correct, as far as they go. Mr. Stodder figures an under-layer (No. 1 in the 'Lens') the existence of which I do not deny, though I think his figure is not quite correct. I hope Mr. Stephenson will soon publish his researches into the structure of *Coscinodiscus Oculus Iridis*, as his mode of showing an inner layer is very instructive. Two of Mr. Stodder's figures (3 and 4)—one, representing very irregular hexagons, with indistinct markings; and the other, irregular black dots—appear to me to be affected by distortion, as well as incompleteness. His figure 3, more regular hexagons with central bright spots, is, I think, true under certain conditions of illumination, with imperfect resolution. The central marks in these hexagons I conclude result from the action of the *lower* layer. Fig. 5 in Mr. Stodder's paper is not reconcilable with anything I have seen. I believe the true formation to be much more symmetrical, and also more complex.

I must leave microscopists who study chemical, as well as optical, probabilities, to consider how far I am justified in thinking diatom silica to be uniformly deposited in spherules. Many individual diatoms show no spherules with means at present in use, but I know no *group* in which they are not apparent, and as objectives and modes of illumination improve, more and more spherules are seen. They can now be traced in many species close to the limits of (present), optical visibility; I see no reason why they should be supposed not to exist beyond it.

I quite agree with Mr. Stodder in noticing that in many diatoms (Coscinodisci, &c.) lines of fracture pass through the apparent depressions, showing them to be the weakest parts. In most of such cases the hexagonal borders appear to me composed of beads, and in many cases the floors of the hexagons are beaded too. The lines of fracture can often be traced to pass between the rows of these minute beads, just as Mr. Wenham showed in the case of *Pleurosigma*, &c.

Mr. Stodder thinks me wrong in objecting to the terms "areolæ" and "cellules" being applied to diatom markings. I do so because I do not believe the diatom marks coincide in character with the objects in other plants known by these names.

I remain, &c.,

15th March, 1873. HENRY J. SLACK.

PROCEEDINGS OF SOCIETIES.

ROYAL MICROSCOPICAL SOCIETY.

KING'S COLLEGE, *March* 5, 1873.

Charles Brooke, Esq., President, in the chair.

The President said he felt some little diffidence in occupying the chair for the second time as their President; he should not have thought of doing so himself, and he must ask them to consider him as a stop-gap (No! No! from a number of Fellows), because it unfortunately happened that two gentlemen, whom it was thought desirable to have as Presidents, had been prevented from accepting the office. He trusted that with this explanation they would receive his humble services during the coming year.

The minutes of the preceding meeting were read and confirmed.

A list of donations to the Society was read, and the thanks of the Society were voted to the donors.

The Secretary announced that the special vote of thanks passed at the last meeting had been sent to Mr. Hogg, and duly acknowledged by him.

The Secretary read the following letter which he had received that day, in explanation of an error which had been printed in a former number of the Journal, and which had been noticed in the number for March.

2, Lansdowne Crescent, W., *March* 5, 1873.

My dear Mr. Slack,—I shall feel obliged if you will communicate to the meeting to-night that I admit I have made an error at page 52 by inadvertence and haste. The magnifying power should be *one more* than the distance of distinct vision divided by the focal length, *instead of one less;* so that the examples will read $8\frac{1}{7}$ times instead of $6\frac{1}{7}$; 81 instead of 79. I regret the error; but console myself with the sentiment that we are none of us infallible.

I am, yours very truly,

G. W. Royston-Pigott.

The Secretary exhibited to the meeting a pattern chimney for microscope lamps which had been placed in his hands by Mr. Wenham. It was a cylindrical brass tube with a space cut out of one side of it, this being closed by an ordinary plain glass slide held in its place by means of a spring clip. The chimney itself was indestructible, and if the slip of glass got broken by accident, it could, of course, be very easily replaced. He also wished to mention that at the last meeting some slides were sent to the Society from Mr. Allen, of Felstead; they contained some crystals obtained from a liquid distilled from coke, as described in the last number of the Journal, at page 125. There was not time then to say much about them, but having had his attention directed to it, and having in his greenhouse a slow-combustion coke stove, he had obtained and examined some of a similar liquid. He found that when the coke was wet or impure a great deal of matter came over, it appeared to be a mixture of tar with a corrosive fluid. On a damp day it formed freely, and it was so corrosive that it perfectly riddled a piece of ordinary tinned iron piping placed to receive it. He had sent some which was unusually free from tar to Mr. Bell, who had kindly examined it.

