This arrangement so far performs perfectly in all but one particular. It throws a strong beam of light constantly upon the four prisms *p p*, and illuminates the lines well; but although no direct light can enter into the field from the mirror placed so far out of the cone of rays from the objective, still the light thrown against the side of the eye-piece tube is sufficient to completely destroy the effect of this illumination. The difficulty, however, has been completely removed in this way:—

I should first mention that the eye-piece or micrometer tube is made double, an outer parallel tube and an inner taper one, and it is between these two that it is required that the light should be brought to the four prisms or micrometers, any light shining into the inner tube doing mischief by injuring the blackness of the field.

On the lens used to give a slight convergence to the light is placed a circular opaque disc, o, of a certain size easily ascertained. A lens, I, of a suitable focus being then placed near the reflector, an image is formed of that opaque disc just over the eye-piece tube at x, and of such a size, when properly adjusted, that no light can possibly enter the inner tube.

Thus, while not a single ray of light can by any possibility enter the inner tube, a flood of light is sent down between the inner and outer tubes, and directed upon the four prisms in whatever angular position they may be.

It only remains to say that both the intensity and colour of the light for both characters of the illumination are under complete control of the observer while actually observing.

One other matter is perhaps worthy of note.

The want of a convenient method of mapping nebulæ or faint stars by a reticulated diaphragm of bright lines in the field of view has long been felt, and the various methods of using diamond scratches on glass or illuminated lines are subject to objection, and troublesome to manage. A simple method of using an image of such a diaphragm instead of the actual diaphragm itself here suggests itself.

Referring to the portion of the rays used for bright field illumination, and shown in Fig. 1, suppose the small diagonal mirror, R′, to be replaced by an equally small prism having such a convex power that it forms an image of any object at the end of the declination axis exactly in the same plane as the image formed by the objective—then any kind of reticulated diaphragm of bright lines on dark ground can be placed on the end of the declination axis which would have a suitably prepared carrier for them, and their image would be seen in the field of the telescope of any colour and any intensity desired.

SCIENTIFIC SERIALS

THE *Scottish Naturalist* for July is rich in articles of interest, mostly brief, and chiefly relating to Entomology and Ornithology. Many deserve notice, but we have been especially interested in one on the nest of *Formica rufa* and its inhabitants by the editor, Dr. Buchanan White.

IN the *Journal of Botany* for August, Dr. Trimen describes and draws the genuine *Ranunculus chærophyllos* Linn. which has been detected in Jersey, but was not heretofore known as a native of Britain. Dr. Hance describes a new species of Iris, *I. tomiolopha*. The Rev. J. M. Crombie contributes some notes on the Lichens in Sowerby's Herbarium.—In the September number, Dr. Hance describes another new species belonging to the Bignoniaceæ, *Spathodea cauda-felina*. Mr. T. R. A. Briggs contributes Notes respecting some Plymouth plants, and Dr. A. Ernst Notes on a small collection of Alpine plants from the summit of Naiguta in the mountains of Caracas.—The first article in the October number is Mr. Hayne's paper, read at the Brighton meeting of the British Association on the Flora of Moab. Mr. J. G. Baker, who has paid great attention to the Liliaceæ, has a monograph of the two genera *Dasylirion* and *Beaucarnea*. Another British Association paper, Mr. Hemsley's Summary Analysis of the Phanerogamic and Fern Flora of Sussex, is reprinted. The Rev. E. O'Meara contributes a continuation of his recent researches in the Diatomaceæ; and the Rev. J. M. Crombie, a description of a new erratic British *Parmelia*. Mr. Leo Grindon forwards a suggestive paper on the non-occurrence near Manchester of certain common British plants.

THE last part of the *Proceedings of the Swedish Academy of Sciences* for 1871 (Öfversigt af Kongl. Veterskaps-Akademiens Förhandlingar, Arg. 28, No. 7), opens with a notice by Prof. Lilljeborg of the occurrence of a South European species of Bleak (*Leucaspius delineatus*, Heckel) at Landskrona in Scania.—The same author has also a notice of the occurrence of *Limnadia gigas* (Hermann) in Sweden, which will prove of considerable interest to the student of Crustacea, as in it he gives a very detailed description, illustrated with good figures, of the structure of this curious species, and also gives a list of the other species of Phyllopoda, six in number, which inhabit Scandinavia. Prof. Lilljeborg is inclined to identify this species with the *Monoculus lenticularis* of Linnæus.—Prof. Nordenskiöld publishes a short paper, containing a table, on the fixed and variable atomic volumes of simple bodies.—The Swedish expedition to Greenland of the year 1870 originates two papers, namely, a valuable essay on the Phanerogamic flora of Disco Bay and Auleitsivik Fjord by Prof. S. Berggren; and a series of calculations of geographical positions worked out by M. E. Jäderin.—M. L. K. Daa discusses the origin and meaning of the name of Grumant applied by the Russians to Spitzbergen, and cited as an evidence of the independent discovery of that inhospitable land by the Russians; M. Daa states that Spitzbergen was named East Greenland by its earliest English and Dutch visitants, and he maintains that "Grumant" is merely a corruption of "Grönland."—Mr. H. D. J. Wallengren publishes a Contribution to the knowledge of the Lepidopterous fauna of the island of St. Bartholomew in the West Indies. He gives a list of 34 species belonging to various families from the Rhopalocera to the Crambidæ, with remarks on their characters and distribution. Three species are described as new, namely, *Graphiphora bartholemica*, *Micra Stâlii*, and *Palthis Walkeri*.—M. L. J. Igelström notices the discovery of sandstone *in situ* in the Gefleborg district.

