

antiquarians abroad with data for comparing the stone implements of Japan with those found elsewhere. In a short treatise of eight pages he describes the beliefs universally current in Japan on the subject of these remains. Dividing stone implements into "chipped" and "polished," he mentions four varieties of the former, which, translating the original Japanese names, he calls arrow-heads, spear-heads, rice-spoons of the mountain gnomes, and pound-stones—the last being really hoe-heads. The three first are known all over Japan, but become more and more numerous as one approaches the north. They are supposed to have been used by the Ainos. Of the "polished" stone implements there are six principal varieties, vulgarly known as thunder-bolts, thunder-clubs, stone daggers, and dagger-heads, *magatama* and *kudatama*, or curve and tube-shaped jewels. The thunder-bolts, so called, are evidently axe-heads; they are found everywhere, but chiefly in the north. The "thunder-clubs" are beautifully ornamented, while their shape and size—occasionally they are found as much as five feet long and five inches in diameter—suggest the idea that they served as insignia of authority rather than as weapons of war. The prehistoric pottery, is Kamloka pottery, from the name of the locality in Northern Japan where it was first discovered. Like the stone implements, it occurs with greater frequency the farther north we go. The general conclusion is thus suggested that the aborigines of Japan were gradually pushed northward by invaders from the south, but where the distinction is to be drawn between the races known as Tsuchigamo, Yezzo, and Aino is a question for future determination. No metal implements have ever been found with this pottery, whereas it is constantly associated with all the stone implements enumerated above. In the ancient tombs, which exist everywhere throughout Japan except in Yezzo, there are unearthed several varieties of stone implements, and with them occur metal implements, together with a species of pottery known as *Giogi* ware, after a priest of that name who came to Japan from Corea in the eighth century, and who is supposed to have introduced the potter's wheel. The name is doubtless improperly applied to the ware found in the ancient tombs, for in court relics now preserved and dating back to the eighth century there is ware incomparably superior to this so-called *Giogi* ware, which should therefore probably be referred to a period much more remote. The stone implements found in these tombs are for the most part of an ornamental character, though some may have served for agricultural purposes. The former include the *magatama*, or "curved jewels" which were used as pendants. Some of them are of nephrite and chryso-prase, minerals never yet found in Japan, so that these ornaments must have been brought over from the Asiatic continent. Mr. Kanda thinks that the ancestors of the present Japanese, when they arrived in Japan, brought with them from their old home metal implements which, not being sufficient for all, were appropriated by the privileged few, the majority of the people going back to stone implements. This curious theory would explain the circumstance that many of the thunder-clubs already mentioned are so beautifully ornamented as to indicate, almost with certainty, the use of metal chisels; but archæologists will probably prefer leaving this circumstance unexplained to adopting so violent an explanation.

WE have received the *Proceedings* of the Windsor and Eton Scientific Society for 1884, with the Society's diary and the presidential addresses since its formation in 1881. One naturally looks in the *Proceedings* of this and similar societies to the local work—the papers with some of the *locus in quo* in them—rather than to the more general papers read and lectures delivered. We find more than one instructive communication on the subject of the old Roman town of Silchester, near Reading; a paper on the trees of Windsor Forest, by Dr. Gee; whilst amongst the papers read during the four years, but not printed, we notice one

on some bronze implements found in the Thames near Windsor, on carnivorous plants found in the same neighbourhood, and on recent explorations of a tumulus at Taplow. The Society, which does all its interesting work on a subscription of five shillings from each member, is affiliated with the Albert Institute of Windsor, and was formed in consequence of the success of an exhibition of microscopes and other scientific objects which formed one of the fortnightly entertainments provided by this institute.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♂) from India, presented by Mr. F. J. Edmonds; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, deposited; two Great Kangaroos (*Macropus giganteus* ♂ ♀), eight Silky Bower-birds (*Ptilonorhynchus violaceus*) from New South Wales; two Red Kangaroos (*Macropus rufus* ♂ ♀) from Australia; two Bennett's Wallaby (*Halmaturus bennetti* ♂ ♀) from Tasmania; a Roan Kangaroo (*Macropus erubescens*), two — Wombats (*Phascolomys* —) from South Australia, received in exchange; two Sumatran Rhinoceros (*Rhinoceros sumatrensis* ♂ ♀); a Rufous-tailed Pheasant (*Euplocamus erythrophthalmus* ♀) from Malacca; a Bar-tailed Pheasant (*Phasianus reevesi* ♀) from North China; two Peacock Pheasants (*Polyplectron chinquis*) from British Burmah; a Silver Pheasant (*Euplocamus nycthemerus* ♀) from China, a Cooi Heron (*Ardea cooi*) from America, purchased; a Bonnet Monkey (*Macacus sinicus*), a Black Lemur (*Lemur macaco*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

