

## **On abscess and tumours of the orbit. Pt. I / by Spencer Watson.**

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Watson, Sir William Spencer, 1836-1906.  
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### **Publication/Creation**

London : H.K. Lewis, 1866.

### **Persistent URL**

<https://wellcomecollection.org/works/kv56gzc7>

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ABSCESS AND TUMOURS OF THE ORBIT.

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ON

ABSCESS AND TUMOURS OF

THE ORBIT.



PART I.

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*Reprinted from the MEDICAL MIRROR.*

LONDON:

H. K. LEWIS, 136 GOWER STREET.

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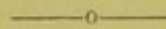
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THE HISTORY OF THE

THE GREAT

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## P R E F A C E.



IN venturing to lay before the profession the results of my reading and experience in regard to the Diseases of the Cavity of the Orbit, it is perhaps necessary to apologise for what may to some appear an attempt to increase the already overcrowded list of specialities in medicine and surgery.

The indignant outcry raised by the great body of the profession against specialists of every kind, is one in which I would heartily join; my sincere sympathies are with those who would crush out the crying abuse of special hospitals.

A love of speciality is a disease of the human mind, which the more the public are inclined to the more should the profession strive to root it out. I cannot agree with the American sage, that there is no power of expansion in man, and that the minds of most men are like a piece of Labrador spar, which has no lustre as it is turned round until you come to a specific angle, and then alone it reveals its depth and beauty of colouring. Surely our own Johnson was nearer the truth in believing that there was an adaptation and applicability in energetic men to the universal, not that each man has no special talent, and that the mastery of successful men consists in applying themselves solely where that talent can be specially practised. Certainly Hunter, Sydenham, Harvey, Brodie, and the eminent men of the present day, are not numbered among this separative order. As in the products of the garden the most beautiful flowers,

if not the oddest and rarest, are grown by those who have studied and practised according to the most general and widest principles of their art, so these principles correct and chastise the tendency to a grotesque and conventional form and colouring, and restore and revive the beauty and freedom of Nature.

Still, while the present state of things exist, the means of classifying and comparing cases, offer many advantages, and I have endeavoured to do my humble part in aiding and advancing such desirable and legitimate objects. In every extreme and excess of doctrine or practice, there is a source of goodness and utility, and I sincerely trust that I have neither overlooked it, nor utterly failed to extract some benefit from specialism.

It must indeed be granted, that in mere theories of disease, or even in treatment not ending in decisive operations, the weakness of an extended, but imperfect study, may be supplied by a frequent exercise and a renewed experience; but if we operate *imperfectly*, we can seldom recover the mistake. In many cases (and this applies to operations on the orbit more particularly), we can operate but *once*, and this necessity renders it imperative that our skill possesses a specific exactness, since it cannot be mended on trial, and thus our general surgery requires to be corrected by our particular experiences, and this to be concentrated on the one operation before us. Hospitals of this kind, whatever their fundamental deficiencies, assist the mind of the surgeon in a severer study and more contracted contemplation of separate diseases. From what I have advanced, it will be seen that I have thought it most important to search the vast fields of experience opened up to me in General Hospitals; and the subject of my Paper appears to me to be a fair debateable ground upon which specialists and general practitioners might meet, and compare notes with mutual advantage.

Such being my main object in taking in hand the present work, I have thought it right to scrutinise all the

existing and past authorities on the subject, and to select as many striking illustrations from all and each as I could conveniently introduce into a short Treatise.

In order that the tediousness of lengthened details in the reports of cases might, as much as possible, be avoided, I have taken the liberty of excluding in most instances, all but the essential particulars. "Brevis esse laboro," whether "obscurus fio," I must leave to the reader's verdict. On the subject of treatment I acknowledge that I have assumed a didactic and somewhat positive tone—not, for an instant, as esteeming myself a high authority, or as having had a larger experience than others, but rather with the view of challenging criticism, and in the hopes that wherever I may have set up principles of doubtful stability, they may be shaken from their usurped eminence; while those that remain undisputed may continue to guide me in future difficulties.

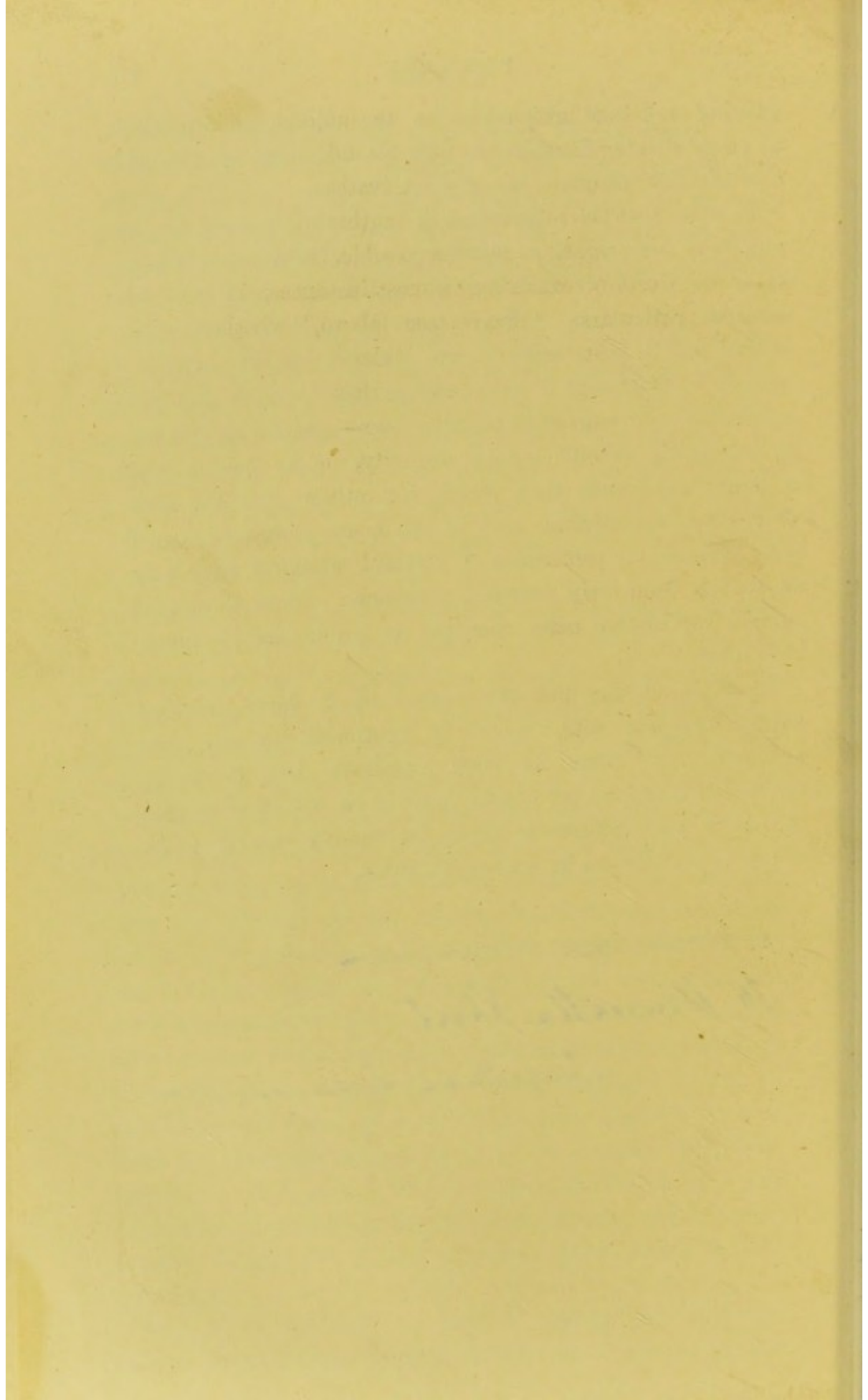
In some of the diseases treated of, I have avoided saying anything with regard to treatment, on my own authority, and have in such instances left it to be inferred that general principles were to be followed, or that the cases and indications given, sufficiently indicated the course to be followed in similar instances.

~~27 MONTAGUE STREET, RUSSELL SQUARE.~~

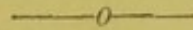
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## ON ABSCESS AND TUMOURS OF THE ORBIT.



THAT diseases of the orbit are rarely met with in general surgical practice, may be judged of by the fact that, out of 12,692 out-patients at the Royal London Ophthalmic Hospital in the year 1864, only ten were affected with diseases of this cavity, six suffering from tumours, and four from abscesses. The rarity of these affections, then, is such that few individuals can have sufficient personal experience to speak authoritatively on the subject, excepting in the way of general principles applicable to diseases of this, as to those of any other region of the body. It is this consideration, which has induced the writer of the following observations to lay before his readers, as shortly as possible, some of the facts he has been able to collect, deduced from recorded cases of the kind referred to, and from a few that have come under his own observation.

And first let us inquire into the causes and diagnosis of abscess of the orbit. Most of the cases recorded are to be found in Demarquay's "Treatise on Diseases of the Orbit," in which alone seventeen cases are recorded in detail. Besides these, Mr. Hulke has published three cases in the *Ophthalmic Hospital Reports*, Mr. Poland one in the same journal; the *Pathological Transactions*; Mr. Lee, in his work 'On Phlebitis,' and other authors have supplied me with others.\* Altogether thirty well-observed cases are at my disposal, and from a careful study of these, especially from Demarquay's 'Treatise,' I have ventured to make the practical deductions which follow.

### I. THE CAUSES OF ABSCESS OF THE ORBIT.

The following are adduced as the probable causes:—

Injuries of various kinds, either local or in the immediate neighbourhood, punctured wounds, with or without having a

\* Viz., Mr. S. S. J. Salter, in his paper in the *Medical and Chirurgical Transactions*, vol. xlv.; Mackenzie on "Diseases of the Eye;" and Haynes Walton on the "Surgical Diseases of the Eye."

foreign body imbedded in the cavity (see cases in *Pathological Transactions*, vol. i.); or blows on the eye with the fist; or surgical operations (see Demarquay, p. 111); or scalp-wounds (see Henry Lee, 'On Phlebitis, p. 79); or even the extraction of upper molar teeth, two instances of which are related by Demarquay, in which low inflammatory action set in after this operation, terminating in one instance, fatally.

Of the whole number of cases I have met with seven were attributed (with or without good cause) to injuries, and allusions are made to several other cases by various authors. Mackenzie, for example, mentions an instance of inflammation of the cavity of the orbit following abscission of the anterior half of the eye-ball.

In all these instances, however, the injury seems nothing more than the accidental excitement of an action, of which the predisposition already existed, and they were generally associated with an enfeebled state of health, such as would be most favourable to pyæmic complications. Caries of the orbital walls was discovered in four cases. In three of which, the frontal bone, and in one the petrous portion of the temporal were affected (see Hulke's cases in *Ophthalmic Hospital Reports*, vol. iv., p. 80, and *Pathological Transactions*, vol. iv., p. 25).

The influence of cold from draughts, has been adduced as a cause of orbital inflammation, by Dr. O. Ferrall who cites two cases in illustration. On the other hand, Gendron relates a case in which exposure to the sun seemed to have the same effect. Erysipelas spreading from the neighbouring parts has been followed by abscess in the orbit in some of the cases mentioned as the result of injury, and in others of spontaneous origin. Gonorrhœal ophthalmia was the exciting cause in one case mentioned by Middlemore ("Diseases of the Eye," vol. ii., p. 582). Affections of the lacrymal gland are sometimes the starting-point, according to Carron du Villards, and the same author relates cases of abscesses of the orbit consecutive to acute meningitis, as a sequel to typhus fever.