SOCIETIES AND ACADEMIES

PHILADELPHIA

Academy of Natural Sciences, April 9.—Prof. Leidy directed attention to some fossils upon which he made the following observations:—Several teeth and jaw fragments from the Loup Fork of the Niobrara River, Nebraska, obtained by Prof. Hayden, appear to indicate a large species of Felis, not previously described. The most characteristic specimen consists of an upper sectorial molar about as large as that of the Bengal tiger, and consequently much too large for either of the largest American cats, the panther and the jaguar. It is as much too small to have pertained to the American lion, *Felis atrox*, for its breadth is but slightly greater than that contained in the lower jaw, from which the latter was described. Breadth of the crown of the tooth is 15½ lines; its thickness in front 8 lines. The measurements in the corresponding teeth of a Bengal tiger are, 16 lines in breadth, and 7½ lines in thickness in front. The form of the fossil tooth is the same as in the other feline species. The extinct species may be named *Felis augustus*. A distal extremity of a humerus, from the Niobrara River, about the size and construction of the corresponding part in the Bengal tiger, may belong to this species. Another fossil, consisting of a detached body of a vertebra, apparently indicates an extinct reptile allied to *Plesiosaurus* and *Discosaurus*. The specimen, recently received from Prof. Hayden, was obtained in 1870, on Henry's Fork of Green River, Wyoming. It is free from attached matrix, and was the only specimen pertaining to the animal which was found. It probably belonged to a formation of earlier date than that of the same locality, which has yielded other fossils previously described. The vertebra is from the base of the tail, and is much shorter in relation to its other dimensions than in *Plesiosaurus* or *Discosaurus*. The extremities are concave, and encircled near the margin of the articular surfaces with a narrow groove. Posteriorly there are two larger articular facets, as widely separated as the bone would permit, for the junction of a chevron. Anteriorly there are no marks of chevron attachment. The roots of strong transverse processes or diapophyses project from the sides of the body just above the middle. The neural arch was completely co-ossified with the body, leaving no trace of its earlier separation. The breadth of the body is 23 lines, its depth 19 lines, and its length 1 inch. Viewing the specimen as probably representing a genus different from those mentioned, I propose to name it with the species as *Oligosimus grandævus*. Another fossil is a remarkable specimen, obtained by Prof. Hayden in the "Black Foot Country" at the head of the Missouri River. It looks as if it had formed part of the dermal armour of some huge saurian or perhaps of an armadillo-like animal. It is imperfect, and looks as if it were half broken away. In its present state it is hemiovoid, about two inches in diameter, concave below and convex above, where it is

covered by about fifteen large mammillary bosses. Accompanying this specimen there is a distal phalanx, which may belong to the same animal. It is rather less than two inches long. The articular surface is transversely elliptical, 1¼ inch wide, and 11 lines deep, and feebly depressed, so as to indicate a moderate degree of mobility. The upper surface of the bone slopes to the end, and is transversely convex. The extremity is expanded at the borders. Beneath are several vascular perforations. Though the specimens are not sufficiently characteristic to determine positively whether they belong to a mammal or a reptile, or whether they even belong together to the same animal, the former one is so peculiar that I am disposed to regard it as representing a genus and species, which may be named *Tylosteus ornatus*.—Mr. Cope made the following remarks on a curious habit of a snake:—"I had for some time a specimen of *Cyclophis æstivus*, received from Fort Macon, N. Ca., through the kindness of Dr. Yarrow, living in a wardian case. The slender form of this snake, and its beautiful green and yellow colours, have led to the opinion that it is of arboreal or bush-loving habits. It never exhibited such in confinement, and instead of climbing over the caladia, ferns, &c., lived mostly underground. It had a curious habit of projecting its head and two or three inches of its body above the ground, and holding them for hours rigidly in a fixed attitude." In this position it resembled very closely a sprout or shoot of some green succulent plant, and might readily be mistaken for such by small animals.

