of veteran Diatomists of that Society should be formed, to whom all new or doubtful forms might be sent for examination or identification. The recommendation appears to me to be a good one, and such a committee might easily guard themselves from the trouble of naming common valves for tyros, by making a rule only to receive specimens forwarded to them through some member of the Royal Microscopical Society."

PROCEEDINGS OF SOCIETIES.*

ROYAL MICROSCOPICAL SOCIETY.

KING'S COLLEGE, *March*, 1870.

Rev. J. B. Reade, M.A., F.R.S., in the chair.

The minutes of last meeting were read and confirmed.

A donation from the Royal Society was announced by the Secretary, consisting of certain parts of the 'Philosophical Transactions,' which would render complete the volumes of that work presented to the Royal Microscopical Society by the President, and to which reference was made in the current number of the Journal.

Mr. Slack moved, and it was unanimously carried, "That the thanks of the Society be given to the Royal Society for the parts of the 'Transactions' which had been so generously presented."

The President said, the presentation of those parts now made the volumes in the possession of the Society complete from 1751 to the present time. They were therefore greatly indebted to the Royal Society for their contribution. He would just mention that the Council had come to the conclusion to have the parts bound into volumes; and that the volumes might be borrowed for the space of one month, on condition that the Fellows submitted to a fine of 1s. per day for default in returning them. It was necessary that regularity should be observed on this head, and probably the penalty of incurring the fine would ensure such regularity. He thought that such volumes could only be studied satisfactorily by the Fellows at their own homes, and that with this privilege of taking the volumes from the library before them, many gentlemen would be glad to join the Society for the sake of having free access to such a work.

Mr. Ladd, F.R.A.S., of Beak Street, Regent Street, exhibited that evening a simple form of spectroscope and micro-spectroscope combined. The maker described it as a form of spectroscope contrived by him in 1868. Its size, when closed, is 2 inches long and $\frac{7}{16}$ inch diameter. It can be applied to the microscope very effectively in the following way:—The tube containing the direct-vision prisms is

* Secretaries of Societies will greatly oblige us by writing their reports legibly—especially by printing the technical terms thus: *Hydra*—and by "underlining" words, such as specific names, which must be printed in italics. They will thus secure accuracy and enhance the value of their proceedings.—ED. M. M. J.

mounted above the ordinary eye-piece of the microscope by means of a tube adapted (taking the place of the eye-piece cap), in which the prism tube will slide. An adjustable slit is made to take the place of the micrometer in the eye-piece. When a second or comparative spectrum is required, it is only necessary to place below the object-glass either a "Reade's" or a right-angled prism, or a simple reflector, and the two spectra will appear side by side. By this arrangement all the advantages of the more expensive forms of instruments are obtained at a small cost. It was as well a spectroscope for non-microscopic work.

A new form of rotating stage of portable character was exhibited by Mr. Blankley, and also a very convenient pocket travelling microscope by Mr. Browning. This very portable form of instrument was made for a gentleman connected with the Excise, who, being much engaged in the examination of suspected articles, is obliged to carry a microscope about with him in his daily duty.

Mr. Moginie also exhibited his monocular and binocular travelling microscopes; and Mr. Richards his arrangement for working more accurately with Darker's selenite films.

Dr. Carpenter compared "The Steadiness of the Ross and Lister Models of Microscopes under trying circumstances." He also entered into some interesting details "On the Shell-Structure of *Fusulina*," "The Micropyle of the Fish's Ovum," and "The Reparation of the Spines of *Echini*."

Mr. Beck thought the real credit of carrying out the principle so ably commented upon by Dr. Carpenter belonged to Mr. Jackson. He did not think that in Mr. Lister's improvements would be found the full development of the principle. He had in his possession the first microscope that had been made on Mr. Lister's model, as brought out by Tulley; and whilst the principle is firmly maintained of moving the body, there is no approach to the beautiful movement for which they were indebted to the mechanical skill, and thorough knowledge and distribution of vibration, of Mr. Jackson. George Jackson was the man who introduced the planing out that arm; and he thought that he was correct in saying that it was planed out by Mr. Jackson in an amateur planing machine of his own.

The President said Tulley's microscope was the Lister model. The supporting rods gave great firmness, but the form exhibited by Dr. Carpenter was unquestionably the Jackson form. Still the question is, which form is the most valuable for diminishing the tremor?

