is produced by secretion is therefore based more on physiological facts than upon data such as:—

1. Anatomy of the ciliary processes.
2. Cytological evidence of functional activity.
3. Electrical evidence.
4. The stimulation of secretion by drugs or by nerves; and in the opinion of many workers these last four methods of investigation in themselves produce very strong evidence as to the secretory nature of the intra-ocular fluid.

In conclusion I would like to thank the Honorary Staff of Moorfields Royal Ophthalmic Hospital for the honour they have done me in inviting me to give these lectures.

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A DESCRIPTION OF A MONSTER, DIPROSOPUS TETROPTHALMUS

With notes on the histology of the median eyes
by John Maude

BY

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AN uncommon monstrosity which is an example of superior duplication, was recently presented to the Department of Pathology, University of Sydney, by the Royal Alexandra Hospital for Children.

The specimen may be designated diprosopus tetrophthalmus in association with anencephaly.

In the following notes the external features will be described and illustrated; a short description of the internal anatomy, the microscopical appearances of the median eyes, and the radiographical features (together with reproductions of the radiographs) are also incorporated.

External description.—The foetus is a white female. It weighs 2,668 grammes (5 pounds, 14 ounces) and the length from the most superior point to the heel is 42 centimetres (16½ inches).

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The vault of the skull is absent. In the midline of the floor of the skull there is a bony projection which may be the fused posterior clinoid processes, and anterior to it is a small piece of nervous tissue corresponding in site and shape with a pituitary body. The surrounding tissue, of which there is very little, is dark brown, soft and friable. Peripherally an irregular line marks the junction of the meninges with the skin. A remnant of the upper end of a single spinal cord is evident.

The facial area is broad. On each side is an ear, both being folded to such a degree that the external auditory meatus is not visible. On the left side the supero-posterior margin of the helix hangs over the lower edge of the pinna. The helical margin is thinner at the point where the folding is most acute.

Three bulgings above the bilateral noses contain eyes. The eyes and palpebral margins of the lateral eyes appear normal,

FIG. 1.

The anterior view of the monster.

notwithstanding an epicanthal fold at the inner angle. A description of the central bulging is deferred. In the midline, almost directly below the concavity in the lower eyelid of the central bulging, and slightly above the level of the corners of the mouths, there is a pit 1.5 mm. in diameter. Its depth is 8 mm.

Two noses are symmetrically placed, but the one on the right side is flattened at the tip (probably due to faulty mounting). Each lateral nostril has a posterior defect lined by mucous membrane, which has been prolonged into it from lateral hare lips, which preserve the general symmetry. The anterior portions of the palate of both mouths show a lack of apposition between the maxillary and globular elements on the outer side, and correspond with the hare lips. In the floor of each mouth is a normally formed tongue. Two chins are present, between them lying a common central cheek. The neck is poorly represented. It is delineated laterally by a deep groove between the shoulder and the lateral cheeks, the grooves being continued medially in the form of a faint crescentic line.

The limbs and the body appear to be normal, though the upper limbs have assumed a grotesque attitude in the mounting.

The anus and vagina are patent.

Internal description.—The buccal cavities do not communicate with each other except at the posterior end, where they open into a common pharynx. From the posterior pharyngeal wall an irregular pyriform lump, 1.5 centimetres long, projects upward and forward. The lump is attached by a stalk and a broad attachment to the left lateral wall. A section of the lump demonstrates cartilage, mucous glands, striped muscle; and a layer of high columnar epithelium on one side.

There is only one oesophagus. Ventral to it is a single trachea with lobes of thyroid gland, unconnected by an isthmus, applied to its lateral aspects. Two separate masses of thymus gland face ventro-laterally, but no designation other than descriptive can be given to two flat elongated plaques of tissue which lie medial to the lobes of the thyroid.

The right lung has an irregular arrangement of its lobes, the intermediate lobe being four times larger than the combined aggregate of the apical and basal lobes.

The heart is small and measures approximately 4.2 x 3.2 x 2.3 centimetres. The apex is bifid, and the ventricles are equally represented on the anterior surface.

The right atrium is dilated, yet is normal in all respects, except that the foramen ovale is widely patent. No abnormality is present in the left atrium.

Of the two ventricles the wall of the right is thicker. A defect in the upper end of the interventricular septum allows the blood

in each chamber to mix, this blood subsequently passing into the aorta, which bestrides the two ventricles. The aorta possesses a normal complement of valve cusps, and the coronary vessels leave the parent trunk just above the valve.

