public subscription. A considerable portion of this amount has already been raised.

A LATE issue of the Batavia *Dagblad* contains a report of a paper read by Dr. Cornelissen, of the Java Medical Service, before the Society for the Advancement of Medical Science of Java, on his researches in Acheen, in Sumatra, into the causes of the dreaded disease *beri-beri*, known as *kakke* in Japan—a species of elephantiasis. Dr. Cornelissen comes to the unexpected conclusion that it is infectious, and is propagated by bacilli. He accordingly recommends a thorough system of disinfection in hospitals and troop-ships where patients suffering from this malady have been kept. The theory has caused much excitement in Java and the neighbouring regions where the disease prevails, for it has not hitherto been suspected that it was infectious. Dr. Cornelissen's theory, however, does not appear to be generally accepted in Java and the Straits Settlements.

IN the current number (27) of *Excursions et Reconnaissances* of Saigon, M. Aymonier brings to a conclusion his notes on Annam, the particular province dealt with being Khanh-Hoa. The most interesting part of the paper is the sketch of the so-called savages, or Mois, inhabiting the mountains of the province. These papers have now been running through many numbers of the periodical, and are encyclopædic in their nature. M. Aymonier is, beyond question, the greatest living authority on Cochin China generally, and he undertook prolonged journeys into various parts of the country with a view to perfecting his information for this series. His original intention was to explore the whole coast of Annam up to Tonquin, but the rebellion of 1885, which resulted in frightful massacres of missionaries and native Christians, prevented him from carrying out this project. Accordingly in his "Notes" he has been compelled to omit all reference to the ancient kingdom of Ciampa, as well as to a great part of Annam, and to confine himself to the two great southern provinces Binh Thuan and Khanh-Hoa, which stretch from Ciampa on the coast across to Cambodia. Capt. Réveillère, who has already twice navigated the Meikong rapids in a gun-boat, describes a voyage on that river in a steam-launch. The Meikong can scarcely be said to be a new river to geography, inasmuch as the greater part of its course was described with great minuteness in the work recounting the details of La Grée and Garnier's expedition from Saigon along the Meikong to the Yangtsze, published ten or twelve years ago. Father Azemar describes the Stiengs, amongst whom he lived between 1861 and 1866, and gives a vocabulary of their language. The Stiengs form one of those wild tribes which inhabit the mountains between Cochin China and Tonquin on the east and Laos and Siam on the west. The writer thinks they have no ethnic affinity with the Mongol family, mainly basing his opinion on differences in language and manners.

PERHAPS the most important point to be noticed about the Perthshire Society of Natural Science, the *Proceedings* of which for the past year we have received, is that the present method of publication has been abandoned. For six years past the *Proceedings* have, for the most part, been reprinted from the reports of the meetings which have appeared in a local newspaper. But the selection and arrangement of matter most suited to a newspaper were not always the best adapted for the *Proceedings* of a scientific Society. The Council have, therefore decided to commence a new series of *Transactions* and *Proceedings*, which will be specially printed for the Society, under the supervision of a publishing Committee. An examination of the *Proceedings* now before us certainly reveals so much activity in many departments of research that the Council appear justified in this resolution. It is especially noticeable that the papers read refer, almost without exception, to local investigation —in our judgment the most valuable and instructive work in which the members of such a Society could systematically engage. Thus, we have some notes on a collection of nests and eggs presented by a local landowner; a thorough description, by several hands, of the natural history of Kinnoull Hill, under the heads of Introductory, Geology, Flowering Plants, Ferns, Mosses and Fungi, Insects, Mollusca, and Vertebrates, and many others of the same kind. Dr. Buchanan White's address this year, as last, urges the improvement of the museum, with a view to securing more space for the exhibition of the collections. He dwells on the value of a properly selected and arranged museum as an educational medium for the members of the Society, and, quoting the words we used last year in regard to this subject, that a local museum, to be of the fullest value, should be made as complete as possible, he explains what degree of completion he expects such a museum to attain.

WE have received the *Proceedings* of the Holmesdale Natural History Club, with its home at Reigate, for 1884 and 1885. The papers are of a very general kind, ranging from the continuity of protoplasm to the wild animals of South Africa, and from mahogany to the Yellowstone National Park. Students will probably turn with most interest to two papers by Mr. W. H. Beeby on recent additions to the flora of Surrey, Mr. Tyndall's meteorological notes for the two years, and Mr. Crosfield's paper on the geographical distribution of wild plants in the British Isles.

THE Town Council of Bombay has unanimously resolved that the municipality must bear its share, with the Government and other public bodies, in the expenses of the establishment of a technical school, and a sum of 5000 rupees was voted for the purpose at a late meeting. The scheme is one drawn up by Dr. Cooke, Principal of the Poona College of Science, and explained by him to the Council. The skilled artisans, he said, turned out by the school would be a benefit to the country and to the municipality alike.

