the sensation, as he expressed it. Agitation, restlessness, vomiting of dark-green, bilious liquid. Pain and burning in stomach. I thought of strangury, and introduced a catheter and drew off a little urine, but without relief. I believed there had been perforation of the bowel by an ulcer, and escape of fluid into the peritoneal cavity. Drs. Cross and Snow were called in consultation.

Treatment.—Two grains of opium every hour till relief. Several doses were administered before pain and vomiting ceased.

Symptoms of collapse speedily set in. Pulse in one hour ran up from 96 to 160, and became small and thready. Body bathed in cold clammy perspiration. The usual supporting treatment was of no avail. At midnight he was nearly pulseless, yet his mind remained clear. Abdomen enormously distended, and now very hard. Percussion gave a dull sound. Fluctuation could be detected. The peritoneal cavity was evidently full of extravasated fluid and inflammatory serum.

At 11, A.M., he sank and died.

Was this a case of typhoid fever, attended, on the eighth day, with perforation of the bowel, and rapidly ensuing death from peritonitis? If so, it is an unusual case. Or was it more properly a case of enteritis, with perforating ulcer?

Could any other treatment have been more successful?

It is to be regretted that a *post-mortem* examination could not be obtained.

Selected Papers.

CONIC ACCOMMODATION IN THE COMPOUND EYE.

By RUSSELL MURDOCH, M.D.

DR. RUSSELL MURDOCH, at the last meeting of the Baltimore Pathological Society, showed how cones in the compound eyes of insects are adapted, *by reason of their shape*, to produce distinct images on the retina of objects *at all distances*, and that the single function ascribed to them—"of cutting off lateral rays, and admitting to the retina only such rays as directly face them"—is but a part of what they accomplish. He recalled the anatomical structure of these eyes—that they possess no crystalline lenses, and that the cornea, in different species, vary from concavo-convex, plano-convex to

bi-convex. The irides are frequently absent or rudimentary; but if present, are fixed, and therefore do not take any part in regulating the different amounts of illumination for varying distances. These irides are situated between the layers of the cornea, thus foreshadowing the future separation of cornea and lens. It was shown, therefore, that there was no provision for focal adjustment, such as is found in the higher type of eye; and *à priori*, he argued, any such adjustment, depending on the comparatively slow muscular action to accomplish it, would be totally inequitable for the rapid flight of insects—as, for example, where the dragon-fly is pursued by the swallow, in the well-known experiment so often quoted.

He showed how parallel rays from distant objects are focused on the retina, and how the sides of the cones, being radii of the corneal sphere, surround and take the direction of these cones of rays. It is not so with rays from near objects, for these are divergent, and after passing through the cornea separate—or are too large for the cone, and, therefore, the most external ones, as the object approaches, are, one after another, lost on its pigmented sides. The central straight rays, limited in number by the amount of truncation of the cone, form a distinct image at whatever point they meet the recipient surface.

It might at first sight be objected to this hypothesis, that so few rays would interfere with adequate illumination; but the deficiency of rays is compensated by the greater illumination of each ray proceeding from a near object.

The fixation of the pupil and the absence of the ciliary muscle, are both introduced for the same end, viz.: to dispense with the appreciable interval required for muscular contraction. The great Mechanist, although apparently committing an oversight, has improved in rapid adjustment on the method best known to us, and the one we have adopted in all of our optical instruments.

He showed farther that the isolating function, usually ascribed to these cones, is another mechanical contrivance for dispensing with the still slower action of rotation which is found in the spherical eyeball. The isolation of cones, coupled with the prominent position of the compound eyes, allows of an unlimited field of vision, as well as an unlimited and simultaneous accommodation in different cones—one set of cones might be directed to, and would

focus a pursuing enemy at a distance, while another would accurately define a near object.

This very great perfection of vision, it will be remembered, takes place on both sides of the body, thus further dispensing with the still slower process of rotating the head.

The objection to the fusion of so many separate images and their proper interpretation by the brain, presents no greater difficulty than the union of the two distinct images of the two organs into one impression, as occurs in those animals having an antero-posterior direction of the optic axes.

Dr. Murdoch proposed the name of conic or passive accommodation, to distinguish this from active or muscular accommodation of the globular eye.—*Baltimore Med. Journal*.

DISEASE OF THE ANTRUM.

By C. S. CHITTENDEN, I.D.S.

ON the 30th of August, 1870, a stout, sturdy Englishman called on me to have the roots of the left superior second bicuspid extracted. The face was most fearfully swollen, the swelling commencing about the orbital edge of the malar bone and extending downward to a point a little below the alæ of the nose, and puffing out in the centre, much as if the half of an egg, cut longitudinally, had been placed under the skin. The surface was very hard and intensely red, the appearance being unlike anything I had ever seen before. I made a good many inquiries, from which I gathered that the swelling first commenced about seven years before, and had given more or less trouble ever since, but had never been as painful or as badly swollen as when he came to me. I also learned that on three or four occasions he had consulted physicians, who had opened the enlargement in the cheek, from which, so far as he knew, there had been no discharge but blood.

The gums were perfectly healthy, there being no inflammation about the roots of the bicuspid even. Suspecting disease of the antrum, I plied him with the usual questions, but failed to elicit anything from him that would lead me to decide positively as to whether the cavity were affected or not, and as I could see no other cause for the trouble, I decided to make an opening into it. For this purpose I extracted the roots, which were removed without difficulty, and then attempted to pass a small

drill through the socket of the palatal root, but as it caused him a good deal of pain I desisted for a moment, and then inserted the drill into the socket of the buccal root and gave it two or three turns, when I found it had passed entirely through the bone. I withdrew the drill, expecting to see it followed by a discharge from the swelling; but, as nothing came away, I took up a small probe and passed it through the opening made by the drill, and pressed it up till he asked me to stop, when I found, on measuring, that it had passed up an inch and a half from the edge of the gums. Still there was no discharge. I then took a fine excavator, the shaft of which was bent at an angle of forty-five degrees, and passed that up nearly as far as I had the probe, and rotated it sufficiently to break up any saccular formations within its reach, when fully half a teacupful of very offensive matter was discharged. When all had passed out that would do so, I injected tepid water into the cavity several times till it seemed pretty well cleansed, when I threw in a mixture of iodine and carbolic acid, and placed a tent, saturated in the same mixture, into the opening, and requested him to call the next day.

August 31st.—Patient called according to appointment. Found the cheek distended nearly as badly as at first. On removing the tent, nearly as much matter was discharged as on the day before.

I filled the cavity with the same mixture, placed another tent in the opening, and requested him to call the next day, which he did. I continued to treat in the same manner for some time, with very little improvement. On probing the cavity carefully, I found that the external wall of the antrum was almost entirely eaten away, so that he could, by sucking, draw the cheek into it, leaving quite a depression on the outside.

On the 8th of September I resolved to try nitric acid, very much diluted, as an injection. Accordingly, I put three or four drops of the acid into a tumbler of water, which diluted it so much that there was only a slight sour taste to it, and injected a syringeful into the cavity every day for a week. From that time he improved rapidly, and in two weeks I discharged him, cured. The opening into the nose was evidently closed, and he positively refused to allow one to be made there. So I could only do the next best thing—form an artificial one into the mouth, which I did.—*Canada Journal of Dental Surgery*.