In comparison with the aorta, the pulmonary artery is inconspicuous, the respective diameters at the widest parts being 9 millimetres and 5 millimetres. Both the infundibulum and conus are incorporated in the anterior wall of the right ventricle, and their topographical representation is on the left of the anterior longitudinal sulcus. The pulmonary valve is normal, and further on, the ductus arteriosus, which is pervious, leaves the main vessel at the bifurcation of the channel, where the right and left pulmonary arteries commence.

There is no defect in the diaphragm, and except that the kidneys and suprarenals are small, and that the liver rises to the level of the third rib anteriorly, the abdominal viscera appear normal.

Description of the central bulge.—Inspection removes the impression that there is a single median eye. The palpebral margins provide a clue in that a concavity is present almost in the middle of the inferior lid, though no ridges or depressions mark the conjunctival surface. Eccentrically placed, and slightly to the left of the midline, is an iris, approximately equal in size to the lateral irides. On retracting the eyelids another iris is seen in

FIG. 2.

The fused eyes viewed from the right supero-anterior aspect.

the upper and right quadrant. The corneae over these two irides are continuous, the corneo-sclerotic junctions taking the form of an hour glass. The illustration (Fig. 2) shows this well in addition to revealing strabismus, the axes of the eyes making an angle of 20 degrees in front.

A block containing the two eyes exhibits maximum peripheral fusion at the corneal area. In a sagittal plane, a moderately deep annular groove extends around the junction of the eyes and becomes flattened near the cornea. A common lateral rectus muscle serves both eyes, though it is attached principally to the

FIG. 3.

A diagram of the hemisected fused eyes showing the sclerotic partition.

smaller eye, which incidentally receives the larger of the two optic nerves. More than half of the cornea of the smaller eye is buried in the fusion, whereas the limbus of the larger is just covered.

Histological description.—The transition from sclera to cornea is clearly defined in the larger eye, being demarcated by large vessels. When the sclera is traced back it is found to become thin and compact at the junction of the two eyes. The large vessels at the junction probably indicate the anterior limit of the common sclera; over the front of this the cornea is continuous. Bowman's membrane extends from the extremity of one cornea to the outer edge of the other cornea and crosses the point of junction, where

it is less well defined. In the smaller eye, deep to Bowman's membrane, are vessels which do not extend quite as far as the junction of the two corneae. The substantia propria of the smaller eye loses its lamination at the point where the two corneae are incompletely separated. Descemet's membrane and the endothelium of the smaller eye appear to end abruptly at the junction of the substantia propria and the sclera. From this point to the angle, the anterior chamber is lined by a thin membrane. Posteriorly, the common sclera separates into two parts corresponding to each eye. The vessels of the choroid coats are large and full, but there is no abnormality of the retina. A wide gap intervenes between the two optic nerves.

Radiographical examination: There is duplication of the upper six cervical vertebrae and of the jaws. Hemi-vertebrae may be

FIG. 4.

The lateral and antero-posterior radiographs of the monster. The arrows point to the hemi-vertebrae.

seen at the level of the 10th and 12th thoracic segments. The skull is typical of anencephaly. The lateral radiographs dispose of the impression gained from the antero-posterior aspect, that the femora and tibiae are achondroplastic.

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THE SCHOOL OPHTHALMIC SERVICE

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THE eye and the ear are the chief gateways of learning, therefore defects here are of prime importance. Impaired eyesight is one of the commonest and most potent defects which stand in the way of a child's school education. A service for the treatment of a particular condition or defect can only be made comprehensive by an efficient organisation in which the ascertainment of children suffering from that defect is complete. The earlier the ascertainment, the better the results of treatment. This applies to many other conditions besides defective vision, crippling defects being a good example. It is very important that arrangements should be fully developed for the ascertainment of defective vision and eye disease in children below school age. In the case of children under five years of age suffering from these defects the chief means of ascertainment is by the home visits of Health Visitors of the Maternity and Child Welfare Authority. The health visitors visit all homes (with the exception of the well-to-do) within fourteen days after the birth of the child, and thereafter periodically up to the age at which the child enters school. The health visitor inquires into the general condition of the child, and invites the mother to attend the infant welfare centre where an examination by a medical officer would be carried out. In the course of this work, the health visitors would become aware that a child was suffering from blindness, obvious squint, and inflammatory disease of the eye, and such a child would be referred for examination and treatment. Children known to be suffering from severe defective vision or eye disease should be notified to the Education Authority before admission to school. The Education Authority is then forewarned and can make suitable arrangements for any special medical or educational treatment at the earliest possible moment. In rural areas the health visitors can