It appears, therefore, that injuries of the orbit itself, or of adjacent structures, or of its visceral contents, are the most frequent causes of the inflammatory actions in this cavity, more especially if followed or accompanied by erysipelas.

Perhaps the next in order of frequency, caries of the orbital walls may be mentioned, and then typhus and typhoid fevers. The other causes adduced are somewhat conjectural. In some cases no assignable cause can be found. Seven such are among the thirty detailed cases to which I have alluded, and one of them was under my own observation quite recently. I was inclined to give some importance to the fact that several decayed stumps in the upper jaws were present in this patient and

had long caused her great suffering, and to the probability of their being a nidus for the collection of puriform fluid, and its communication through the venous system of the orbit. Such an explanation presents some difficulties, but seems corroborated to some extent by the two cases already alluded to, in which the removal of molar teeth was followed by the same result. In the latter instances, the irritation was an active and violent one; in the former, continuous and abiding, but at the same time affording a constant supply of putrid material to the circulation, and lowering the digestive functions and general vitality of the patient, directly or indirectly.

## II. THE DIAGNOSIS OF ABSCESSSES OF THE ORBIT.

This part of the subject may be conveniently considered under these two heads.

1st. The Diagnosis of Abscess from other Tumours, or diseases in the orbit.

2nd. The Diagnosis of the kind or form of Abscess.

Several different kinds of tumour may be very easily mistaken for chronic abscess, and *vice versa*. *Cysts*, for instance, may produce the same deformity, the same protrusion of the eye-ball, and the same fluctuation may be felt; and, in doubtful cases, an exploratory puncture is the only means of solving the difficulty. It has been observed, however, that the majority of tumours of this kind have thrust the eye-ball directly upwards, or directly downwards. And such a deformity is not a common one in cases of abscess.

*Aneurism* may, also, be mistaken for abscess, either acute or chronic, and more particularly those aneurisms which arise suddenly and spontaneously by giving way of an intra-orbital vessel. In two such cases recorded by Demarquay, punctures were made into the tumours by the surgeons in attendance, before the certainty of the diagnosis could be ascertained. One of these was Dalrymple's celebrated case, also related at length in Mackenzie's work, p. 350. The tumour was punctured five times, and ultimately subsided after ligature of the common carotid.

A third (Mr. Nunneley's *Medical and Chirurgical Transactions*, vol. xlii., p. 168), was the result of a blow on the eye, and was successfully treated by ligature of the common carotid.

Such cases, however, must be exceedingly rare, and the absence of pulsation must be very infrequent in aneurismal tumours. The fact, however, of these cases occurring in the hands of the most skilful surgeons, is not to be overlooked.

The position of the eye-ball as an aid to diagnosis, is of little value. In a large majority of the diseases within the orbit, the eye-ball is pushed outwards as well as forwards; and this

remark holds especially with regard to abscesses, which most frequently point at the upper and inner corner. When, however, the abscess depends upon caries of adjacent bones, the position of the swelling will vary with the bone affected, and the displacement of the eye-ball will correspondingly vary.

Thus tumours and abscesses, coming from the temporal side of the orbit, will thrust the eye-ball towards the nose, and such a deformity would at once arouse the suspicion that the case was a very unusual one. Out of 240 cases of tumours of all kinds in this cavity, in only eight was the eye-ball displaced inwards. One of these was an abscess originating from disease in the ear, with caries of the petrous portion of the temporal bone, ending fatally. Two were tumours of the lacrymal gland; one an hydatid cyst; one an osteo-sarcoma in the temporal fossa, invading the orbit; one a fibro-cystic tumour; one a sebaceous cyst; and one a disease of doubtful nature, called by Demarquay a steatome.

The displacement of the globe upwards is also rare, and is mentioned as occurring in fourteen cases, none of which were abscesses, but included tumours of various kinds, chiefly medullary, fibrous, and fibroid in their nature, with one osseous tumour of the antrum, and one mucous polypus of the nose.

The fact, therefore, that in any given case the eye-ball was displaced inwards, or upwards, would be a strong presumption that it was *not* one of abscess, and the same might be said of any tumour presenting at the outer side of the orbit or below. On the other hand, a tumour presenting at the inner side of the orbit, and displacing the eye-ball outwards, as well as forwards is, *cæteribus paribus*, likely to be of the nature of abscess. If the tumour thus presenting be distinctly fluctuating, associated with the usual febrile disturbances, have resulted from erysipelatous inflammation, an injury, or followed typhus fever, the probability is reduced to nearly a certainty that we have to deal with an abscess. It is seldom, however, that all these symptoms are appreciable or easily recognised. In most cases of abscess there is a period in which the presenting tumour is hard and unfluctuating, or may not be distinguishable at all. The protrusion of the eye-ball may not be discoverable in consequence of the great œdema of the eyelids and chemosis of the conjunctiva; and in some cases the protrusion is directly forwards, so that the axis of the eye-ball remains normal. When this is the case there is some similarity in the deformity to that produced by dropsy of Tenon's capsule, which, however, is a very rare affection; or to that caused by hypertrophy, or serous infiltration of the cellular tissue of the orbit, which is also extremely rare; both of these affections being unaccompanied by febrile disturbance.

In one case of abscess of the cellular tissue of the orbit recorded by O'Ferrall, there was no protrusion of the eyeball, but the eye was simply thrust downwards.

It is scarcely necessary to point out the means of distinguishing some other diseases of the orbit such as the goitrous exophthalmus and emphysematous or sanguineous effusions from injuries. The points of difference are obvious, but must be borne in mind as possible sources of error, or as complications under peculiar circumstances.

Tumours of an encephaloid cancerous nature are little likely to be confounded with abscess. Apart from the history of the case, there will be local peculiarities quite distinctive. Solid nodulated masses most frequently presenting at the inner canthus, solid œdema of the eyelids, enlargement of the superficial veins of this part, and rapid growth of the tumour, will all point to a malignancy.

The other solid tumours, fibrous, fibroid, enchondromatous, and osseous will also be easily distinguished, not so much by their physical characters, however, as by their history and their very slow growth as compared with the development of suppuration. The hardness of inflammatory swellings in the early stage, is the only possible source of error in respect to these forms of disease.

The only kind of general enlargement of the eyeball which could possibly be confounded with an abscess of the orbit, would be one in which acute inflammation had supervened on a chronic hydrophthalmus, and, in such a case, the history would probably supply the clue to the diagnosis.

The possibility of making a diagnosis of the *kind* of abscess with which the surgeon has to deal is of practical value, as on the opinion formed will depend in great measure the prognosis and treatment of the case. Thus, the absence of protrusion of the eyeball, associated with distinct fluctuation at some point of the circumference of the orbit, and other indications of suppuration would show, that we were dealing with an abscess in front of the orbitar fascia, and such a one as required less severe measures of treatment than those of the deeper region, and would most likely be the sign of superficial caries of the margin of the orbit, a comparatively trivial affection, though troublesome in its after consequences.

On the other hand, protrusion of one or both eyeballs coming on in the course of erysipelas, or low fever, or after severe wounds of the scalp, or the neighbouring parts, and associated with low febrile symptoms, would indicate the most severe form of purulent infiltration of the deeper structures of the orbit, and possibly be the prelude to a fatal issue from pyæmia.

Abscesses coming from neighbouring tissues or cavities may

invade the orbit and produce all the physical signs of suppuration originating there. When the frontal sinuses, the antrum, or the nose, are the parts whence the abscess arises, certain symptoms in those parts such as swelling, pain, arrest of secretion, and superficial redness will indicate more or less distinctly the source of the original mischief.

When, however, the cranial cavity, or the temporal, or the zygomatic fossæ are the seats of the original or of a co-existent abscess, it is much more difficult to arrive at an accurate diagnosis, though it is precisely in these cases that the issue is so likely to be fatal, and the treatment requires so much care and circumspection. When abscess in the brain is present, associated with orbital abscess, it is not necessarily associated with cerebral symptoms in the early stages, though death is generally preceded by palsy, convulsions, or delirium, but only when too late to avert the issue.

Purulent deposits within the cranium, associated with abscess in the orbit, were found in seven out of twelve fatal cases, and symptoms of acute meningitis were present in another case of recovery. Two of these were caused by caries of the frontal and other bones. Three followed injuries, and the rest probably resulted from erysipelas.

It is obvious how important it would be to be able to distinguish such cases in the early stages, in order to be able to warn the patient's friends of the danger of his state, and to give caution to surgical interference of any kind.

Severe and persistent pain in one side of the head was noted as present in three of these cases, at an early period; and in one was the earliest symptom observed; so that in such a case some guess might be formed as to its serious character. In two of them—viz., Mr. H. Lee's case and Mr. Poland's, both eyes became prominent simultaneously, or nearly so, and this circumstance would be a symptom pointing at once to a deeply-seated source of mischief, most probably within the cranium, and should incline the surgeon to a very unfavourable prognosis.

### III. PROGNOSIS IN CASES OF ABSCESS IN THE ORBIT.

Two points have to be considered under this head:—

1st. Whether the patient will recover.

2nd. Whether the sight will be restored or saved in the event of recovery.

1st. *Will the patient recover?* This question may be answered in the affirmative in the great majority of cases; for though the number of fatal cases recorded is large in proportion to those of recovery, it cannot be supposed that all the trivial cases have been put on record, while it is a fair inference that the most

severe forms of disease have been published, as conveying more instruction. Out of thirty cases which I have collected, thirteen were fatal, and some of these probably originated within the cranium or other parts surrounding the orbit, the orbit itself being involved secondarily. In nine out of these thirteen cases mischief within the cranium was discovered after death; and this fact points at once to the source of danger. In most of them suppuration had occurred either in the veins, sinuses, between the dura mater and bone, or in the substance of the brain itself. Those most speedily fatal seemed to be due to pyæmia; the symptoms preceding death being delirium, incoherence in speaking, convulsions, paralysis and coma. The earlier symptoms being intense pain in one side of the head, a low state of health, erysipelatous swelling of the parts, and symptoms indicating the existence of caries or necrosis of the bony walls of the orbit, such as the escape of fetid pus, and sequestra, and the indisposition to a healthy action in the abscess.

The position of the disease in the bone seems to be an important element in the dangerous character of the case. Five of the fatal cases were found to be associated with disease of the roof of the orbit; one with that of both the malar and sphenoid bones; one with that of the sphenoid bone; and one with disease of the tympanum. In two of the recoveries, the roof of the orbit was involved; and both of these were among the most nearly fatal of those that ultimately recovered. Hence, we may infer that, should caries or necrosis of the roof of the orbit be discovered, or disease of the deeper or cranial bones be suspected, the case is one of considerable danger. On the other hand, disease in the superior maxilla, such as is associated with abscess of the antrum, is not so likely to lead to dangerous complications, though a fatal case is recorded under these circumstances; in which, however, disease of the roof of the orbit was also found after death. (*Vide* Demarquay, "Sur les Tumeurs de l'Orbite," p. 145.)

The above observations do not apply to cases of caries of the margins of this cavity, such as are frequently seen in scrofulous children,—the lesion here being in front of the orbital fascia, and very rarely leading to any result more serious than a very unsightly eversion of the eyelid when cicatrisation has been completed.

Abscess following erysipelas of the scalp or face, and cases resulting from a punctured wound in the orbit, seem to be the most frequently fatal.

