would seem, from its discovery in a lymphatic abscess by Bancroft, and in a lymph scrotum by Lewis, to have a peculiar aptitude for selecting the lymph channels for its habitat; a selective power not more remarkable than that which urges the trichina to lodge in muscular tissue. This is further borne out by the fact that its embryos—the filaria sanguinis hominis—are met with in the blood and the urine of the subjects of chyluria and nævoid (or lymphatic) elephantiasis.

Now, although the various discoveries which have been made—at the expense of so much patient research and at such various times that, as Dr. Cobbold remarked at the meeting, they form each distinct "epochs"—have enabled us to form the above complete sketch of the life-history of the parasite, there are lacunæ still to be filled up. Thus knowledge is wanted upon the growth and migration of the parent worm after it has gained entrance into the human body, also as to its duration of life, and particularly as to the question whether it can take on the power of a sexual reproduction, and if so, for how long a time. The myriads of filariæ that are probably daily reproduced in the body of such a patient as that under Dr. Mackenzie's care seem to demand such a fact as alternate generations, and also to raise the question as to the time during which the process of reproduction can continue. There is no reason to believe that the embryonic filariæ in the blood can undergo further development within the human body; indeed, analogy, as well as the remarkable discovery of an intermediate host in the mosquito, are opposed to this notion. Again, filariæ have been found in the blood apart from chyluria or any outward manifestation of lymphatic derangement; but this is explicable if it be admitted that the adult worms may lodge in other parts of the body in communication with blood vessels alone. Conversely, chyluria may exist without filaria, and the case mentioned by Dr. Mackenzie, where the parasite was found in the man's blood in India, but could not be found when he came to England, is explicable on the view that though the parent organism might have perished, or yielded no more embryos, yet the change excited by its presence in the lymphatic channels, and therefore the chyluria, might still have persisted.

The precise mechanism of chyluria still requires to be explained, and until it is elucidated an important part of the subject will remain obscure. The question of the pathology of chyluria was, however, barely touched upon on Tuesday, Dr. Mackenzie limiting himself to the statement of the facts observed in his case; the most important in connection with the urine being that besides having all the chylous characters, it invariably contained more or less blood,—that passed by day containing more blood and filaria, that passed by night being more milky; and that filariæ were found in it, especially in connection with blood coagula. The most remarkable feature of the whole case lay in the periodicity shown by the filariæ in their time of appearance in the blood. During the whole period of the man's stay in the hospital his blood had been examined regularly every three hours, with the constant result that, by night, the filariæ abounded and by day were entirely absent. From 9 A.M. to 9 P.M. they were absent; they appeared at the latter hour and increased up to midnight, then decreased till at the first-named hour none were found. These observations entirely confirmed those of Manson, and particular stress was laid upon their nocturnal wanderings and the habits of the mosquito. It is certainly singular that the time selected by the mosquito should coincide with the presence of the parasite in the blood stream, and the connection of these two facts is not the least wonderful chapter in the life-history of the parasite. But whatever the explanation of the periodicity—Dr. Vandyke Carter pointed out that it was not invariable,—a valuable addition to our knowledge of it has been made by Dr. Mackenzie. He found that whereas the time of ingestion of food bears no relation to it, it is otherwise with the time of rest and sleep, for when the patient was up during the night and slept during the day the period of filarial migration was similarly inverted. Dr. Mackenzie did not venture to speculate upon these curious points. He wisely contented himself with laying the facts he had observed before the Pathological Society.—*Lancet.*

A VERY REMARKABLE METEOR.