THE additions to the Zoological Society's Gardens during the past week include an Indian Rhinoceros (*Rhinoceros unicornis* ♂) from India, presented by the Maharajah of Cooch Behar; a Tiger (*Felis tigris* ♂) from India, presented by the Zoological Gardens, Calcutta; a Chanting Hawk (*Melierax musicus*) from South Africa, a Red-throated Diver (*Colymbus septentrionalis*), European, presented by Lord Lilford, F.Z.S.; a Short-eared Owl (*Asio brachyotus*), British, presented by the Rev. Hubert D. Astley, F.Z.S.; ten Moorish Geckos (*Tarentola mauritanica*) from the borders of the Mediterranean, presented by Mr. J. C. Warburg; three Zebus (*Bos indicus* ♂ ♂ ♂) from India, a Montagu's Harrier (*Circus cineraceus*), European, deposited.

OUR ASTRONOMICAL COLUMN

THE SPECTROSCOPIC METHOD OF DETERMINING THE DISTANCE OF A DOUBLE STAR.—Mr. A. A. Rambaut, in a paper communicated to the Royal Irish Academy on May 24, discusses at some length the possibility of determining the distance of a double star by measures of the relative velocities of the components in the line of sight by means of the spectroscope. Of course, as soon as Dr. Huggins had demonstrated that it was practicable to measure the rate of approach or recession of a star, it was seen that it would be at least theoretically possible to determine the distance of a star by this method, but Mr. Rambaut does not merely repeat the suggestion, but examines the conditions of the problem that he may ascertain what chance there is of putting it into successful operation. His first step is to find the value of πV for the satellite star of any binary system, π being the parallax in seconds of arc, and V the velocity of motion in the line of sight expressed in miles per second. The resulting formula is—

$$\Pi V = \frac{la^2\sqrt{1-\epsilon^2}\cdot\sin(\phi-\lambda)\sin\gamma}{Pr\sqrt{1-\epsilon^2\cos^2\phi}} = k,$$

where ϕ denotes the angle between the tangent and major axis,
λ denotes the angle between the line of nodes and major axis,
γ denotes the angle between the plane of orbit and tangent plane to sphere,
P denotes period in years,
l denotes mean motion of earth in miles.

This equation therefore gives a relation between Π and V depending only on the period and the angular elements of the orbit, so that if either Π or V can be measured the other may at once be determined. If k be greater than unity, then either V must exceed ten miles per second, or Π one-tenth of a second of arc. If, then, the spectroscope show the lines in the spectra of both stars to be absolutely coincident, it follows that the parallax must exceed 0″·1, and the star will repay investigation. But if a measurable displacement be noticed, V can be determined, and the parallax will follow at once. So that "all double stars for which k is at any time greater than unity may be said to be within measurable distance either by the spectroscopic or the trigonometrical method." If, however, k be less than unity, the star may still chance to be within a mea urable distance, for V may be small either from the small linear dimensions of the orbit or the length of the period; but if k be smaller than unity, and V be large, then we shall at once know, "with a certainty which the mere failure to measure its parallax trigonometrically could never reach, that the star is at an inconceivable distance from the solar system." Mr. Rambaut next proceeds to determine k for some 39 stars, the elements of whose orbits he takes for the most part from Houzeau's "Vade Mecum." In the case of five only does it exceed unity, viz., α Centauri 6·023, Sirius 5·400, 70ρ Ophiuchi 1·270, η Cassiopeiæ 1·247, and γ Coronæ Australis 1·224. Of these the parallax has already been determined for all but the last named. This star, the components of the pair being of nearly equal magnitude, would be well adapted for examination by the spectroscopic method if one of the new giant telescopes were employed, and since $k = 1{\cdot}224$, had it been examined in 1880 either the velocity in the line of sight would have been found to exceed 12 miles per second, or the parallax to exceed 0″·1. Since a star fainter than the fifth and a half magnitude would be beyond the reach of even the most powerful instrument to successfully measure its movement in the line of sight, the field of inquiry is practically confined to α Centauri, and the following three stars for all of which k is fairly large though less than unity: ξ Ursæ Majoris 0·895, γ Virginis 0·624, and ζ Herculis 0·605. The result of Mr. Rambaut's inquiry is therefore to show that but little practical use can be made of the suggested combination of the two methods in the case of double stars.

NAMES OF MINOR PLANETS.—The following minor planets have recently received names:—No. 254, Augusta; No. 255, Oppavia; No. 257, Silesia; No. 260, Huberta; and No. 261, Prymno.