Such being the conditions, many of which can only be discovered after death, what are the indications necessary for the formation of a prognosis? The exploring probe; the escape of fetid pus, or sequestrum; symptoms of disease of the internal ear;



are valuable means of information in the early stages. The occurrence of drowsiness, delirium, or other cerebral symptoms in the course of any orbital abscess, will be so unfavourable that little hope can be entertained of a recovery, and the sudden occurrence of protrusion of the eyeball or both eyeballs in the course of erysipelas after a severe wound involving bone, is equally ominous. On the other hand, should the patient be in tolerably sound health previously to the attack; should the pain and swelling be confined to the orbit itself or to its immediate vicinity; should the abscess have been opened early and exit given to pus of a healthy character; should there be no symptoms of cerebral mischief; and lastly, should rational treatment have been adopted, there is every probability of a favourable issue.

2nd. *In the event of recovery will the vision of the affected eye be retained or restored?* In some cases, vision is from the first little or not at all impaired, and in these no anxiety need be entertained with regard to it.

Two or three cases of this kind are recorded, and in five of the recoveries it is especially mentioned, that the vision was lost, either by suppuration of the eyeball and subsequent shrinking, or by atrophy of the optic nerve.

One case was supposed to have resulted in loss of vision in both eyes from wound of the globe by the surgeon's knife.

In the case of a patient, recently under observation at Moorfields Ophthalmic Hospital, vision was not restored at the expiration of three months from the commencement of the case, and the pupil remained dilated and insensible to the stimulus of light. The appearance of the optic disc viewed by the ophthalmoscope was that of atrophy.

This case was analogous in some respects to the case mentioned by Mr. S. J. A. Salter, in vol. xlv. of the *Medical and Chirurgical Transactions*, and in both cases the condition of the optic nerve was the same. The data do not seem to be sufficient to show what the loss of vision, or atrophy of the optic nerve really depended upon; whether upon the stretching of the nerve-fibres from the accumulation of pus behind the eyeball; or upon the inflammation of the nerve-sheath of the optic nerve; or upon irritation communicated to the brain through the fifth pair of nerves, which is the view taken by Dr. Mackenzie.

In forming an opinion, therefore, of the probable effect on the patient's sight, regard must be had to the presence or absence of inflammation of the eyeball, to the length of time during which the supposed stretching of the nerve has been in operation, and to the amount of this stretching; as well as to the state of the pupil and the ophthalmoscopic appear-

ances after the evacuation of the pus in the orbit, and the return of the eyeball to its socket. In a case in which the eyeball is not protruded, vision will most probably not be affected, unless there is inflammatory mischief in the globe itself, and the prognosis will be in this respect highly favourable. When, on the other hand, iritis, ophthalmitis, or suppuration, or sloughing of the cornea have been set up, little or no vision will be retained.

#### IV. THE TREATMENT OF ABSCESS IN THE ORBIT.

Probably in no two cases of this affection could precisely the same treatment be properly adopted. Each must be treated on principles applicable to its peculiar circumstances; as for instance, the age, constitution, temperament, &c. of the patient, and each must be treated on different principles during the acute and the chronic stages of the disease.

Can we, nevertheless, lay down any general rules of treatment?

There are some rules specially applicable to the early stages of acute inflammation of the orbital cellular tissue, which can readily be laid down, and will bear the test of experience.

1. Depletion is rarely indicated. The patients have generally feeble health to begin with, and will require all the sustaining nourishment which can be obtained. Possibly, leeches may relieve pain in some instances; but the wholesale way in which they are sometimes applied, is a method very far from worthy of imitation. In Demarquay's treatise, cases are described in which bleeding from the arm, leeches and scarifications were employed with great freedom; in others, besides leeches and bleeding, mercury and iodide of potassium were administered, though it is difficult to conceive on what principle of therapeutics. Thus, in one patient, a man of forty years of age, who had very severe febrile symptoms, following the extraction of an upper molar tooth, and accompanied by exophthalmos and constant and violent supra-orbital headache, blood-letting to twelve ounces was employed, and twelve leeches were at once applied. Subsequently, sixteen more leeches were put on, and calomel was given. The patient recovered after an illness of six months' duration, with the loss of the eye, which suppurated and shrunk.

2. An early incision or incisions are useful. Probably, the best way of abstracting blood, and at the same time of relieving the pain and tension, is to make early incisions into the orbit, even before fluctuation can be discovered. A surgeon of some authority recommends "free plunges and incisions into the orbit in as many places as possible, in the early stage of the disease;" and I cannot but think such a plan far preferable to blood-letting from the arm, and leeches to the orbit itself. At

the same time I should prefer a single incision, or two at most to such a multiplication of wounds as is recommended by that gentleman. Should pus escape through one or other of the incisions, it will be advisable to put a strip of lint in the wound to prevent it closing.

The same authority condemns the treatment by antiphlogistic measures, more particularly in cases associated with or following erysipelas, and upholds with great justice and powerful reasoning a stimulating and nourishing plan of diet in such cases. This rational plan of treatment of erysipelas and its sequelæ is, however, too well and too generally recognised to need being insisted on at the present day.

3. Next to early incisions, or as an auxiliary, the local application of ice will be of most service in allaying pain and reducing vascular excitement. If properly applied in caoutchouc bags, this is a most valuable method of treatment.

4. In chronic abscess, or in acute, if the cavity does not readily contract, exploration with a probe, or by enlarging the opening and passing in the finger, will be necessary, with a view of discovering any carious or necrosed bone, and of removing any offending bodies. Should, however, no disease of the bone be present, and yet the cavity of the abscess remain open, it will be advisable to inject water or some mild stimulating lotion once or twice a day, until a more healthy action is set up; at the same time attending to any indications of a faulty state of the general health which can be altered by remedial agents, of a medicinal or dietetic nature.

5. Several points of practice applicable to special cases will require a passing notice. Some surgeons are in the habit of using caoutchouc drainage tubes for chronic abscess in this situation, and I believe I have seen benefit result from their use in a case of abscess of the frontal sinus recently under Mr. Bowman's care at Moorfields. A very obstinate case of abscess in the orbit might be treated in the same way. It has also been proposed by M. Riberi, of Turin, that in cases of abscess in the orbit, particularly those associated with caries of the inner side of the orbit, the orbital plate of the ethmoid should be broken through, and a portion removed if necessary, in order to establish a fistulous opening into the nose, through which the pus may escape.

6. There seems some difference of opinion as to the point most suitable for opening the abscess or supposed abscess; and M. Richet thinks that the puncture should be made in the oculo-palpebral groove, and if possible below the eyeball, and to the outer side. But the best rule of practice is to thrust the knife into the most prominent part of the swelling, and if fluctuation is perceptible, which it rarely is, in the early stages

to puncture the part at which it is most distinct. In any case, however, the incision should be made, if possible, near the margin of the orbit and in the direction of the folds of the skin of the lids, and the fibres of the orbicularis. By taking these precautions the subsequent contraction will lead to less deformity, as to the inversion or eversion of the lids, and the scar will be lost in the natural folds of the skin. It is worth while observing, that a case is recorded (Demarquay, *Op. cit.* p. 116) in which both eyeballs were injured by the knife in opening abscesses of the orbit, and that destruction of both eyes resulted. Such a case should make the surgeon careful to keep the knife paralld with the wall of the orbit, and as near it as possible.

7. Should there be good reason for supposing that caries of the teeth have been the exciting cause of the collection of pus in the orbit, it would be advisable to remove them as soon as this can be done with safety, as the same disease would be likely to recur, the cause remaining. The possibility of abscess of the antrum being present in these cases should not be overlooked, as the removal of a decayed tooth might be the means of emptying the abscess and removing a cause of irritation at the same time, and the injection of tepid water or astringents into this cavity might have an important influence on the result. In a case related by Mackenzie, the extraction of an upper molar tooth allowed a free escape of pus from the antrum, and the symptoms all yielded very rapidly, vision being restored in a few days.

A similar case is related in Mr. Salter's paper as having occurred to Brück. And Mr. Salter's case in the same paper is a further argument for the same plan of treatment whenever abscess of the antrum is present. In two cases recorded by Demarquay there was abscess in the antrum following the extraction of upper molar teeth. One of these terminated fatally, and the antrum was found full of pus, with a softened state of the floor and the roof of the orbit, and a large abscess of the brain; the other was not fatal, but there could be no doubt of the presence of pus in the antrum, as there was a continuous discharge from the socket of the tooth and from the nostril of the same side. The escape of a sequestrum from the posterior nares further confirmed the true origin of the mischief in this case.

In a third case already alluded to, the cause to which the formation of pus in the orbit could be assigned, was the presence of a number of decayed teeth in the upper jaw; and it seems likely that had these causes of irritation and possible foci of purulent infection been removed earlier, the mischief to the eye, the sight of which was totally destroyed, might have been averted.

## V.—PATHOLOGY.

Having now considered the subject of my paper in reference to the *Causes, Diagnosis, Prognosis and Treatment, the Pathology* will be best elucidated by an analysis of the recorded cases, and by giving such details of typical cases as will suffice to justify their being classified under the four heads following, viz. :—

DIVISION I.—Fatal cases in which the deposit of pus in the orbit was an indication of general pyæmia.

DIVISION II.—Fatal cases in which lesions of the brain or its membranes were found without pyæmia.

DIVISION III.—Cases (not included in the first two divisions) in which the bones of the cranium or face were involved.

DIVISION IV.—All cases, not included under the above heads, the causes and pathological conditions being various.

DIVISION I.—Fatal cases in which the deposit of pus in the orbit was an indication of general pyæmia.

Under this head will come five cases out of thirty, all of which proved fatal within a few days of the commencement of the severe symptoms.

*Case 1.*—(Demarquay, *Op. Cit.*, p. 112.)—A woman of sixty years was attacked with erysipelas of the right cheek and eyelids, and this soon spread to the other parts of the face and the eye of the opposite side. On the third day stupor, coma, and delirium came on, and death occurred on the fifth day. At the autopsy deposits of pus were found in the cheek, eyelids, in the cellular tissue surrounding the optic nerve, and in that covering the floor of the orbit. The lungs were pneumonic. The rapid termination of the case, taken in connection with the post-mortem appearances, seem to justify my placing it under this division.

*Case 2.*—(Henry Lee "On Phlebitis," p. 79.)—J. B., æt. twenty, scalp wound denuding the bone; puffiness of the scalp upon the eighteenth day; rigors followed by profuse perspirations, restlessness, delirium, projection of the eyeballs.

Twenty-four days after the accident and five days before death, secondary inflammation set in.

*Post-mortem Appearances.*—Bone exposed to the extent of a shilling, of a yellow colour, and with a very dark diploe; effusion of lymph and pus between the dura mater and the bone, extending to the base of the skull, and through the sphenoidal fissures into the orbits; effusion of pus into the arachnoid cavity; incipient secondary abscesses in the lower lobe of the left lung; spleen large and very soft, mottled; degeneration of both kidneys.

*Case 3.*—(*Ophthalmic Hospital Reports*, vol. i., p. 27.)—A woman under the care of Mr. Poland, forty-five years of age, had erysipe'as and abscess of the forehead. Intense pain in the orbit and temple; protrusion of the eyeballs; cerebral symptoms; rapid prostration; death on the sixth day.

*Post-mortem Appearances.*—Orbits infiltrated with sero-purulent fluid. Both ophthalmic veins filled with dirty pus; cavernous sinuses and right middle cerebral vein distended with purulent matter; brain soft and arachnoid opalescent.