Mr. Breese said, it seemed to him that the question of vibration must be mainly dependent upon the steadiness of the object-glass and object taken relatively, and consequently on the rigidity between these parts, and had but little to do with the eye-piece, as spoken of by Dr. Carpenter. He would contend that the Ross model is the steadier of the two. The point of support for the object-glass is much nearer the object, and there is no danger of motion in the tube interfering at all. Without calling in question the experiments made by Dr. Carpenter, he thought that a Ross model, which he had had in his own hands, bore as severe a test, and exhibited no defect such as has been

spoken of. He had to carry on some experiments at a railway station, where everything was in a state of vibration (so much so that when heavy trains passed small scalpels chattered on an earthen plate); and he found that the Ross model with a $\frac{1}{8}$ objective worked admirably. He did not assert that the Ross model was the best in all respects; but at the same time he could not see any logical inference that the tremor was due to motion in the eye-piece; and while the point of support was near the object-glass, this has but little motion.

Dr. Carpenter.—Let any gentleman take the eye-piece between his fingers and give it a touch, he will at once convince himself that the tremor is from the eye-piece. You may touch the other portions of the instrument and produce no tremor.

Mr. Lobb said, without reference to any particular make of microscope, he would suggest that, having had considerable experience in the use of high powers, unless the slow motion be excessively steady, there must be a great vibration of the object under inspection. To view the objects satisfactorily, not only must the instrument be steady, but the slow motion also.

Mr. Ladd thought that it was scarcely fair to take two single microscopes and compare them in the manner alluded to. He could understand that if a microscope were taken which was a little worn, the screw that tightens the bar and would make it steady might be in fault. It was quite possible, in selecting a microscope at random, to account for all the shaking spoken of by Dr. Carpenter, since all depends upon the way in which the instrument is screwed up. There is the round bar at the bottom, and a little shake at that part would account for all Dr. Carpenter had referred to.

Dr. Carpenter explained that the instrument used by him was not worn at all; it was one recommended in the Canadian survey.

The President proposed a vote of thanks to Dr. Carpenter for his papers.

Dr. Carpenter said he ought to apologize for the mistake he had made in his book. He had overlooked the fact that the particular plan was Mr. Jackson's; but he thought the title of his paper should remain, and he would add an explanatory note.

Mr. Slack said that he was sure the Society was much obliged to Dr. Carpenter for the interesting subjects he had brought before them, and that general regret would be felt that there was not sufficient time to discuss them properly.

The President then announced that the *soirée* would be held on the 20th April next, when he hoped a larger number of Fellows would bring their microscopes than had done so on two or three previous occasions.

Mr. Beek inquired whether the *soirée* was to be of the same character as formerly. Without wishing to say anything against the plans which had already obtained, he should very much like to see a new mode of conducting this annual entertainment. It was highly desirable, he thought, that there should be one day in the year on which the Fellows could meet for some useful purpose, and when they can see the scientific exhibition of microscopes and microscopic objects.

Mr. Lee said he desired to see the soirée carried out in a better manner. He considered it a downright disgrace to the Society that only four Fellows had replied to the inquiry respecting the objects they intended to exhibit; and that only about a dozen besides the Council had exhibited their microscopes on the last occasion. It was merely a trade soirée. He said this without any disrespect to the opticians who had supplied the chief attractions of the evening. He was not prepared to advocate the abandonment of the soirée, but he did think that the exhibition of objects and microscopes should be more in accordance with the Society's character.

Mr. Slack said that, in accordance with desires expressed to that effect, the Council had endeavoured to give the soirée on the last occasion a more scientific character. It was extremely difficult to unite the requirements of a scientific gathering with those of a crowded evening party. If the latter character were abandoned, he hoped a good substitute would be found, so that we might not lose the advantage of a friendly gathering of Fellows with their wives and daughters.

Mr. Beck said, what he wished to have was a separate evening devoted to purely scientific purposes. They need not give up the public meeting on this account.

Mr. Lee said if it was proposed to have two soirées, one of them purely scientific, he should vote for the proposition.

Mr. Slack said he would not do away with the soirée, but he would propose that an evening should be devoted to the completest possible exhibition of the recent discoveries, new instruments, objectives, best methods of showing difficult or disputed objects, &c., &c. This would be a strictly scientific meeting, and the numbers could be limited to about half those who usually attended, that the objects might be seen. An excursion might then be organized for another day, to which ladies could be invited to join, and when methods of collecting and examining objects could be shown.

