exceedingly rare here, only one other possible case having been observed in the last 15 years.

2. That loss of vision may also result from an injury acting at the retinal level either suddenly (usually recovered in whole or in part), or gradually and permanent (due to late changes in the vessels); this is not very rare.

3. That minor injuries may take place involving the retinal vessels as evidenced by haemorrhages, oedema and alteration in calibre of arteries and veins without immediate interference with vision; such are relatively common.

4. That the lesser spastic phenomena of the arteriolar tree described of recent years were probably missed, owing to the hurried nature of the ophthalmoscopic observation, rather than absent, on account of any peculiarity in the local conditions.

5. That detachment of the retina is probably very rare here as a sequel to the toxæmias of pregnancy; it has not been observed by us in this condition either in this series or on any previous occasion in the past 10 years.

ON THE STRUCTURE OF HERBERT'S PITS

BY

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REPORTING to the last Ophthalmological Congress in April, 1933, at Madrid, on a series of observations concerning the trachomatous lesions of the cornea, I maintained that the formations known as Herbert's pits consisted histologically in thickenings of the corneal epithelium which proliferated on those points where the nodules of trachoma had previously appeared.

During a subsequent communication, Pascheff expressed his surprise at such an interpretation being maintained. Owing to lack of time then, I was unable to discuss the matter further. Had I had time to discuss the subject on that occasion, I should have limited myself to stating that my views were based upon histological researches carried out on a number of pieces of cornea which I had removed from patients and had studied by means of serial sections. At the time it was impossible for me to furnish more convincing evidences to support the view that the thickenings I had taken as corresponding to the pits did really correspond to them. One of the photomicrographs which I had the opportunity of presenting to the Congress, is the one that is seen in Fig. 1. It was

made from a case of old trachoma undergoing an acute relapse. In this case there were nodules and Herbert's pits at the upper part of the limbus. At the distal part of the lunula a markedly thickened area of the epithelium may be seen which then was pointed out as belonging to a Herbert's pit found during a clinical examination by means of the slit-lamp.

FIG. 1.

Histological picture of trachomatous "pannus scleroticus" undergoing an acute attack. Material obtained by biopsy. The more marked infiltration is seen in area *a-b*, which corresponds to the "lunula." Towards both, the cornea and the bulbar conjunctiva the infiltration is not so marked. In *c* a nodule is seen which was also observed by means of the slit-lamp. In *d* a thickening is shown which corresponds to a Herbert's pit.

The above mentioned objection offered by Pascheff, as well as the fact that while studying the limbus region, both normal and pathological, thickenings of the epithelium which were afterwards met with, situated in between the papillary crest which is named "palisade," induced me to continue my researches, trying to work

FIG. 2.

Herbert's pit as seen with the slit-lamp. Right eye: the light source comes from the temporal side. The temporal margin of the lighted prism is irregular at the point corresponding to the pit, and seems to follow the depth of the latter. With attentive observation it is seen that between the irregular line and the smooth corneal surface there is a zone apparently empty which is the result of the thickening of the epithelium.

FIG. 3.

Diagram showing a tattooed Herbert's pit. The Chinese ink is particularly dense at the periphery.

out a method enabling me to determine precisely in serial sections the exact seat of the tissues corresponding to the pit. This method was found and consisted in tattooing the pit, with Chinese ink, sometime before removing this part for microscopical examination. This procedure has proved a very satisfactory one as may be seen in this paper through the photomicrograph representing the pit which was removed a month after the tattooing was performed.

The anatomico-pathological findings, secured with this method, thoroughly prove my previous statements and furnish a further explanation for a number of peculiar facts observed when the slit-lamp is used.

Examining rather large pits (Fig. 2) by means of this apparatus I became convinced that there are no distortions of the prism caused by the bundle of light, and that under favourable conditions, at the lateral face of the prism, an apparently empty area is observed which is due to the abnormally developed epithelium, this one growing in order to fill up a lack of tissue existing underneath and having an irregular base.

At the proximal part it is easy to find what might be called the clear strips due to the tissues belonging both to the scleral and to the episcleral layers, which were destroyed.

