Clinical Remarks

MODIFIED LINEAR EXTRACTION.*

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VIII.—ESCAPE OF VITREOUS HUMOUR.

WHILST among the first hundred of my operations I had thirteen times an escape of vitreous humour, in the third hundred the accident occurred only six times. Thus, the percentage is no longer much in excess of that experienced in flap-extraction. The following few remarks will be found to refer rather to the loss of vitreous humour generally, than to its occurrence in this particular operation.

Sometimes the escape is not due to the rupture of a normally constituted vitreous body, but merely the consequence of a pre-existing liquefaction of the substance and the giving way of its natural investments. Under such circumstances, the escape is unavoidable, whatever may be the method of extraction preferred, but does not appear to imply material danger. The accident occurs when eyes affected with cornea globosa are operated on for congenital cataract, or in cases of operation for spontaneous dislocation of the lens, itself the consequence of an altered condition of the vitreous humour, and, according to my observation, in a considerable percentage of cases of Morgagnian cataract. Already, before the corneal incision is completed, we notice that, although the aqueous humour escapes, the anterior chamber remains full, owing to the vitreous substance flowing forward across the more or less destroyed zonula and over the edge of the lens. After the incision is finished, and during the following steps of the operation, a faintly yellowish and almost fluid substance is seen to escape by the edge of the lens. In modified linear extraction, performed after the present method, I have met with this occurrence five times; viz., in the two eyes of a man affected with congenital cornea globosa (diameter of cornea = $6\frac{1}{4}$ "") and tremulous iris; again, in both eyes of a drunkard, the one presenting a Morgagnian, the other an immature and softening cataract; and lastly, in one eye of a female, with a Morgagnian cataract exhibiting a singularly yellowish (instead of the usual milky) cortical fluid. All these cases progressed satisfactorily. The first four eyes did not even present any opacities in the vitreous humour, and the fifth but very slight ones; these, moreover, had, in all probability, existed before, since there were choroidal irregularities observable about the equator.

A very different event, and which we have to be as careful as possible to avoid, is actual rupture of the vitreous body, or rather of its normal boundary, the zonule and hyaloid fossa. The immediate consequence of the mishap is a sudden change in the ocular pressure, which is necessarily followed by great hyperæmia *ex vacuo*. That such hyperæmia may become the starting point of irritation is very probable; it certainly is often immediately succeeded by intraocular hæmorrhage. Slight bleedings of the kind, seldom wanting, are productive of peculiar opacities, which, for a time, may be distinguished from those

produced by infiltration of the ruptured substance. Profuse hæmorrhage, fortunately of rarer occurrence, may lead to very extensive loss of vitreous humour, together with detachment of the retina, and even complete evacuation of the contents of the eyeball with protrusion of the retina.

With this most formidable of all the accidents which may accompany a cataract operation, I became first acquainted through my esteemed master, Friedrich von Jaeger. In my own practice I have observed it six times; viz., five times after flap extraction, and once after modified linear extraction—consequently in 0.3 per cent. of the operations. It is, however, consolatory to know that of these six eyes four were obviously diseased; viz., two affected with a high degree of choroiditis posterior, one previously treated for equatorial choroiditis, and one suffering from chronic glaucoma; the fifth eye, again, belonged to a female of pronounced hæmorrhagic disposition; so that, in one case only among the six, there was no cause assignable for the accident. More frequently than in cataract operations is the phenomenon observed in other operations, implying the formation of an extensive wound, and performed where there obtains an excess of intraocular pressure of long standing. The occurrence of intraocular hæmorrhage, with complete evacuation of the eyeball, in the operation for staphyloma, is sufficiently known; but it is worth remembering that, in such an event, there is almost always a secondary glaucomatous degeneration superadded to the staphyloma. With some certainty, the accident may be looked for, if, in a case of consummated glaucoma, attended with glaucomatous cataract, the attempt be made—which, were it even on this account alone, ought to be abstained from—to relieve the patient from his sufferings by combining with the iridectomy extraction of the swelled lens. The characteristic symptom of such an hæmorrhage is an incessant pro- ruption of vitreous substance. As soon as the lids are opened, a fresh amount of liquid escapes from the wound, and may even burst forth with impetuosity, although for a time appropriate pressure have been applied to the eye. Furthermore, the ocular pressure does not abate under the escape; but the eyeball remains hard, or becomes even harder, and the wound-edges, instead of collapsing, remain stretched and forced asunder. A peculiar aching pain is complained of; the face betrays great suffering; or a moaning and wailing become audible, such as we are not accustomed to hear in eye-operations. The dressing is unbearable, and, when we raise it, we have a fresh portion of the contents of the eyeball before us, sometimes soon succeeded by shreds of the retina and large coagula of blood between the eyelids.