Dr. Carpenter fully coincided with the remarks that had been made on the non-scientific character of the soirée, and the difficulties of making it a scientific meeting were most apparent. But he would just say that whatever plan might be adopted, he was willing to aid the Council most cordially. He would engage to exhibit as many objects as they could provide microscopes for, and would also be happy to lend them large drawings which he had in his possession, which would indicate the nature of the objects displayed.

The President said, he gathered from the remarks which had been made, that it was the wish of the Fellows that there should be a purely scientific evening, on which they could meet together, and also a more social evening, conducted as formerly. The scientific meeting would have this advantage, *viz.* that it would be exceedingly inexpensive.

The President then put it to the meeting which of the two plans should be carried out—the social excursion suggested by Mr. Slack, or the evening party. The latter was adopted by a large majority.

After a few more remarks from Mr. Beck, the President announced that the meeting was adjourned to the 13th April next.

Donations to the Library from February 9th to March 9th, 1870 :—

	From
Land and Water. Weekly	<i>Editor.</i>
Society of Arts Journal. Weekly	<i>Society.</i>
Nature. Weekly	<i>Editor.</i>
Quarterly Journal of the Geological Society. No. 101 ..	<i>Society.</i>
Scientific Opinion. Part XVI.	<i>Editor.</i>
Quekett on the Microscope, 2nd Edition	<i>Dr. Millar.</i>
Ditto ditto 3rd Edition	<i>Ditto.</i>
Philosophical Transactions for the Years 1813, 1836, 1837, 1838, and 1843	<i>Royal Society.</i>
Description of the Improved Achromatic Microscope. By W. and T. Tulley. 1832	<i>President.</i>
Report of the Committee of the R. A. S. on W. Tulley's first large Achromatic Telescope, 1828, with an Object-glass 6-8 inches clear aperture	<i>President.</i>
Report from the U. S. Army Medical Department, on the Magnesian and Electric Light for the Purposes of Micro- photography	<i>Surgeon-Gen. U. S.</i>

Peter Le Neve Foster, Esq., M.A., was elected a Fellow of the Society.

WALTER W. REEVES,
Assist. Secretary.

QUEKETT MICROSCOPICAL CLUB.*

At the ordinary meeting of the Club, held at University College, February 25th, 1870, P. Le Neve Foster, Esq., M.A., President, in the chair, four new members were elected, four gentlemen were proposed for membership, and several presents to the library and cabinet were announced. Mr. M. C. Cooke read the translation of a paper by Monsieur Alphonse de Brebisson, corresponding member of the Club, entitled "Critical Notes upon British and Normandy Diatoms." The paper was of a technical and critical character, and of much value as bearing upon the question of "new species" of classification; upwards of twenty slides in illustration of portions of the paper were presented to the cabinet of the Club.

Mr. B. T. Lowne made some interesting observations upon the structure of the cornea of the bee, founded upon some recent dissections of the eyes of a large African species of carpenter bee. The Secretary read a short paper descriptive of a number of varieties of *Triceratium*, found upon a slide prepared from Jutland cement stone, a diagram of the diatoms being exhibited. Some critical remarks upon the paper having been offered by Mr. M. C. Cooke, the Secretary announced that Mr. Lowne was about to commence a class for members of the Club who were desirous of studying microscopic zoology, and the proceedings terminated by a conversazione, at which objects of interest were exhibited by Messrs. Brown, Golding, Hainworth, Hislop, and White.

The annual soirée of the Club was held on March 11th, at University College, which was kindly lent for the occasion by the Council. A large number of microscopes were exhibited in the library and

* Report supplied by Mr. R. T. Lewis.

museum by the members. Interesting collections of photographs were lent by the India Office, the Autotype Company, Messrs. A. E. Durham, F. Good, and A. L. Henderson, and Flaxman's studies were open to the inspection of the visitors in the Shield room, whilst in dark rooms, at frequent intervals, exhibitions of micro-photographs were admirably shown by Mr. How. Mr. Solomon showed his process of photography by the magnesium lamp, and Mr. Apps performed a variety of brilliant experiments with induction coils and vacuum tubes. Refreshments were served in the museum and in one of the classrooms. A numerous and brilliant company attended during the evening, who were received on entrance by the President, Secretary, and members of the Committee.

LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER.

(Continuation of paper "*On the Natural Ropes used in packing Cotton Bales in the Brazils,*" from page 172.)

Bignoniaceæ.—Travellers in the Brazils tell us that by far the larger number of climbing plants in the South American tropics belong to the natural order Malpighiaceæ, and we should therefore expect that this would be the family which furnishes the majority of natural ropes. But this does not appear to be the case; the Bignoniaceæ stands pre-eminent as the natural order most largely used for supplying lianas for packing purposes, both as regards the quantity of ropes, and the largest number of species.

Most of them are readily identified by the remarkable and symmetrical outlines presented by the cortical and woody systems of their stems when seen in a horizontal section, the bark being projected into the woody tissue, towards the centre, in the form of rays. These cortical rays are wholly formed of liberian fibres, and they vary in colour according to the species. In the majority of stems such prolongations of the bark are four in number, disposed after the manner of a Maltese cross. In a few species each of the four cortical portions is very thick and perfectly square in contour, but in the larger number they are long and slender, frequently reaching the pith itself.

The yearly additions to these rays do not proceed after a uniform method, and I shall notice two or three of the principal arrangements. The more common is that where the four primitive rays are deeply projected into the woody portion, the addition taking place each season in the form of plates deposited on each side of the primitive cortical ray. It is difficult without the aid of a diagram to convey a clear idea of the sequence in which the various portions of bark and wood are formed; suffice it to say that each successive addition of bark is projected into the wood a shorter distance than its predecessor, and as the innermost extremity of every plate is truncate or rectangular, it follows that the outline presented by each cortical mass is that of a pyramid, whose sides are formed of a series of rectangular steps like an ordinary stone staircase. It is difficult to account for this

singular appearance, but the more probable explanation seems to be that a layer of wood is deposited for every layer of bark, so that by the time a new deposition of the bark is about to take place the wood has already surrounded the extremity of the previous plate, in consequence of which the progress of the new plate inward is barred by the previous season's layer of wood. If this explanation be sound the number of cortical plates on one side of, and including the primitive cortical ray, indicates the age of the stem under examination. Each annual layer of wood is thus broken up into four distinct portions by the projecting bark, each portion filling up one of the spaces enclosed by two of the arms of the cross. The number of plates formed on each side of the four primitive cortical rays rarely exceeds six. The peculiarity of arrangement, to which I here draw attention, is so striking, that it is a matter of surprise to see this feature so badly represented in Gaudichaud's plates; it is fairly drawn by Schleiden, in his 'Principles of Botany,'* but a better figure is given by Duchartre, in his 'Éléments de Botanique,' p. 167.

Another arrangement of the cortical portion is also common. It commences, as in the last method, with the projection of four slender rays into the midst of the woody fibres, reaching about half-way to the pith; but the next additions which take place are not found by the side of the four primitive rays, as in the first-noticed arrangement, but occur as four new projections placed exactly midway between the first four, so that the stem now exhibits eight of these rays arranged like the spokes of a cart-wheel. At first, the four secondary rays are very much shorter in length than the four primitive rays, but as the stem increases in age all the eight rays become of equal length. Even in this type some species exhibit an approach to the first type, by some of the primitive rays in the older stems having one or two lateral plates lying alongside them.

Perhaps the most striking form of all the Bignoniaceæ which I have hitherto examined is one which unites the peculiarities of both the preceding arrangements, but carried to such an excess as that the cortical portion at last forms one-half the bulk of the stem. Originally, the woody portion is arranged in the form of a cross, the bark filling up the whole space enclosed by the four arms of the cross. According as the stem increases in diameter, new cortical rays are projected into the four extremities of the woody mass, so that the arms appear to be bifid; these bifurcations also in their turn become bifid, and so the woody mass has its primary, secondary, tertiary, and quaternary divisions according to its age. Further, as the innermost cortical deposit—that surrounding the woody tissue—is very dark in colour, it throws into high relief the stellate outline of the woody portion. I have met with only one or two species of *Bignonia* which furnish this elaborate arrangement, and the specimens exhibited will show its striking character.