Mr. Bell said that he found the crystals deposited on evaporation to be proto-sulphate of iron. The liquid contained sulphuric acid; there was also with them a little hydrochloric acid. Probably in the first instance the sulphur was given off from the coke as sulphurous acid, and this, by contact with the air and moisture, would become free sulphuric acid, the action of which upon the iron would of course be very rapid.

Mr. Richards reminded the meeting that he had some time ago introduced a metallic chimney for microscope lamps, similar to the one brought there that evening, but he used to put a glass tube inside, which he thought was more simple.

Mr. Wenham explained that his idea in making that chimney was not so much for simplicity as for the purpose of providing one in which a blank slide could be made available in case of breakage, that being a thing which everyone was sure to possess. He had tried the plan of putting an exterior tube to increase the draught, but he found that it did not succeed.

The Secretary thought that Mr. Wenham's idea was a good one, and would relieve microscopists from a great deal of trouble if they happened to be away in the country. He found that he never could get such a thing as a chimney for a microscope lamp at a country shop, and the consequence was, that if he met with an accident to his chimney he had to wait until he visited London before he could get another.

Mr. Beck observed that this chimney was cylindrical, and many paraffin lamps had flat wicks, and would not burn well with a straight chimney; they required one bulged out at the bottom and tapering towards the top. His own idea was that a flat wick lamp was far superior to any other for microscope use, because so much better light could be obtained by using it with the flame turned edgeways.

Mr. Wenham said that the chimney which he had brought was used on a flat wick lamp; it slightly elongated the flame, but was found to burn very well.

The President said that many years ago when he had occasion to go carefully into the subject of lamps, he found that the best flame was obtained by a flat wick bent into a circular arc; this would always burn in a straight chimney.

Mr. Richards had used a small circular wick in his lamps.

A paper was read by the Secretary, entitled "Some Additional Notes on the Microscope and Micro-spectroscope," by Mr. E. J. Gayer, Surgeon H.M. Indian Army, being a continuation of his paper upon the same subject read at the December meeting. (The paper will be found at page 147.)

A vote of thanks to Mr. Gayer for his paper was unanimously carried.

A paper was also read by the Secretary, "On a Minute Plant found in an Incrustation of Carbonate of Lime," by Dr. Maddox; the paper was illustrated by coloured drawings and specimens exhibited under the microscope. (The paper will be found at page 141.)

The thanks of the Society were unanimously voted to Dr. Maddox for his communication.

The Secretary hoped if any gentlemen present had paid special attention to this subject, that they would look at the object, and give the meeting the benefit of their opinions. It was curious that this plant was so much better preserved than the other vegetable matter with which it was associated; this would seem to show that it was of more recent growth. He also observed that Dr. Maddox stated that it did not seem to be parasitic on the moss.

The President thought that it must be a plant growing in the interstices of the calcareous concretion.

Mr. T. C. White inquired whether other plants in the neighbourhood were also incrusted. He thought this would be the case if the water were highly charged with lime.

The Secretary said that such would no doubt be the case ; indeed, any substance placed in a highly-charged spring would in time become semi-fossilized in the same manner.

At the next meeting, on the 2nd of April, Mr. W. K. Parker, V.P.R.M.S., will read a paper on "The Development of the Sturgeon's Facial Arches," and Mr. Henry Davis will read one on "A new *Callidina*: with the result of experiments on the Desiccation of Rotifers."

Donations to the Library, from Feb. 5th to March 5th, 1873 :—

	From
Land and Water	*The Editor.*
Nature. Weekly	*Ditto.*
Athenæum. Weekly	*Ditto.*
Society of Arts Journal	*Society.*
Quarterly Journal of the Geological Society, No. 113	*Ditto.*
Transactions of the Northumberland and Durham Natural History Society, Vol. 10, Part II.	*Ditto.*
Bulletin de la Société Botanique de France, 2 parts	*Ditto.*

Edward Cresswell Baber, L.R.C.P. Lond., &c., was elected a Fellow of the Society.

WALTER W. REEVES,
Assist.-Secretary.

MEDICAL MICROSCOPICAL SOCIETY.