**DIVISION II.**—Fatal cases in which lesions of the brain or its membranes were present without pyæmia. Seven cases are recorded of this kind, one, perhaps two, of traumatic origin, and the others generally associated with disease of the bones of the cranium.

The three cases following have been selected as the most characteristic.

*Case 4.*—(*Pathological Transactions*, vol. i.)—Mr. Prescott Hewett relates the case of a child of two years of age who was wounded in the orbit by a piece of lead pencil. The child soon became drowsy, had convulsive twitchings of the limbs and coma. "For some time before death the right eyelids were separated, and the eye could be seen uninjured."

Death occurred on the seventh day, when an abscess in the brain was found with meningitis, and a fissure in the roof of the orbit through which pus flowed into the cranial cavity.

*Case 5.*—(*Demarquay, Op. Cit.*, p. 146.)—An unmarried woman, twenty-five years of age, was taken with acute pain in the right side of the head. At the end of fifteen days the cheek was swollen, the eye reddened; she had fever, nervous agitation, and anxiety. Suppuration occurred in a few days, and matter escaped spontaneously at the outer angle of the eye. The pus was fetid, and escaped not only from the orbit, but from the neighbouring parts of the eye and cheek. On the fourth day after the opening of the abscess, sudden paralysis of motion and sensation; respiration slow, irregular, and stertorous; pulse small and intermittent; death.

*Post-mortem Appearances.*—The whole of the fatty and cellular tissue in the eyelids and cheeks down to the level of the lower jaw, filled with pus. Fetid pus in the space between the eyeball and orbit, and burrowing among the muscles. The anterior lobe of the brain in great part destroyed by suppuration; pus surrounding the optic nerve and communicating with the orbit.

*Observations.*—The exciting cause of the mischief is not hinted at in this account; but it seems very probable that caries of the teeth may have given rise to the pain in the head and abscess in the cheek, and the orbit may have become in-

volved secondarily. Considerations to which I shall allude subsequently will make this appear a probable explanation of the phenomena here observed.

*Case 6.*—(Demarquay, *Op. Cit.*, p. 145.)—A shoemaker, twenty-seven years of age, of an irritable temperament, and addicted to drinking, had one of the left upper molar teeth extracted. This operation was followed by swelling and redness of the side of the face; epiphora; rigors; photophobia, and intolerable pain in the side of the head, increased and rapid swelling of the face and eyelids.

Some days after, distinct fluctuation at the internal angle of the eye. Abscess opened; yellowish, green, and fetid pus escaped.

The symptoms now became aggravated, and he died in convulsions within less than a month from the commencement of the case.

*Post-mortem Appearances.*—Dura mater and pia mater congested and altered in colour. Anterior lobe of the brain contained a large collection of pus communicating with the lateral ventricle. Optic thalamus soft and pulpy. Substance of the brain unusually soft. Pus covering the Pons Varolii, and filling up the fourth ventricle.

The roof of the orbit softened and perforated, the opening communicating with the abscess in the brain. The floor of the orbit perforated—the opening communicating with the antrum of Highmore, which was full of pus.

*Observations.*—In this case the disease in the orbit is clearly traceable to the decayed tooth; but whether the caries of the tooth, or the injury to the gum in its extraction were the actual starting point of the disease, it is very difficult to say.

**DIVISION III.**—Cases (not included in the two preceding divisions) in which the bones of the cranium or face were involved. Six of the thirty came under this head, one of which was fatal.

*Case 7.*—(*Medical and Chirurgical Transactions*, vol. xlv., p. 256), related by Mr. S. J. A. Salter.—Eliza F., æt. twenty-four, a domestic servant, was attacked with violent toothache, the evident source of which was caries in a first right upper molar. Rapid swelling of the face, and infiltration of the lower lid came on, with protrusion of the malar bone, and a thrusting over of the nose to the opposite side of the face; fearful pain in the right side of face and eyeball, which latter became protruded; total blindness of right eye. After twenty-four hours matter pointed just below the inner canthus, and this was let out by puncture with a lancet. This orifice closed at once, and another puncture was made at the outer canthus. Pus came through these openings and through the nose almost constantly

for two or three weeks, when Mr. Salter removed the decayed stumps and carious wisdom tooth in the right upper jaw. Pus then escaped through the alveoli of the molar teeth, the fangs of which were denuded of periosteum at their extremities, and had evidently been lying in the antrum surrounded by pus.

Subsequently a large sequestrum of dead bone was removed from the floor of the orbit and the cheek surface of the maxilla, with great amelioration of all the symptoms. Several flakes of bone escaped at intervals afterwards, and the patient made a good recovery, though with total loss of vision in the eye affected, the optic nerve of which was found by ophthalmoscopic investigation to have undergone complete atrophy.

*Case 8.*—(Mackenzie, *Op. Cit.*, p. 965.)—A man, of thirty years of age, was attacked with sudden and violent pain, shooting from the temple to the side of the face and eye. His sight was quite lost, and his cheek swollen. Soon a discharge came from the furrow between the lower lid and the conjunctiva; and on the extraction of a decayed molar tooth a splinter of wood was found attached to its fang, and projecting into the antrum. Pus escaped from the socket; sight was recovered in a few days, and all symptoms subsided.

*Case 9.*—(H. Walton on "Surgical Diseases of the Eye.")—A man, of forty-two years of age, had had exophthalmus of the left side, with impaired vision and occasional paroxysms of pain, and swelling for three or four years. For these complaints he had been treated by the repeated application of leeches to the neighbourhood of the orbit; and it was estimated that 800 leeches had been applied at various times. At length he went into King's College Hospital, under the care of Mr. Fergusson, and as there was evident pointing of matter at the lower and outer edge of the orbit, a puncture was made there, giving exit to the contained pus. Very soon nervous excitement, delirium, and epileptic fits were succeeded by coma and death.

*Post-mortem appearances.*—No mischief within the cranium. Abscess occupying the outer and lower parts of the orbit, and the orbital and external aspects of the malar bone, which were carious.

*Observations.*—It is very remarkable that no lesion should have been discovered in the brain. Probably the other internal organs were not examined, as no mention is made of the state in which they were found. The symptoms at once pointed to cerebral lesion, and in the absence of any indication of such being the case, the only rational explanation is that some form of blood-poisoning had occurred. This case, therefore, might be included under the category of pyæmic cases; but in the absence of any evidence of blood poisoning deducible from the appear-



ances after death, it will be better to class it under this division.

**DIVISION IV.**—All cases not included under the above heads, the causes assignable being various.

Twelve cases are included under this head, agreeing in the following particulars (which, being negative peculiarities, scarcely redeem them from being a miscellaneous collection), viz.: They were not fatal; there was no reason for attributing the deposit of pus to pyæmia; no bones were involved; the brain was not involved, or if so, not seriously.

*Case 10.*—(*Medical and Chirurgical Transactions*, vol. xlv., p. 260.)—The case is related by Mr. J. S. A. Salter, as having occurred under the care of Mr. G. Pollock.

A man, thirty-five years of age, had great swelling of the cheek and the external parts of the eye, with protrusion of the eyeball, and loss of vision in the eye affected, the pupil of which was dilated and insensible to light.

After the extraction of a bicuspid and molar tooth, both of which were carious, the whole of the symptoms gave way, with the exception of the loss of vision.

*Observations.*—This case, taken in connection with another related by Mr. Salter (Case 7 in this paper), and also with Case 8, and four or five others, of which I have notes, make it extremely probable that many of the cases of abscess of the orbit, the origin of which have not been hinted at by the authors by whom they are recorded, may have been due to the irritation of decayed teeth, and that many of them might have been satisfactorily explained by a reference to the state of the patient's teeth.

The following case, occurring under my own observation quite recently at Moorfields Ophthalmic Hospital, will serve to confirm this view.

*Case 11.*—A healthy-looking married woman, of thirty-eight years of age, had suffered for years from toothache, due to the presence of several decayed teeth in both jaws, chiefly situated, however, in the left side of the upper jaw. Suddenly she was attacked by pain in the left orbit, with considerable swelling of the eyelids, protrusion of the eyeball, and with a fluctuating tumour at the upper and inner angle of the orbit; the vision at the same time being absolutely lost.

After the opening of the abscess, by a deep incision at the point at which it was felt most distinctly, the swelling and protrusion of the eye subsided, and the patient made a good recovery; the loss of vision remaining, the ophthalmoscope revealed the characteristic appearances of atrophy of the optic nerve.

The next case is in many respects similar to these two, but no mention is made of any possible cause, and it is therefore open to conjecture whether it might not have been one of the same kind.

*Case 12.*—(Demarquay, *Op. Cit.*, p. 134.)—A woman, of twenty years of age, suffered from severe pain in both orbits, with headache and fever. Both eyes were protruded—vision was completely extinguished—there was fluctuation at the upper and inner angles of each orbit.

Incisions were made and the matter let out with relief to the patient; but vision was not restored at the end of the period, during which she was under observation (thirty days).

#### VI.—CONCLUSIONS DEDUCIBLE FROM THE FOREGOING CONSIDERATIONS.

1. Abscesses in the orbit are dangerous to life chiefly from the proximity of the disease to the brain and the large veins and sinuses in the neighbourhood, a large proportion of the deaths being traceable to pyæmia or phlebitis, and a still larger proportion to inflammation of the brain and its coverings.

2. Symptoms of cerebral disturbance are frequently premonitory of a fatal issue, and are always of serious import.

3. Disease of the bones of the orbit or cranium, associated with abscess, give an element of danger, and the recognition of this complication is an important aid in forming a prognosis.

4. Caries of the teeth has been clearly demonstrated as the source of mischief in a considerable proportion of the cases, and it is probable that the same cause may have been in operation in others, the origin of which was uncertain.

5. The sight of the eye affected is not necessarily destroyed, but may even recover when there has been decided amaurosis.

6. The conditions, upon which the amaurosis in such cases depends, seem variable; but ophthalmoscopic signs will enable the surgeon to calculate the probability of a recovery. Should there be atrophy of the optic nerve, no hope of the sight being restored can be held out to the patient.

7. Among the less common causes of abscess in the orbit, may be mentioned, gonorrhœal ophthalmia, syphilitic caries; blows on the eye, wounds of the eyeball, debility after typhus and typhoid, and other fevers.

8. The treatment in most cases is simple, and is not likely to be aided by the use of drugs or leeches, still less by blood-letting from the arm.

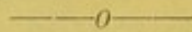
9. Local treatment consists, in the first instance, in the application of cold to the neighbourhood of the orbit, and when the abscess is pointing, or when a distinct protrusion of the

fascia can be felt by the finger, it should be opened by an incision at that part.

10. The general treatment will be chiefly of a dietetic kind, but medicines may be required in certain cases.

11. In the later stages, or when the disease has become chronic, disease of the bones is the most probable cause of the continuance of the symptoms, and the removal of this source of irritation will be necessary for the completion of the recovery.

Having considered those affections of the orbit, which are the result of inflammation, under the head of abscess, I shall next consider the subject of tumours, not dependent upon inflammatory mischief; and it will be convenient first to take the tumours of a fluid or semi-solid character. This group will include cysts, vascular and aneurismal growths, sanguineous effusions, and gaseous, or emphysematous swellings.