In two cases of flap extraction on eyes affected with sclerotic-choroiditis posterior, I had still extensive, though less ruinous, bleeding. The symptoms were likewise persisting hardness of the eyeball and continued escape of vitreous humour, gaping of the wound-edges, and a decline of the perception of light. The ordinary slighter bleedings, which leave in the vitreous humour those fine streaks referred to before, are not marked by any special symptoms during the operation.

The rupture of the vitreous humour need not necessarily precede the bleeding; sometimes the reverse is the case. In one of the above-mentioned cases, I observed that, already while the surface-matter was being removed by pressure, and everything else had so far proceeded normally, the eyeball grew uncommonly hard, and the wound betrayed a disposition to gape. It was not before these phenomena had attained to a certain height

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that the spontaneous rupture of the vitreous humour ensued.

Although, in my former paper, I have expressed the opinion that enhanced vasomotory or secretory activity dependent on the traumatic irritation may be productive of an increased ocular pressure, the observation just recorded is, I believe, more naturally explained by assuming that it was the pre-existing bleeding which caused the tension of the eyeball to increase. At all events, the rupture of the vitreous humour gives free vent to the bleeding which was limited before; whence the rule may be derived that, wherever the hardness is noticed to augment, whilst the surface matter is being emptied by pressure, whether the increase be due to vasomotory excitement or hæmorrhage, the operation should be terminated with despatch and the dressing applied.

The mere opening of the vitreous space is an occurrence distinct from the escape of vitreous humour. The hyaloid fossa and the zonule may, indeed, be injured without any loss of vitreous substance through the corneal wound. In flaccid and collapsing eyes, a pretty extensive opening may even be made in the vitreous humour without prolapse being the necessary consequence; and the same may be observed in the anesthesia from chloroform.

I would also call to mind the attempts just recently revived, to extract the lens within its capsule, in which the instruments of traction are directly introduced behind the lens—i.e., into the vitreous humour, without an escape of vitreous humour invariably being (although it is often enough) the consequence. Besides, every operator knows that, in cases of shrunken cataract, the entire lenticular system may sometimes be extracted with forceps or hook without causing any vitreous humour to escape—a fact which, in my opinion, does not call for any anatomical explanation, but is sufficiently accounted for by the ocular pressure being, in such like cases, mostly of low degree. In our present operation, I believe that it has sometimes occurred to me to injure the hyaloid fossa with the hook, without any loss of vitreous humour ensuing. The occurrence may be recognised by the following signs.

1. The cortical matter does not, as usual, admit of being, without resistance, moved towards the wound; but, although it yield to external pressure, it advances only up to a certain limit, always to return to its primary situation. The jumping movement which we impart to the cortex in these manoeuvres arises, I believe, on the one hand, from the fact that a portion of the vitreous jelly, pressing across the hyaloid fossa, against the posterior surface of the cornea, opposes a barrier, as it were, to the progress of the cortical substance; and, on the other, that beneath this barrier an amount of aqueous humour stagnates, which allows the cortical matter to be moved more freely than usual.

2. Suddenly, during the operation, the pupil becomes uncommonly black (i.e., the capsular fragments separate from each other), and a spacious anterior chamber re-appears; the contents of which do not admit, like the perfectly fluid aqueous humour when re-secreted, of being emptied by the faintest pressure.

3. The tension of the cornea becomes relatively great, in consequence of the hyaloid fossa no longer yielding any support to the ocular pressure. This sign, it is true, has no importance attached to it, except in connection with the two preceding ones, since a relatively strong ocular pressure alone suffices for its production.

