began to be troubled with constipation. The first attack lasted three weeks, and, since then, the bowels had been relieved on the average only once every two or three weeks. During this time she had been taking purgative medicine constantly, with no effect, and having frequent enemata. The relief of the bowels had been due to the enemata. For the last two or three months she had had pain in the lower part of the back, and running down both thighs, and the feet had been liable to swell.

On admission, she was well nourished, but pallid and delicate-looking. The abdomen was rather large, and resistant, but it was resonant; there was no tumour, no pain or tenderness, and its walls were flaccid. The bowels had not been relieved for three weeks. During the ensuing week, large enemata were administered on several occasions, and thus a considerable quantity of solid feces was evacuated. Since then, the bowels have been periodically relieved by enemata, so that there has been no reason to believe that there has been any continuance of undue fecal accumulation. They have never yet, however, acted spontaneously, or under the influence of purgatives. The patient suffered at first from occasional pains in the abdomen, and severe aching in the legs, but these symptoms have improved. She has been liable, also, to bad headaches. In other respects her health has been fairly good, and it has improved. The patient is still under treatment (April 18th).

ON THE ADVANCE OF THE PERIPHERY OF THE IRIS IN GLAUCOMA.

By W. A. BRAILEY, M.D.,

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THE application of the peripheral part of the iris to the cornea in glaucoma is one of the most interesting phenomena of this remarkable disease. It has, at the same time, great importance in a practical sense, since its occurrence appears to me to signify the entry of the malady on a new and less curable stage, in which neither myotics any longer afford a chance of cure, nor is any operation so easily done or so likely to be effective. For it appears reasonable to assume that, when the iris has once reached this position, it remains there, pressed valve-like against the meshwork of the ligamentum pectinatum. Moreover, the applied part very rapidly contracts inflammatory adhesions, and soon passes, probably in consequence of this, into atrophy, together with the rest of the iris.

These circumstances prevent its removal by iridectomy from this, in this sense, most important region of the cornea. They also hamper the performance of this operation and of sclerotomy, by misleading the operator as to the real position of the point of the knife at its emergence into the anterior chamber.

In connection with this application of the iris, certain questions suggest themselves.

1. Is this condition essential to the establishment of increased tension?
2. Though perhaps not essential in the above respect, does it not always occur at a later period in those cases where the disease runs its course to blindness?
3. What are the symptoms indicative of its occurrence?
4. What is its cause?

I venture myself at once to supply answers to the first three and less important questions, in order that we may come as quickly as possible to the fourth, which forms the essential question before us. I say decidedly, both on clinical and on pathological grounds, that increased tension does not necessarily involve the application of the periphery of the iris to the cornea, and that eyes in which the disease has attained merely an early or very subacute stage do not exhibit this phenomenon. For, when we see a patient suffering from glaucoma, in whom the pupil is active, and becomes contracted to a pin's point under eserine, we must believe that the muscles of the iris have good tone, and, consequently, that this membrane is not inordinately stretched, as it would be if its periphery were applied to the cornea. And the clinical evidence seems conclusive in those cases in which heightened tension falls to normal under the use of this drug. So, also, in intermittent glaucoma.

Pathological evidence in the same direction is not easy to obtain, since, in the vast majority of eyes excised on account of glaucoma, the disease is in its final stage. But I have three such eyes in which the iris-periphery shows no evidence of application. One of them is of about two years' standing from the commencement of the disease, with

no great rise of tension, though perception of light has ceased. The margin of the anterior chamber is, however, narrower than normal. Both the others are cases of recent and acute glaucoma. They appeared to be in a condition curable by operation, and would not have been available for our instruction, had not the operator chanced in each case to wound the lens in his attempted sclerotomy.

The above observations will also furnish my answer to the second question. Though I admit that the periphery of the iris is applied in the vast majority of eyes excised on account of primary glaucoma, and though I have found it thus placed even where the pupil, though not excluded, has remained small and rigid from adhesions between it and the lens, I cannot, in the face of the specimens above referred to, suppose that it may not remain unapplied.

With regard to the third point, excepting such cases as those with posterior synechiae just referred to, I should say that dilatation, often excentric, and immobility of the pupil, in association with an advanced position of the iris, are the signs by which this application can be recognised clinically, and that a sudden wide dilatation of the pupil shows the exact time of such advance.

As to the causes of this condition, and the exact pathological states associated with it, I propose to speak more fully. From the anatomical conditions of the normal eye, I admit, as maintained by Weber, Priestley Smith, and others, that the ciliary folds can, by their advancement, cause this application of the iris; for the more prominent of these folds run on to the base of the iris, and the shorter ones up to it. From a consideration of the relative extreme diameters of the aqueous chamber and lens, it is clear that the latter itself, so long as it retains its normal attachments, cannot, by its advance, effect such application. A lateral pressure of the lens or of the ciliary folds, such as would be due to the swelling of either, without any advancement, is not the means of effecting it, since there is no evidence of the compression of the ciliary folds, either against each other or towards the ciliary body, in any one of the very numerous cases that I have examined microscopically. Moreover, the extreme base of the iris, which would be the part pressed outwards, if the diameter of the lens became materially increased, retains its normal position. Indeed, the anterior chamber may still exist at its extreme periphery, notwithstanding the application just in front of it of the corresponding part of the iris to the ligamentum pectinatum.