On the evening of Wednesday the 16th, while sweeping the western heavens in search of comets, I was startled by a brilliant illumination to my right; looking up hastily, a bright meteor was seen moving rapidly along the north-eastern heavens. It started from a point about 3° north of Capella, and, traversing a path of about 10°, passed some 2° above *delta Aurigæ*. The flight of the meteor did not exceed three seconds, when it burst with a dazzling brilliancy, to be compared only to the whiteness of the electric light. At the moment of exploding it must have been at least five or six times brighter than Venus at her maximum. There remained in its wake—covering the full extent of its path—a thin reddish train; this drifted slowly among the stars towards the north-east, gradually collecting into a lightish cloud at its N.E. end. Noting the remarkable permanency of the train, I turned the telescope (a 5-inch refractor) upon it, and was surprised to see a very brightly glowing mass of pinkish smoke; the same material lay stretching out toward the southwest in a long, straggling strip; this trail was about one-fourth a degree in thickness, and could plainly be seen with the telescope for a distance of at least ten degrees. This mass of smoke drifted northeasterly over the stars, curling slowly, like a mighty serpent. It was knotted in several places with cumulous forms which were due probably to minor explosions in the meteor. The outlines of this wonderful train of celestial smoke were well defined; it did not diffuse itself in the atmosphere, but faded gradually from view. During the whole of its visibility it retained its pinkish color. The appearance of the meteor was at 48m. past 6. The train remained visible to the naked eye for about six minutes. In the telescope it was very distinct up to seven o'clock. At three minutes after seven it was still visible in the instrument. Meanwhile it had drifted about 4° to the north-east, becoming more crooked each moment as it curled about in the air. The remarkable duration of the train of smoke from this meteor—over fifteen minutes—deserves being recorded. E. E. BARNARD.

NASHVILLE, Tenn., *November* 21, 1881.

INSTRUCTIONS ISSUED BY THE INTERNATIONAL CONFERENCE FOR THE OBSERVATION OF THE TRANSIT OF VENUS OF 1882.

Contributed by M. BENJAMIN, Ph. D.

ARTICLE 1.—It is desirable, from a theoretical standpoint, that the telescopes used should be of as large aperture as possible. In practice, the difficulty of transportation on the one hand, and the necessity of observers at different stations having similar instruments, limits the apertures to from 0.12 metre to 0.15 metre (about 4½ to 6 inches).

In all cases the objectives should be as perfect as possible. Observers should give an exact description of the quality and defects of the objective, as also the eye-piece employed. Towards this end they should determine:

1. The form of the image of a good star in focus, as also the image of the same star at a point before and after coming into focus.

2. The separating power of the objective for double stars.

It will be useful to know also if the telescope is able to show the solar granulations on any favorable opportunity, and also the degree of visability of these granulations during the transit.

ARTICLE 2.—It will be well to employ a reflecting prism, or a polariscopic eye piece, to diminish the heat and consequent danger to the observer's eyes.

If it be decided to use a silvered objective, a method which offers the great advantage of eliminating all the obscure heat rays and doing away with errors from distortion arising from heating of the interior of the tube, the excess of light may be absorbed by a neutral tint glass composed of two glasses of similar thickness, one being colored and the other colorless.

ARTICLE 3.—The eye-pieces should be positive, achromatic, and of a power of 150. The observations of contacts should be made in a field sufficiently clear to show plainly projected on the solar disc, two wires separated by a distance of 1″.

Means should be employed to remove as far as possible the effects of atmospheric dispersion.

The setting point of the reticule should be previously ascertained on the stars or by means of a collimator focussed to stars.

In cases of observation by projection, correspondent means should be employed.

ARTICLE 4.—The times corresponding to internal contacts may be defined as follows:

Ingress. The moment when an evident and, at the same time, persistant discontinuity in the illumination of the apparent limb of the sun joining the point of contact with Venus, disappears.

Egress. The moment of the first appearance of an evident and, at the same time, persistent discontinuity in the illumination of the solar limb joining the point of contact.

If the limb of two stars coming into geometrical contact, without obscuration or deformation of the interposed thread of light, the instant previously defined is that of contact.

If there be produced a black drop or ligament, well defined and as dark as the body of the planet, the precedingly defined instants, are for Ingress, that of definite rupture, and for Egress, that of the first apparition of the ligament.

Between these two extreme cases, other appearances may be produced when the instants of contact may be noted as follows:

If the limbs remaining without deformation, there is produced an obscuration of the luminous thread, without the shadow, however, being as dark as the body of the planet, the observer notes the instant of geometrical contact. The moment of the formation or disappearance of this shadow should also be noted.

