XXI.—A CONTRIBUTION TO THE PHYSIOLOGY OF CELLS.*

By Martin Barry, M.D., F.R.S.

IN the second series of his researches in Embryology, the author had traced certain changes in the mammiferous ovum consequent on fecundation. The object of his present communication is to describe their further appearances obtained by the application of higher magnifying powers; and to make known a remarkable process of development thus discovered. In order to obtain more exact results, his observations were still made on the same animal as before, namely, the rabbit, in the expectation that, if his labours were successful, it would be comparatively easy to trace the changes in other mammals. By pursuing the method of obtaining and preserving ova from the Fallopian tube, which he recommended in his last paper, he has been enabled to find and examine 137 more of these delicate objects; and has thus had ample opportunity of confirming the principal facts therein stated. He has now procured in all 230 ova from the Fallopian tube. But being aware that repeated observations alone do not suffice in researches of this nature, unless extended to the very earliest stages, he again specially directed his attention to the ovum while it is still within the ovary, with a view to discover its state at the moment of fecundation, as well as immediately before and after that event.

The almost universal supposition, that the Purkinjian or germinal vesicle is the essential portion of the ovum, has been realized in these investigations; but in a manner not anticipated by any of the numerous conjectures which have been published. The germinal vesicle becomes filled with cells, and these again become filled with the foundations of other cells; so that the vesicle is thus rendered almost opaque. The mode in which this change takes place is the following, and it is one which, if confirmed by future observation, must modify the views recently advanced on the mode of origin, the nature, the properties, and the destination of the nucleus in the physiology of cells. It is known that the germinal spot presents, in some instances, a dark point on its centre. The author finds that such a point is invariably present at a certain period; that it enlarges, and is then found to contain a cavity filled with fluid, which is exceedingly pellucid. The outer portion of the spot resolves itself into cells; and the foundations of other cells come into view in its interior, arranged in layers around

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the central cavity; the outer layers being pushed forth by the continual origin of new cells in the interior. The latter commence as dark globules in the pellucid fluid of the central cavity. Every other nucleus met with in these researches has seemed to be the seat of changes essentially the same. The appearance of the central portion of the nucleus is, from the above process, continually varying; and the author believes that the nature of the nucleolus of Schleiden is to be thus explained. The germinal vesicle, enlarged and flattened, becomes filled with the objects arising from the changes in its spot; and the interior of each of the objects filling it, into which the eye can penetrate, presents a repetition of the process above described. The central portion of the altered spot, with its pellucid cavity, remains at that part of the germinal vesicle which is directed towards the surface of the ovum, and towards the surface of the ovary. At the corresponding part, the thick transparent membrane of the ovum in some instances appears to have become attenuated, in others also cleft. Subsequently, the central portion of the altered spot passes to the centre of the germinal vesicle; the germinal vesicle, regaining its spherical form, returns to the centre of the ovum, and a fissure in the thick transparent membrane is no longer seen. From these successive changes it may be inferred, that fecundation has taken place; and this, by the introduction of some substance into the germinal vesicle from the exterior of the ovary. It may also be inferred, that the central portion of the altered germinal spot is the point of fecundation. In further proof that such really is the case, there arise at this part two cells, which constitute the foundation of the new being. These two cells enlarge, and imbibe the fluid of those around them, which are at first pushed further out by the two central cells, and subsequently disappear by liquefaction. The contents of the germinal vesicle thus enter into the formation of two cells. The membrane of the germinal vesicle then disappears by liquefaction.

Each of the succeeding twin cells presents a nucleus, which, having first passed to the centre of its cell, resolves itself into cells in the manner above described. By this means the twin cells, in their turn, become filled with other cells. Only two of these in each twin cell being destined to continue, the others, as well as the membrane of each parent-cell, disappear by liquefaction, when four cells remain. These four produce eight, and so on, until the germ consists of a mulberry-like object, the cells of which do not admit of being counted. Nor does the mode of propagation continue the same with reference to number only. The process inherited from the germinal vesicle by its

twin offspring, re-appears in the progeny of these. Every cell, whatever its minuteness, if its interior can be discerned, is found filled with the foundations of new cells, into which its nucleus has been resolved. Together with a doubling of the number of the cells, there occurs also a diminution of their size. The cells are at first elliptical, and become globular.

The above mode of augmentation, namely, the origin of cells in cells, appears by no means to be limited to the period in question. Thus it is very common to meet with several varieties of epithelium-cells in the oviduct, including those which carry cilia, filled with cells; but the whole embryo at a subsequent period is composed of cells filled with the foundations of other cells.