The woody system of the stems belonging to this natural order is by no means uniform, but it requires careful study before a detailed description can be given. Nearly all the species, however, have

* Pp. 251, 252, of the English translation.

numerous vessels of large diameter imbedded in the woody tissue, so that the stems are for the most part very light and porous. Such an arrangement might have been expected in plants whose stems are only as thick as a finger, and whose sap has to travel a long distance before it can reach the leaves, which are for the most part met with only in the uppermost portions of the stems. In most of the species, this woody tissue is traversed by a large number of fine medullary rays, which give a beautiful figure to many of the sections. Their internal arrangement does not manifest itself in any marked way on their exterior; their form is generally cylindrical, but some of them exhibit four slight projections in the form of narrow raised bands arranged lengthwise, which correspond with the outermost portions of the four cortical rays. Some species have a square stem during their early growth, and even the older stems do not altogether lose their four-sided character.

The constancy of the figure four as the radical number is very noticeable in the structure of the different parts of these stems, and there can be little doubt that it originates in the decussate arrangement of the leaves. The stems of the Mints, Sages, and many other British plants furnish us with ready examples of a quadruple arrangement of parts.

Malpighiaceæ.—If the lianas which belong to the Bignoniaceæ are remarkable for the symmetry of their parts, the lianas of this family may be said to be characterized by an absence of symmetry. In general, their stems are singularly rugged in outline, a section presenting deep sinuosities or irregular projections, while at other times they appear to be made up of a number of separate branches which have become consolidated in the progress of growth, so as to form a rough-looking rope of many strands.

Jussieu gives a full and interesting account of the structure of one of these stems, the *Stigmaphyllon emarginatum*,* and Gaudichaud† figures an allied species; but I have not, as yet, identified either amongst those coming with cotton. I exhibit, however, a stem which appears to be the *Tetrapteryx Guilleminiana* referred to by Jussieu, and figured by him in his Monograph;‡ but this species does not exhibit the sinuosities so characteristic of most of the lianas of this family.

As a general rule, the woody matter is developed unequally round the central pith in the form of irregular lobes, the bark closely following all the sinuosities of the stem. If the lobes increase on one side of the stem only, the pith soon becomes eccentric; but, on the other hand, in many species, while the pith retains its central position, the irregular growth of the woody lobes—each of which is closely invested by the bark—causes some to grow beyond their neighbours, and these latter, in the progress of growth, become imbedded, with their bark, in the midst of the woody matter produced by the more vigorous lobes. A stem in this adult state therefore presents the greatest irregularity of form, particularly in the genera *Banisteria* and *Heteropteryx*.

Sapindaceæ.—In this natural order we meet with some wonderful

* *Mémoire*, &c., pp. 103, &c.

† '*Recherches*,' &c., pl. xviii., fig. 11, p. 129.

‡ Plate iii., fig. 5, p. 106.

aberrant forms of dicotyledonous stems, but I shall here notice only two which are met with on cotton bales.

One of these is most probably the *Serjania cuspidata* figured by Duchartre* and Schleiden,† and easily recognized by its triangular form and compound character. It consists of a primitive stem not specially noticeable for any divergence from the usual type of a dicotyledonous stem; but round this stem are arranged three other lateral stems, each of which has its own bark separate from the rest, but united to the bark of the primitive central stem. These lateral portions are circular in outline, save that they are flat on the side by which they are attached to the central stem, which latter is in consequence hexagonal. The attachment of the lateral portions to the central mass is not very firm, as most of the ropes of this species reach this country with their strands separated, but this is due to the rough usage to which they have been subject in packing; but Gaudichaud points out that in certain parts of the stem—most likely at the nodes, for he is not very clear upon the point—the lateral strands have an organic attachment to each other, since some of the woody fibres of the central mass are continued in one of the lateral strands, and *vice versa*.‡

A still more remarkable example supplied by this family in the form of a natural rope, is one which might have served our telegraph engineers as the model of a submarine cable. Like the *Serjania*, there is a central woody mass possessing a medullary sheath and pith, woody layers, and a cortical system; but surrounding this central core and arranged parallel with it is a series of eight lateral strands, each surrounded by its own bark, the whole being consolidated so as to form a rigid cylindrical axis, which presents no external manifestation of its peculiar internal organization. It is represented in the last figure of Gaudichaud's 'Recherches,' § and has been copied into most of our text-books, in some cases incorrectly described as a Malpighiaceae plant, as by Professor Balfour in his 'Class Book,' figs. 186 and 1429.

