The idea conveyed was, that two layers of spherules (first detected by Mr. Beaumont within the tubes), like two confined layers of small shot, had, by compression, been forced and largely spread out into broader layers. It was thought also that detached portions resembled long tubes or puckers filled with spherules exactly fitting them. The spherules appeared perfectly spherical, but somewhat unequal in size.

In the general flattened and extended surface of the compressed and disintegrated scale the spherules appeared dark blue or red, according to the slight change in the focal plane, and in a still lower plane white.

In the adjoining uninjured scales long strings of beads were seen, like necklaces of coral, here and there sharply bordered with black lines, apparently denoting tubes of membrane or puckers enclosing them like a tube. Between these strings of spherules peeped forth others of a light orange-colour.

The slide was an old one and well known. The mass of the crushed scale occupied a much broader space than any of the scales.

XVIII. "On the Accommodation of Vision, and the Anatomy of the Ciliary Body." By Arthur Trehern Norton, F.R.C.S., Lecturer on Anatomy at St. Mary's Medical School. Communicated by Dr. Sibson, V.P.R.S. Received June 5, 1873.

(Abstract.)

This paper is to show that the increase in the convexity of the lens, when accommodated for near vision, is effected by compression of the equator of the lens by an erectile cushion composed of the ciliary processes turgid with blood, the ciliary muscle being the motor agent; also that the iris aids accommodation by increasing its rapidity, but that accommodation of vision can be effected slowly without the assistance of the iris.

The author states that, by dissection of human eyes, he has determined the existence of an erectile mass attached to the interior surface of the ciliary muscle from which the ciliary processes proceed, and that in dissections of injected specimens the vessels of the ciliary processes and of the erectile mass can be seen to pass through and between the fibres of the ciliary muscle near to the apex of that muscle.

From the festooned appearance of the ciliary processes when uninjected, and from their greatly increased size when injected, he concludes that the ciliary processes, and the mass from which they project, are erectile, and are capable of undergoing a great alteration in size, the erection being due to compression of their veins by contraction of the ciliary muscle.

In the anatomy of the ciliary muscle he gives, as the origin of that muscle, the middle fasciculus of the posterior elastic lamina of the cornea,

and as the insertion $\frac{1}{4}$ to $\frac{1}{3}$ the fibres into the connective tissue of the choroid coat of the eyeball, and the remaining fibres into the connective tissue of the erectile mass and ciliary processes.

Judging the action of the muscle from the attachment of its fibres, he states that those fibres inserting into the choroidea, and which are seen to pass around the veins derived from tissues which he terms erectile, must, when contracting, compress those veins, and so cause the erection of the ciliary processes and ciliary mass; whilst the fibres of the muscle which curve round to insert into the connective tissue of the ciliary processes, when contracting, cause those structures to approach the muscle, thereby tensing them upon their contained vessels, so as to render them solid and to prevent them from flattening upon the anterior surface of the lens.

The attachment of the ciliary muscle to the suspensory ligament of the lens, either primarily or secondarily, is denied; so that the contraction of that muscle cannot draw forward the suspensory ligament as hitherto described.

The existence of a ciliary ligament is not admitted.

The author continues :—

Accommodation is known to depend upon the convexity of the lens.

The convexity of the lens depends upon the size of the erectile organs (ciliary processes and ciliary mass), which, when the eye is accommodated for closest vision, assume the greatest amount of erection. These erectile organs form a circular cushion, which overlaps the equator of the lens; and as the size of this cushion increases as the erectile tissue becomes filled with blood, so does the cushion exert a greater amount of pressure upon the equator of the lens, decreasing the substance of the lens at its equator, and increasing it at its poles; in this manner the lens is increased in convexity and accommodated for near vision.

So far accommodation may be effected without the aid of an iris; but without an iris the change of accommodation from extreme distant to extreme near vision must occupy the time required to fill the ciliary processes with blood to complete erection. With the iris the change is almost (but not quite) instantaneous.

From the circumferential attachment the iris curtain passes obliquely forward for $\frac{1}{20}$ to $\frac{1}{24}$ inch, and then falls at a *sharp angle*. [In operations the iris tears from this angle, and not from its circumferential attachment.] The *plane* of the iris is therefore $\frac{1}{20}$ to $\frac{1}{24}$ inch in front of its attachment.

Papillary narrowing is associated with accommodation for near vision. The muscular fibres of the iris are circular and radiating; and though the two sets would appear to counteract each other, yet both can act at the same time. When the circular fibres (sphincter) contract, the radiating fibres contract with a power not sufficient to overcome the contraction of the circular fibres, but with a power sufficient to tense the

curtain of the iris and to obliterate the sharp angle already described. The plane of the iris is then thrown back to a level with the circumferential attachment.

The ciliary cushion, which is at the same time, one may say, slowly enlarging by the erection of the ciliary processes &c., and which lies behind the iris, is thus instantly pressed back by the iris upon the equator of the lens, and the lens is therefore instantly accommodated for the nearer vision. The iris is thus shown to greatly increase the rapidity of accommodation.

XIX. "On Mr. Spottiswoode's Contact Problems." By W. K. Clifford, M.A., Professor of Applied Mathematics and Mechanics in University College, London. Communicated by W. Spottiswoode, M.A., Treas. and V.P.R.S. Received June 19, 1873.

(Abstract.)

The present communication consists of two parts.

The first part treats of the contact of conics with a given surface at a given point; this class of questions was first treated by Mr. Spottiswoode in his paper "On the Contact of Conics with Surfaces," and general formulæ applicable to all such questions were given.

The results of that paper are here reproduced with some additions; with the exception of a few collateral theorems, these are all contained in the following Table:—

*Number of five-point conics through fixed point	= 6
*Order of surface formed by five-point conics through fixed axis	= 8
Number of six-point conics through fixed axis	= 9
*Number of seven-point conics	=70

The second part treats of the contact of a quadric surface with a surface of the order n; and in particular it determines the number of points at which a quadric (other than the tangent plane reckoned twice) can have four-branch contact with the surface. In his paper "On the Contact of Surfaces," Mr. Spottiswoode proves that at an arbitrary point on a surface there is no other solution than the doubled tangent plane, and gives the conditions that must be satisfied by those points at which another solution is possible.

The method here adopted is an extension of that applied by Joachimstal to the contact of lines with curves and surfaces. The coordinates of a point on a conic are expressed in terms of a single parameter, those of a point on a quadric by two parameters. To determine the intersection with a given surface we have an equation in the parameter or parameters; and the conditions of contact are expressed in terms of the coefficients of that equation. The special case of the intersection of a quadric with a cubic surface is treated by the method of representation on a plane.

* These results constitute the additions.