In the second series of these researches, it was shown that the mulberry-like object above mentioned, is found to contain a cell larger than the rest, elliptical in form, and having in its centre a thick-walled hollow sphere, which is the nucleus of this cell. It was further shown, that this nucleus is the rudimental embryo. From what has been just stated, it appears, that the same process, by which a nucleus in one instance transforms itself into the embryo, is in operation in another instance, where the product does not extend beyond the interior of a minute and transitory cell. Making allowance, indeed, for a difference in form and size, the description given of the one might be applied to the other. It was shown in the second series, that in the production of the embryo out of a nucleus, layer after layer of cells come into view in the interior, while layers previously formed are pushed further out; each of the layers being so distinctly circumscribed as to appear almost membranous at its surface. The same membranous appearance presents itself at the surface of the several layers of a nucleus in many situations. Farther, in the formation of the embryo, a pellucid centre is the point around which new layers of cells continually come into view; a centre corresponding to that giving origin to similar appearances in every nucleus described in the present memoir. It was shown that in the embryo this mysterious centre is present until it has assumed the form of the cavity, including the sinus rhomboidalis, in the central portion of the nervous system.

The process above described as giving origin to the new being in the mammiferous ovum, is no doubt universal. The author thinks that there is evidence of its occurrence in the ova of Batrachian Reptiles, some osseous Fishes, and certain of the Mollusca; though the explanation given of these has been of a very different character. It has hitherto been usual to regard the round white spot, or cicatricula, on the yolk of the bird's laid egg, as an altered state of the discus vitellinus in the

unfertilized ovarian ovum. So far from thinking that such is the case, the author believes the whole substance of the cicatrix in the laid egg to have its origin within the germinal vesicle, in the same manner as in the ovum of Mammalia.

There is no fixed relation between the degree of development of ova, and their size, locality, or age. The variation with regard to size is referrible chiefly to a difference in the quantity of fluid imbibed in different instances by the incipient chorion. Vesicles filled with transparent fluid are frequently met with in the Fallopian tube, very much resembling the thick transparent membrane of the ovarian ovum. These vesicles are probably unfertilized ova, in the course of being absorbed. The so-called "yolk" in the more or less mature ovarian ovum, consists of nuclei in the transition state, and exhibiting the compound structure above described. The mass of these becomes circumscribed by a proper membrane. They and their membrane subsequently disappear by liquefaction, and are succeeded by a new set, arising in the interior, and likewise becoming circumscribed by a proper membrane, and so on. This explains why some observers have never seen a membrane in this situation. After the fertilization of the ovum, the cells of the tunica granulosa, that is, part of the so-called "disc," are found to have become club-shaped, greatly elongated, filled in some instances with cells, and connected with the thick transparent membrane by their pointed extremities alone.

That the thin membrane described by the author in his second series as rising from the thick transparent membrane in the Fallopian tube, and imbibing fluid, is really the incipient chorion, was then shown by tracing it from stage to stage, up to the period when villi form upon it. There remained, however, two questions undecided; viz., whether the chorion is formed of cells, and if so, whether the cells are those of the so-called "disc," brought by the ovum from the ovary. The author now states that the chorion is formed of cells, which gradually collect around the thick transparent membrane, and coalesce; and that the cells in question are *not* those of the "disc" brought with the ovum from the ovary. The cells which give origin to the chorion are intended to be more particularly described in a future paper.

The existing view, namely, that a nucleus, when it leaves the membrane of its cell, simply disappears by liquefaction, is inapplicable to any nucleus observed in the course of these investigations. The nucleus resolves itself into incipient cells in the manner above described. In tracing this process, it appears that the nucleus, and especially its central pellucid cavity, is the seat of changes which were not to have been expected

from the recently advanced doctrine, that the disappearing nucleus has performed its entire office by giving origin at its surface to the membrane of a single cell. It is the mysterious centre of a nucleus which is the point of fecundation, and the place of origin of two cells constituting the foundation of the new being. The germinal vesicle, as already stated, is the parent cell, which, having given origin to two cells, disappears, each of its successors giving origin to other two, and so on. Perpetuation, however, at this period, consists, not merely in the origin of cells in cells, but in the origin of cells in the pellucid central part of what had been the nucleus of cells.

The author shows that neither the germinal vesicle, nor the pellucid object in the epithelium-cell, is a cytoblast. He suggests, that the cells into which, according to his observations, the nucleus becomes resolved, may enter into the formation of secondary deposits—for instance, spiral fibres; and that they may contribute to the thickening which takes place, in some instances, in the cell-membrane.

The germ of certain plants passes through states so much resembling those occurring in the germ of mammiferous animals, that it is not easy to consider them as resulting either from a different fundamental form, or from a process of development which even in its details is not the same as what has been above described; the fundamental form in question in Mammalia—and therefore it may be presumed of Man himself—being that which is permanent in the simplest plants, the single isolated cell.