ANCIENT OCCULTATIONS OF ALDEBARAN.—IN NATURE, vol. xxxi. p. 182, reference was made to an occultation of Aldebaran which Bullialdus found recorded in a Greek manuscript, and which it had been supposed was observed at Athens on March 11, A.D. 509. The extract from the manuscript is given at p. 172 of the well-known work of Bullialdus, "Astronomia Philolaica." The observation is perhaps mentioned in somewhat undecided terms, inasmuch as it is rather implied that after twilight had ended the moon seemed to have occulted the star; nevertheless we have its position described as close to the moon at the time of observation; and further: "Stella quippe apposita erat parti, per quam bisecatur limbus Lunæ illuminatus." If we remember rightly, Street, amongst others, has pointed out that the occultation itself could not have been seen at Athens, but must have been observed at some more eastern station. The following are results of a recent computation in which the moon's place has been determined on the same elements which closely represent the occultations observed in China B.C. 69, February 14, and A.D. 361, March 20, referring to the planets Mars and Venus respectively, as well as other phenomena recorded previous to the fourth century.

A.D. 509, March 11, at 2h. 30m. Paris mean time.

Moon's right ascension	...	...	...	48	11	23
" declination	...	...	...	+12	55	46
Hourly motion in R.A.	...	...	...	30	15	
" " Decl.	...	...	...	+7	12	

The position of Aldebaran was in R.A. 48° 10' 16", Decl. +12° 29' 29". The sidereal time at mean noon at Athens was 23h. 22m. 11s. Hence, calculating for Athens, we find the star disappeared at 3h. 7m., and re-appeared at 4h. 37m. local mean time; the sun set at 6h. 6m., so that the occultation occurred in broad daylight, and "post accensas lucernas" there would be a considerable distance between the moon and the star, as seen at Athens.

By way of testing the moon's place here employed, we may examine the circumstances of another occultation of Aldebaran, which Gaubil extracted from the Chinese historical works, and thus describes:—"In the ninth year (period *Yung-ming*), third moon, day *ping-chin*, the moon eclipsed Aldebaran;" this occurs in the records of the "Dynastie des *Tsi* du sud, la cour à Nanking." Gaubil gives the date March 29, A.D. 491 Proceeding as before we have for

A.D. 491, March 29, at 1h. 30m. Paris mean time

Moon's right ascension...	48° 35' 53"
" declination	+12° 53' 1"
Hourly motion in R.A.	29' 44"
" in Decl.	+7' 39"

The position of Aldebaran was in R.A. 47° 50' 44", Decl. +12° 10' 15". The sidereal time at mean noon at Nankin was oh. 29m. 36s., and, calculating for that place, we find the star disappeared at 9h. 2m. local mean time, and would set at 9h. 14m., so that its altitude at disappearance was only 2° 3'. Whence, assuming the accuracy of these computations, it is clear that the occultation could not have been seen as recorded at Nankin, if the moon's place about the epoch to which they refer were sensibly behind that deduced, so as to render possible an observation in twilight at Athens of the occultation of March 11, 509.

This result for the circumstances of disappearance of Aldebaran at Nankin in 491 reminds us of a similar observation made in London on the occultation of the same star, September 14, 1717, probably from the roof of the Royal Society's house in Crane Court, Fleet Street, whence, we are told, on the occasion of the total solar eclipse in 1715 there was a free horizon. "On the 14th of September, in the evening, for the first time the moon returned after a long interval to hide *Palilicium*; and the sky was extraordinarily clear at London, so that the moon and the star were seen to rise in the horizon at the same time; the immersion of *Palilicium* was at 9h. 6m. 20s., the moon not being 3' high, in the very middle, as it were, of the eastern limb, over against the northern part of that small *macula* which Hevelius called *Stagnum Meridis*, and Ricciolus by his own name . . ."

BARNARD'S COMET.—A new computation of the orbit of this comet, by Mr. Egbert, of the Dudley Observatory, Albany, U.S., confirms that of Dr. Berberich, as regards the close approach which the comet makes to the orbit of Mars. At a true anomaly of 37° 35', corresponding to heliocentric longitude 343° 52' (equinox of 1884), the distance is within 0.008, the earth's mean distance from the sun being taken as unity, and a very close approach of the two bodies may have taken place, as before remarked, at the end of the year 1873. Dr. Berberich's period of revolution is 1958.9 days, that of Mr. Egbert 1970.3 days, an increase of only ten days on the latter period would suffice to have brought the comet and planet together in December 1873. The latest observation made by M. Perrotui, at Nice, in November, 1884, has not yet been brought to bear upon the direct calculation of the orbit, though Dr. Berberich's comparison of his elements therewith shows but small difference between calculation and observation. Barnard's comet does not quite attain to the orbit of Jupiter, the distance at aphelion being 0.555.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, APRIL 12-18

(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 12

Sun rises, 5h. 12m.; souths, 12h. 0m. 41.7s.; sets, 18h. 51m.; decl. on meridian, 8° 51' N.; Sidereal Time at Sunset, 8h. 15m.

Moon (New on April 15) rises, 4h. 2m.; souths, 9h. 47m.; sets, 15h. 43m.; decl. on meridian, 3° 38' S.

