faxon. Part I. "The Genera Cambarus and Astacus" (with ten plates). Cambridge, for the Harvard Museum, August, 1885 (being vol. x. No. 4, of the *Memoirs of the Museum of Comparative Anatomy*).]

HABITS OF THE CUCKOO.—However well known may be this summer visitant of ours, there are still few points in its strange life-history that have been well worked out. Even an ornithologist will hesitate to say whether it is the male or female bird which utters the familiar cry, or will be able to say when the young bird moults. In Mr. Henry Seebohm's important and just-published "History of British Birds" we find that the strongest doubts are thrown on the statements that the young cuckoo, soon after it is hatched, ejects the young or eggs of its foster-parents from the nests. "One feels inclined," we read, "to class these narratives with the equally well authenticated stories of ghosts and apparitions," and this, too, though these narratives are from the pens of such accurate observers as Montagu, Jenner, and others. It is therefore not without interest that we find, from a series of observations made with every precaution as to their accuracy by Mr. John Hancock (*Nat. Hist. Trans.*, Northumberland, Durham, and Newcastle-on-Tyne, vol. viii., 1886), that the observations of the older writers were exact. The nest of a hedge-accentor, built in a convenient spot for observation, was found, on January 17, 1884, to contain four eggs of the accentor and one cuckoo's egg. On the 27th the cuckoo's egg and two eggs of the accentor were hatched. On the 28th the "murder" began with an attempt on the part of the cuckoo to put out of the nest one of the unhatched eggs. At 10.30 a.m. on the same day the egg was successfully thrown out. Getting more perfect

with practice, about half an hour later one of the young accentors was ejected: strange to say, its mother was present, and looked on quite calmly, but the desperate efforts of the young murderer seemed for the time to exhaust it, so that it was not until 1 p.m. that it returned to the work and pushed out the second egg, and then tried to put out the remaining accentor. This at 3.30 was done, and the cuckoo remained sole occupant. No wonder Mr. Hancock writes:—"The cuckoo's proceeding, as I saw it, is, in my opinion, the most wonderful and unaccountable piece of business that I ever witnessed in bird life." Some of our readers may like to learn that one of the unfortunate young accentors was placed in a whitethroat's nest, where there were four young ones about its own age, and that it was properly attended to by its foster-parents, whereas the young cuckoo was, after a week's short existence, found dead, apparently of sunstroke, at the bottom of its nest.

THE TORTURE OF THE FISH-HAWK.—While the facts above recorded about the cuckoo are wonderful, and, from a human standpoint, perhaps cruel, they would seem to be surpassed in both respects by those recently recorded about the fish-hawk of Southern Florida by a well-known observer, J. Lancaster (*American Naturalist*, March 1886). The distribution of land and water on the Gulf coast of Florida is very favourable to the existence of fish, and the flats and creeks swarm with life. Birds subsisting on fish diet also abound. Long lines of pelicans can be seen on every hand; armies of cranes stalk about; fish-hawks abound. These latter are arboreal in their habits, nesting in the tops of the pine-trees, and rarely resting on the ground. For the most part they fish in the secluded creeks and inlets, hovering over the water and capturing their prey by suddenly diving upon it; but sometimes they fish in the open waters. While large, active-winged birds, they never soar. On first acquaintance their actions seemed inexplicable: while in the hidden creeks they uttered no cry and seemed to be masters of the gentle art; but in the open, allured thereto by a school of mullet, at the moment when they would seem eager for action and all alive with expectation, just as they might be swooping on a fish, they would emit a discordant, frightened scream, and make for the shore with a haste so ill-advised as to seriously impede their progress. The shelter of the trees gained, the terror would subside. Desire for food would tempt the bird once more out, and again and again the same frantic performance was to be witnessed. The reason was soon made evident. A fine specimen of the fish-hawk swooped on a fish, which soon left its element and swung aloft in the bird's talons. The hawk began its homeward journey. But now a new-comer appeared on the scene. A black creature, which seemed all wings, dropped from above and confronted the hawk, which at once let go its prey and uttered a scream so brimful of mortal terror as to excite one's pity. The hawk was not struck, and it made off with wild haste for shore. The intruder was a frigate-bird, which seized the dropped fish in its beak long ere the prey reached the water, and then with a sweep of exquisite grace, on tense wings, fronting a mild breeze, the corsair was lifted half a mile into the air. A bite was taken from the fish by a wringing motion of the bird's head, which sent the carcass whirling. The morsel being swallowed, the bird, folding its wings tightly on its body, dropped swiftly after the fish, seized it, again swept upwards, and then the performance was repeated till the meal was over. In a personal contest for superiority on the ground of physical strength the frigate-bird, with its small legs and feet and its head and beak not stronger than the fish-hawk's, was no match for the latter; but sometimes the fish-hawk does not play its part as capturer of the prey desired by the frigate-bird, and several of these latter combine to cut off its retreat landwards, swoop about it until the unfortunate victim loses its power of screaming, then of flight; down it falls at last exhausted into the waters of the Gulf; the demon birds still pursue it; with their miserable, puny feet they alight on it, and push it beneath the surface, continuing in one case to do this for over an hour, until the bird was dead. When the hawks captured fish they were not so treated—they were robbed, not killed. It would seem as if the existence of the fish-hawk as a species depended on their understanding this, and that now and then those that did not understand lost their lives in the struggle.