If, then, we conclude that the ciliary folds are, by their advance, the cause of this application of the periphery of the iris, the next question is as to the cause of the advanced position of the ciliary folds, or, at all events, of their anterior border.

Before undertaking this part, let me state some facts, or some things appearing to me to be facts. Perhaps I shall make certain recantations.

1. There is no atrophy of the ciliary body, inclusive of its muscular part, in the early stages of glaucoma. This I state on the strength of certain preparations which I have examined comparatively recently. The atrophy of the ciliary body and iris, which is so well marked and characteristic, comes on later, and is, in my opinion, only a consequence of this application of the iris. It is the ultimate stage of the inflammatory change set up by the adhesion.

2. The anterior chamber is rendered shallow in the earlier stages of glaucoma by a partial advance of the lens and iris. Later still, when the margin of the iris has become applied to the region of the ligamentum pectinatum, and when atrophy of the ciliary region has set in, the lens recedes to its normal position. Then, as we see by the numerous microscopic preparations in which fluid is clearly trying to push its way between iris and cornea, to the separation of the adhesion between them, the iris tends, though ineffectually, to regain its proper position.

3. In most cases of glaucoma, the vitreous body is at least not below the normal size. But cases are not wanting where it is shrunken and detached from the posterior part of the retina by fluid; and others are found where it is only represented by traces remaining in the cavity of the umbrella-shaped detached retina.

4. The canal of Schlemm is open, at least as widely as normal, up to and for some time after the establishment of the glaucomatous condition. And the ligamentum pectinatum presents its usual loose texture.

5. The lens does not usually exceed the normal size in glaucoma. In the comparatively rare cases where I have found a disproportionate size, this is simply in consequence of the initial stage in the development of the cataractous condition. Moreover, this enlargement causes it to approach the spherical shape, being developed principally in an antero-posterior direction.

6. There is no certain evidence, either pathological or clinical, that the ciliary folds are swollen in glaucoma; though, from the enlarge-

ment of the ciliary arteries always, or, at least, so frequently found, we must admit that this condition is not an improbable one.

What, then, is the agent by whose pressure the ciliary folds are advanced? Not the swollen lens, since, as before said, demonstration of such swelling is rare; and, admitting it to be more frequent than I think, its effect would be principally, as in the early stage of some forms of cataract, to render shallow the more central parts of the anterior chamber. Moreover, the advance of the ciliary folds takes place as readily after the lens has been removed by extraction, whether in its capsule or not; but a swelling of the lens would doubtless predispose to glaucoma by its simple encroachment on the space included within the ocular tunics. Nor is an accumulation of fluid in front of the vitreous body, that is, between it and the ciliary body or lens, the agent; for such, if it had existed, would give some microscopical evidence of its presence by distension of the region of the so-called canal of Potit, or otherwise. Therefore, the parts posterior to the lens and ciliary folds, and between these and the secreting parts, must be the agents in question. Such might be the vitreous body itself, the retina, or fluid accumulated between the vitreous body and retina, or between the retina and choroid.

It is difficult to demonstrate an enlargement of the vitreous body, and impossible to measure such; but I take it that, if the lens and ciliary folds be advanced, and the optic disc pressed backwards into a concave shape, and if there be, at the same time, no detachment of the vitreous body to be found, then this body must be enlarged. Such a condition is probable in glaucoma on other grounds, since, in most cases of this disease, the vitreous body is firmer, and contains more cell-elements than normal.¹ Enlargement of the vitreous body occurs undoubtedly in the early and acute stages of suppurative hyalitis, and there produces an advance of the lens, ciliary folds, and iris, as well as increased tension.

The retina is extremely frequently thickened in glaucoma by cystic oedema of its substance. This thickening affects most commonly the front part, and occasionally, especially in the glaucoma accompanying Bright's disease or embolism of the central vessels of the nerve, at the posterior part of the retina. It is occasionally found in isolated patches, and in such the thickening may be very great, even amounting to ten times the normal; but such thickenings, even the greatest of them, can have no very great effect in pushing the vitreous body forwards, and, therefore, may be simply taken as indications either that more fluid passes from the surrounding vessels, or that there is some obstruction to the outflow of this fluid from the retina. *Post mortem* examinations sometimes demonstrate the existence of fluid just behind the detached retina, or between it and the choroid. We must then ask why this fluid, whether it be in the vitreous body or elsewhere, is detained there, and if it be normal in constitution, and in the amount secreted.