In reference to the theory of the incision, I have, in my former paper, insisted upon the fact, that the

equal elasticity of the two wound-edges tends to secure their contact in the plane. There is, however, another point upon which I have neglected to lay becoming stress. Whoever has had the opportunity of anatomically examining even the most satisfactory cicatrix resulting from flap extraction, will have convinced himself that the two wound-edges are anything but precisely level. In many cases, examination during life suffices to discover that the contact between the two segments of the cornea noways affects their whole thickness.

[The ununited portion of the pro-eminating wound-edge becomes overgrown with corneal epithelium, the reflection of which produces later on the semiblance of the level being restored. From a preparation of Professor Klebs, I have learned that the epithelial growth penetrates even lower down between the lips of the wound; a fact which I believe to be accounted for by the elastic retraction of the flap.]

Although, in the majority of cases, the difference of level just referred to does no harm, it must evidently be regarded as an adverse circumstance so far as the healing is concerned. It thanks its origin, undoubtedly, to the fact that the edge of the flap opposes a less resistance to the ocular pressure than the peripheral edge. The evil is, of course, obviated, if the incision, as in our method, falls in the greatest circle, or very nearly so. A beautiful proof of this was afforded by the eye of the patient before alluded to, who died of delirium tremens soon after the operation. On the external aperture of the sclero-corneal wound being properly exposed, the most accurate examination proved the level to be as perfect as that of the inner aspect.

IX.—THE TERM FOR OPERATING: SIGNIFICANCE OF ATTENDING CIRCUMSTANCES.

The proper period at which to proceed with the operation for cataract has often been the subject of discussion in reference to the older methods. External circumstances, as well as the individual dispositions of the patients, preclude the laying down of an universal rule. Not seldom a material impairment of vision is sufficient utterly to debar a patient from earning his livelihood; if so, we are certainly warranted in interfering sooner than we might under more favourable circumstances of life. Again, in some patients, the progressive decline of their sight becomes the source of an excitement, which threatens to disturb their mental equilibrium and perhaps impair the chance of recovery, were we to delay so long as we are accustomed to do in behalf of more resigned individuals. The object of science, strictly defined, can be no other than this; viz., in the process of cataract formation to discover that phase which, *cæteris paribus*, offers the most favourable chances of recovery.

In regard to flap extraction, that period, by almost unanimous assent, coincides with the confirmed extension of the opacity throughout the whole of the lens. Prior to this term, the coherence within the lenticular system is too unequal; whilst, at a more advanced period, the adherence to the capsule becomes too intimate to allow of an easy and complete emergence of the cataract. Albeit, therefore, that immaturity, as well as over-ripeness, have their own inherent drawbacks, these vary, nevertheless, greatly in importance according to the several species of cataract, and may even become *nil*. In thoroughly hard cataracts, immaturity, as I have variously stated, implies no disadvantage; nor does over-ripeness in the Morgagnian species. In our present method, immaturity is of much less moment than in flap extraction, as we have experienced in those cases where the cortex is but partially become softened and

opaque, again, in those of a zonular character, and those of posterior cortical cataract, in all of which the evacuation of the still transparent portions is, in our method, fraught with less difficulty. In all the forms just enumerated, the delivery of the cataract may, too, be attempted by simple pressure, the resistances being yet undeveloped which call for the use of traction instruments.

I do not wish to conceal, however, that with a partially transparent lens the thorough emptying of the capsule may prove somewhat more difficult than where we have to deal with a mature cataract; and I am altogether far from advocating any wanton precipitation in deciding upon the term for the operation.