## ON CYSTS IN THE ORBIT, WITH FLUID OR SEMI-SOLID CONTENTS.

The contents of cysts in this region have been very various, the most frequent being those with serous fluid, and next the hydatid cysts. But besides these there are cases recorded of others with oily and semi-gelatinous contents—sebaceous, atheromatous, and meliceric fluid; and others of great rarity which it would be out of place to mention in a paper of this kind. Cysts, with blood effused into them, and those that have suppurated after injuries, must be looked upon as merely accidental modifications of one or other of the groups mentioned. Dropsy of Tenon's capsule may be conveniently considered with the other fluid growths of this region.

### I.—THE DIAGNOSIS OF CYSTS.

The marks that distinguish cysts from chronic abscesses are by no means unmistakable either with respect to the physical signs, or the history of the symptoms, and the only method of arriving at a conclusion, in most cases, is to employ an exploratory puncture. This simple proceeding should be adopted in all cases of doubt. I have myself known an operation to be commenced in this region as if for the removal of a solid tumour, when the knife of the surgeon has after a few strokes opened into a cyst, and the tumour has subsided after the escape of the fluid, and a similar instance is related by Démarquay (*Op. Cit.* p. 405.)

The diagnosis from an acute abscess need not be dwelt upon but in case of any doubt the same method may be employed as in the case of chronic abscess. Aneurisms will be distinguished in many cases by their own peculiar features ; solid tumours by the absence of fluctuation.

In all cases of cysts there will probably be combined an inactivity and sluggishness in the growth itself, the progress being very slow ; there will be no superficial discoloration, and no heat of the part ; but the disturbance of function, and perhaps the disorganisation of the neighbouring organs, will be traceable simply to displacement and pressure from the bulk of the tumour.

From an analysis of the recorded cases of cysts, it does not appear that any important indication is derivable from the direction in which the eyeball is protruded. In all the cases, however, protrusion of the eyeball is mentioned as a marked feature in the case, but this cannot be taken as any means of distinguishing such a case from disease equally bulky in the same cavity. It may sometimes be of importance to determine whether a cyst originates within, and is confined to the orbit, or whether it extends into the cranium or frontal sinuses or elsewhere. The symptoms of disturbance in the parts affected will be the only guide in each case, unless a puncture, and exploration by means of a probe be resorted to. Should, however, there be a reasonable probability of the cyst extending into the cranial cavity, it would be necessary to be extremely cautious in exploring. M. Démarquay has related such a case. The surgeon in that instance explored with the finger, after making an incision into the cyst. In a very few days symptoms of acute meningitis came on, and death quickly followed.

Dropsies or cysts of the frontal sinuses, extending into the orbit (of which a large number of instances are recorded by various authors) are characterised by a swelling in front of the forehead, and at the inner side of the orbit. This swelling may be very hard, but sometimes soft and fluctuating. Tumours invading the orbit from the lacrymal sac would be distinguished by the accompanying regurgitation through the puncta lacrymalia.

Lastly, it will be advisable, if possible, to determine whether the cyst be of the simple serous kind, or an hydatid ; whether with oily or other contents ; and this will rarely be possible till either the cyst has been opened, or has been removed. Several cases are related (see one by Mr. Hulke in the *Ophthalmic Hospital Reports*, vol. iv., p. 88), the diagnosis of which was cleared up by the escape of an hydatid cyst in a poultice which had been applied after the opening had been made.

In some instances it may be possible to appreciate exactly

the position of the cyst relatively to the superficial structures, and the following extract, from the writings of M. Bérard, as quoted by M. Demarquay, shows so much ingenuity, and seems so useful and practical, that I shall venture to give a translation of the passage in this place.

“Should the tumour lie between the palpebral muscle (*Levator palpebræ superioris*) and the eyeball, it will by its growth have thrust upwards the elevator muscle of the upper lid, and from the time of the appearance of the disease, the eye left almost completely uncovered will have run the risk of becoming inflamed. Further, if we place a finger on the tumour, at the same time that we tell the patient to raise the lid, we feel distinctly the fibres of the muscle as they make an effort to contract. Should the cyst, on the other hand, be between the levator palpebræ and the orbit, the lid can still be lowered, and when raised, the finger placed on the tumour, feels no contraction analogous to that perceived in the preceding case. The muscle then does not pass in front. The importance of this point of diagnosis is easy to apprehend: as what we have to regard chiefly here is the elevator muscle of the upper lid, if the tumour pass below it the incision should be made through the conjunctiva, whilst in the contrary case it must be made through the cutaneous part of the eyelid.

Certain rare cases of cystic disease of the lacrymal gland are on record, which might give considerable trouble in diagnosis; the position of the tumour and its history would, however, be some guide to a conclusion.

The only other disease liable to cause a difficulty is the dropsy of Tenon's capsule, first described by Carron du Villards, the symptoms of which are sufficiently distinctive to be worth a short description.

The patient in whom the symptoms first attracted attention was a girl of seventeen years of age. She had a considerable exophthalmus, accompanied by excessively sharp pains when she bent her head downward; and the eye was found to be surrounded and incased by a hard uniform tumour, without alteration of the conjunctiva or cornea, but with complete loss of sight. The tumour being supposed to be solid was removed by the knife with the eyeball and it was then found to be a mere distension of the capsule with fluid.

Symptoms such as those described coming on after scarlatina or measles may be considered conclusive of this peculiar dropsy being the occasion of them.

## II. COURSE AND PROGNOSIS OF CASES OF CYSTS.

In their course and development, cysts are very slow, and produce a gradual distension of the parts surrounding them. Though generally harmless in their nature, merely producing deformity and impairment or loss of vision from distension, they are liable to sudden inflammatory action from the effects of injury, and to suppuration, when the walls become thinned, and the abscess points at the most easily dilatable part, and ultimately bursts, the contents being discharged at the point of rupture.

There is a general belief among surgeons that the exposure to the air of the lining membrane of a cyst favours suppuration, and recorded cases seem to confirm this conclusion; hence when a cyst has been opened, there is every probability of an abscess forming, and the danger of this will be proportioned to the extent of the cyst wall, and the importance of the parts immediately surrounding it. It is only on these grounds that danger may be apprehended to the life of the patient. Should the cyst be ascertained to have passed through the optic foramen or the sphenoidal fissure into the cranium, there is imminent danger; should it be confined to the orbit, little or no danger need be apprehended. If the whole cyst has been removed, the wound will probably heal readily; if, on the other hand, only part of the cyst has been removed, the remainder will almost certainly suppurate, and a corresponding amount of mischief will be threatened to the surrounding parts.

## III. TREATMENT OF CYSTS.

In all cases in which such treatment is possible, there seems to be no doubt that the removal of the whole of the cyst is the safest and most effectual plan of treatment. In the case of hydatid cysts this will be easily accomplished, the cyst-wall being generally very easily detached from the surrounding parts. On the other hand, sebaceous and dermoid cysts require a very cautious dissection in order to remove them entire, the cyst wall being very thin and very adherent to the tissues around them. Such cysts rarely, however, invade the orbit, and when they do, originate from the periosteum at the margin of the cavity, or from the conjunctiva or eyelids, and most usually from the neighbourhood of the outer angular process of the frontal bone. Injection with iodine and solution of sulphate of zinc has been tried with success in those cases in which the cyst could not be removed entire, and this plan

would be particularly applicable in that particular form of cyst which consists of a dropsy of Tenon's capsule.\* Great care will be required in the dissection of cysts from this cavity, and where they are large great difficulty must necessarily be experienced in doing so.

It is manifestly impossible to calculate beforehand the difficulties that may be met with; but if it can be ascertained by any means that the cyst extends deeply and perhaps into the cranium, it would be better not to interfere in any way for its removal.

#### IV. CASES ILLUSTRATING THE PATHOLOGY AND TREATMENT OF CYSTS.

1. *Serous Cyst.*†—A man, twenty years of age, had a tumour occupying the upper and inner part of the left orbit, with protrusion of the eyeball outward and downward, which had existed since his eighth year. The cornea had become obliterated by inflammatory attacks; the tumour protruded from between the eyelids, was fluctuating, tense and shining, and evidently a cyst. As there were no cerebral symptoms of any kind, though great deformity of the surrounding cranial and facial bones, an incision was made into the tumour. The contained fluid spirted out with considerable force and was of a serous nature. The cavity was then explored by the finger of the operator, and the cyst found to extend within the cranial cavity through a widely dilated optic foramen. Some charpie was gently placed in the cavity, and the edges of the wound kept apart by a strip of lint smeared with cerate.

On the fifth day profound stupor came on, and death occurred the same evening.

*Post-mortem Appearances.*—The vessels of the brain injected; the sub-arachnoid tissue infiltrated; the lateral ventricles filled with milky serum; the whole of the lower surface of the brain softened and of grey colour, and on the left side in a diffuent state from suppuration; the orbital cyst had extended about three inches into the left anterior lobe, pushing before it the arachnoid and pia mater, to which it had become firmly adherent; the left optic foramen measured more than six lines in diameter, and the left optic nerve had entirely disappeared. On the lower surface, and in the substance of

\* M. Carron du Villards, who has described this form of disease, recommends a cautious incision into the capsule with scissors, while the patient's head is bent forwards, and a few strips of charpie stuffed into the cavity for twenty-four hours. *Vide Démarquay, p. 419, et seq.*

† Démarquay, *op. cit.*, p. 376 (Extract from Delpech.)

the right anterior lobe, was a sero-mucous cyst of about half the size of a pigeon's egg.

2. *Serous Cyst*.\*—A man, æt. twenty-four, was admitted into La Pitié, under Lisfranc, with exophthalmus of the right side, and a tumour occupying the space between the inner wall of the orbit and the eyeball. This tumour was fluctuating, hard and tense, and covered by inflamed conjunctiva, at the same time pushing before it the upper lid, and almost surrounding the eyeball. Vision was not entirely lost.

An exploratory puncture was made by Lisfranc, which gave exit to a serous, colourless fluid, after which the eyeball was returned to the socket, and retained there by a compress and bandage.

The next day erysipelas of the face came on, but soon subsided; the protrusion of the eye, however, was again produced. A month after the puncture, Lisfranc dissected away part of the cyst and removed it, and lint was put into the wound to produce suppuration in the remaining part of the cyst.

For five days after the operation no bad symptoms were observed, but on the sixth erysipelas of the face and ophthalmia, both of which subsided, and a free escape of pus from the cavity was established. On the twenty-fifth day, the wound having partially closed, was enlarged, and a large quantity of fetid pus let out. The patient now appeared to be approaching recovery, when symptoms of purulent infection appeared, and the patient died fifteen days after the first rigors.

*Post-mortem Appearances*.—Abscesses in the lung, liver, and brain; the shoulder and hip-joints were full of pus; the cavity of the cyst in the orbit nearly obliterated, and enclosed a muco-serous pus. All the veins in the neighbourhood were examined, but no trace of inflammation could be found in them. It is remarked, however, by M. Legendre that the *diploe* in the neighbourhood of the cyst was *not* examined.

*Observations*.—This and the preceding case must be looked upon as unusual in their rapidly fatal termination, and are related here chiefly from the light they are calculated to throw on the pathology of non-fatal cases.

3. *Hydatid Cyst*.†—A sailor, twenty years of age, was admitted into the Royal London Ophthalmic Hospital, Aug. 10, 1852, for a tumour situated in the left orbit, which had already caused the disorganisation of the eyeball.

An obscurely fluctuating tumour was felt at the upper and under part of the orbit; the upper lid was turned inside out,

\* Démarquay, *op. cit.*, p. 408.