If the shadow is almost or becomes quite as dark as the planet, the precedingly defined instant is that when this equality ceases or is established.

The observer should also note whether there is produced on the luminous thread, any fringes or any other distinct phenomena, and should note the moment of their appearance and disappearance.

It is generally desirable to note the time of occurrence of any distinct phenomena about the time of contact. Nevertheless it is a grave mistake, and one that should be guarded against, to multiply the noting of times near the occurrence of a contact.

The time of appearance of phenomena of a distinct character, should be mentioned only in such a manner as to be readily separated from other phenomena observed about contact.

It will be useful in all cases that the observer should illustrate his notes with a drawing made immediately after each complete observation of contact, in order to show more clearly the interpretation which he attaches to his description of the phenomena.

ARTICLE 5.—As the limb of Venus falls internally on the solar disc during internal contact, as has been noted in Article 4, the observer should indicate as closely as possible whether the moment when the limbs of Venus and the sun, apparently coinciding, seem to be lengthened out.

This observation, though rough, is still desirable as a check to the principal noted phase.

ARTICLE 6.—Notwithstanding the fact that observations of external contacts are subject to considerable uncertainty, the conference recommends that they be observed either by direct vision or by means of the spectroscope, and that the point on the solar disc, where the first contact takes place, be determined in an appropriate manner.

COMPTES RENDUS, Oct. 17, 1881, t xciii., p. 569.

BACTERIAN NOTES.

So long as the makers of microscopes do not place at our disposal much higher powers, and as far as possible without immersion, we shall find ourselves in the domain of the Bacteria, in the situation of a traveler who wanders in an unknown country at the hour of twilight, at the moment when the light of day no longer suffices to enable him clearly to distinguish objects, and when he is conscious that, notwithstanding all his precautions, he is liable to lose his way.—Cohn.

Bacteria were regarded as animals up to the time of Dujardin (1841), a kingdom—the *Protista*—midway between the animal and vegetable, being created by Haeckel for their especial benefit. Duvaine (1859) was, however, among the first to show clearly their alliance with the algæ. Cohn holds them to belong to the algæ, although from want of Chlorophyle, approaching the fungi. Magnin says, "If there are still some differences of opinion among naturalists as to the place of the Bacteria among the cryptograms, there is but one opinion of their vegetable nature." Sachs, however, solves the difficulty by uniting the algæ and fungi in a single group, the *thallophytes*, in which he establishes two series exactly parallel —one comprising the forms with chlorophyle, the other, the forms which are deprived of it."

"The Bacteria, then, resemble green plants, in that they assimilate nitrogen contained in their cells by taking it from ammonia compounds, which animals cannot do. They differ from green plants in that they cannot draw their carbon from carbonic acid, and only assimilate organic substances containing carbon, above all the hydrates of carbon and their derivatives; and in this respect they resemble animals."

Ehrenberg was the first to maintain that the motion of Bacteria depended upon the presence of vibratile cilia (observed by him in *spirillum volutans*), but although the cilia, denied at first by most microscopists, have been since seen in nearly all the bacteria, recent researches permit us to say that cilia exist without doubt in all true bacteria; the botanist who has best studied them, M. Walming for example, recognize that it is scarcely probable that these organs are the cause of their movement, for one meets some examples in which the body remains motionless, while the cilia are in violent agitation, and others in which the body moves, while the cilia remain inert or dragging behind.

Cohn explains the origin of the gelatinous substance in which the bacteria are included as being produced by a thickening or jellification of the cell membrane, but a more plausible view is that it is produced by a secretion from their protoplasm.

MR. A. AGASSIZ has printed in the *Proceedings of the American Academy* a biographical sketch of the late Count Pourtalès, together with a biographical list of his principal publications. Mr. Agassiz has also written a Review of Professor Haeckel's Monograph of the Acalephs in the August number of the *American Journal of Science.*