[In spite of my predilection for the method, I have not been unmindful of the necessity to determine the limits of its safety. For a perfectly dangerless method of extraction it would be vain to seek, since it is diseased eyes that we have to deal with; the cataractous process being certainly but the result of complicated disturbances in the vessels and tissues of the eyes, however little known to us at the present time. The morbid disposition of the eyes in question is frequently so pronounced, that momentous seizures may be occasioned by comparatively trifling causes. Were we in the position to watch for years many persons affected with cataract, experience would sufficiently prove what we have just been advancing. Only last month, a cachectic person arrived here from England to be operated on for cataract. While yet looking out for apartments, he was seized with central infiltration of the cornea, which assumed a phagedænic character; it proved troublesome enough, and very serious in its consequences. Was it likely for this ill-fated man to have sustained a cataract-operation without harm? Another person, presenting a perfectly simple but not yet fully matured cataract, I sent, a year since, back to his home. Last spring, when he reappeared before us, he was affected with irido-cyclitis, without anything having occurred in the interval to account for the latter disorder. Was that an accidental epiphenomenon? or is it not more correct to regard the apparently simple cataract as dependent upon a previously latent affection of the deeper tunics? As to certain forms of cataract—*e. g.*, the posterior polar and cortical species—I am persuaded that they are of choroidal origin, although the fact cannot invariably be substantiated by ophthalmoscopic evidence. I have observed two very instructive cases of the kind, in which I had been able to watch the formation of such-like cataracts during an affection of the vitreous humour. After two years, the latter disorder—*i. e.*, the appreciable opacities—had entirely disappeared, and any uninformed observer would have been justified in diagnosing idiopathic cataract. From all the foregoing we infer that, in cataractous eyes, slight causes may be productive of deleterious effects. In two cases, indeed, I have seen a simple iridectomy, by which I had intended to secure additional safety for the subsequent operation for cataract, lead to utter destruction of the eye, although the operative act had been entirely free from irregularity. It is true that both patients were wretched individuals, who might, perhaps, occasionally have become the subjects of corneal ulceration or the like. However, as it is impossible for us invariably to detect a lurking disposition of this nature, we should, before we propose a cataract-operation, be mindful of the highest surgical virtue—caution.]

The following are, so far as circumstances admit, my rules for guidance.

1. Where one eye is deprived of useful sight by cataract, the other appearing still perfectly healthy,

if the individual have passed the fiftieth year of life, modified linear extraction should not be performed, except under special circumstances, or in obedience to irrepressible solicitation; whilst in persons of great age it should be absolutely abstained from. With persons in youthful or early middle age, there is less cause for hesitation.*

2. If the cataract of the last affected eye be sufficiently advanced to hinder the patient from reading fluently, the eye first seized should without hesitancy be operated upon, even though its cataract be not yet perfectly ripe. But, if incipient cataract of the second eye permit the patient still to read, the cataract of the first affected eye should be allowed to reach maturity, though not to become over-ripe, before we operate.

3. If both eyes be almost equally affected, it is advisable, in order to release the patient from the most painful feeling of progressive helplessness, not to wait for the term of maturity, but to operate, when this is approaching, upon one of the eyes; and, if they are different, by all means upon the worse of the two. A week or two afterwards, the success of the operation being established, the other eye may be operated upon.

4. The same principle applies to the extremely tedious zonular species, and to the posterior polar and cortical cataracts, if bilateral, and if seriously compromising the sight of the patient.

5. If one eye have been rescued by the operation, we may feel emboldened (in healthy individuals) to operate upon the other, though in this the cataract may yet be far from mature. It cannot be denied that the concurrence of two eyes of equal refraction has great advantages, when compared with that condition in which aphakia of one eye subsists together with partial usefulness of the other; the latter being, moreover, the subject of ever-varying disturbance, as the cataract advances in its development; and we are the more warranted in seeking to secure those advantages, as we have seen the item of maturity in no remarkable degree to affect the prospect of success in our method.

There is, to my knowledge, nothing in the mechanism of the operation to justify our delaying it until the period of over-maturity. The only condition in which such a course can be advisable is that of aged persons with useful sight still subsisting in one eye—a condition in which, as we have seen, the operation is yet inadmissible.