† Bowman's 'Med. Chir. Trans.' 1861.



and the eyeball thrust outward and downward. The cornea was flaccid and half opaque, and the globe of the eye partly collapsed. The first symptom had been an abnormal protrusion of the eye three years before. On the 27th August Mr. Bowman made a puncture with a bistoury and let out a perfectly limpid fluid. He then enlarged the incision, and explored with the finger, but without discovering any hydatids; he therefore introduced a strip of lint. In the course of a week suppuration had been established, and three hydatid cysts of the size of marbles escaped into the poultice. The cavity rapidly closed up, and the patient made a good recovery.

*Observations.*—In the *Ophthalmic Hospital Reports*, vol. iv., p. 88, Mr. Hulke has related a case similar to the one of Mr. Bowman's. The hydatid cyst came away in the poultice in this case, the cavity quickly closing up, and vision being in part retained.

4. *Sebaceous Cyst*.\*—A young woman, æt. twenty years, had protrusion of the eyeball in a direction inwards and upwards, which was caused by a tumour at the lower and inner part of the orbit. This tumour was appreciable to the eye; covered by unaltered skin; having an indistinct fluctuation, and communicating to the finger the sensation of softness, but scarcely of fluidity. Vision was lost, and the pupil dilated, but still moveable.

An exploratory puncture was made without any fluid escaping. A few days after, the tumour was cut down upon and found to be filled with stinking sebaceous matter, similar to the ordinary sebaceous tumours of the skin. The contents of the cyst were of the bulk of an orange. The cyst itself was left to suppurate, and the wound kept open by a strip of lint. The eye returned to the socket and vision improved. Injections of the cavity were had recourse to in order to remove the remains of the sebaceous matter, and various measures tried to promote suppuration, but none succeeded. At the end of three months the probe could still be passed to the bottom of the orbit, and at the end of eight months a small fistulous opening still remained, through which a sero-purulent fluid escaped and occasionally with it fragments of the stinking sebaceous material already alluded to.

*Observations.*—Mr. Haynes Walton has related a case of a similar kind to the above in the *Medical Times*, 1854, p. 195. In all probability the cysts in these instances originated in the eyelid, and thence invaded the orbit.

For an instance of *Colloid Cyst*, containing a gelatinous liquid, I must refer again to Démarquay's work, p. 395; for an

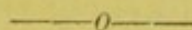
\* This case was observed by M. Testelin, and is quoted by M. Démarquay, at p. 392 of his work.

encysted *Oily Tumour*, to Mr. Haynes Walton's work, p. 280. Several other cases of rare forms of cyst are related by Démarquay, such as a Melanic Cyst (p. 369), and Meliceric Cysts (p. 391); but it would be out of place to give details of such cases in this paper. The instances of dropsy of Tenon's capsule, however, deserve notice, as offering a similarity and a contrast to those cases already related.

5. *Dropsy of Tenon's Capsule*.\*—M. Carron du Villards relates the following case in the "Annales d'Oculistique," 1858, t. XL, p. 106:—

A young man had a distinct projection of the fluid whenever he bent his head forward. If he remained long in that position the eye became so hard and so painful that he was obliged to lie down on his back to push back the fluid by making pressure on the eyelids.

*Observations*.—In all the persons affected by this malady the protrusion of the eye has followed scarlatina or measles, and M. Carron du Villards has observed that the same affection is seen in sheep suffering from the *rot*. This latter being also a cutaneous eruption. The same authority has always succeeded in removing the fluid by a puncture, which should be performed only after a previous cautious dissection down to the capsule before opening it.



## ON VASCULAR AND ANEURISMAL GROWTHS.

Notwithstanding the large number of cases illustrating this interesting subject, which have been put on record by different observers; very few can be arranged satisfactorily according to their pathology; partly because a large proportion of these cases have been so successful as regards the results of treatment, that no opportunity of verifying the diagnosis has been afforded; and partly because others, which have terminated fatally, have yielded evidence of such varying nature that it is almost impossible to find materials for comparison, or to carry out anything like a statistical inquiry in the subject. No two cases out of about forty cases which I have collected, present exactly the same features, either in the symptoms or the pathological conditions; at the same time there are some general points of resemblance among a considerable number to which it may be interesting to allude, and from which, probably, practical conclusions may be obtained.

\* One case has been already noticed under the section devoted to Diagnosis, *vide supra*, p. 665.

In the first place there are about thirty-six cases of tumour recorded which agree as to the following broad characters: they are associated with protrusion of the eyeballs; they have a pulsatile movement perceptible to the eye or finger, or both; there is a bruit or whirring sound heard by the patient and by the stethoscopist; the pulsation and bruit cease when pressure is made on the carotid artery of the same side, and return when the pressure is removed.

It is obvious that a number of entirely different pathological conditions are compatible with the existence of such morbid phenomena as are here mentioned, and on analysing these cases, they will be found to include cases of true aneurism of the ophthalmic artery; diffuse aneurism of the same artery; aneurism, true or diffuse, of the internal carotid in the cavernous sinus; aneurismal varix of the internal carotid; tumours of various kinds obstructing the return of venous blood through the sphenoidal fissure; malignant pulsating tumours in or behind the orbit; and general dilatation of the intra-orbital arteries from atheromatous degeneration of the middle coats.

True aneurism of the ophthalmic artery within the orbit is in all probability the least common form of aneurismal lesion. In Mr. Guthrie's case it is mentioned that an aneurism was found in each ophthalmic artery of the size of a nut. At the same time he states that the ophthalmic vein was very much enlarged and was obstructed near the sphenoidal fissure by an hypertrophied condition of the four recti muscles, which had acquired an almost cartilaginous hardness. (*Lectures on "Operative Surgery of the Eye,"* p. 158). In this case, though the eye was protruded and a bruit could be heard during life, no tumour could be felt.

The only other case in which true aneurism of the ophthalmic artery in the orbit was seen after death, was one mentioned by M. Carron du Villards, as having been met with by him accidentally while dissecting at the *École de Médecine*.

Diffuse aneurism of the ophthalmic artery, either spontaneous or traumatic, seems a much more common condition, but in many cases the mischief seems to be situated as much behind the orbit as within it; and in some it would appear that the symptoms during life are more due to pressure in the cavernous sinus and sphenoidal fissure, than to actual disease in the orbital cavity.

As an instance of a traumatic diffuse aneurism, the case related by Mr. Busk in the *Med. Chir. Review*, for April, 1836, is perhaps the most complete, and illustrates best the symptoms, treatment and pathology of the disease.

*Mr. Busk's case at the London Hospital (Med. Chir. Review, April 1836).*—A man had cerebral disturbance after a violent blow on the left temple. Copious bleeding from the ear fol-

lowed, and deafness. The eyelids were swollen, the pupil dilated and the eye fixed and immovable. More than six months after the accident a pulsating tumour was found at the upper and inner part of the orbit. The common carotid was tied with immediate relief and ultimate cessation of all the symptoms. Some years after a *post-mortem* examination was made, and an old rupture of the ophthalmic artery was found.

This case seems conclusive as to the nature of some, at any rate, of the cases of pulsating tumours in this region, and several similar cases following injuries, seem to confirm the same view of their pathology. A case read by Sczokalsky, at the Heidelberg Ophthalmological Congress, was probably of exactly the same nature. (*Ophthalmic Review*, vol. ii., p. 188.)

*Case by Sczokalsky.*—A man, fifty years of age, while chopping wood, received a violent blow on the left temple from a splinter. The left eye was protruded at the end of a few weeks, and a softish indistinctly pulsating tumour appeared on the left temple.

Between the eyeball, and the upper and outer margin of the orbit, a flat tumour was felt reaching deep into the orbit. The two tumours being superficially separated by the edge of the orbit; both pulsated and pressure on the carotid stopped the pulsation.

The treatment at first tried was compression by the finger on the carotid, with the addition of ice-cold applications, and digitalis internally. This plan not succeeding, the common carotid was tied, digital compression having been employed for eight hours previous to the operation. Three months after the aneurismal tumours had become softer and smaller, and the protrusion of the eye less.

Instances are not wanting of cases of aneurism involving the internal carotid and ophthalmic artery, and it is probable that they form the larger number of the cases of pulsating tumours in the orbit.

The following particulars are related by M. Giraudet, of Tours, of an aneurism involving the internal carotid and ophthalmic artery (*Gazette des Hôpitaux*, 7th March, 1857), and will throw light on the pathological conditions of many of the cases in which the state of the structures involved could only be guessed at. "On raising the right anterior lobe of the brain, we discover an irregular, oblong, nodulated tumour, situated above the cavernous sinus. The colour is of a red brown, mingled with yellowish spots, its volume measures four centimetres by two-and-a-half. The right ophthalmic artery enlarged into the form of a funnel, is continuous with the anterior aspect of the tumour. The latter having been divided, and the clots turned out, the two funnel-shaped openings of the carotid and ophthalmic arteries are seen, establishing a communication with the aneurismal sac. The sac has only one cavity, the thickness of its walls

varies from two to three millimetres. The cellular coat of the artery adheres closely to the surrounding vessels. The middle coat is thickened ; a slight magnifying power discloses numerous laminae of tranverse fibres. Between this coat and the inner coat we find a large number of little osseous lamellæ of a blue-yellowish colour, the inner coat is marked with red and yellow marks in two different places. It is completely worn away and destroyed, and the osseous plates are in direct contact with the interior of the cyst.

Among the clots which the tumour contains, some escape at the time of the incision ; others are closely united and arranged in concentric layers. The right optic nerve is flattened like a ribbon, displaced and bound to the under surface of the tumour ; the motor oculi nerve, and the ophthalmic branch of the 5th, are also thinned and compressed at the base. The cavernous sinus is obliterated ; the clinoid processes have entirely disappeared ; the commencement of the roof of the orbit is stripped of periosteum and *ruginè* for the extent to two centimetres."

An account of the dissection of the orbit in a similar case is given in the *Pathological Transactions*, vol. xi., p. 8, by Mr. Nunneley, and the conditions in the two cases offer a very remarkable resemblance. Those pulsating tumours which come on suddenly in the orbit, especially when occurring in the course of pregnancy, or during any rather violent exertion, may be looked upon as of the nature of diffused aneurism, differing only from those of traumatic origin in having been preceded by a diseased artery or true aneurism. These are what Demarquay describes as diffuse consecutive aneurisms as distinguished from diffuse primitive aneurism, or those not preceded necessarily by disease of the coats of the artery involved. Dalrymple's case of a pregnant woman forty-four years of age, who had sudden pain and noise in the head, followed by a pulsating tumour which receded after ligature of the carotid is a good instance.

A case related by Mr. Nunneley in vol. xvii. p. 168 of the *Med. and Chir. Transactions*, is especially interesting, as the diagnosis was confirmed in a remarkable manner by an autopsy five years after the disease had yielded to the ligature of the common carotid.

In this instance there had been during life, besides the other common symptoms of aneurism, paralysis of all the extrinsic muscles of the eyeball, and the seat of the tumour was thought to be in the cavernous sinus from this circumstance. This proved to be the case ; for a circumscribed aneurism was found on the side of the sella turcica, filled with solid coagulum and pressing upon the ophthalmic vein.

Mr. Nunneley, from this and other cases, draws the conclusion that pulsation in orbital tumours may be a merely communicated pulsation from an intra-cranial aneurism to an enormously

dilated ophthalmic vein; and from cases that have been reported elsewhere, such an explanation seems very probable, and to be justified by facts that have been brought to light.\*

This consideration explains some cases which have been very puzzling to the surgeon, of *simulated aneurism* in this region.

