

OUR ASTRONOMICAL COLUMN.

DOUBLING OF MARTIAN "CANALS."—Telegraphing to the *Astronomische Nachrichten* (No. 4551) on January 25, Prof. Lowell states that the canals Ganges and Jamuna are doubling, both from the western mouth.

REPORTED FALL OF AN AÉROLITE.—A curious accident is reported in a Lloyd's message from the Finisterre (Spain) Signal Station. The message states that at 9 a.m. on January 25 the semaphore and telegraphic apparatus was completely destroyed by the fall of a meteor, thus causing an interruption of both the maritime and land communications. Nothing, more than is implied in the above message, is reported as to the finding of any meteorite or its fragments.

A BRIGHT METEOR.—From Tarnów Prof. Anton Wilk reports the apparition, in a clear, cloudless sky, of a bright meteor on November 15, 1911. The path lay between 20h. 20m., +40°, and 22h. 40m., +30°, and was traversed very rapidly. At the beginning of the flight the meteor was about twice as bright as Venus, whilst during the flight it gave off luminous particles, and was followed by a long luminous trail. At first the colour was bluish, then a glowing yellowish-white, and the duration of the whole phenomenon was about three seconds.

EPHEMERIS FOR SCHAUMASSE'S COMET, 1911h.—*Astronomische Nachrichten* No. 4549 contains an ephemeris for comet 1911h, computed by M. Schaumasse from the elliptic elements now published by M. Fayet in the same journal.

The present approximate position is 16h. 10m., -3° 57', and the comet is only about one-sixth as bright as when discovered.

M. Fayet directs attention to the similarity of the orbits of this comet and that of 1894 I. (Denning).

OBSERVATIONS OF COMETS.—Bulletin No. 3 of the Khedivial Observatory, Helwan, contains a further list of positions of Halley's comet determined from photographs taken with the Reynold's reflector by Mr. Knox-Shaw. It has been found desirable to apply a temperature term in the reduction of the measures, the temperature having varied between 6° and 24° C.

Numerous observations of comets are recorded in Nos. 4550-1 of the *Astronomische Nachrichten* from several observatories.

DISTANCES OF SPIRAL NEBULÆ.—Assuming that the spiral nebulae are external galactic systems, Prof. Max Wolf makes some speculations as to their relative distances in No. 4549 of the *Astronomische Nachrichten*. His deductions are based also on the assumption that such systems are of the same order of actual magnitude, hence the apparent diameters are inverse measures of their distances.

Measures of eight objects have been made, and the relative distances derived, both from the measures of the length and the breadth; the results for each object agree fairly well. Taking the parallax of certain objects in the Milky Way, e.g. Nova Persei, as 0.01", gives a means of calibrating the relative scale, and Prof. Wolf's final speculative numbers are as follow:—

Object	Distance in light years	Apparent diameter,	Diameter in light years
M31 ...	33,000	120	1100
M33 ...	94,000	54	1500
M81 ...	172,000	18	900
M101 ...	289,000	18	1500
M51 ...	370,000	10	1100
H ₂ 24 ...	500,000	15	2200
H ₂ 76 ...	522,000	7	1100
H ₂ 56 ...	578,000	8	1300

OBSERVATIONS AT THE MOSCOW OBSERVATORY.—The fifth volume of the *Annales de l'Observatoire astronomique de Moscou* is a handsome volume, in which Prof. Ceraski publishes numerous results derived from various observations made since the new observatory was installed in 1900; the frontispiece is a reproduction of a photograph of the new buildings.

Among other results, Prof. Ceraski gives those obtained for the stellar magnitude of the sun in two separate researches in 1903 and 1905. In the first he compared the sun with Venus, and then, in the evening, Venus was

compared with α Leonis. The sun was found to be 242,400,000,000 times brighter than the star, and, taking Müller's magnitude (1.57) for α Leonis, the sun's magnitude is -26.89. In the later research other stars were also employed, and -26.5 was obtained as a more trustworthy value of the sun's magnitude.

Other papers deal with the angular velocities of Perseid meteors, a special eyepiece for solar observations, a method of utilising the sun's heat, the intensity of the luminosity of the atmosphere near the sun's limb, &c. Further, M. Sternberg has a long paper on the application of photography to the measures of double stars, and M. Blažko writes concerning Algol variables, and describes a type of slitless spectroscope. In the appendix a large number of photographs showing the regions around variable stars, discovered by Madame Ceraski, are reproduced.