Seeing that modified linear extraction does not involve as much danger as flap-extraction, less hesitation need be felt to operate on both eyes in one sitting. Before the double operation is conceded, however, all the circumstances should be well weighed, considering that two operations after this method, performed within a short delay of each other, are not so trying either as two flap-operations similarly distanced. If one of the eyes retain still a certain amount of vision—*e. g.*, that fingers are counted at the distance of some feet—I am rather disposed to defer the second operation for a week or two, until the success of the first be fully ensured—a caution which becomes indispensable, if the second eye be yet in the enjoyment of tolerable sight. If, after the first operation, the progress should prove anyhow irregular, it will be advisable, even though the second eye be already deprived of all useful sight, to abide the recovery of the first, to enable us to put all the experience thus gained to advantage in the operation on the second eye. The age, the constitu-

* On the whole, I find that apart from traumatic and complicated cases, the instances are but very rare of one eye being perfectly blind from cataract, whilst the other remains still free from all traces of the same affection.

tion, and the wishes of the patient, will have to be taken into consideration in the individual case, before we decide to allow the inherent advantages to outweigh the risk of two operations in one sitting.

In conclusion, I beg leave, from my limited statistics, to point out the influence of certain collateral circumstances connected with the general health of the patients and the condition of the eyes to be operated upon.

Senile marasmus, however marked, did not affect the result in any noticeable degree. The percentage of irregular recoveries was the same between 65 and 80 years as between 50 and 65; whilst it proved half as high again in premature marasmus—*e.g.*, in cachectic, pale, and emaciated individuals between 35 and 50 years of age, in whom the formation of cataract itself was, perhaps, closely connected with the cachexia. Again, an abnormal course was, by the showing of my journal, of relatively frequent occurrence in "individuals of nervous and pusillanimous disposition". In these two latter respects, then, we find modified linear extraction not to differ considerably from flap-extraction. Greater is the difference in regard to chronic cerebral disorders, whether meningeal irritation, or arterio-sclerosis with cerebral atrophy, or delirium tremens, all of which are but of very subordinate influence in modified linear extraction. In like manner, I find, among twelve individuals, the subjects of chronic bronchitis or asthmatic attacks, not more than one irregular and imperfect recovery; consequently, no noteworthy difference from the total of our results. Eight of the eyes operated upon were those of patients labouring from declared diabetes; in all of these cases, the after-course was normal, except in one, which promises, however, at least an "imperfect result". (The patient, a female, was operated upon but a few weeks ago.) Three of these patients, of whom two were operated on both eyes in one sitting, were discharged from the hospital on the seventh and ninth days respectively. I must, however, not omit to mention that four of the diabetic cataracts were of a pulpy softness throughout, and occurred in youthful persons; whilst only the four remaining ones presented a yellow nucleus. Intolerance of, or an occasional departure from, the recumbent posture, urinary ailments—in short, circumstances interfering with the observance of strict immobility—do not appear to exert any material influence, and merely call for an increase of caution.

As regards the condition of the eye itself, the bearings of immaturity or over-ripeness of the cataract have been sufficiently referred to in the course of this paper; and the measure of the influence which the various consistencies of cataract exert upon the healing, we have likewise endeavoured to determine in the foregoing pages.

A sunken position of the eye, narrow palpebral aperture, a slight (marastic) reduction of the diameter of the cornea, and collapse of this membrane after the operation, proved entirely harmless. Twenty-four thoroughly deep-set eyes were operated upon; only in two of them the after-course was irregular (one failure, and one imperfect result). Ten times we had the highest possible degree of corneal collapse after the operation; in the whole of the ten cases, the result was perfect. Among the eyes with less thorough collapse of the cornea, one only yielded an imperfect result.

The prominent eye appears to be less auspicious than the deep-set one. With the former, the ocular pressure being greater than usual, the insertion of the retractor and the fixation of the eyeball become matters for consideration. Among sixteen eyes entered in the journal as uncommonly prominent, I

had five times escape of vitreous humour. Flap-extraction, it is true, is likewise dreaded on prominent eyes; but what I used to fear was not so much escape of vitreous humour (I always performed the operation downwards in such cases), as the not unfrequent occurrence of iridal prolapse. I believe, however, modified linear extraction to be quite adapted to prominent eyes also, provided that certain cautions be observed, to which I have hitherto omitted to pay sufficient attention. The most important, no doubt, is a thorough anæsthesia. Furthermore, a retractor of different shape should be employed, the branches of the ordinary one being too shallow to take a sufficient hold of the conjunctival reflexion. Possible that, under circumstances, the retractor may better be altogether dispensed with, or, also, the incision and the iridectomy made in the direction outwards and downwards.*