I judge it to be normal in constitution, in the absence of direct evidence to the contrary, and inasmuch as, under the mechanical influence of eserine, it can escape *via* Schlemm's canal; also, that it is beyond the normal in amount, since, Schlemm's canal and the entrance to it remaining normal, there is sufficient fluid still retained within the eye to keep it hard. The demonstration of an increased flow through Schlemm's canal in glaucoma is convincing, when the instillation of eserine rapidly brings about a restoration of the tension to normal; and that of an increased secretion depends upon the rapidity with which the tension is re-established after paracentesis in glaucoma, and, perhaps, also on the slowness with which the anterior chamber is re-filled after more extensive operations for the same disease.

But why should this application of the iris take place only in the later stage of glaucoma? It is, as many specimens in which sarcoma of the choroid co-exists with still normal tension show, preceded by a somewhat advanced position of the base of the iris, such advance being sufficient to narrow but not to close the peripheral part of the anterior chamber of the aqueous. The ciliary folds are, of course, the agents in this case, but their action is opposed by that of the muscles of the iris, especially the sphincter. But when, as in the later stages of glaucoma, the motor-nerves to the iris are paralysed, then this structure is impelled forwards to within the influence of the suction towards the ligamentum pectinatum, and immediately close apposition is brought about.

It is worthy of note that pressure on the posterior pole of the eye, as by sarcoma of the optic nerve or orbit, produces some advance of the periphery of the iris, just as in the earlier stage of glaucoma. This commends itself to me as a fact by the microscopic evidence of numerous cases of intra-orbital tumour.

The lens regains its position in the later stages of glaucoma by the tension of the zonula, which becomes greater as the atrophy of the ciliary body progresses. This tension is now free to act with effect, since, supposing the vitreous body to be now of the normal size, the pressure in front of and behind the lens becomes equalised on the closure of the exits from the anterior chamber. The iris tends to regain its position from the same cause, but its attempts are frustrated by the inflammatory adhesion which is speedily developed between it and the peripheral part of the cornea.

CHYLOUS ASCITES.

By W. WHITLA, M.D.,

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CASES where large quantities of chyle have been removed from the body are sufficiently uncommon, and of such physiological importance, as to warrant me in bringing the following under notice.¹

The following is an abstract of the case, taken by my clinical clerk, Mr. Thomas.

A. C., aged 13, was admitted to hospital on November 10th, 1883, complaining of abdominal swelling.

Family History.—His mother was alive and well; his father suffered from phthisis (and had since died); he had one sister who died in infancy.

Personal History.—The patient stated that he enjoyed good health until last spring. He had been an inmate of a reformatory for over two years. In May, 1883, whilst at work, he got a severe wetting, which was followed by bronchial catarrh, accompanied with pain in the left side. After he had got rid of the catarrh, the pain remained, catching him on breathing deeply. In August, the pain became more severe, due, he thought, to getting overheated, and he was sent to hospital. The following is Dr. Lindsay's account of his condition at that time. He was suffering acute pain in the left side, and had a cough; a loud friction-sound was audible in the sixth space, on the left side in front. There were some dulness and faint crepitus over the corresponding part of the same lung behind. His temperature did not rise beyond 100°, and the constitutional symptoms were slight. He remained in hospital five weeks, and his illness ran a slow but mild course. He was confined to bed for only four or five days; and convalescence was gradual, and apparently complete.

Present Illness.—He thought that his present illness began about four weeks after (about the middle of October), when he had a shivering fit, followed by pain on the left side, in the axillary line above the level of the last rib. Owing to this, he was placed in the sick-ward of the reformatory.

On October 31st, the patient first noticed that his abdomen was swollen. The swelling was always uniform; there was no oedema of the face, feet, or legs. The swelling increased rapidly; it was unaccompanied by pain. The appetite became poor, and he suffered much from thirst. The bowels were a few times irregular, some days confined; diarrhoea lasting three or four days following; a confined state again supervening. The patient stated that he passed urine more frequently than in health, not a great quantity at a time, and thought that, altogether, he passed less than usual; he stated that it was sometimes reddish and darker than normal.

Condition on Admission.—The patient was fairly well nourished; intelligent; he ate moderately, and slept well. His tongue was slightly furred. The abdomen was uniformly distended. On palpation, there was increased resistance, with slight pain on pressure over the left hypochondriac region. The percussion-note was tympanitic over the epigastric and umbilical regions, but became duller towards the pubes and flanks; this dullness changed with position. Fluctuation was well marked, and could be easily made out. His bowels were now regular, and his appetite good. The region of hepatic dullness could not be clearly made out on account of the distension. Pressure close to the costal arch in this region caused slight pain. The heart-sounds were normal, and the pulse was 90.

On examination of the lungs, the percussion-note was somewhat dull, over a limited area, at the inferior angle of the right scapula, over which region the breath-sounds appeared feeble, and there was some loss of vocal resonance. At the base of the right lung, a few crepitations were audible on deep inspiration; there were also a few

¹ "On the Vitreous Body in its Relation to Various Diseases of the Eye." *Guy's Hospital Reports*, 1882.

² Specimens of the chylous fluid, and morbid specimens, were exhibited before the Ulster Medical Society and the last annual meeting of the British Medical Association.