INTERNAL AND CLOUD VELOCITIES OF GROUPS OF STARS IN RELATION TO SPECTRAL TYPE.—In No. 5, vol. xxxiv., of *The Astrophysical Journal*, Dr. Weersma arrives at some interesting results arising from a mathematical inquiry into the ratio between the linear velocities of the individual members of star groups and the general velocities of the groups as a whole, as it exists in different spectral types. Prof. Kapteyn, in a paper published in 1910, found that the individual linear velocities of stars increase with age, and suggested that this phenomenon probably entails a dissipation of star groups as they grow older. Dr. Weersma now shows, from a study of A-type and K and M-type stars, that this suggestion is probably correct. He finds that the individual velocities do tend to increase with age, while there is apparently a tendency for the group velocities to diminish; the evidence for the latter, however, is by no means conclusive.

SILK-CULTURE IN THE PHILIPPINES.¹

SILK production is one of the most important industries in most of the warmer parts of the world; but the mulberry silkworm, *Bombyx mori*, still supplies by far the largest proportion of this commodity.

As regards the Philippines, although the Jesuit Father Antonio Sedwo made large plantations of mulberry in 1593, and introduced silkworms, and in 1780 the Augustinian missionary Father Manuel Galiana sent both mulberries and silkworm eggs from China, and the silk industry was carried on for a while with success, yet it seems subsequently to have been neglected until about six years ago, when the Bureau of Science again introduced mulberry silkworms into the Philippines, under the auspices of the American Government, which, at the same time, promulgated an Act forbidding the introduction of silkworms into the Philippines by unauthorised persons.

This was due to the fear of the probable importation of silkworm diseases; but it may also be pointed out that the introduction of that terrible pest the gipsy moth into America was due to an entomologist carrying on experiments with possible silk-producing moths; and great care should always be taken in introducing an animal or plant into a new country, as it sometimes becomes an unexpected pest, even though it may be innocuous in its native home.

The Bureau of Science began by importing the eggs of silkworms from Japan in 1905, but it was found impossible to preserve the eggs of the next brood. Therefore, in 1907, cocoons of four different varieties were obtained from Ceylon, and these proved to be a great success. The pamphlet before us gives a full history of the development and management of the insects in all their stages.

Having succeeded so far, the Bureau of Science attempted in 1909 to introduce the Eri, or castor-oil silkworm, *Attacus ricini*, belonging to another family of silk-producing moths, also from Ceylon. The treatment of the silk produced by this insect is different from that used for the mulberry silkworm, for the moth must not be allowed to emerge from the cocoon, and the cocoons cannot be reeled, but must be spun like wool or cotton, though when thus treated they yield a very fine silk.

¹ "A Manual of Philippine Silk Culture." By Charles S. Banks. (From the Entomological Section, Biological Laboratory, Bureau of Science, Manila). Pp. 53+xx plates. (Manila: Bureau of Printing, 1911.)

This moth is closely allied to, if not a form of, *Attacus cynthia*, the Ailanthus silkworm, which Dr. Alexander Wallace attempted to introduce into England some years ago. It is a very handsome species in all its stages, as

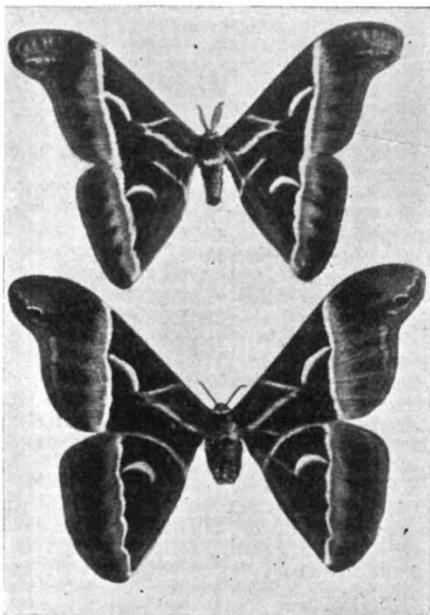


FIG. 1.—Adult male and female of *Attacus ricini*, Boisd., the Eri moth.

may be seen by the accompanying figures of the moths and caterpillars.