At the second Ordinary Meeting of this Society, held at the Royal Westminster Ophthalmic Hospital, Friday, Feb. 21st, Jabez Hogg, Esq., President, in the chair, the minutes of the previous meeting were read and confirmed. The Secretary announced that six microscope lamps, as well as a cabinet for the use of the Exchange and Cabinet Committee, had been purchased since the last meeting, and the President notified that the Committee had decided to provide tea and coffee at the meetings in future.

Thirty-three gentlemen, proposed at the last meeting, were duly elected, and twenty-eight others proposed for election at the next meeting.

The President then called upon Dr. Pritchard to read his paper "On the Cochlea." See p. 150.

In the discussion following the reading of the paper, the President asked whether Dr. Pritchard had tried staining the nerves with chloride of gold, and also whether he had succeeded in setting up inflammatory action in the cochlea previous to the death of the animal experimented upon.

Mr. Crétin asked whether the animals used by Dr. Pritchard were similar to those employed by previous investigators.

Mr. Schäfer considered that the form of the rods was a question which would never be settled. He asked why Dr. Pritchard did not mention the striation of the rods, as this was to be seen by teazing with bichromate of potash, and stated that he had traced the fibrillation along the outer rods and into the membrana basilaris in osmic acid preparations. The fact that the rods increased in size towards the apex of the cochlea, he believed had been previously mentioned by some German author. He considered that teazed preparations were better for examination than sections, and doubted with Helmholtz whether the rods vibrated as they were stated to do, since they were firmly fixed the one to the other. He asked if cells existed between the rods, and said he considered it easy to demonstrate cilia on the rods, and accounted for Dr. Pritchard's not having seen them by the fact that he used chromic acid in the preparation of his specimens. The nerve cells described by Dr. Pritchard he believed to be simply epithelium.

Dr. Bruce asked how Dr. Pritchard prepared his specimens.

Dr. Pritchard, in reply, stated that he had used chloride of gold for staining the nerves, but with no very good result, and he had not succeeded in setting up inflammation. The animals he had made use of were cats, dogs, rabbits, guinea-pigs, man, and a kangaroo, but he had found very little variation in the form of the rods in any of them. He believed he had stated that the rods could be split up into fibres. He had discovered the difference in the length of the rods in 1871, and believed that the rods in a living animal might vibrate, although fixed, and thought it hardly fair to compare them to a mechanical instrument. The cilia mentioned by Mr. Schäfer he considered to be the fibrillæ of the rods torn off from the membrana tectoria, and the cells which Mr. Schäfer regarded as epithelial he still considered to be nerve cells, and Dr. Beale had also expressed his opinion in favour of their being nerve cells. With regard to methods of preparation, Dr. Pritchard referred those interested to the 'Quarterly Journal of Microscopical Science' for October, 1872.

A cordial vote of thanks was accorded to Dr. Pritchard for his valuable and interesting paper, which was illustrated by many excellent models, diagrams, and specimens.

The following presents were announced:—An Italian Medical Journal from Signor A. Tigri. Nine Slides from Mr. J. W. Groves.

The meeting then resolved itself into a conversazione, at which several interesting specimens were exhibited.

MANCHESTER (Lower Mosley Street) MICROSCOPICAL SOCIETY.*

Report of Annual Meeting.

The third annual soirée of the Microscopical section of the Natural History Society, in connection with the Lower Mosley Street schools, was held on Tuesday evening, February 4, 1873. There were about 200 present, amongst whom were Professor Williamson, Mr. John Barrow, Mr. Thomas Peace, Mr. Councillor Nield, Mr. Thomas

* Contributed by Henry Hyde, Hon. Sec.