PARIS

Academy of Sciences, October 7.—M. Faye, President. M. A. Trécul read a paper entitled "Observations on the various parts of the Flower of *Campanulaceæ*," and his long paper was followed by an account of some "new experiments intended to show that the germs of the ferment which produces wine come from the exterior of the skin of the grape," by M. Pasteur. The author prepared forty flasks with long necks, which were twisted and bent in the now so well known fashion first used by this chemist. Ten flasks were partly filled with grape-juice, and allowed to rest; ten others, also containing juice, had introduced into them a few drops of water, in which a small piece of grape-skin had been washed; the next ten had juice and water from the skin like the last, but were boiled; and the last ten contained juice and a few drops of the interior of a grape carefully extracted by means of a glass tube, without bruising the skin. The series containing the unboiled juice and grape-skin washings were soon full of mycelium and beer-yeast, and a few days after of *Mycoderma vini*, within forty-eight hours of the appearance of which they were in a state of violent fermentation. None other of the flasks were changed in the slightest degree, even after days; and the author states that they will remain unchanged for years. M. Fremy replied to this in a note on ferments, in which he states that M. Pasteur confounds ferments with the spores of mould. M. Fremy believes the ferment to be generated in the fermentable liquor, and that fermentation can also be started by mould spores by a secondary action, hence he considers that M. Pasteur has only proved that this latter kind of fermentation is produced by the grape-skin. M. Pasteur replied that he only intended to prove that the juice of the grape is not of itself alone capable of fermenting, and that neither the albuminous matters of the juice nor the parenchyma cells are developed into ferment cells by the action of atmospheric oxygen alone. At the request of M. Dumas, M. Pasteur then read an account of some "new facts serving to elucidate the theory of true fermentation." M. Fremy again criticised the paper, and after a reply from M. Pasteur, the subject dropped. M. A. Trécul then read a note confirming several of M. Pasteur's observations, and was followed by M. Faye with a note on a memoir of Mr. Clerk-Maxwell, "On the stability of the Saturnian Rings."—A note from M. Otto Struve, "On the exactness which should be attributed to the constant Coefficient of Aberration determined at the Pulkowa Observatory," was then read, and next came "Researches on Crystalline Dissociation" (continuation), by MM. P. A. Favre and C. A. Valson. This paper, containing a great number of numerical results, was followed by "Studies on the Echinodermata," by M. S. Lovén, and by a paper on the structure of heterogeneous vegetables, by M. Th. Lestiboudois.—M. de Caligny then read a note on the effects of the communication of a lateral movement to a stream of water traversing a reservoir, and on the sand-banks which thence result. This was an account of some experiments made by the author. He finds that banks are deposited almost parallel to the stream.—M. Chevreul then read a note relating to a work on colour, by M. P. Havrez, which he presented to the Academy; and M. Dumas presented a pamphlet by M. de Jacobi, entitled "On the galvanic deposition of iron by a powerful electro-magnetic solenoid." The author hoped by these means to deposit permanently magnetic iron, but failed; the deposit, however, was composed of agglomerations of crystals, whilst iron deposited in the ordinary way is smooth and amorphous.—M. J. M. Gaugain then presented his second memoir on the induction currents produced in M. Gramme's machine, which was referred to the Physical Section.—A note on the efficacy of lightning conductors, by M. W. de Fonvielle, was sent to the commission on that subject. A note from M. Laborde, on auroræ, storms, and waterspouts, was sent to the Physical Section, and the Aerostatic Commission received memoirs from M. Reynal and M. Babé and a letter from M. Braconnier, all on aërial navigation.—A note from Raoult de Couesquelon on a "New System of Masked Batteries" was sent to the Commission on Military Art, and two notes from M. Duclaux, two from M. Cornu, and an article from the Journal *La Gironde* by M. Laliman, all on *Phylloxera*, were sent to that Commission.—M. de Saint-Venant then presented a note from M. J. Boussinesq on "Lines of Summit (*faîte*) and Thalweg," which was followed by a note from M. Béchamp "On the action of borax on fermentation." The author demonstrates that the boric acid of the borax is not the cause of the peculiar action of this body, as that acid does not produce the effects of borax. Hydric sodic carbonate, however, acts in a strictly analogous way; hence the author decides that it is the sodium present in the borax which determines its action.—A note from M. E. Monier "On the determination of the amount of vegetable matters in contaminated potable waters" then followed. The author uses a method now abandoned by all the best analysts of water in this country, namely, titration with potassic permanganate.—M. E. Gouriet then read a paper "On certain exterior characters which distinguish the different sexes of the River Craw-fish (*Astacus fluviatilis*)." The author finds the following differences:—If the length of the animal be taken as 100, then the antennæ in the male are 67·83, and in the female 57·18. The weight of the animal being 100, the great claws are in the male 27·81, in the female 12·92; moreover, the female abdomen is much more developed than that of the male—A note from M. Brown "On the relations between electricity and mephitic emanations" closed the session.

BOOKS RECEIVED.

ENGLISH.—The Clematis as a Garden Flower: T. Moore and G. Jackman (Murray).—The Travelling Birds: Cuthbert Collingwood (C. Bean).—Synopses: Physical Geography, Geology, Mineralogy, and Palæontology, D. Page (Blackwoods).—Revised List of Vertebrate Animals in the Gardens of the Zoological Society.

FOREIGN.—Grundriss der Chemie gemäss der neueren Ansichten: der unorganischen Chemie dritte Auflage: C. Rammelsberg.—Incendio Vesuviano del 26 Aprilo, 1872: L. Palmieri.—Der Ausbruch des Vesuv vom April 26, 1872: L. Palmieri.—Vereins für Erdkunde zu Dresden, Nos. 8 and 9.

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