The castor-oil plant grows wild in the Philippines, and this silkworm is more easy to rear, and requires less care

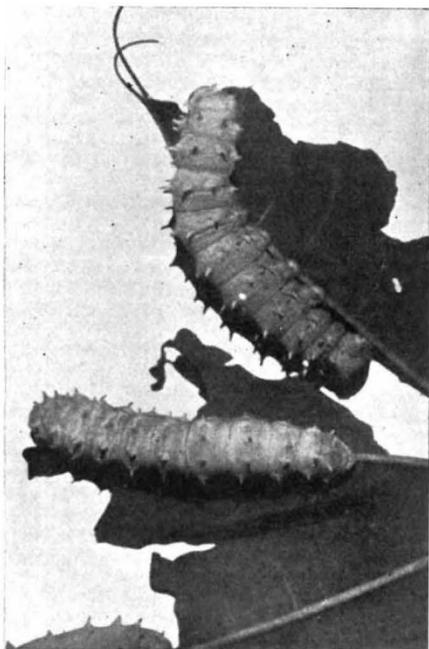


FIG. 2.—Eri silkworms ready to spin: half natural size.

than the mulberry silkworm. Several other silkworms are found in the Philippines, some of which may possibly be ultimately utilised as silk-producers.

Enemies and diseases of silkworms are discussed. The

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most important of the former are ants, rats, and mice; and hitherto it has been possible to keep silkworms in the Philippines almost entirely free from disease, by constant care and supervision.

Other matters treated of in this useful pamphlet are the silk house, the mulberry, shipping eggs, the silk trade of the Philippines, &c. The plates illustrate the mulberry and Eri silkworms in all their stages, cocoons of *Antheraea semperi*, one of the wild silkworms, a mulberry nursery and plantation, plans of a silk house, and various machines used for silk-weaving, &c.

This pamphlet is a good illustration of what may be accomplished by a little energy and foresight in the way of introducing a profitable industry into a comparatively new locality.

W. F. K.

THE RECENT FROST.

THE closing days of January and the early days in February witnessed a keen frost over the British Isles, but from the current weather changes it seems probable that the frost has come to an abrupt termination. At Greenwich the temperature fell below the freezing point each night for ten consecutive days, from January 27 to February 5. The lowest shade temperature was 19° , recorded on January 29 and February 3, whilst the lowest maximum day temperature was 27° , on February 4, which day also had the lowest mean of maximum and minimum temperatures— 24° . The mean maximum or day temperature at Greenwich for the ten days was 35° , which is 10° below the average of the last fifty years, and the mean of the lowest night temperatures 24° , which is 11° below the average; the mean of the maxima and minima for the whole period was 30° . At the meteorological station at Hampstead the shade temperature on February 3 was 16° , and on the surface of the grass the thermometer registered 6° . In the frost of 1894-5 the average temperature at Greenwich for the whole of February, 1895, was 29° , and in the frost of 1890-1 the mean for December, 1890, was also 29° . Both these frosts were, however, much more prolonged than the spell just experienced. The recent frost was more keen over the country generally than any experienced since the winter of 1894-5, when special trains were run for London skaters to Loch Lomond, which *The Times* of February 6 reports now to be covered for about a mile with good sheet-ice—the first occasion for the last seventeen years. A region of high barometer was centred over the British Isles during the early period of the frost to the close of January, but during the latter period of the frost the barometer was low over England, and the atmospheric conditions were complex in character.

A summary of the weather issued by the Meteorological Office for the week ending February 3, which embraces the severest weather of the recent cold spell, shows that the temperature was much below the average over the entire kingdom, the deficiency amounting to 10° in the south-west of England and the Midland counties, and to about 9° in several other parts of Britain. The lowest temperatures are said to have occurred on February 3 over the kingdom generally. Some of the lowest shade temperatures reported are 4° at Balmoral on February 2, 4° at Nairn on February 5, 9° at Llangammarch Wells, in the south-west of England, on February 3. The lowest readings on the surface of the grass were -0.3° at Norwich at 11 p.m. on February 2, and 0° (zero) at Balmoral and Burnley.

SKULLS AND PHYSIOGNOMY.

AT the present time anatomists are divided as regards the possibility of reconstructing from the skull the appearance of the face and head during life. Those interested in this problem will find a recent pamphlet by Prof. von Eggeling, of Jena (*"Physiognomie und Schaedel,"* Fischer, Jena, 1911, price 1.20 marks), of the greatest assistance, for the author has summarised in a very clear manner the various results obtained by previous investigators, and added his own observations. Such researches were at first employed to ascertain whether the skulls, which were alleged to be those of famous men, really corresponded with their death-masks. In 1867 Prof.