Armstrong, F.R.M.S., Mr. Tozer, Superintendent of the Fire Brigade, Mr. Thomas Brittain, Secretary of the Manchester Aquarium, and Mr. Plant, of the Salford Museum. In a lower room were ranged, on tables, a number of microscopes, under which were shown numerous interesting objects, including specimens of the grains of various flowers; the calcareous covering of marine objects; the anatomy of insects; the cuticle of plants; portions of the human lung, and other objects. Each table was presided over by a member of the Society, who gave such information as was necessary to the spectators. After the company had had an opportunity of examining the interesting collection, they adjourned to an upper room, where arrangements had been made for a lecture, upon Pond Life, to be given by Mr. R. Horne, of Oldham. The chair was taken by Mr. Thomas Armstrong. In opening the proceedings, he said that, as President of the Society, he would venture to offer a few remarks upon the subject which had brought them together. It was about two hundred and fifty years since the microscope was invented, and to the valuable discoveries made thereby they stood indebted for a great amount of knowledge in various branches of science. At first difficulties and discouragements surrounded its introduction, but by degrees its use extended until it had attained to what they then saw it. Among the earlier workers as microscopists were Dr. Boyle, Mr. Hooke, Dr. Lieberkühn, Culpepper, and Henry Baker, F.R.S., who, so far back as 1743, wrote an admirable work upon the subject. A great impulse had been given, during the present century, to that branch of knowledge by societies; amongst which were the Royal Microscopical Society, the Old Change Society, and others, till they got down to their own little one there. There were people at that time, however, who looked upon the microscope as but a thing to excite wonder, and as a plaything, but he had no doubt that these opinions would soon be dissipated. Speaking upon the use of the microscope, he said, its results must materially lead a thinking mind to a consideration of organisms of all kinds, from the most minute to the most immense, until it was lost in the variety and magnificence of them. There remained a boundless field for inquiries in that department of science, and every step they took enlarged their ideas, and gave them greater capacity to understand the wonders of nature. Histology, or the science of the minute structure of the organs of plants and animals, might be said to be the creation of that century; some glimpses of organic structure having been, however, obtained by the earlier observers, but without system, and from which it would have been impossible to get a proper idea of the laws of formation and development. It was only within the last forty or fifty years that the microscope had been made capable of yielding such a magnifying power, combined with such clearness of definition, as was necessary for the investigation of that most interesting and important field of research. In organized beings nature worked out her most secret processes by structures far too minute to be observed by the naked eye, hence the microscope was of great importance to the physiologist. The medical profession were greatly indebted to it. Referring to animals and plants, he said the difference between the two seemed very great, but upon investigation it would be found that they gradually approached each other, and it took a skilful microscopist to determine sometimes to which of the two kingdoms an individual belonged. Formerly the power of motion was considered the characteristic of an animal, but then it was known that some plants possessed that power. Histological inquiry had rendered the matter complex by the discovery of a common character, namely, the primary cell as a starting point for all organic beings. The microscope had taught them that the simplest plants were composed of cells, and also all others of the higher order were made up of such cells, of course arranged according to the functions they had to perform. In the earliest condition of animals the cells were nearly the same as those in plants. In the latter the cells continued present throughout their growth, but in animals, except in those tissues called cellular, they soon disappeared. The minute structure of the skeleton of plants, and the lower order of animals, was a most interesting study, and would amply repay them for the investigation, and he (the Chairman) knew of none more calculated to make them forget time and place. There was something so entrancing in the way Nature gave up her wondrous secrets, that the mind seemed to be entirely taken out of the world—the hours flew past as in a dream, and the day became too short for the pleasant labour. An interesting lecture on Pond Life was then delivered by Mr. R. Horne, of Oldham, who illustrated his remarks by means of a large picture thrown on a screen by means of an oxyhydrogen lantern. The originals of the objects of animal and vegetable life, depicted on the drawing, were taken from a pond in Essex, but it was shown that every pond contained more or less the same objects. Mr. Horne explained those phenomena in a scientific, popular, and even humorous manner.

Oldham Microscopical Society.

Recently the members of the above Society held their sixth conversazione in the club-room of the Oldham Lyceum. After spending an agreeable half-hour in conversation, and in the examination, under the various microscopes lent by members, of objects illustrative of the subject of the evening, the chair was taken by the President, Dr. A. Thom Thomson, and a paper read upon "Common Moulds" by Mr. Pullinger. At its close some interesting discussion took place upon the question, "How can we account for the presence of mould in the inside of nuts, in the core of apples, and other unlikely places?" which gave the advocates and opposers of the theory of spontaneous generation an opportunity of airing their peculiar notions thereupon. After an inspection of a further supply of objects, the meeting was brought to a close by the usual vote of thanks. The following is an abstract of the paper:—

The term "mould" has been applied generally to a whole host of minute plants, belonging mostly to the natural orders Mucedines and Mucorini, which include some of the great scourges of the day, attacking and destroying our grape crops, our potato crops, our silkworms, and many forms of useful vegetable life. These moulds, however, belong to special species, and are not commonly met with, and it is my purpose to confine myself to those met with continually in every-day life, and which infest our bread, cheese, preserves, pickles, ink, beer, fruits, and decaying vegetables; also our boots, our linen, our cotton goods *en route* for India or China, and even our very teeth and the mucous membrane of our throats. These belong, for the most part, to the genera *Aspergillus*, *Penicillium*, and *Mucor*, the two former being hyphomycetous, and the latter physomycetous.