THE SENSIBILITY AND MOVEMENTS OF PLANTS.—To the last number of the *Bulletin de l'Académie Royale de Belgique*, the late Prof. Morren contributes a valuable memoir on the sensibility and movements of plants, in which he further develops

Darwin's well-known theory, and attempts to establish a complete synthesis of the animal and vegetable kingdoms. It is argued that the law of sensation producing motion dominates all the biological sciences, that plants are sensible to the influences of the environment, and not only move, but are able to co-ordinate their movements. All the phenomena of motion are referred in ultimate analysis to protoplasm, a living substance common alike to plants and animals, and whose general and essential characteristics are precisely the power of sensation and movement. It has the faculty of receiving external agencies, and of moving *proprio motu*. It stirs, therefore it lives! And this is equally true of all organisms from man to the microbe and the plant. Life might be defined as the activity of protoplasm, although this is a substance whose true nature is still unknown, of whose texture we are ignorant, and whose activity is a property, the mechanism of which has not yet been discovered.

HEREDITY.—The same *Bulletin* contains an equally interesting paper by M. Ch. Van Bambeke, on heredity, in which the theories of Darwin, Haeckel, Nägeli, Pflüger, and others are subjected to a searching criticism. Both pangenesis and plastidulperigenesis are rejected, as inadequate to explain all the phenomena of heredity, which, it is argued, can be accounted for only by supposing that the germ, Weismann's *Keimplasma*, is in fact continuous. It is not to be regarded as the final outcome of the ontogenesis of each individual, but passes from parent to offspring directly, being from the first present in an unmodified form in a large number, possibly in all the somatic cells. The germinative plasma persists through certain cellular series, concentrating itself anew in the embryonic cells of the new organism. In a word, in the phylogenetic development of the organisms the germ, whose true seat has now been determined, is perpetuated throughout the whole series of successive ontogenies. The generations succeed and efface each other; the *Keimplasma* alone is immortal.

GEOGRAPHICAL NOTES

THE progress of drying up of the steppes around the Caspian Sea is steadily going on. Thus we learn from a recent communication by M. Krasnoff to the Geographical Society that the series of the Sarpinsk lakes in the eastern part of the Kalmuck steppes, close to the Ergheni hills, are rapidly disappearing; the lakes Chilguir and Keke-tzun have quite disappeared in the course of the last year.

GENERAL TILLO publishes in the last issue of the *Izvestia* of the Russian Geographical Society the results of new exact levellings made in order to ascertain the heights above the sea of Lakes Ladoga, Onega, and Ilmen. Their respective heights above the average level of the Gulf of Finland appear to be only 16, 115, and 59 feet, with a probable error not exceeding 1.5 feet. The formerly accepted heights were 59, 237, and 157 feet.

A VERY interesting paper on the irrigation of the oases of Merv and Akhal-Tekke was recently read by M. Pokrovski-Kozel at St. Petersburg, before the Society for the Assistance of Russian Trade and Commerce, Count Ignatieff being in the chair. The lecturer considers the Merv oasis as one of the most fertile spots on the earth. Wheat, rice, and other cereals cultivated by natives for home consumption yield beautiful crops. The oasis includes about 900,000 acres of cultivable land. But, in order to cultivate them, it would be necessary to colonise the oasis with civilised pioneers, and to spend about 120,000*l.* on the restoration and extension of the splendid system of canals built up by the Arabs a thousand years ago, and preserved until now in some parts, as, for instance, at the mouth of the River Murhab, about 50 miles from Merv. These canals are 14 feet deep and 70 feet wide, and partly used even now by the Merv Turcomans for the irrigation of their fields, though in a primitive manner. The Akhal-Tekke oasis is not so rich as that of Merv, but still it has about 900,000 acres of land suitable for culture. It covers the space of 7 miles along the railway line from Mikhailovsk Bay to Khizil Arvat, and could be irrigated by the water from the River Tejen.

THE Imperial Russian Geographical Society has decided in its Natural Science Section, to organise during the current year another expedition to Central Asia, in order to investigate the mountain district of Khan-Tengri, which has never yet been explored by any of the European travellers in Central Asia.