Disorders of the conjunctiva and of the lacrymal sac appear likewise to affect the prognosis; at least, where such existed, I have noted a greater number of irregular recoveries. This seems to be sufficiently accounted for by the fact that the conjunctiva is involved in the incision. Also a particularly rotten and attenuated condition of the conjunctiva, evidenced by the tearing through of the steadying forceps, and by a proneness to bleeding, chiefly, however, a shrunken state of the membrane from previous granulation, appear to have an untoward influence.

Opacities of the cornea, even of a leucomatous nature, and corneal ectasia, existed in several of the operated eyes, without affecting the result. Very frequently the operation was performed in the presence of sclero-choroiditis. This complication is, at all events, an undesirable one: first, because we are uncertain regarding the acuity of vision, and also because of the somewhat greater frequency of escape of vitreous humour. However, the results differed so little from the general average, that I had reason, under the circumstances, to be quite satisfied with the proceeding. Two cases of chronic glaucoma with traumatic cataract (produced in the operation of iridectomy) I have adverted to before. Since a marked increase of the intraocular pressure usually persists in spite of the iridectomy, when, by the lesion of the lenticular system, a filip has been given to secretory irritation, cases of the kind are certainly not favourable to any method of extraction. Nevertheless, no accident of great consequence occurred in the above two cases. The operation was also performed on some eyes affected with irido-cyclitis. A favourable circumstance was, that the resulting corneal opacities were less than we find them after flap-extraction; but the evacuation of the lens, not so much on account of its hardness as from its adherence to the capsule, and chiefly to the capsular fold, was very difficult; and hence considerable fragments had to be left behind. In respect of these cases, I am at present meditating a modification of the proceeding; and further experiments will be needed to decide between it and flap-extraction, which, in irido-cyclitis, we know to be shorn of part of its dangers—*i.e.*, of that of suppurative of the cornea.

Lastly, I have, in reference to linear extraction, to confirm a thesis which I have beforetime put forward in regard to flap-extraction; *viz.*, that the prognosis is, on the whole, more favourable in respect of the last-seized eye than of the one which was first affected. Among twelve irregular recoveries, affecting one eye only after double operation in one sitting, the eye which had been the first to suffer from cataract was concerned eight times, although in half of

* Recently, I have found such an incision most convenient for the evacuation of the cataract in a case complicated with leucoma adhaerens.

the cases the cataract in the eye, which had become cataractous in the second place only, was still immature at the time of operation.

CASES OF DUODENAL PERFORATION.

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As I was passing through the hospital on June 10th, a man was brought into Harrison Ward, complaining of severe pain in the right side of the belly; and I was requested to examine and prescribe for him.

In answer to my questions, he said that he had breakfasted as usual about eight o'clock; that between nine and ten, he had taken some of a mixture which his doctor had sent him for a slight indigestion, that immediately afterwards he was seized with pain which grew in severity up to the time of admission into the hospital, and that he was in his own opinion suffering from the effects of some mistake in the preparation of his physic.

The patient, 35 years of age, was a moderately well nourished, fresh coloured, and altogether healthy looking man. Reclining upon the bed, he uttered frequent groans, and turned restlessly from side to side. The legs were sometimes straightened, and sometimes bent, as it were, indifferently. The belly was flat, and its walls were rigid. His constant and sole complaint was pain, and its chief seat was in the right side between the situation of the free margin of the liver and the groin. Shortly afterwards the pain extended upwards into the right shoulder and downwards into the right testicle which was not, however, retracted. The pain was not increased either by pressure or by change of position, and the patient bore free examination of all parts of the belly without apparent increase of suffering. The tongue was clean and moist. There was neither nausea nor vomiting; the bowels had been moved naturally two days before admission; urine passed a little before my examination was quite healthy; the pulse was about 76, of natural fullness and strength; the extremities were warm.