The mould which has most frequently come under my notice is *Aspergillus glaucus*, the presence of which in its favourite nidus, cheese, is considered by some of my friends (and I must plead guilty myself to the soft impeachment) to greatly improve its flavour. I have found it on Manilla cigars, on preserves, on *Radix althæ*, or the marsh-mallow roots of the shops, on horn, old oak, mistletoe, old shoes, and, in fact, everywhere. The name *aspergillus* has been given in consequence of some resemblance to the *aspergillus* or mop-like brush used in Roman Catholic countries to sprinkle the holy water with. In its young state it presents nothing to our view but a rapidly-spreading white articulated *mycelium*, which, however, soon, under favourable circumstances, throws up erect fertile threads, bearing on their apices globular heads, from which chains of spores radiate, and thus give a mop-like appearance to the ripe fruit. In course of time these chains of spores fall off, and leave the globose head, which may then be observed covered with short spiny processes, probably the points of attachment of the chains of spores. These spores are globular in form, and seem to me to be irregular in size—3, 2½, or even 2, sometimes filling the micrometer space for 1–1000 in. They present a most beautiful appearance under the binocular with a ½-inch power. *Aspergillus* has been found in the lungs and air-sacs of birds, also in the external conduit of the ear.

The next form of common mould is *Penicillium*, which also belongs to the hyphomycetous family, and natural order Mucedines. The most common is *Penicillium glaucum*, which is found in great abundance, in the form of bluish and greenish mould, on decaying vegetable substances generally, but especially on semi-fluid or liquid matters, forming a dense pasty crust, slimy on the lower surface, and bearing spores on the upper, Its general appearance is similar to that of *Aspergillus glaucus*, and it is only by the aid of the microscope that we can distinguish them. Its *mycelium* consists of interwoven articulated filaments, extensively ramified, and bearing fertile threads, also articulated, upon the apices of which are developed septæ or branchlets, consisting of an elongated cell, or cells, sometimes simple, sometimes forked, but each bearing a chain of spores, frequently arranged in a peniciliate or brush-like form; hence its name. The spores are of various colours, according to age and circumstances, but green of some shade generally prevails. They are elliptic in form, and thus easily distinguishable from those of *Aspergillus*. They are also smaller, and more even in size; at least, such is my experience of them, about six placed side by side filling the micrometer space for 1–1000 in. The specimens on the table are mostly from fruit—oranges and apples—and also from bread.

Years ago a considerable interest was created by the introduction of a new article of domestic economy in the form of a slimy mass of gelatinous matter, very much like inferior boiled tripe, and called the vinegar plant. It was said to have been introduced from India or South America. It was usually placed in a jar containing a solution of treacle or sugar, and, on being allowed to remain in a warm situation for a month or six weeks, the liquid was found converted into vinegar by the action of this strange plant, which also propagated itself by subdivision, for on looking underneath laminæ were observable, which could be separated, and, when placed in the proper media, would develop into new plants. This curious plant has been undoubtedly resolved into a *Penicillium*, the gelatinous mass being only an abnormal condition of the *mycelium*, due probably to its submerged position, for when allowed to dry up, the fruit of *Penicillium glaucum* is invariably produced. The general mass of the vinegar plant is structureless, but near the middle are chains of cells of all sizes, many of which are undistinguishable from those of the yeast plant, which fact suggests the idea of a family likeness, an idea now fully established ; and as the yeast plant is a known cause of vinous, so also the vinegar plant seems to be a cause of acetous fermentation, and, as both are but different forms of *Penicillium glaucum*, so it comes about that the common mould of our bread paste, &c., becomes the presiding genius over the great regenerating work of fermentation, giving us not only our yeast wherewith to make our bread, but also vinegar for our pickles, and, what is better still, " wine, which maketh glad the heart of man," and last—but not least—our " far-famed bitter beer."