Extracts and Abstracts from Foreign Journals.

[From *Valentin's Repertorium*, 1841.]

Will on the Compound Eyes of Insects. (Continued from page 86.)—Amongst the *Neuroptera* in *Eschima grandis* a continuous and bright stratum of pigment exists, in which the bases of the crystalline bodies are placed, the latter being short and pyriform. The long and equably thick nervous fibril has in the centre a dark tube. Over the whole of the crystalline bodies, even of much of their bases, exists a transparent longitudinally striated skin. In *Agrion Virgo*, with the exception of these bodies being more conical than pyriform, the same conditions are found. *Libellula depressa* has pyriform-shaped crystalline bodies, which, with the exception of their bases, are imbedded in brown pigment. In the larva state, the nervous fibril increases in thickness the nearer the cornea, and contains a tube, which, so long as it is enveloped in a sheath, becomes but slightly thicker; anteriorly, the sheath suddenly ceases,

and the nerve is here provided with much pigment, whilst the inner tube forms a sort of conical cup, totally destitute of colouring matter. *Hemerobius perla* has long, narrow, conical, crystalline bodies, with slightly conical bases; behind them is a transparent, bason-shaped mass which surrounds their points, and as far as which proceeds the inner tube of the visual nerve: the whole cone is surrounded with dark pigment. Among the *Hemiptera*, *Ranatra* has elongated pyriform or oval bodies with convex bases. In *Naucoris*, they are short and bluntly conical, and enveloped in an almost black-coloured pigment, with which is connected a thin red layer of pigment lying upon the inner surface of the cornea, but having circular openings for the crystalline bodies. The comparatively very thick nervous fibril consists of a dark tube, and a very wide sheath. In *Cicada orni*, the crystalline bodies are three times as long as broad, have rounded points, and bluntly hexangular concave bases; anteriorly, the nervous fibril becomes thicker, and presents a reddish-coloured tube and yellow sheath, the former dilating itself around the crystalline bodies. Amongst the *Lepidoptera*, *Sphinx atropos*, *S. populi*, and *Cossus ligniperda*, have very long, roundly conical bodies, with slightly convex bases, which split into three-sided prisms. Behind each of these bodies, is a transparent substance, which envelops their delicate points. In *Sphinx atropos*, the nervous fibril is equably cylindrical, but comparatively very thin, and covered with dark pigment, has no inner tube, envelopes the transparent substance and the cone with its bason-like expansion, and terminates in a membrane between the cornea and the conical bodies. In *Cossus ligniperda*, it becomes very much thickened shortly after it is given off, is devoid of pigment, but becomes thinner towards the cones, and surrounded with a dark-red pigment anteriorly. In *Pontia brassica* and *Vanessa urticae* the cones are small, short, pointedly conical, and of a yellow colour, they have slightly convex bases, and split into numerous prisms. The cup-shaped envelope of the cones is alone formed by the inner tube of the cylindrical nervous fibril. Before the base of the cones is found a transparent substance. A clear pigment is placed before the dark one of the fibril, and proceeds to the facets. Amongst the *Diptera*, *Musca domestica* has very minute, short, conical, crystalline bodies, whose thicker ends are covered with a purple red, the rest with a dark brown pigment. The cylindrical fibril surrounded with pigment, along with its internal tube, may be traced to the points of the cones. In *Tabanus bovinus* the same conditions exist.

As a *resumé* of his labours, the author gives as his belief that each of the faceted eyes possesses a pupil (opening in the pigment), a cornea, an aqueous humour (the mass between the cornea and the crystalline bodies), a lens probably surrounded with a delicate capsule (the crystalline body), a vitreous humour (the transparent substance between the posterior portions of the crystalline bodies and the anterior extremity of the expansion of the nerve), a visual nerve, a retina (the bason-shaped expansion of the visual nerve), and a choroid; and that therefore the crystalline bodies are not to be regarded as analogous to the vitreous humour, but are to be looked upon as crystalline lenses.

Ascherson on the Tegumentary Glands of the Frog.—The author alludes to numerous simple follicles, mostly opening outwardly, and which are also to be met with on portions of regenerated skin; they (on the sole of the foot at least) have no pigment near them, and often contract and become angular.