Thus, Gendrin relates the case of a woman thirty-two years of age, who was attacked by sudden pains in the head, and protrusion of the eyeball. Pulsation and bruit both distinct. After death the intra-orbital veins were found distended with blood, but there was no extravasation. In the interior of the cavernous sinus the internal carotid and ophthalmic arteries were surrounded by an adherent blood-clot. Their inner wall presented various alterations—the greater part of the arteries of the orbit were obliterated. Here, as in Mr. Nunneley's case, the pulsation felt in the orbit must have been communicated.

The following case also, anterior in point of time to those already related, illustrates the same point.—*Ophthalmic Hospital Reports*, vol. ii., p. 6 :—

The woman, æt. forty years, under the care of Mr. Bowman, at King's College Hospital, complained of a sudden loud noise in her head after a blow with the fist.

She had double vision, redness and protrusion of the eyeball, dilated and immovable pupil, and enlarged veins at the outer and inner canthi. Pulsation was felt over the eyelids.

The common carotid was tied, and the pulsation and bruit immediately ceased, and for a week there seemed every chance of the case proving a successful one. Phagedænic ulceration, however, followed by hæmorrhage, led to a fatal termination eighteen days after the operation.

When the parts came to be examined, no trace or appearance of an aneurism could be discovered, but there were evident signs of "phlebitis of the cavernous, transverse, circular, and petrosal sinuses. The internal carotid artery may have been partially compressed by the swollen walls of the cavernous sinus against the side of the body of the sphenoid bone, giving rise to the bruit, which would have a good conducting medium in the cranial bones. The plugging of the trunk of the ophthalmic vein, where it joins the cavernous sinus, by obstructing the return of blood from the orbit, accounts for the protrusion of the eyeball, and perhaps also for the pulsation which was felt when the fingers were laid on it."

These remarks were made by Mr. Hulke, who reports the

\* It is, however, remarkable that in the case, to explain which Mr. Nunneley makes these observations, there was aneurismal dilatation of the arteries in the orbit, sufficient, if the drawing be correct, to account for the symptoms. *Vide Pathological Transactions*, vol. xi., p. 8.

case, and to him, therefore, is due the credit of making out this important point in the pathology of intra-orbital tumours, the cases adduced by Mr. Nunneley having in a striking manner confirmed his views.

The difficulty of exactly appreciating the nature of the intra-orbital growth is well illustrated by another case related by Mr. Nunneley in *Med. Chir. Transactions*, vol. xlvi., p. 21, in which a highly vascular malignant growth was treated by ligature of the carotid, with temporary relief of the symptoms, the eyeball receding and the pulsation being less marked. Death occurred eighteen months after, and a tumour of the nature of medullary cancer was found occupying the post-orbital region of the cranium, passing into the orbit and zygomatic fossa, and pressing upon the cavernous sinus and ophthalmic vein.

A parallel case is recorded by Demarquay as having occurred to Mr. Lenoir (*Bulletins de la Société de Chirurgie*, t. ii., p. 61 and 84).

The tumour was treated as an aneurism by ligature of the carotid, after which pulsation ceased and the tumour diminished in size. Two months after, a pulsating tumour appeared in the calf. Death occurred nine months after the ligature of the carotid; when encephaloid tumours in the brain, in the calf of the leg, and in the lungs were found.

Having, however, brought forward so many cases of difficulty, the practical aim which I have before me would be entirely overlooked were I not to endeavour to lay before my readers a succinct statement of what symptoms may be expected in an uncomplicated case, and that some have occurred and are likely to occur again there can be no doubt, though in very few will there be such simplicity and clearness as would satisfy those who look for the precision of the printing press in the pages of nature, rather than the faint outlines left in the sand by the finger of the unseen Master.

An uncomplicated diffuse aneurism is very frequently the result of an injury to the orbital or temporal region, or to the base of the cranium. Where there is no history of external injury, the attack of pain and noise in the head with which the symptoms are ushered in, has been sudden and has been observed to occur in pregnant women or during child-birth in a large proportion of cases.\*

\* Thus, of thirty-four cases of aneurismal tumours in or about the orbit, tabulated by Dr. T. G. Morton, of Pennsylvania, thirteen are directly attributed to injuries received, and six occurred either during pregnancy or during childbirth.—(*American Journal of Medical Sciences*, April, 1865.)

And in two other cases not tabulated, by Dr. Morton, the origin of the disease in each case was injury.—(Holmes, *American Journal of Medical Sciences*, July, 1864.)

The immediate effect is to produce swelling and ecchymosis of the lids and surrounding parts, and this is followed sooner or later (it may not occur for months after), by protrusion of the eyeball, a pulsating tumour near the eyeball, and a whirring bruit heard over the temporal region or brow by the aid of the stethoscope. Pressure made on the carotid of the same side stops the pulsation, which recurs when the pressure is removed. The patient complains of a beating or humming noise in the head, and in some cases this noise can be heard by others at some little distance from the patient.

The protrusion of the eyeball increases gradually, and in all probability the expanding tumour would at length burst, leading to a fatal hæmorrhage, unless art stepped in and arrested the morbid process. The only case in which fatal hæmorrhage occurred was one of aneurismal varix of the cavernous sinus, the rupture occurring during a period of the intermission of treatment by compression of the carotid. (See a case of M. Nélaton's, related by Dr. Holmes in the *American Journal of Medical Sciences*, for July, 1864, at page 46).

Whether an ordinary diffused aneurism of the orbit has ever been known to terminate in this way, is of very little consequence; the mode of termination of the same disease in other parts being well known; and there being no reason for expecting any difference in its progress in this locality.

It is remarkable, however, that treatment by ligature of the common carotid and by compression with the finger of this artery should have been so often successful in checking the progress of a disease which, in other parts of the body, is not usually controlled by the same method; and this consideration throws considerable doubt on the diagnosis in those cases in which the operation has been successful, and makes it probable that true aneurism has been present, and not a diffused aneurism, or that, at any rate, the diffused aneurism has become encysted and so assumes some of the characters of a true aneurism, and among those its amenability to treatment by ligature of the main vessel. It is easy to conceive that the firm fascia of Tenon's capsule in front, and the attachments of the recti muscles behind, would form such barriers to the extension of effused blood, that after a clot had once formed, it would offer considerable resistance to the impulse of an artery of so small a calibre as the ophthalmic, and that an aneurism in this cavity would be under conditions somewhat different from those of one in the popliteal space or in Scarpa's triangle. In those spaces, and in others along the chief arteries of the limbs, the fascia of the limbs would only limit the extension of effused blood forward, while neither their own sheath nor the fasciæ would, in any way hinder an extension in the direction of the



long axis of the limb. On the other hand it may be said that in tying the common carotid the treatment is equivalent to tying the arteries supplying both ends of the divided or ruptured vessel, and that it cannot be compared to simply tying the superficial femoral for an aneurism in the brain. Such an argument, however, is open to the objection that the anastomosis with the arteries, on the other side of the head are very free and perhaps as much likely to interfere with success as the anastomosis of the profunda femoris with the recurrent and other branches of the popliteal.

The *sudden* attack of pain and noise in the head will suffice to distinguish a case of this kind from the pulsating malignant growths, and these seem the only ones likely to be confounded with them. I have, however, already mentioned an instance in which the diagnosis from abscess was only cleared up after making a puncture into the tumour, and it is well to bear in mind cases that have been recorded of aneurism by anastomosis in the orbit (see Haynes Walton "On Surgical Diseases of the Eye," second edition, p. 230), and the dissection of a case by Mr. Nunneley (*Pathological Transactions*, vol. xi., p. 8), in which, from the drawing given by him, there seems to be a general dilatation of the ophthalmic artery and its branches.

The symptoms of aneurism of the internal carotid in the cavernous sinus may resemble, in some respects those of aneurism within the orbit, but will most likely be accompanied by others, such as disturbances of the cerebral functions; paralysis of the motor apparatus of the eye from pressure on the nerves at the sphenoidal fissure; and if the tumour does not invade the orbit no pulsation would be perceptible, so that the difficulty of diagnosis would be lessened. A case related by Mr. Hussey, of Oxford, in the *Ophthalmic Hospital Reports*, vol. ii., p. 127. well illustrates the difficulty of diagnosis of such cases; the disturbance of functions of the brain—*e.g.*, paralysis of the arm and convulsive attacks, and the co-existence during the latter part of the life of the patient, of hæmorrhages from the nose, seemed to indicate a tumour of a malignant kind in the cranial cavity invading the cerebral tissues, though the sudden occurrence of the symptoms, during a somewhat violent exertion, favoured the hypothesis of an aneurism of the internal carotid in the cavernous sinus. In the absence of a post-mortem examination this very interesting case remains of doubtful nature.

The treatment of aneurism of the orbit has been, it would appear, very successful, whether ligature of the common carotid has been adopted or digital pressure, or injection by astringents or internal remedies.

Dr. T. G. Morton, of Pennsylvania (*loc. cit.*) has collected thirty cases in which the common carotid artery was tied for aneurism, or supposed aneurism, within or near the orbit, and of these twenty-two are reported as cured, and three as partially successful; two were unsuccessful and three fatal.

Dr. Morton has tabulated four other cases, two successfully treated by injection of styptics and two, equally successful, created by digital compression.

And Dr. Holmes (*American Journal of Medical Science*), has related a case successfully (*loc. cit.*) treated by the administration of extract of ergot and tinct. of the veratum viride, or in which, at any rate, the patient recovered perfectly during the administration of those remedies.

A case, treated by compression is also related by this gentleman, but with a fatal result during a period of intermission of the treatment. So that, out of thirty-seven patients treated by different methods (*vide* table), twenty-nine perfectly recovered, three more were relieved, two remained as they were before, and three died.

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*For Table of Cases see following page.*

TABLE OF CASES.

	Operator	Date.	Ligation.	Result.	Origin.
1	Travers	1809	Common Carotid	Cured	Sudden, during pregnancy
2	Dalrymple	1813	ditto	Ditto	Ditto
3	Roux	1829	ditto	Success incomplete	Sudden and spontaneous
4	Warren	1829	ditto	Cured	Ditto
5	Warren	1829	ditto	Unsuccessful	Injury
6	Scott	1834	ditto	Cured	Ditto
7	Busk	1836	ditto	Ditto	Ditto
8	Dudley	1839	ditto	Ditto	No observable cause
9	Jobert	1839	ditto	Ditto	Injury
10	Velpeau	1839	ditto	Ditto	Sudden and spontaneous
11	Wood	1842	ditto	Ditto	Congenital
12	Mott	--	ditto	Success incomplete	Ditto
13	Van Buren	--	ditto	Cured	Injury
14	Herpin	1844	ditto	Ditto	Sudden and spontaneous
15	Petrequin	1845	ditto	Ditto	
16	Nunneley	1852	ditto	Cured	Injury
17	Nunneley	1856	ditto	Ditto	Slow, during pregnancy
18	Nunneley	1858	ditto	Died	Sudden and spontaneous
19	Nunneley	1859	ditto	Cured	Injury
20	Walton	1851	ditto	Ditto	Congenital
21	Brainard	1852	ditto	Unsuccessful	
22	Curling	1854	ditto	Cured	Injury
23	Coe	1855	ditto	Ditto	Ditto
24	Bowman	1859	ditto	Died	Ditto
25	Bowman	1860	ditto	Cured	
26	Syme	1861	ditto	Ditto	
27	Hart	1861	ditto	Ditto	Injury
28	Morton	1864	ditto	Ditto	Sudden, during pregnancy
29	Nunneley	1864	ditto	Ditto	Injury
30	Nunneley	1864	ditto	Successful in arresting protrusion. Patient lived 18 months	Spontaneous
31	Bourget		Treated by injection	Cured	
32	Walton		ditto	Ditto	Sudden, during childbirth
33	Gioppi	1856	Treated by compression	Ditto	Sudden, after childbirth
34	Scaramuzza	1858	ditto	Ditto	Injury
35	Holmes	1864	Treatment by Ext. Sec. Comut. and Tr. Veratr.	Cured	Injury
36	Nelaton & Desmarrs	1855	Compression with tourniquet	Death from bursting of aneurismal varix of the cavernous sinus	Injury
37	Sczokalsky ( <i>Ophthalmic Review</i> ), vol. ii. p. 188.	1864 or 3	(1) Digital compression and ice. (2) Three months later ligation of the carotid	Success lasting for three months at least	Injury