The yeast plant, as you well know, consists of round or oval cells, which live, expand, and give rise to new cells or plants by budding until the fermenting principle is exhausted. The cells are round at first, and as the fermenting principle is nearer exhaustion they become oval, then linear and filamentous, advancing to the primary stage of *mycelium*, until finally they develop themselves into the normal threads and fruits of the common *Penicillium glaucum*. Berkley says that he and Mr. Hoffman followed up the development of individual yeast globules in fluid surrounded in a closed cell with a ring of air until the proper fruit of *Penicillium glaucum* was developed. Some years ago the bread of Paris was much infested with *Penicillium*, the spores of which were found capable of sustaining a heat equal to that of boiling water without destroying their germinating power. The disease known as apthæ or frog, and which is one of our earliest troubles, is now generally believed to be a species of *Penicillium*, as is also the filamentous growth constant in the tartar of the teeth.

The last of these common moulds is known as Mucor. It belongs to the family *Physomycetes*, and order *Mucorini*, the genus being *Mucor*, which, as in the case of *Aspergillus* and *Penicillium*, a number of species exist. The mycelium consists of delicate branching filaments, forming a beautiful network, which is distinguished from the mycelia of *Penicillium* and *Aspergillus* by its consisting of simple tubes, without articulations, which is also the case with the fruit stalks, which bear on their apices, not naked spores, but bladder-like sporangia enclosing sporidia or spores. It is common on decaying fruits, paste, and vegetable matters, and *Mucor mucedo* is very often met with, though, strange to say, I have not been able to meet with a single specimen. I have, however, a beautiful specimen of a more uncommon one—*Mucor tenerrimus*—which is developed in large quantities in a Wardian case I have set up, and in which I put the trimmings of the ferns chopped small to lighten the soil, and shortly after the whole case was one mass of mycelium. Its fruit is scarcely visible to the naked eye, but when viewed with the half-inch it is an object of rare beauty and elegance.

The result of my examination of its sporangia and sporidia is, that the sporangia are about equal in size to the spores of *Aspergillus*, whilst the sporidia—which are liberated on the bursting of the sporangium, which takes place on the application of a drop of water—are very minute indeed, and elliptic in form. They displayed great molecular activity, and in consequence I was unable to measure them. *Mucor stolonifer*, and its life history, is a subject dwelt upon by Professor Wyville Thomson in his address before the Botanical Society of Edinburgh, and he gives the results of the most recent investigations by De Bary, Pasteur, and others. He states that from the mycelium, at certain points, long, rather wide tubes start from the surface, on which the fungus is growing, obliquely into the air, and after running along for a time, again dip down and give origin to other tufts of myceline tube roots. At the point where these roots come off, as at the bud of a strawberry runner, a little tuft of tubular stems rise up vertically, and end in round vesicles or sporangia, which are at first entirely filled with transparent protoplasm, which ultimately breaks up into a mass of black polygonal spores. These spores are thus produced by no process of true reproduction, but are simply separated particles of the protoplasm of the parent plant, and may be regarded as buds, since they are capable of producing new plants like themselves. True reproductive spores exist in the secondary form of fruit of the *Mucor*, and this is the case also with *Aspergillus*. Thus we see these plants are reproduced in two ways—by buds and by true spores born in asci.

Eastbourne Natural History Society.

A meeting of the members of the Eastbourne Natural History Society was held at the Society's Rooms, Lismore Road, on Friday, December 20, when about 30 members were present. Mr. Roper occupied the chair, and the minutes having been read and confirmed, the Hon. Secretary read a paper "On Geoglossum Difforme or Earth-Tongue," by C. J. Muller, Esq.

The plant belongs to the order Elvellacei, which includes within its limits the rare and delicious Morel (*Morchella esculenta*), the no less favourite curled Helvella (*Helvella crispa*), the lovely Peziza (*Peziza coccinea*), the curious and elegant *Ascobolus ciliatis*, and many other genera attractive to the Fungologist. The character of the order is, that the fruit consists of sporidia contained in asci, that the hymenium or fruit-bearing surface is more or less exposed, and that the substance of the plant is soft. The character of the genus Geoglossum is that the receptacle or fruit-bearing part is club-shaped, and that the hymenium surrounds the club. Seven distinct species are found in England.

If a longitudinal section of the plant be made, it will be found on examination with the microscope that the entire substance consists of nothing more than delicate filaments, like the threads of a common mould, interwoven and more or less compacted, and that these threads, as they approach the external surface of the plant, become differentiated into what are called asci and paraphyses. The asci are little elongated bags of transparent texture, which contain, within each of them, eight dark brown spores closely packed together. It is these dark brown spores which partly give to the plant its black and dingy appearance. They are for the most part 7 septate, but some may be found with only 3 septa, and others divided into as many as 14 distinct cells. These spores, or sporidia, are the fruit of the plant, and by germinating under certain conditions are believed to reproduce the parent form.