Cayla on the Measurements of certain portions of the Kidneys of the Horse.—

	Diameters.	Mm.
Terminal Venous and Arterial branches	0.000005	
Malpighian granules	0.0002	
Bloodvessels of the Tubular substance... ..	0.00001	0.000005
Arterial Stems to which the Malpighian gra- nules are attached	0.00002	0.00003
Tubuli urinifera at their mouth.....	0.0004	
Ditto in the middle	0.0001	
Polygons of the surface of the Kidney	0.0001	0.0015

[From *Schlechtendal's Linnaea*, 1842.]

Mohl on the Structure of the Punctated Vessels of Plants.*—When we examine the structure of punctated vessels, in reference to the tissues immediately surrounding them, we find it only in comparatively few Dicotyledons to be similar, and at the same time independent of that of the surrounding tissues. From such being the case, we can only take under consideration those vessels which we are thoroughly satisfied from observation stand in connection with *various* elementary organs, and all vessels must be excluded which are only surrounded with prosenchymatous or parenchymatous cells, as they in all cases possess a similar structure of their parietes. If we regard such separate running vessels as generally appear in *Rhamnus capensis* and *Viburnum opulus*, for example, we shall find a series of modifications of vascular structure, in which the influence of the approximated organs is evident enough.

A. The proper structure of punctated vessels is more completely developed in such plants in which the walls of the vessels admit of no variations, in which they may be connected with other vessels or cells, and everywhere equally provided with a dot and circle, as in *Eleagnus acuminata*, *Clematis vitalba*, and *Broussonetia papyrifera*.

B. In these vessels that wall which is contiguous to the prosenchymatous cells, has dots and circles like the other walls which are contiguous to vessels, but here the cell exerts its influence upon the vascular parietes, and the punctations are more distant from each other than those on the other walls. Such vessels may be found in *Bixa orellana*, *Acacia lophantha*, *Sophora japonica*.

C. In vessels of still more evident dependence upon the cells, their walls which are in connection with other vessels are thickly studded with the dots and circles, whilst those in connection with the prosen-

* We have translated the word *Getüpfelten* as *punctated*. *Tüpfel* we have rendered as the *dot*; the word *circle* is expressed in the original by *Hof*.

chymatous cells have them very distantly situate, large portions being quite free from them, and those near the medullary rays have the dot, but no circle. Such vessels may be observed in *Sambucus nigra*, *Betula alba*, *Aralia spinosa*, *Coryllus avellana*, *Populus alba*, *Alnus incana*, *Platanus occidentalis*, *Pyrus malus*, and *Gymnocladus canadensis*.

D. A higher degree of influence may yet be exerted by the cells, but which, in such cases, present more of a parenchymatous than a prosenchymatous appearance. Here, those vascular parietes alone which are contiguous to other vessels, possess dots along with their circle, whilst the walls lying next the cells have numerous large dots, but no circles, quite like the dots of parenchymatous cells. Such may be observed in *Cassya glabella* and *filiformis*, *Bombax pentandrum* and *Hernandia ovigera*.

E. A mere modification of the just-mentioned form, but which has a peculiar appearance, is seen in *Chilianthus arboreus* and *Cynanchum obtusifolium*; in which the parietes of a vessel which lies next to another vessel has a scalariform structure, the dots being elongated or stretched out into spaces of the whole width of the vessel, whilst the wall contiguous to the cells has large dots, but no circle. Though less strikingly, the same structure is seen in the common Vine.

To the above forms the greater number of punctated vessels may be reduced.

There is another description of vessels, however, which all agree in this particular, namely, the spaces between the several rows of punctations are not smooth, there running spiral fibres on the internal surface of the walls of the vessel. These bear the same relationship to ordinary punctated vessels as the dotted tubes of *Taxus* do to the other Coniferae. In these vessels it is not merely the distribution of the punctations which has to be noted, as in the former description, but it must be observed whether all the vessels, or only a part of them, are provided with the fibres, and whether the punctations are found on every duct, or only on some. In some of these plants we can distinguish (though it must be confessed, not very absolutely) smaller and larger vessels of different structure, some will be found lying in groups together, more especially towards the inner circumference of the annual zone, and near which are often vessels of much smaller diameter, the tube having more the appearance of a prosenchymatous cell. These in the following description are called *smaller* vessels.

The above descriptions may be reduced to the following heads:—

F. All the vessels are provided with dots and circles; the larger ones have smooth walls, the smaller have spiral fibres running between the punctations. *Morus alba*, *Ulmus campestris*, *Clematis vitalba*.

G. All the vessels are closely punctated; between the rows of dots run narrow fibres. *Hakea oleifolia*.

H. The larger vessels have dots, the smaller have none. The walls of both are provided with spiral fibres on the external surface. *Daphne mezereum*, *Passerina filiformis*, *Bupleurum arborescens*, *Genista canariensis*.