COMET FINLAY (1886 *e*).—Dr. J. Holetschek gives (*Ast. Nach.*, No. 2763) the following elements and ephemeris for this object, which, though now diminishing somewhat in brightness, becoming well placed for observation in northern latitudes:—

T = 1886 November 22·48418.

ω = 315° 21′ 0″·5
Ω = 52 45 43·2
i = 3 1 9·4
} Mean Eq. 1886·0.

log q = 9·997122
log e = 9·850744
log a = 0·533468
Period = 6·31 years.

Ephemeris for Berlin Midnight

1887	R.A. h. m. s.	Decl. ° ′	log r	log Δ	Brightness
Jan. 0	23 49 17	1 2·3 S.	0·0565	9·9245	2·3
4	0 8 58	1 23·7 N.	0·0670	9·9343	2·1
8	0 28 10	3 45·0	0·0779	9·9461	1·9
12	0 46 52	5 59·9 N.	0·0889	9·9598	1·7

The brightness at the time of discovery is taken as unity.

COMET BARNARD (1886 *f*).—The following ephemeris for Berlin midnight is in continuation of that given in NATURE for December 9 (p. 134):—

1887	R.A. h. m. s.	Decl. ° ′	log r	log Δ	Brightness
Jan. 0	19 32 32	4 5·2 N.	9·8652	0·1478	10·5
5	19 53 52	1 13·5 N.	9·8935	0·1845	7·8
10	20 11 46	1 20·1 S.	9·9243	0·2177	5·8

The brightness at the time of discovery is taken as unity

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 JANUARY 2–8

(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 January 2

Sun rises, 8h. 8m.; souths, 12h. 4m. 14·9s.; sets, 16h. 1m.; decl. on meridian, 22° 55′ S.: Sidereal Time at Sunset, 22h. 49m.

Moon (at First Quarter) rises, 11h. 56m.; souths, 18h. 12m.; sets, 0h. 38m.*; decl. on meridian, 2° 25′ N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury ...	6 41	10 39	14 37	22 38 S.
Venus ...	8 41	12 36	16 31	23 5 S.
Mars ...	9 34	13 52	18 10	19 35 S.
Jupiter...	2 10	7 16	12 22	11 11 S.
Saturn...	16 35*	0 40	8 45	21 49 N.

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

Occultations of Stars by the Moon (visible at Greenwich)

Jan	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image °
4 ..	μ Ceti ...	4	20 28	21 33	87 348
5 ...	f Tauri ...	4	17 21	18 24	48 293
6 ...	71 Tauri ...	6	18 50	19 7	359 334
6 ...	θ^1 Tauri ...	4½	19 47	21 2	68 295
6 ...	θ^2 Tauri ...	4½	19 54	20 55	47 316
6 ...	B.A.C. 1391	5	21 2	22 19	108 289
6 ...	85 Tauri ..	6	22 19	near approach	27 —
7 ...	Aldebaran	1	0 17	1 15	165 283
7 ...	111 Tauri...	5½	19 51	near approach	340 —
7 ...	115 Tauri...	6	20 53	22 6	95 261

Jan. h.
2 ... 20 ... Sun at least distance from the Earth.

Saturn, January 2.—Outer major axis of outer ring = 46″·4; outer minor axis of outer ring = 18″·5; southern surface visible.

Variable Stars

Star	R.A. h. m.	Decl. ° ′		h. m.
U Cephei	0 52·3	81 16 N.	Jan.	2, 0 3 *m*
			,,	6, 23 43 *m*
λ Tauri	3 54·4	12 10 N.	,,	5, 2 12 *m*
S Cancri	8 37·5	19 26 N.	,,	5, 1 40 *m*
U Hydræ	10 32·0	12 48 S.	,,	5, *M*
R Crateris	10 55·0	17 43 S.	,,	6, *m*
S Leonis	11 5·0	6 4 N.	,,	6, *M*
W Virginis	13 20·2	2 48 S.	,,	2, 4 0 *M*
δ Libræ	14 54·9	8 4 S.	,,	3, 19 41 *m*
			,,	6, 3 33 *m*
U Coronæ	15 13·6	32 4 N.	,,	7, 2 14 *m*
U Ophiuchi... ...	17 10·8	1 20 N.	,,	4, 4 18 *m*
			and at intervals of	20 8
W Cygni	21 31·8	44 52 N.	Jan.	4, *M*
δ Cephei	22 25·0	57 50 N.	,,	4, 20 0 *M*

M signifies maximum; *m* minimum.

Meteor-Showers

The principal shower of the week is that of the *Quadrantids*, maximum January 2, radiant R.A. 228°, Decl. 53° N. Other showers are as follows:—From the borders of Gemini and Cancer, R.A. 119°, Decl. 16° N.; near θ Ursæ Majoris, R.A. 140°, Decl. 57° N.; near ζ Bootis, R.A. 220°, Decl. 13° N.