In a moderately large pit, two little punctures were made with a tattooing needle with Chinese ink. A month later a small piece of cornea containing the pit was removed and examined microscopically. As is shown in Fig. 3, the Chinese ink used for tattooing remained at the periphery of the pit and in the central part of this a kind of deeply-stained navel-shaped depression was found with a number of strands irradiating from it. This material was cut in serial sections in a direction parallel to the corneal meridian; the examination of this material showed typical lesions which allowed me to confirm, without any doubt, both the facts I had previously stated concerning the existence of irregularities in the thickness of the epithelium at the exact seat of the pits and concerning the presence of epithelial proliferations filling up the empty areas left by the scleral, episcleral and corneal bundles which were destroyed due to the formation of the trachomatous nodules. According to these statements the epithelium was found in this case, clearly occupying all the anfractuositities resulting from the destruction of the bundles (Fig. 4).

These findings not only confirm my previous observations, but also enables us to explain the genesis of the Herbert's pits on an anatomico-pathological basis. As I stated in another communication, the trachoma nodules of the limbus begin at the distal margin of the "lunula," that is in the portion of the conjunctiva which takes place in the formation of the limbus region.

These nodules increasing push the vessels which are located at the sides; destroy only in that area the tissues, episcleral and scleral, which constitute the limbus region and go down to the corneal tissue, which is partially destroyed. Thus are formed round-shaped masses, which jut out a little or not at all above the corneal surface, and have a gelatinous appearance. They have a clear, rather yellowish colour, and are connected with small branches of blood vessels running in their neighbourhood. The new-formed

FIG. 4.

Serial sections of a Herbert's pit pointed out by tattooing. (A) Section lateral to the pit, where the epithelium has an almost uniform thickness. (B) Section corresponding to an anfractuosity of the peripheral part of the pit; an isolated island of epithelial tissue is seen which is not continuous with the superficial layer. (C) Marked thickening and irregularity of the epithelium at the central part of the pit. At the middle part of the thickening, epithelial cells are seen containing granules of Chinese ink; this point has a dark colour when examined by means of a slit-lamp. There is also a small central funnel-shaped depression. (D) Section medial to the anterior one. (E) Peripheral part of the pit. Slight thickening of the epithelium and unevenness of its surface.

vessels which come and go from the pannus of the cornea are seen passing through the interstices existing between the nodules.

When the process of recovery starts the nodules begin to re-absorb; the connective tissues situated between the nodules show a process of sclerosis, the blood vessels become smaller or are transformed in small compact strings and only a small number of the larger ones still remain partially open, furnishing blood from time to time.

As a consequence of the re-absorption of the nodular cells and owing to the scar-formation which takes place in a later stage there is a tendency for the cicatricial tissues to form depressions on their surface. However, no depressions at all are found due to the fact that the cells of the deeper layers of the epithelium increase in number and fill up completely the unevenness of the above mentioned depressions. The episcleral, scleral and corneal bundles which were once interrupted do not regenerate themselves and the

empty areas, formed on account of this lack of regeneration, become almost entirely occupied by the proliferated epithelial cells.

Considering that under optical examination these tissues appear empty, and that the opaque tissues (*i.e.*, episcleral and scleral layers) which normally take part in the formation of the limbus region are absent in the pits area, it results that the lamellae of the cornea are visible through the proliferated epithelium which lies behind. Due to this fact the area corresponding to the pits is more transparent than normal.

Keeping pace with the sclerosis of both tissues and vessels situated between the nodules, the opacity corresponding to these is increased and reaches also the normally transparent part of the cornea. All these facts result in the appearance of a characteristic picture. This picture is made up of festoon-like lines of a whitish colour, which lines circumscribe clearly (with the exception of the edge of the cornea) the round-shaped greyish areas, which, on a superficial examination, suggest the impression of a pit, while in reality this is not the case.

Only an exceptionally small central depression can be found at their centre. In conclusion it must be said that the name "pit" used to indicate the lesions considered does not express the real morphology of these formations.

TWO CASES OF RETINAL DETACHMENT PRESENTING CERTAIN UNUSUAL FEATURES AFTER OPERATION BY SURFACE DIATHERMY

BY

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It occurred to me that certain features in the two cases of retinal detachment reported below might be of interest to some ophthalmic surgeons who are practising the surface diathermy technique of Larsson. Both cases were unsatisfactory during the immediate post-operative period of rest in bed in the appropriate position, the retina remaining detached, but later becoming completely replaced with full restoration of the visual field in each instance.

Case 1.—J. D., a boy, aged 13 years, was referred by his school doctor to the Moorfields Eye Hospital on account of defective left vision. He stated that this had been poor since some dirt had been thrown into his left eye four years ago. He had never worn glasses and was emmetropic in the right eye, the vision of which was 6/5.