I. The walls of the vessels abutting on other vessels are punctated, whilst those contiguous to cells have the dots very distant, or are quite free from them. All the vessels are provided with fibres. *Samara*

pentandra, *Tilia parvifolia*, *Æsculus hippocastanum*, *Acer pseudoplatanus*, *Cornus alba*, *Ilex aquifolium*, *Crataegus oxyantha*, *Prunus padus*, and *P. Virginiana*.

On reviewing the above remarks, it is evident that the general opinion of phytotomists, that the structure of punctated vessels is uniform, is erroneous; it is but in comparatively few cases the fact. The only point in which they all agree (and even here we must leave out of the question those comprised under division *H.*), and by which they are distinguished from other vessels, is the presence of dots with surrounding circles, and which at least are met with on those walls which are in contact with other vessels.

(*To be continued.*)

[From the *Gazette des Hopitaux*, 1842.]

Bouisson on the Microscopic Characters of the Bile.—In order to determine the microscopic characters of human bile, or of any of the higher animals, an amplification of 250 diameters must be employed, and the liquid should exist in a certain degree of concentration. Cystic bile, from a person previously subjected to a long abstinence, answers the best. The microscope develops three elements:—

1. Plates of yellow colouring matter slightly tinged with green, of variable size, and generally irregular.

2. Geometric corpuscles of crystalline appearance, less considerable in number than the plates of colouring matter, with which they are sometimes united. These corpuscles are cholesterine in a state of suspension, disappearing under the action of ether.

3. Globules of variable quantity, sometimes disposed in small coherent masses, at others associated with the lumps of colouring matter, to which they appear to serve as media of union. These globules belong to the mucus of the gall bladder.

From the above and other observations, the author concludes that the colouring matter is not entirely dissolved in the bile, but that a part is naturally precipitated; that the cholesterine, which, from the observations of Chevreul, has been thought to exist in the bile in a state of dissolution, is really in a state of suspension; and, lastly, that the mucus facilitates the adhesion of these two elements of the bile.

M. Bonjean de Chambéry, on the properties of the Microscopic Fungus called Ergot.—This experimenter states, as the result of numerous experiments,—1, That Ergot gathered the first day of its formation, does not possess the deleterious properties that it evinces on the termination of the sixth day. 2, That a heat of 100 degrees Cent. produces the same effects as too early gathering. 3, That fermentation also destroys these properties. 4, That ergot of old rye, not fresh and damaged, loses nothing in this respect.

Ehrenberg's preliminary Report upon a Deposit of Microscopic Organisms in Berlin.—In this report, which was read at the meeting of the Berlin Academy, in July 1841, he first referred to previous discoveries since 1834 of similar deposits in all parts of the world, and to the recent light which had had been thrown upon the mode of formation of such deposits by Infusoria, from observations made in the Zoological Gardens of Berlin.

All the hitherto known fresh-water forms had been silicious, and none calcareous; and all subterranean deposits consisted only of dead remains, affording evidence of having formerly lived on the surface, and of having died, and been covered by new generations, again dying in their turn.

In consequence of the close attention which had been awakened to investigations on this subject, great interest had been excited, by the discovery in Berlin itself of an extensive formation of Infusory remains.

The extent and thickness of this formation is then described, which appears to be situated at a depth of about 15 feet, and the bed to be from 5 to 28 feet or more in thickness. This formation of fresh-water Infusoria is by far the most extensive and the thickest of any hitherto known in detail. The deposit is composed of from $\frac{1}{3}$ rd to $\frac{2}{3}$ rds of its mass of silicious Infusoria, of which a very considerable portion is still living and breeding.

Many of the smaller shells are broken, but many others are uninjured, and present internally altogether the same organization as those at present in full vitality on the surface, near Berlin. They are filled with fresh and lively green granules, or cells, containing green ova. However, the number of such cells is less in the fossil than in the surface specimens. The greater part of the animalculæ forming the deposit, belong to the *Gallionella*, which are under all circumstances motionless. The author, however, on one occasion observed spontaneous motion in some small *Navicula*; but these motions were very slight, and were wanting in most.

Another striking circumstance with regard to this Berlin deposit, is the fact, that the majority of the forms constituting it had not previously been found in the neighbourhood of Berlin, but that the same species constitute the deposits of Infusoria (Infusorien-Mehl), alternating with the brown coal and sandstone near Kliecken. It is farther remarkable that, intermixed with these Infusoria, there should be found many silicious spicula, which are abundant in marine sponges, but have never been found in river sponges in the living state near Berlin.

[From *Müller's Archives*, 1841.]