In looking at the fruit, one cannot but be struck by the very ample provision made for the propagation of the plant. The spores are all but innumerable, and are carefully packed away in parcels of eight in delicate little bags ready for future use. In what condition they remain during the spring and summer, no one has yet discovered. The plant does not appear until late in autumn, so that they may be supposed to lie dormant in the ground during the greater portion of the year.

I have mentioned paraphyses at part of the fructifying surface. These delicate filaments are believed by many mycologists to be simply abortive asci, but I have noticed in the case of Geoglossum that they occasionally thicken and give origin to distinct uniseptate spores.

In conclusion, I have only to remark that this plant, like many other species of fungi, consists of nothing more than septate threads like the threads of a common mould; and that it differs from a mould only in the nature of its fructification, and the way in which these threads are compacted into an object of definite shape, and considerable consistence. The same remark applies to mushrooms and many other species of fungi, and indicates the vast resources of nature in multiplying forms from one simple element, a delicate tubular filament.

F. C. S. Roper, Esq., F.L.S., then read a "Note on the Wall Pellitory." The *Parietaria officinalis,* or Wall Pellitory, is a plant so common on old walls and buildings that it is probably well known to most of our members. It has, however, some peculiarities of structure, not generally noticed in botanical works, but at the same time of much interest to the microscopical observer. As the minute examination of the structure of both animal and vegetable organisms is of great interest to the really scientific investigator of the wonders of creation that are spread around us in such boundless profusion, I propose to direct attention to some points of interest that may have escaped notice, even of those well acquainted with the general habit and appearance of a plant that is met with in so many localities.

The *Parietaria officinalis* belongs to the Urticaceæ or nettle family, which, although abundant in tropical regions, is represented in England by very few species; the stinging-nettles, the hop, and the elm, being the only other members of the order. I do not, however, propose to enter into any detail of the characteristic or common peculiarities of these genera, but merely to point out some points of interest in the leaves of the common pellitory.

The only description generally given of these leaves in botanical works is, that they are slightly rough or hairy, and Loudon in his Encyclopædia notices that they are marked with pellucid dots. If a leaf is placed in water under the microscope, or, better still, if a small section is made and examined in the same way, the hairs are very plainly seen, and are of two kinds. The most abundant consists of long slightly curved transparent spine-like hairs, with rather blunt points, apparently hollow at the other extremity, and attached to the centre of some cells arranged somewhat in a stellate manner, and larger than those forming the general substance of the leaf. Interspersed with these, but not so abundant, are found small recurved hairs, about one-fifth the length of the others, which in shape and peculiar curve exactly resemble small fish-hooks; these are scattered apparently at intervals, especially on the younger leaves, but are less abundant on the older leaves towards the base of the stem. But the structure of most peculiar interest in these leaves consists in the so-called "pellucid dots" of Loudon, which may be readily seen by holding a leaf up to the light. If the leaf is placed in water, and the upper surface examined with a half or quarter inch objective, these dots are seen to consist of seven or eight rather large cells, radiating from the sides of a centre cell, which appears slightly raised above the surface of the leaf, so that the surrounding cells appear to slope from it to the surface of the leaf; below these, and in the parenchyma, or substance of the leaf itself, is a large single cell, within which is suspended a sub-globular or slightly pear-shaped mass with a papillated surface, but with no clearly defined crystalline structure. These bodies are known as Sphæraphides, and have also been called "Crystoliths" by Continental writers; they are sufficiently large and hard to be easily separated from the parenchyma of the leaf when thin sections are made, or small portions torn up under the microscope. When treated with muriatic acid they dissolve rapidly with considerable ebullition, and when burnt are reduced to a white powder; there can be no doubt that they are, therefore, chiefly composed of lime, and probably in the form of carbonate. They differ from the true Raphides, so abundant in many plants, by being almost amorphous, though occasionally a slight semi-crystalline appearance may be detected in small fragments if examined with a quarter objective. Although not so often noticed as true Raphides, they are characteristic of many tribes of British plants—as the Caryophyllaceæ, Geraniaceæ, Bythraceæ, Chenopodiaceæ, and especially the Urticaceæ, and it is thought by some botanists that they afford a good diagnostic character for species. In some exotic plants these Sphæraphides occur of considerable size, forming a weighty grit, and are especially large and fine in the prickly pear and others of the Cactus tribe.