## ON EFFUSIONS OF BLOOD, AIR, AND SERUM, IN THE ORBIT.

### I. EFFUSIONS OF BLOOD IN THE ORBIT.

THE causes of extravasations in this region are direct injuries, penetrating wounds, and fractures of the skull involving the orbital walls; but there are a few instances in which the extravasation has taken place independently of actual violence applied to the part; and such cases have occurred during violent exertion on the part of the patient and generally in a highly heated atmosphere. The effusions of blood of an external kind, and leading to diffuse aneurism, have been already considered, and our present subject will, therefore, exclude the consideration of any aneurismal growths. The symptoms will, however, be similar to those of intra-orbital aneurism in some respects. There is a sudden protrusion of the eyeball immediately or at a slight interval after an injury—with discoloration of the conjunctiva and eyelids, and perhaps, ecchymotic redness and swelling of the surrounding parts. The vision may be simply defective from the alteration of the axis of the two eyes, and the consequent diplopia, or there may be temporary amaurosis consequent on pressure behind the globe, or around the optic nerve. The swelling may or may not be felt by the finger, but the history and symptoms will clearly point to the nature of the case, and, unless there be serious lesions within the cranium, the treatment will be of the simplest nature.

When the extravasation is associated with fracture, it is evident that the case may be of a very serious kind; the prognosis being unfavourable in proportion to the extent of the injury. It may therefore be well to consider, in such a case, what evidence there is of the fracture having extended into the base of the cranium or the roof of the orbit. M. Carron du Villards says, that he has seen many cases in which fracture of the cranium has been associated with symptoms of intra-orbital effusions of blood, and he relates a case in which his diagnosis was verified by post-mortem inspection. (Demarquay, *Op. cit.*, p. 272). With regard to extravasation in the eyelids as an indication of the seat of fracture, there seems to be no certainty, though, if not associated with sub-conjunctival effusion it would point to the *margin* of the orbit as the probable seat of injury; while sub-conjunctival effusion associated with other symptoms of fracture and unassociated with effusions into the eyelids, or followed by it, would point to the deeper or post-ocular part as

the seat of injury.\* The latter condition would be, of course, more likely to be serious than the former, in proportion as the base of the cranium is more important than the facial region.

The following extract from Mr. P. Hewett's paper in "Holmes's Surgery," vol. ii. p. 127, will serve to show what value can be placed on this symptom as an indication of fracture in the orbit.

"Out of twenty-three cases of fractured base, involving more or less extensively the orbital plates of the frontal, all of which occurred at St. George's Hospital within the space of ten years, it was found in eight cases, that there were no traces of extravasated blood to be seen, either in the eyelids or under the ocular conjunctiva; and in five cases that the effusion of blood occupied the eyelids only; so that in these *thirteen cases* there could have been no suspicion whatever as to the existence of a fracture. But, on the other hand, the nature of the injury was made manifest in the *ten remaining cases* by the blood effused under the ocular conjunctiva and in the lids.

"Blood may, however, be effused into the lids and under the ocular conjunctiva, in fractures of the malar, or superior maxillary bones; and this may give rise to an error of diagnosis."

The following case abridged from a report in Demarquay's works, taken from the "Annales d'Oculistique" 1847, t. xviii. p. 201, is a good illustration of the subject in hand.

M. L., æt. sixteen, fell from the rigging of a ship, a height of fifty-two feet, and struck the left side of his head. He was taken up insensible and blood flowed copiously from his mouth, nose and ears for several days. The left eye was thrust out of the orbit and hung down on a level with the tip of the nose. The captain of the ship replaced the eye and put on a linseed poultice. Fever supervened, with delirium, and lasted fifteen or twenty days.

Three months after the accident he was placed under the care of M. Duval, who found his left eye protruded and absolutely blind; though the iris acted regularly. Iodide of mercury ointment was rubbed into the temple and brow, and iodide of mercury given internally, and leeches applied.

A year after, violent inflammation of the eyeball and surrounding parts came on, which subsided under treatment, which still left the protrusion of the globe. Iodide of mercury internally and externally were again used, and at the expiration of two months the eye had returned to the socket. Two years after, the patient's appearance was quite normal, but vision was never restored in the affected eye.

In a case related by M. A. Ricord and quoted by Mr. P. Hewett ("Holmes' Surgery," v. ii. p. 173), there was distinct evidence of extravasation of blood in both orbits, but no protrusion of either eye. The sight of one eye was temporarily lost, and

\* Demarquay, *Op. cit.*, p. 274.

Mr. Hewett remarks that the temporary loss of vision must have been due to effusion into the sheath of the optic nerve, rather than to pressure, and the restoration of blood in the orbit and around the nerve of vision, to a re-absorption of this blood.

Among the symptoms of extravasation with fracture, may be mentioned paralysis of the fifth and third pair, and instances of such lesions are given by Mr. Hewett in the same place; but it would be imprudent to look upon these lesions as merely the result of compression by effused blood; when we consider that the same injury which has caused the latter may have damaged the brain substance permanently; and the prognosis must be cautious in proportion.

Extravasations from penetrating wounds, and from contusion, give rise to symptoms similar to those already mentioned and instances can be found in many authors.\*

A remarkable case by Dr. Redemans is well worth notice.† The obstetric forceps were applied by this gentleman, for the delivery of a woman in her sixth confinement. The child was extracted alive, but, two hours after, the right eye was found to be thrust out of the orbit, the eyelids being buried in that cavity and the conjunctiva everted and infiltrated with blood. There was also infiltration of the eye and eyelid of the other side, but to a less extent.

Pressure with the fingers failed to replace the protruded eye, and a puncture made into the swelling was also unsuccessful. Graduated compresses were applied, but suppurative action set in and ulceration of the cornea which ended in perforation. After this the protrusion became less, and the eyelids resumed their normal position.

This case is unique, but seems to point out the possible dangers of delivery in this way when it is necessary to apply the forceps for a long period, and, as Mr. Redemans observes, suggests the expediency of applying a compress immediately after birth in any case where there is reason to anticipate such a result. Possibly, in a suitable case it would be better, when the protrusion has actually taken place to leave the process of absorption to go on without any local interference and to protect the surface of the cornea by the application of olive-oil and a gauze-shield or goggle of such a size as to cover the whole circumference of the orbit, and the everted conjunctival surface. Punctures into the orbit itself would scarcely be likely to be of use in any case of extravasation, though, in such a case as the

\* (Vide Demarquay, *Op. cit.*, p. 280—1. *Ophthalmic Hospital Reports*, Oct. 6, 1857).

† Demarquay, *Op. cit.*, p. 283.

above, the temptation to effect a rapid replacement of the eye was very great and would justify any rational attempt with such an object.

Spontaneous effusions of blood in the orbit are very uncommon, but M. Demarquay's work contains allusions to several instances occurring in typhus patients and in one scorbutic. He also relates in detail the case of a workman, nineteen years of age who had sudden diplopia and impairment of vision and of the movements of the eyeball, which could only be attributed to this cause. M. von Graefe, under whose care the patient was, considered the *absence* of cerebral symptoms, taken in connection with the symptoms observed, plainly indicated the seat of the effusion, and the gradual disappearance of all these symptoms justified his diagnosis.

The treatment adopted in this case was that of general and local bleeding, and M. Demarquay recommends in similar cases to make an opening for the escape of the effused blood. How far such a plan may be justified by experience I am unable to say, but I should be inclined to leave the effused blood alone till absorption had taken place.

## II.—EMPHYSEMA.

The escape of air from the lacrymal passages into the cellular tissue sometimes gives rise to protrusion of the eyeball; and this is generally the result of some injury by which the os unguis has been fractured. The following two cases of M. Desmarres (Demarquay, p. 224-5) are very good illustrations of this very rare and curious affection.

M. Desmarres' first case:—

“As soon as the patient pressed his nose between his fingers to use his pocket-handkerchief, and the air was forced into the nasal canal, the left eye was visibly projected for the extent of at least a centimetre and a half, being thrust forward by the air which found its way behind the globe at each attempt made by the patient to blow his nose. As soon as the compression of the nostrils was taken off, the globe resumed its place, and occupied the same level as its fellow. At the same time that it was thrust forwards, the eye was directed from above downwards, and from without inwards, and there was double vision. When the other eye was closed, at that moment double vision ceased, and the image perceived was single and distinct; it was only displaced, and followed the direction of the fellow organ.”

M. Desmarres' second case:—

“A blow from the fist on the left eye ruptured the lacrymal sac; an enormous emphysema of the whole anterior wall of the orbit was soon produced. With the view of showing me how he made the air pass at will into the tumour, the patient blew his nose violently while compressing his nostrils; immediately the eyelids and the circumference of the orbit swelled, and became of a blueish ecchymotic black, just as if a coloured injection had been forced into the tissues.”

General emphysema may affect the orbit with other parts and protrusion of the eyes in such a case would not be at all a serious symptom. It is necessary to bear in mind the possibility of meeting with such a singular condition as that of the cases described, but it would be improbable that any mistake of diagnosis should occur.

The treatment consists in making punctures for the escape of the air from time to time, and the patient should be cautioned against blowing his nose until the opening in the membrane and lacrymal bone has closed up.

### III.—EFFUSION OF SERUM INTO THE CELLULAR TISSUE.

M. Demarquay has pointed out this condition as the probable cause, in some cases at any rate, of the exophthalmus, associated with disease of the heart in goitre; and adduces a case of albuminuria and general anasarca in which infiltration of the cellular tissue was found after death, the eyes having been much protruded during life.

He allows, however, that the pathology of this disease is not at all conclusively settled, and as researches seem still to be wanting on this subject, it is premature to give any description which must necessarily be wanting in accuracy and completeness. Nevertheless, the most recent observations seem to confirm the views of Demarquay, and, in addition to point to some lesion of the cervical sympathetic nerve as generally associated with it. (See Dr. Reith's remarks on a "Case of Exophthalmus" in the *Med. Times and Gazette*, Nov. 11, 1865.)

These few remarks on the subject of effusion into the cellular tissue are only offered as indirectly bearing on the subject of tumours, properly so called, in this locality and as a means of assisting in forming a diagnosis. Thus the aspect of the patient, generally anæmic and languid; the *slow* progress of the protrusion by which *both* eyes are simultaneously affected; and the coexistence either of cardiac symptoms or of bronchocele, and perhaps of both, will, together, serve to distinguish a case of intra-orbital effusion of serum from any other affection in the same region.



ERRATA.

Page 29, line 26, for "tried," read "tied."

Page 34, line 5, for "brain," read "ham." Line 24, for "carvenous," read "cavernous."