Müller on a peculiar Morbid Parasitic Formation with specific organized Seminal Corpuscles.—The disease here described was first observed in the cellular tissue of the orbit of a young pike, in the substance of the sclerotica, and between it and the choroid. It consists of cysts from one-fifth to one-half of a line in diameter, with very delicate walls, and containing a whitish substance, which is composed of very small granules, with molecular motion, and of innumerable corpuscles, very like

spermatozoa, but quite motionless. These corpuscles have an oval body and a tail. The body has a general resemblance to an elliptical blood-globule, and is about as large as the blood-globule of the pike, like which also it has two surfaces, and a thick edge. In its interior there are always at the opposite extremity to that whence the tail proceeds, two rather long vesicles, whose smaller ends converging at the end of the corpuscle, are there united, and thence lying symmetrically on it, gradually diverge to their larger extremities. Besides these vesicles, the corpuscles contain a transparent fluid. The tail of the corpuscle is a filament like those of spermatozoa, three or four times as long as the oval part, and sometimes bifurcated. It appears to be a prolongation of the wall of the corpuscle; the cavity of the latter is not continued into it.

In the pike the cysts, with such corpuscles as these, are found only in the orbit; but in several other river-fish, cutaneous eruptions are sometimes met with, consisting of vesicles with corpuscles differing from those just described, in not being caudate, but resembling them in containing the two oval diverging vesicles; and since his first observations were made, the author has found them in cutaneous eruptions in a number of fish, as well in those of his own country as in those of other parts of Europe, Brazil, North America, the Nile, &c. On the skin the vesicles are most common in the *Zander* (of which the author does not give the Latin name, but which we find translated as the *perch-pike*), and in this the mode of development of the corpuscles has been observed; for among a great number of them there are found some which show the two diverging vesicles separated and enlarged, and lying free in the interior of the corpuscle, and other examples in which two corpuscles lie near one another, surrounded by one very pale cell, and each presenting all the characters of the simple corpuscles, together with the rudiments of diverging vesicles in each. So that the mode of development of the corpuscles is in all probability this: the diverging vesicles are the germs of new corpuscles; and as they become developed, they swell up, separate, and lie in pairs within the cavity of the corpuscle, which is transformed into the thin-walled cell containing them. Then, as they are yet further developed, the maternal cell dissolves, and they become free, each as a separate corpuscle.

The author regards this as a remarkable example of the propagation of a disease by a living *Seminium morbi*; it seems to hold an intermediate place between the acknowledged parasitic Entozoa and Epizoa, increasing by distinct ova, and the cells of ordinary morbid structures increasing by the development of their nuclei, and of one cell within the other.—*Müller's Archiv. Heft. V.* 1841, quoted in *Brit. and For. Med. Rev.*, Jan. 1842.

Grüby on the Vegetable Nature of Rupia, &c.—It has been shown by microscopic observers, that in the crusts of *Tinea favosa* and *Pseudo-tinea*, there are two very distinct vegetable growths. M. Grüby has since asserted, that he has discovered another plant in the bullæ of *Rupia*.—*Gazette Medicale de Paris*, Août 24, 1841.

[From the *Annals of Natural History*, April 1842.]

Willshire on Viscum Album.—Two or three years ago it was stated by Dutrochet, that in the nodi of *Viscum album*, no true woody matter existed; that the vascular connexion of the internodal spaces was therefore broken up, or was only maintained by a layer of *cellular tissue* or *pith*; this doctrine was admitted, and *Viscum* was supposed to form another illustration of what have been called *articulated stems*. Some time after, Decaisne published a small volume on the woody structure of this plant, in which he contradicted the statement of Dutrochet, and maintained that the vascular or woody portions of the internodal spaces were continuous, and the state of articulation was solely dependent upon the non-continuity of the vessels of the bark. Dutrochet again averred before the French Academy that his views were right. Here, I believe, the matter has rested. I have taken some pains to satisfy myself which of these theories is correct. I have examined portions of the plant both young and old, and at all portions of the nodal places, and I fully concur with Decaisne in stating, that the true woody and vascular structure of *Viscum* is perfectly continuous through the nodi; that there is no transverse and separating layer of cellular tissue or pith in this portion of the plant, but that the connexion of the inner layers of the bark is broken up at the nodi. *Viscum album* has not an articulated stem, in the proper sense of the word then. The vascular structure of *Viscum album* is by no means so entirely composed of those peculiarly marked and rather elongated cells, as is generally drawn and stated. Kießer's representations are often copied, but they only represent a part of the vascular apparatus; no doubt a great portion of the woody matter is composed of cells quite different from those met with in the wood of Exogens; but if the young wood or first-formed bundles be examined, plenty of very long annular ducts—and (to me) spiral ducts, with the fibre unrollable, however, as far as I have been able to detect—will be found. I may also remark, that the long pleurenychmatous cells surrounding the first-formed vascular bundles are carried along with the latter to the centre of the plant, around the pith of which they may be found, a circumstance somewhat analogous to that stated by Decaisne to take place in *Menispermaceæ*.