If we look to the use of this curious and elaborate structure in the leaves of plants, and ask what is their object in the economy of nature? It is a question easier to ask than to answer. Some suppose that Raphides are perhaps rather a disease than formations of natural growth in plants; but they are of too common occurrence and too universally distributed over the whole tissue of certain species for this to be the case. In some instances they are doubtless useful as a medicine, and the genuineness of sarsaparilla, guaiacum and squills may be tested by the presence or absence of Raphides. Dioscorides says that the juice of the wall pellitory tempered with ceruse is good for the shingles, and Pliny affirms it is also a remedy for gout. But it is more probable, as Dr. Gulliver suggests, that the large proportion of these crystalline bodies being compounded of phosphate or oxalate of lime, or some other compound of this earth, and remember the value of these substances in the growth and nutrition of plants, that nature has established in some plants a storehouse or labóratory of such calcareous salts, and that we may thus get a glimpse of the utility of these crystals.

A vote of thanks was passed to the authors.

Both papers were illustrated by sections and specimens showing the points of interest, which were exhibited under the microscope, at the close of the meeting.

Sheffield Naturalists' Club.

Last month the first meeting of the Sheffield Naturalists' Club was held in the Cutlers' Hall. Mr. Henry C. Sorby presided.

The President, in delivering the inaugural address, said he proposed to give a few of his views with reference to the formation of the Society. He had been asked what was the use of such an institution, and he would tell them. If they were to look upon the study of natural history as the discovery of rare plants in the district which did not exist in other parts, such a society as this would be of little use. The knowledge of natural history was not to be limited to the mere knowing the names of animals and plants, and the chronicling of them. That would be about equal to knowing the name of a man and thinking they knew his character, or knowing the name of a country and thinking they knew its history. Such a society as this had two characters. First of all, the subjective influence it had on the members who composed it. The study of natural history was most desirable in many ways. Man had a certain amount of energy; it must be expended in some way or other, and the examination into natural history furnished them with a study which was advantageous to both body and mind. The explorations into the country would be exceedingly beneficial in point of health, and they might learn many interesting facts during those excursions which would have a beneficial influence on the intellect. By being joined together in a society they might greatly help one another. With regard to the objective value of such a society as this, he thought they ought not to limit their efforts to the mere making out of accurate lists of flora and fauna which occurred in the district. The efforts of naturalists also ought to be devoted to the discovery of general philosophical principles, as applied to both animals and plants. He thought they could learn a great deal more by the careful study of the commonest things than by looking for rarities. They could not hesitate in saying that a great deal remained to be done in the study of natural history in every district. They might come to such a question as this: "What is life, and how have the various species of animals and plants originated?" Such a problem was one of the greatest that could be presented to the human intellect. Then, again, a very difficult subject was, why particular plants grew in particular localities. That was a question easily asked, but most difficult to answer. Sooner or later, science ought to be able to say why certain plants grew in certain localities and not in others, and the determination of that question would have a most important bearing on geological theses. Another problem for study was, what was the effect of dry or wet seasons on certain plants? If that question were settled, they might know the effect that must have been produced in bygone ages, by the alteration of climate, on certain plants and animals. Another most interesting subject for investigation was the influence of plants on plants, animals on animals, and one on the other; the fertilization of plants by insects, and the attractability of different colours for different insects. The speaker recommended for study the following subjects:—The manner in which the habits of animals have been acquired; the manner in which varieties or species have been formed; the limit of the successive generation of insects through none but females; the diseases of plants due to parasitic fungi and insects. He concluded by remarking that he might say much more on this subject, but he had shown sufficient to prove that much might be learnt by studying the commonest things seen almost everywhere.

Mr. Edward Birks read an interesting paper on the botany of the district, after which, the following gentlemen were added to the members of the Society:—Messrs. M. du Gillon, G. W. Hawksley, W. H. Booth, F. Trickett, R. Lokley, F. Lawton, D. K. Doncaster, J. Hobson, W. K. Peace, W. Smith, S. Osborn, E. Allen, J. Bedford, J. H. Wood, H. Seebohm, A. Ellin, J. Webster, H. I. Dixon, and the Rev. J. T. F. Aldred.

A vote of thanks to the President concluded the proceedings.