Of the man's condition before the attack, all that could be made out was that he had occasionally suffered from slight indigestion; that he was so suffering in a small degree when he became ill; and that once at least he had been jaundiced; he had never, however, had pain after food or vomiting.

Such were the chief facts of the case. What was their interpretation? Obviously enough the patient was not suffering from the effects of any irritant poison. Was it gastric or intestinal perforation? There was certainly a history of slight indigestion, and the pain was excruciating; but eight hours had elapsed since its commencement, and still there was neither collapse nor evidence of peritoneal inflammation, and the ingestion of fluid was followed by no increase of suffering. Was it a renal calculus? There was pain in the region of the kidney passing downwards and forwards into the groin and testicle; but then the urine was healthy; there was no history of any kind of gravel; the testicle was not retracted; and the pain was more severe even than that which commonly attends the passage of a concretion from the kidney into the bladder. Could it be a gall-stone? True, there had been indigestion, and once at least a little jaundice. True also, there were now pain in the right side of the belly, not increased by pressure; pain in the right shoulder and arm, and a quiet pulse; but, on the other hand, there was neither nausea, nor vomiting, nor flatulence; and there

was no sense of constriction about the epigastrium. The pain suffered by the patient was burning instead of boring; continuous; less in the region of the liver than lower down; and ranged over a wider space than I had ever known the pain of a biliary calculus to range. The notions of colic, strangulation, typhlitis, and the like, were dismissed from the mind almost as soon as they arose. The case was somewhat obscure: I feared perforation, but chose to suspend my judgment till the next visit, which I proposed to make a few hours afterwards. Meanwhile the patient was restricted from food; a full dose of opium was prescribed, and ordered to be repeated in half doses at short intervals; hot flannels sprinkled with turpentine were applied to the belly.

An hour after leaving the patient, I had an urgent summons to Leytonstone, and was unable to see him again alive. I am, therefore, indebted to Dr. James Jackson for the subsequent history of the case.

The patient was relieved by the opium, and remained during the afternoon and evening in tolerable comfort; but in the middle of the night, Dr. Jackson was summoned in great haste on account of a sudden return of the pain, and its rapid diffusion throughout the whole abdomen. On Dr. Jackson's arrival he found the man lying on his back with his knees drawn up; the belly was much swollen and exquisitely tender; the features were contracted and anxious; the pulse was quick, small, feeble, and irregular; and the skin cold, dark, and covered with a clammy sweat. General peritonitis had set in. There was no longer any doubt as to the nature of the case; it was one of perforation. After six hours of extreme suffering, the patient died.

On examining the body after death, the peritoneal cavity was found to contain much flaky serum; the coils of intestine were lightly glued together by recently effused lymph spotted with blood, and just below the middle of the liver the pancreas and first part of the duodenum were bound together by a mass of partly old and partly recent lymph. At one side of this mass was discovered a rugged opening, about half an inch in its greatest diameter, which communicated with the cavity of the bowel. When the duodenum was laid open, the perforation was seen to have occurred at one side of the base of an ulcer situated about half an inch from the pyloric orifice of the stomach. The ulcer measured $\frac{3}{4}$ by $\frac{1}{2}$ of an inch in diameter, and had sharp shelving margins getting narrower towards the base, which was formed by peritoneum thickened outside by layers of tolerably firm lymph. One could see clearly that they had been formed at different times. On the opposite side of the bowel, but a little further down, there was noticed a shallow circular depression about a quarter of an inch in diameter, with rounded margins and a smooth whitish base, composed of fibroid tissue, clothed with a single layer of flattened cells. It resembled, and probably was, the cicatrix of an ulcer.

There were several minute erosions in the pyloric half of the mucous membrane of the stomach.

No disease was discovered elsewhere.

There are two or three points in this case worthy of passing notice. In the first place it is plain that ulcers must have formed and healed, or remained open, without causing other than trifling disturbances of digestion. The most careful inquiry elicited nothing more than that the patient was occasionally out of sorts, and had just before death been under treatment for some slight indigestion called "biliousness." But there was no history of pain after food or of vomiting.

A second point of interest in this case was the long continuance of pain, due to leakage into the