On examining such stems of this order as I have been able, the pith and medullary sheath with its characteristic tracheal vessels appear to be met with in the central mass only, and some botanists, contrary to the opinion expressed by Jussieu,|| doubt the existence of these organs in the lateral strands. Nevertheless, one of the most recent observers of these stems, Herr Nägeli, has recently demonstrated their presence in each of the surrounding woody masses.¶

A short summary of their mode of growth, communicated to the French Academy by Monsieur Netto, will be found in 'Comptes Rendus,' t. lvii., pp. 554–557, 21 Sept., 1863, from which it would appear that a young stem, two to three weeks old, exhibits a number of fibro-vascular bundles in the midst of an outer zone of cellular tissue, one bundle being formed opposite the innermost portion of each of the

* 'Elements,' &c., fig. 82, p. 170.

† 'Principles,' fig. 168, p. 253.

‡ 'Recherches,' pl. xiii., figs. 2 and 3, p. 110.

§ Pl. xviii., fig. 21, p. 130.

|| 'Mémoire,' pp. 116, 117.

¶ Dickenwachsthum des Stengels . . . bei den Sapindaceen. Munich, 1864.

external grooves of the stem; so that from its very earliest stage the stem exhibits all the rudiments of the lateral strands which surround the core. Around each of the fibro-vascular bundles a mass of liber is formed, at first crescent-shaped, but afterwards annular; and by the growth and union of these several parts the stem soon assumes its peculiar composite character.

Leguminosæ.—Another group of lianas, presenting some external resemblance to the sinuous Malpighiads, is met with in plants which belong to this natural order of the genera *Bauhinia* and *Schnella*. In the Brazils they bear the name of *Cipo d'Escada*, from their resemblance to a ladder, but Jussieu restricts this name to the *Schnella macrostachys*.*

They are chiefly remarkable for depositing their woody fibres on two sides only of the central pith, so that their stems have a singular flat tape-like appearance, presenting in section the outline of an elongate ∞ , the position of the pith being at the intersection of the two loops. The pith, however, by no means maintains its central position, for according to the researches of M. Netto, the growth of branches brings about a lateral deposit of woody matter, sometimes on one side and sometimes on the other, so that the pith soon becomes eccentric. The pith is generally in the form of a small Maltese cross, formed of two unequal arms, the longest of which lies in the direction of the largest diameter of the stem.

There are many other forms of *Bauhinia*, many of which will be found figured in the standard works of Lindley, Schleiden, Richard, Duchartre, &c.

Aristolochiaceæ.—It is very likely that this natural order has representatives amongst these ropes; at least to it I refer for the present two species remarkable for their very striking medullary rays.

In both species these rays proceed from the pith to the bark, increasing in breadth and volume as they recede from the pith, so that by the time they reach the bark they become of considerable thickness.

In one species, whose wood has a reddish tinge, there are about nineteen or twenty of these magnificent rays in a stem exceeding half an inch in diameter; the intermediate spaces are filled up with woody fibres in which occur large vessels. In this species secondary medullary rays rarely make their appearance. But in the other species, which has a beautiful cream-coloured wood of the shade of our common holly, secondary and tertiary medullary rays make their appearance, so that in a stem three-quarters of an inch in diameter there will be as many as thirty primary rays, and as many more secondary rays. In this, the commoner species of the two, the cortical system is much thicker than in the first-mentioned species. Both bear much resemblance to a wood-section in my cabinet which is called "New Zealand Pepper," a plant of which I am quite ignorant.

Ampelidææ.—Gaudichaud in his memoir† gives a figure of the *Cissus hydrophora* as one of the common lianas of the Brazil, but I am not sure whether it occurs amongst the ropes which reach this

* 'Mémoire,' p. 118.

† 'Recherches,' pl. xiii., fig. 5, p. 109.

country. It is described by M. Netto,* and a short summary is worth transcribing, as he had the advantage of studying the living plant.

In the section of a young stem, beginning with the bark, we have first a suberous layer, then a thick cellular layer containing very little chlorophyll; and having at the side nearest the bark a mass of dotted cells whose walls become very thick. On the inner edge of this cellular layer we meet with a number of liberian bundles in front of some woody bundles; the latter are strikingly subdivided by the adjacent parenchyma into separate groups so as to cause it to look more like the arrangement generally seen in a monocotyledonous plant.