Planet	Rises		Souths		Sets		Decl. on meridian
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
Mercury ...	5 27	...	13 7	...	20 47	...	18° 0' N.
Venus ...	5 10	...	11 41	...	18 12	...	5 26 N.
Mars ...	4 55	...	11 15	...	17 35	...	3 13 N.
Jupiter ...	13 13	...	20 30	...	3 47*	...	14 1 N.
Saturn ...	7 46	...	15 52	...	23 58	...	21 59 N.

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

Phenomena of Jupiter's Satellites

April	h. m.		April	h. m.	
	h. m.	h. m.		h. m.	h. m.
12 ...	2 1	I. occ. disap.	14 ...	22 43	III. occ. disap.
	23 22	I. tr. ing.	15 ...	2 22	III. occ. reap.
13 ...	1 41	I. tr. egr.		3 13	III. ecl. disap.
	20 29	I. occ. disap.	16 ...	0 0	II. occ. disap.
	23 50	I. ecl. reap.	17 ...	21 2	II. tr. egr.
14 ...	20 9	I. tr. egr.	18 ...	23 35	IV. tr. egr.

The Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

April	h.	...	h.	...
14 ...	6	...	Mars in conjunction with and 0° 12' south of the Moon.	
14 ...	20	...	Venus in conjunction with and 0° 6' north of the Moon.	
16 ...	7	...	Mercury in conjunction with and 6° 21' north of the Moon.	
17 ...	20	...	Mercury stationary.	

GEOGRAPHICAL NOTES

THE Pescadores, which have recently been bombarded and occupied by Admiral Courbet, are a small group of islands lying in the Formosa Channel, about twenty-five miles off the west coast of Formosa. They are attached for administrative purposes to that island, and form one of the six districts into which it is divided. The islands are known to the Chinese as the Panghuting, or district of Panghu, and in Chinese geographical works more than thirty distinct islands are mentioned, but no distinction is made between the inhabited and uninhabited, large and small islands, nor between islands and mere rocks and shoals. The largest of the group is called Panghu, and from it the archipelago has doubtless derived its name. The main island is forty-eight miles in circumference, and the next in size, called Fisher's or West Island, is seventeen. According to the late Admiral Collinson, who surveyed it in 1845, the want of trees, which the Chinese officers accounted for by the violence of the wind and the absence of sheltered valleys, give the islands a barren appearance. Millet is extensively cultivated, and between its rows the ground-nut is planted. In sheltered spots the sweet potato and a few vegetables are grown, but the inhabitants depend mainly on Formosa for vegetables and fruits. Bullocks and poultry were abundant. The population of the two larger islands was stated then to be 5000, and of the whole of the islands 8000. The archipelago contains actually twenty-one inhabited islands, besides several rocks. They extend from 23° 13' to 23° 48' N. lat., and from 119° 16' to 119° 37' E. long. Their general appearance is flat, the summits of many of the islands being nearly level, and no part of the group being 300 feet above the sea-level. The two larger islands are situated near the centre of the archipelago, forming an extensive and excellent harbour between them. The capital of the whole—Makung or Macon—is situated on the north side of an inlet on the main island. The islands offer shelter in all states of the weather in the dangerous Formosa Channel. The archipelago was seized by the Dutch in 1622, and some remains of their fortifications are still to be seen; but in 1624 they left Formosa, where they remained till finally driven out by the Chinese pirate Koxinga.

PORT HAMILTON, the English Naval Station in the North Pacific, acquired during the past week, is the name commonly applied to the large Korean island of Quelpart, situated about sixty miles due south of the extreme point of the Korean peninsula, and situated between 33° and 34° N. lat. and 126° and 127° E. long. It has been described at great length by Hamel, the "secretary" of a Dutch vessel wrecked there on its way to Nagasaki in the seventeenth century. Hamel and his companions were kept captive in Corea for thirty-five years, when some of them succeeded in escaping. Hamel's story will be found in Pinkerton and other collections of voyages. During the present century it has also been visited occasionally in search of the crews of shipwrecked vessels. A glance at the map shows its position relatively to Japan, North China, Corea, and the Sea of Japan, and its value as a naval station better than any words could do. It is 150 miles distant from Shanghai, about 100 miles from Nagasaki, and lies in the mouth of the only exit to the south from the Sea of Japan. It is described by Mr. Griffis, a recent historian of Corea, as an oval, rock-bound island covered with innumerable conical mountains, tipped in many instances by extinct volcanic craters, the highest of all being Mount Auckland, or Haura, which is about 6500 feet high. On the top are three extinct craters, within each of which is a lake of pure water, and Korean children are still taught to believe that the three first-created men of the world still dwell on these lofty heights. The whole island is well cultivated; there are a number of towns, three walled cities, but no good harbours. It has long been used as a place of banishment for criminals. The chief industry is the manufacture of straw hats, those from Quelpart being the best in Corea, which is a country of large straw hats. It has been