absence of macles appear to indicate the variety of chalcocite called *cuprein* by Breithaupt.

All these coins were buried in a dark brown mud, containing numerous shells, many of which have been involved in the sulphurated deposits. From analysis of a sample of the water obtained at 6·70 m. depth, it appears that, as in the thermal springs above referred to, there are no sulphides, but merely sulphates, which organic matters reduce to the state of sulphides.

The novelty in production of the chalcocite in question arises from its occurrence apart, seemingly, from thermal springs, and at a lower temperature than in the cases hitherto known.

OUR ASTRONOMICAL COLUMN

THE GREAT COMET OF 1861.—The long series of observations of this splendid comet has been very ably discussed, with the view to the determination of the most probable orbit, by Heinrich Kreutz, a pupil of Prof. Schönfeld of Bonn, and the investigation is made the subject of an inaugural dissertation in July, 1880.

The comet was discovered on May 13 by Mr. John Tebbutt of Windsor, N.S.W., but the first accurate observations for position were made at the Observatory of Sydney on May 26. On June 10 it was observed at Santiago di Chile, and on the following day at Rio de Janeiro. European observations commenced on June 30, and were continued until May 1, 1862, the later places being obtained by M. Otto Struve with the 15-inch refractor at Pulkowa: the comet was not followed at other observatories beyond February 3, when Prof. Julius Schmidt last observed it at Athens. The number of separate observations collected for the determination of the orbit exceeds 1150, and these extend, as will be seen, over a period of 11½ months, in which the comet traversed an orbital arc of more than 155°. Seeling's ellipse (period 419⅕ years) is adopted in the calculation of an accurate ephemeris for the whole extent of visibility, and the observations, freed from the effects of parallax and aberration, are compared with this ephemeris for the formation of normal places. The best available positions of the comparison-stars were previously brought to bear upon the observations, so that they have received at the hands of M. Kreutz a general revision and rectification, proportional weights being applied after a criticism of the observations at the different observatories, forty-one in number. Thus thirty-one normal positions between 1861, May 28, and 1862, April 23, were formed. The next step was the calculation of the planetary perturbations for the whole interval, and it was found that the attraction of Venus, the Earth, Jupiter, and Saturn were alone sensible; June 12 was taken for the commencement of the perturbations. The normal places being corrected for their effect, sixty-two differential equations were formed, and their solution by the method of least squares gave the definitive corrections required by Seeling's orbit, which it may be stated proved sufficiently near the truth to render provisional correction unnecessary. The orbit which the comet was describing on June 12, or about the perihelion-passage in 1861, is thus found to be as follows:—

DEFINITIVE ELEMENTS OF THE GREAT COMET OF 1861.

Perihelion passage, 1861, June 11·543949 M.T. at Berlin.

Longitude of perihelion	249° 4′ 58″·7	M.Eq. 1862·0
,, ascending node ...	278 58 53·4	
Inclination	85 26 15·3	
Eccentricity	0·9850773	
Perihelion distance	0·8223838	
Semi-axis major	55·1096±0·0330	
Period of revolution	409·40±0·367 Julian years.	

It will be remarked that the probable error of the resulting period is strikingly small.

M. Kreutz defers for the present an examination of the possible effects of planetary perturbation during the last revolution, in view of identifying the comet amongst those observed in the fifteenth century. If, however, the perihelion passage occurred in the winter it is by no means certain that the comet would be sufficiently conspicuous and favourably placed to be remarked in Europe. The following figures will afford an idea of the difficulty that would attend observations in these latitudes during the winter season. Assuming the comet to have been in perihelion twenty days earlier we have these positions for the respective dates (Eq. of 1861):—

	R.A.	Decl.	Distance from Earth.	Intensity of light.
Oct. 20 ...	239°·7 ...	−17°·3 ...	1·53 ...	0·52
Nov. 20 ...	257·0 ...	−20·2 ...	1·77 ...	0·39
Dec. 20 ...	274·1 ...	−20·8 ...	1·88 ...	0·35
Jan. 20 ...	291·5 ...	−19·3 ...	1·86 ...	0·36
Feb. 20 ...	308·5 ...	−15·8 ...	1·70 ...	0·42

In 1861, when the comet appeared as bright as a star of 4·5 mag., the intensity of light was 1·5, and it was just perceptible to the naked eye, when the intensity had descended to 0·4, but there was still a tail of 2½ degrees to distinguish it from a star, which would hardly be the case in the winter.

THE SATELLITES OF MARS.—In No. 2934 of the *Astronomische Nachrichten*, Prof. Asaph Hall has given data for ephemerides of the satellites of Mars at the opposition of 1881. The N.W. elongations take place with the following values of *u*, corresponding to the argument of latitude:—

Nov. 22 ... 331°·7	Dec. 4 ... 330°·3	Dec. 16 ... 327°·1
26 ... 331·4	8 ... 329·4	20 ... 325·8
30 ... 331·0	12 ... 328·3	24 ... 324·5

From Prof. Hall's values of *u* it will be found that true N.W. elongations of *Deimos* occur Nov. 26·4411, Dec. 1·4886, Dec. 6·5350, and S.E. elongations Nov. 24·5480, Nov. 28·3340, Nov. 29·5957, and Dec. 3·3793 Greenwich times. On November 26 the distance of *Deimos* from the centre of the primary at elongation is 48″·7.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The last report of the Higher Local Examinations shows that in Group E (Natural Science subjects) there was a falling off of ten candidates and of two first classes this year. The examiners in Geology and Zoology give a generally favourable report. In Chemistry the practical work done was inferior, and common simple salts were not known by sight. Physiological Botany was little known; and the same remarks applied to Histology in the paper on Animal Physiology. In Group D, Political Economy showed much success, especially among some of the better candidates.

Dr. Latham and Mr. D. McAlister have been appointed members of the State Medicine Syndicate; and Mr. McAlister has been also appointed a member of the Board of Medical Studies.

SOCIETIES AND ACADEMIES

LONDON

Linnean Society, November 17.—Sir J. Lubbock, Bart., in the chair.—Sir John Kirk, K.C.M.G., was elected a Councillor, and Mr. Frank Crisp Treasurer, in place of Mr. F. Currey, deceased.—Mr. George Murray exhibited (for Col. Turberville), a bough of *Pinus pinaster*, with suppressed internodes of the lateral branches, the result of injury to the axis from which they sprang.—De Francis Day showed examples of the stomach of the pilchard, with special reference to points in their digestion. Within the pyloric division of the stomach a membranous envelope incloses the food, the latter composed of the Zoëa stage of crustaceans. What peculiar function the sausage-shaped nerves serves in the economy of digestion is uncertain.—Mr. R. J. Lynch exhibited and read a short note on the contrivance for self-fertilisation in *Roscoea purpurea*, which to some extent resembles that of *Salvia* by modifications of anther and filament.—Sir John Lubbock, Bart., then read his ninth communication on the habits of ants, bees, and wasps. He detailed experiments proving that bees prefer blue flowers to those of other colours. But again if bees have so much to do with the origin of flowers, how is it there should be so comparatively few blue ones? Sir John suggests that all flowers were originally green, and then passed through white or yellow, and generally red, before becoming blue. Ants, he stated, may live seven or eight years.—Mr. C. B. Clarke described a Hampshire orchis not represented in English botany. This pale, flesh-coloured, or yellow orchis he demonstrates is the true *O. incarnata*, Linn., and not that figured by Syme and Babington, which is the *O. latifolia*, Linn.—Prof. Cobbold described a new entozoon from the ostrich, named by him *Strongylus Douglasii*. It is said to prove de-