M. Netto mentions that the structure of the woody mass is even more remarkable, since in the place of the ordinary medullary rays, cellular bands are projected from the bark towards the pith which form cortical rays. Another peculiarity of the woody part is that, notwithstanding it may be two years old, the woody fibres are so loosely held together that they readily detach themselves from the cellular tissue in which they are imbedded. The stem must be at least three years old before it attains anything like consistency; this weakness, as contrasted with other lianas, probably leads to its not being so frequently used for packing purposes.

There is one histological character, however, presented by this liana which will lead to its identification, and that is the abundant quantity of raphidian crystals contained in all parts of the stem. M. Netto describes the form of these crystals as needle-shaped, but bifurcate at one extremity—which is peculiar.

However abnormal many of the stems belonging to these various orders may become, and however difficult it may be to trace their divergency from the normal structure, there can be no doubt that the characteristic elements of the dicotyledonous stem are all present during some portion of their lives. Their unequal development may be brought about either by the vital energy of the growing tissue of the bark being in excess of that of the wood, or *vice versa*, from which circumstance will arise the curious outlines presented by the relative distribution of each; or else it may be produced by a much more copious deposition of woody tissue at some points of the circumference than at others, from which evil will result the curious forms presented by the Bauhinias and many of the Malpighiaceæ.

The monocotyledonous division of the vegetable kingdom has also its representatives amongst these ropes. There are two species, perhaps belonging to the grasses, which I have met with; but in neither case is the entire stem used. One species is much larger than the other, their diameters being about two inches and four inches respectively; both are hollow and are divided into strips for use.

There are many other species found amongst these ropes which belong to other natural orders, such as the Menispermaceæ, Gneta-ceæ, Asclepiadaceæ, &c., but our knowledge of them is too limited to assign them to their respective orders. Most of my specimens have come from cotton bales of Santos Cotton, and it would be as well to

* 'Annales des Sciences,' 5th ser. Bot. t. vi., p. 320; 'Comptes Rendus,' t. lxii., p. 1076.

keep a record of the localities from whence they are derived. I am very anxious to get some from the Pacific coast, where many species differing from Brazilian species must be found. Gaudichaud mentions the neighbourhood of Guayaquil, in Ecuador, as being particularly prolific in these lianas.

I will conclude with a notice of another species which was sent me from the Liverpool docks by Mr. Griffiths, whose structure is so puzzling that I know not whether to call it dicotyledonous or monocotyledonous. It consists of a central spongy mass of woody tissue apparently without medullary sheath, pith, or medullary rays, and arranged in the form of a pentagon formed of semicircular lobes, the whole being surrounded with what appears to be liber which has shruuk away from the very thick and hard external bark, so as to leave the woody core isolated within it. The core consists of woody fibres, but half its area is taken up with wide-mouthed vessels.

I may add that the whole of these lianas furnish beautiful objects for the microscope.

Mr. Forrest suggested that useful dyes might be obtained from the plants described by Mr. Bailey.

In reply to a question from the Rev. Brooke Herford, Mr. Bailey stated that owing to a difference in the structure and general appearance of some of the stems in his possession he had been led to suspect that they were aerial roots of some of the plants he had exhibited and described.

MICROSCOPICAL SOCIETY OF LIVERPOOL.

The second meeting of the present session was held at the Royal Institution on February 1st.

The Secretary read a letter from Mr. Richter, forwarded by Mr. T. J. Moore, descriptive of his published photograph of Infusoria.

Dr. Rickard then exhibited Mr. Richter's photograph on the screen, by means of the oxyhydrogen light, after which a paper was read by Mr. G. F. Chantrell, "On Winter Fishing in the Windsor Reservoir." The author, after a brief description of the reservoir of condensed water at the Liverpool Corporation Pumping Station at Windsor, enumerated the various species of Infusoria and Rotifera which he had found in this pond on *Anacharis alsinastrum* and *Potamogeton crispus* throughout the winter.