Willshire on the Scale of Adelia.—On the under surface of the leaf of *Adelia nereifolia* may be found a very beautiful and peculiar form of scale; it consists of two circular layers of cellular membrane, the one layer of much smaller diameter than the other, puckered and plaited, and of a saucer-shaped form; it is fixed by its centre, which apparently is connected with a *gland*, having coloured contents. From this form of scale, through that met with on *Eleagnus conferta*, I think transitional states may be seen, to the stellate hairs of many of the *Euphorbiaceæ* and *Malvaceæ*; in fact, upon the peculiar adhesions taking place between the cells, depends the appearance of the stellate hair or the scale of *Adelia* and *Eleagnus*. The occurrence both of stellate hairs and this form of scale in *Euphorbiaceæ*, shows the structural differences between the two not to be great in their origin.

April 27th, 1842.—J. S. Bowerbank, Esq., in the Chair.

A PAPER was read by G. Busk, Esq., entitled "Observations on some Infusoria contained in Water from Africa." The water was procured from two localities, and contained thirteen species of Infusoria, all of which, except three species, were common in ordinary water; the other three, which were of the genus *Eunotia*, were precisely similar to those discovered by Ehrenberg, as fossils in the Bergmehl of Sweden; but lately he has detected them in the recent state in earth from the neighbourhood of Labrador; thus having two localities of very different conditions as to climate, for the same species of Infusoria, which, the author states, would tend to prove that no certainty as to climate could be deduced from the occurrence of fossil Infusoria. (See the paper p. 99.)

Another paper was also read by the same author, "On the Young of a species of *Ixodes* from Brazil." These insects (a short account of which was given at the last meeting) were sent from Rio Janeiro in a letter, and were still alive, although upwards of 60 days had been spent on the passage over: they are called by the natives Carapato, and are highly injurious to cattle. The author described minutely their suctorial apparatus, and their general organization, and concluded that they were gifted with extraordinary powers of vitality, and imbibe their food through two suctorial tubes contained in the mandibles.

The Secretary read a letter from Dr. Southby of Bulford House, near Amesbury, Wilts, which had been handed to him by Mr. R. Taylor; it contained three different samples of disintegrated chalk from Salisbury Plain. Portions of each had been given to some members of the Society, and they had detected in them many forms of minute animals which were new to English microscopists.

Another communication was also read by the Secretary, from C. G. White, Esq., of Poplar. It will be recollected that in October 1840, Mr. White exhibited to the Society some beautiful specimens of supposed minute fungi, which he had found in tolerable abundance on gravel stones in the neighbourhood of Old Ford, Middlesex; they corresponded in some measure with the description of *Craterium pyriforme*, as given by Hooker and other botanists. Mr. White, having paid considerable attention to ascertain their true nature, has at last found them not to be of a fungoid nature, but the ova of a species of *Acarus*, with a body of a red colour, and six legs. Specimens of the insects, both in the egg, and after their escape were exhibited to the Meeting.

Microscopical Memoranda.

Apparatus to Prevent the Evaporation of Liquids under the Microscope.
—Vapours arising from the liquids under observation would, by condensing on the under surface of the object-glass form there round drops which act as so many lenses, and which, arresting the rays of light in their progress, would scatter them in every direction, and thus completely destroy the image before it could reach the object-glass. This effect takes place not only when the temperature of the liquid is

raised by the application of heat, either directly or in consequence of chemical action, but also when, in studying any body by the microscope, a fuming acid is used, such as the hydrochloric. This inconvenience is prevented by inclosing the frame of the object-glass in a small glass tube, shut at one end, whose inner surface is closely applied to the surface of the object-glass. This end is then plunged into the liquid, which is thus prevented from either beclouding the surface of the lens, or finding its way into the interior of the microscope, and there producing the same effect. Thus, if it be desired to observe the action of boiling water on a body, the mirror is removed, and a small lamp put in its place, and instead of the plain object-holder, a very thin watch-glass is used, which is filled with water, with a few fibres of silk, &c., to entangle and fix the particles which are to be observed, that the motions of the boiling water may not withdraw them from the eye of the observer. The extremity of the microscope (armed with its tube) is plunged into the water before the heat is applied, and the water must be heated gradually, and with a good deal of caution.—*Raspail's Organic Chemistry.*