Of the species illustrated in Mr. Richter's photograph, Mr. Chantrell stated that he had found within the last fortnight, and chiefly in the lukewarm portion of the reservoir, *Rotifer vulgaris*, *Dinocharis tetractis*, *Pterodina patina*, *Floscularia ornata*, *Macrobrotus Hufelandii*, *Stentor Mülleri*, and *Vorticella nebulifera*; and at an earlier period he had also found *Stephanoceros Eichornii*, *Melicerda ringens*, *Aecistes longicornis*, and *Cothurnia imberbis*.

Other species, not figured by Mr. Richter, that were found in the same place during the winter were, *Floscularia cornuta*, *Brachionus urceolaria*, and *B. Bakeri*; *Scaridium longicaudum*, *Epistylis nutans*, and *E. anastica*; *Actinophrys Eichornii* and *A. Sol*; *Podophrya fixa*, *Acineta*

tuberosa, *Vorticella microstoma*, *Vaginicola crystallina*, *Kerona mytilus*, *Astasia limpida*, *Amœba princeps*.

The paper was illustrated by large drawings from life of the various species alluded to.

A very beautiful Rotifer, not figured either in Pritchard or the Micrographical Dictionary, was also described by the author, its cilia being as fine as those *Melicerta ringens*. It is generally found encased in a gelatinous matter, combined with decayed vegetable substance, in the fork of the leaves of *Anacharis*.

The habits of a voracious parasite, *Trachelias vorax*, which attacks *Brachionus Bakeri*, were illustrated by diagrams. The *Trachelias* in a quarter of an hour entirely destroys the interior of the Rotifer, and leaves only its empty shell; and in one instance the *Trachelias* was seen to divide itself into four while in the interior of the *Brachionus*, quitting the empty shell in sections.

The author, in conclusion, hoped that the short sketch he had given would tend to awaken an interest in this easily accessible pond, and that other members might be induced to examine for themselves the life-history and developments of these interesting living forms.

The meeting concluded with the usual conversazione.

TUNBRIDGE WELLS MICROSCOPICAL SOCIETY.*

The monthly meeting took place on Tuesday, March 1, at the Rev. W. W. Elwes' residence; the President, Dr. Deakin, in the chair.—The subject for consideration was *Diatoms*, which was opened by a very interesting address from the chair, explaining their peculiar structure and appearance under the microscope, and their mode of reproduction. Some very beautiful specimens were exhibited. The same subject will be pursued at the next monthly meeting.

Two new members were elected.

ABERDEEN MICROSCOPIC SOCIETY.†

The Aberdeen Microscopical Society met in the grammar-school on Tuesday, 8th March, Dr. Ogilvie in the chair.—After the ordinary business, Mr. Clark and Mr. Leys occupied the evening, the former on the classification and arrangement of the Society's Cabinet and Catalogue, the latter on the Sea Urchin (*Echinus lividus*), giving a brief outline of the shell spines and other appendages of the skeleton. He then described his mode of cutting and grinding the spines as longitudinal and transverse sections. After some remarks by the chairman and other of the members, a vote of thanks to Messrs. Clark and Leys was unanimously recorded.

READING MICROSCOPICAL SOCIETY.‡

15th March, 1870.—Captain Lang presided, and exhibited specimens, mounted in balsam, of his *Diffugia triangulata*, and of another

* Report supplied by Rev. B. Whitelock.

† Report supplied by Mr. W. J. Johnston.

‡ Report supplied by Mr. B. J. Austin.

flask-shaped species, still unnamed, as far as he is aware. In both cases the surfaces of the tests, which are evidently of a chitinous and not siliceous nature, have a beautifully-regular, hexagonal reticulation.

It is a curious fact that, though the bodies of such animals appear to be nothing but sarcode, and though the specimens shown had been subjected to the intense heat of the flame of a spirit-lamp, yet, in each case, the scarcely-shrunken body of the animal could be seen suspended within the diaphanous test, exactly as in its living retracted state, but surrounded by a ring of agglomerated thorn-shaped particles, apparently of a denser nature.

Captain Lang at first thought these were Diatoms on which the creatures had fed, but examination proved that they were not; and as this outer ring is present in each specimen, and of similar form, it is not likely to be expressed food.

Collins' dissecting compound microscope, with erecting prism, and Möller's *test-slide*, were brought before the notice of the meeting; and specimens of *Podocystis spathulata*, *Asterionella*, parasite of owl, elaters and spores of *Pellia epiphylla*, were exhibited by various members.

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