Dalrymple on the Vascular Structure of the Allantois and Vitelline Membrane of the Incubated Egg.—The value of the observations on the close similarity detected by Mr. Dalrymple between the disposition of the capillaries of the allantois of the chick and those of the lungs of Batrachian animals, is much enhanced from the circumstance of the respiratory function of the vascular membrane lining the incubated egg having been rendered in some degree doubtful by the results of experiments made by Mr. Towne of Guy's Hospital, in which he believed that he had witnessed the development of the chick and allantois in eggs to which the access of air had been prevented. Experiment, however, has shown, that the eggs alluded to were not hermetically isolated from atmospheric influence; and I may observe, that it is essential in any experiments on the influence of the air in animal development, to establish in the first place, by adequate chemical tests, the impermeability to air of the insulating covering of the egg, on whose efficiency in hermetically excluding gas, the value of the experiments altogether depends. When such impermeability of the insulating medium is assumed, as in Mr. Towne's experiments, and not proved, such experiments can only lead to an opinion, and not establish any scientific result. The requisite pains and precautions, which the present advanced condition of chemical science enables the experimenter to put in practice, have been faithfully and effectually taken by Dr. Schwann of Berlin, and the results of his experiments have completely established the opinion of Hunter and other physiologists, that the allantois is a temporary respiratory organ; which opinion Mr. Dalrymple's microscopic observations have so ingeniously supported by the discovery of the close resemblance of this transitory vascular membrane to the persistent lungs in certain animals.—*Extracted from Prof. Owen's Address, read before the Micros. Soc. Lond., Feb. 13th, 1841.*

Martin Barry on Fibre.—An error has been pointed out to us in the last number of this Journal, p. 93, connected with the report of Mr. Edwin J. Quekett's observations on the fibre seen by him in a speci-

men of coal. Our report stated, that the meeting of the Microscopic Society of London, at which Mr. Quekett's remarks were made, took place on the 16th of March 1841, whereas it was twelve months later, being on the 16th of March in the present year. Our readers will have the goodness to make this correction, not merely that our Journal may not be deficient in historical accuracy, but because it involves a question of priority as to two discoveries,—the one by Dr. Martin Barry, in *recent* vegetable fibre; the other by Mr. Quekett, in the *remains* of vegetable fibre, found by him in a specimen of coal and of silicified coniferous wood. As to the respective dates, Dr. Barry's observations were made public, by the reading of a paper before the Royal Society, "On Fibre," Dec. 16th, 1841; in the abstract of which—inserted March 1st, in the Annals and Magazine of Natural History, from the printed "Proceedings" of that Society, No. 51, p. 364,—"*fibre*," vegetable as well as animal, is described as "*being to all appearance composed of two spirals running in opposite directions, and interlacing at certain regular intervals.*" [One of the instances given in the Paper itself, was the fibre of cedar wood.] Mr. Quekett's observations, as above stated, were made public at the meeting of the Microscopical Society on the 16th March following; and he is reported to have said, respecting the fibre seen by him in a specimen of coal, &c., that "where there are more than one row of dots on each fibre, these dots appeared to be formed by *two spirals wound in the interior in different directions, the turns of each connected at intervals* by longitudinal bands, thereby leaving a transparent space by such arrangement." On comparing the words here printed in italics in the respective descriptions, it will be obvious that Mr. Quekett was mistaken when he stated his belief, in reference to his own observation, that "*nothing analogous had hitherto been detected in recent woods.*"

Note of the Inventor on the Side Reflector.—At p. 78 of this volume, "Mr. George Gwilt is described as the first to use the silver concave mirror in the manner in which Mr. James Smith under Mr. Gwilt's directions fitted one to his microscope." The remainder of the paragraph gives no information how this varies from the Lieberkuhn; but if it means the side reflector, I beg to inform you that I invented it about six years ago, and first exhibited it at one of Mr. Bowerbank's Monday evening meetings, and have occasionally supplied it with my microscopes ever since; and I believe the only alteration made by Mr. Smith under Mr. G.'s directions, is an extra joint, which Mr. G. conceives to give greater facility in the adjustment: but the method of using a detached mirror, and of receiving the light above the object, and of reflecting a greater quantity of more obliquely-directed light than a Lieberkuhn, with all the advantages resulting therefrom, is due to me."—*Andrew Ross, May 6th, 1842.*

Knox on the Food of the New Zealand Herring (?).—We have carefully perused the letters of Dr. Knox, relating to the food of a fish which prevails in the sea around New Zealand, and resembles the herring of the British seas, and have examined the specimens he sent. These, which were obtained by Mr. F. J. Knox from the stomach of the fish alluded to, appear to consist of the young of a species of Cyclops (?). In the mean-time, they are referred for further examination.—*Editor.*