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OBSERVATIONS ON MINERS' NYSTAGMUS
AND ITS CAUSE;
CONGENITAL OCULAR DEFECTS;
AND OTHER PAPERS.

BY
SIMEON SNELL.

THE YORKSHIRE COLLEGE



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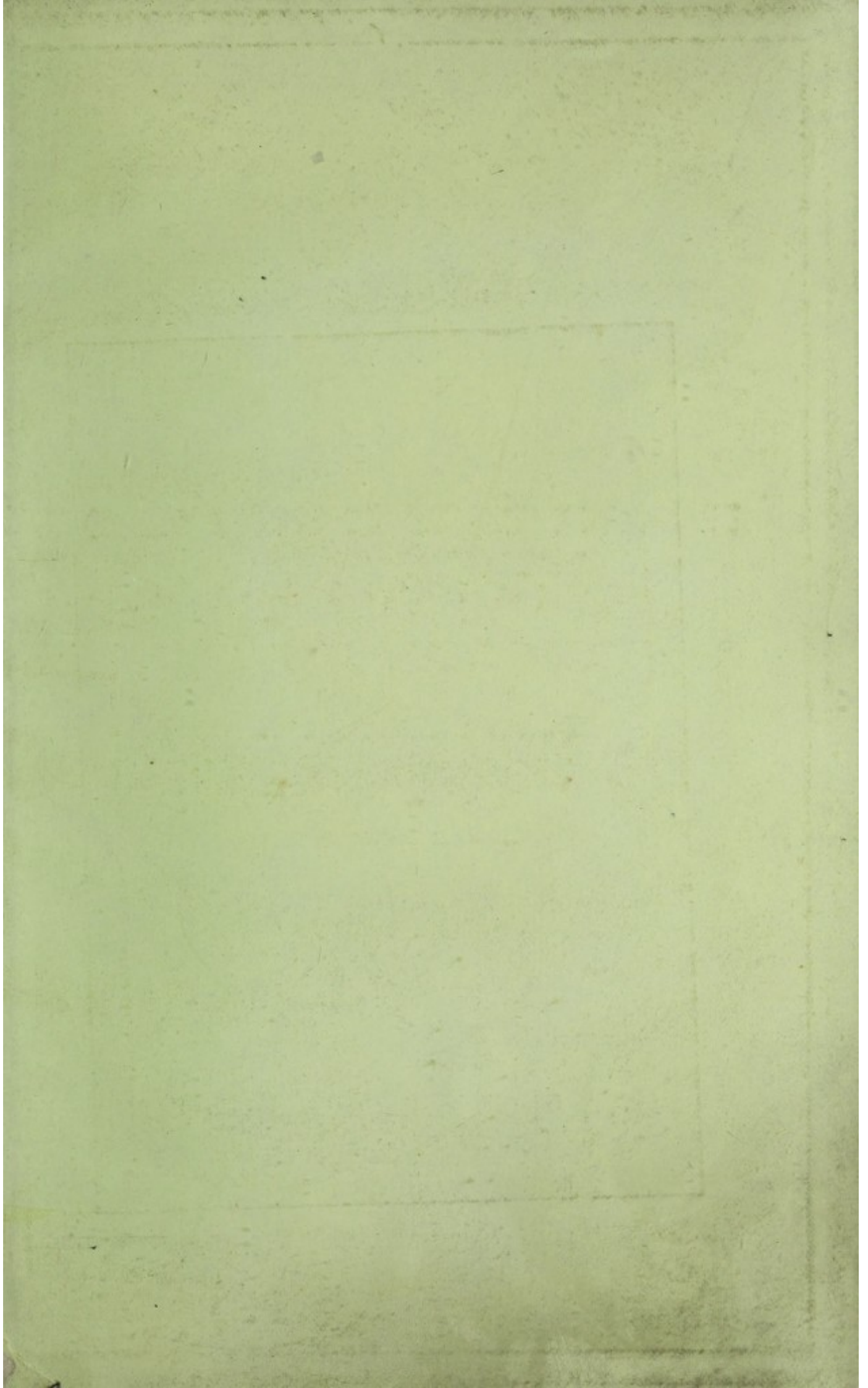
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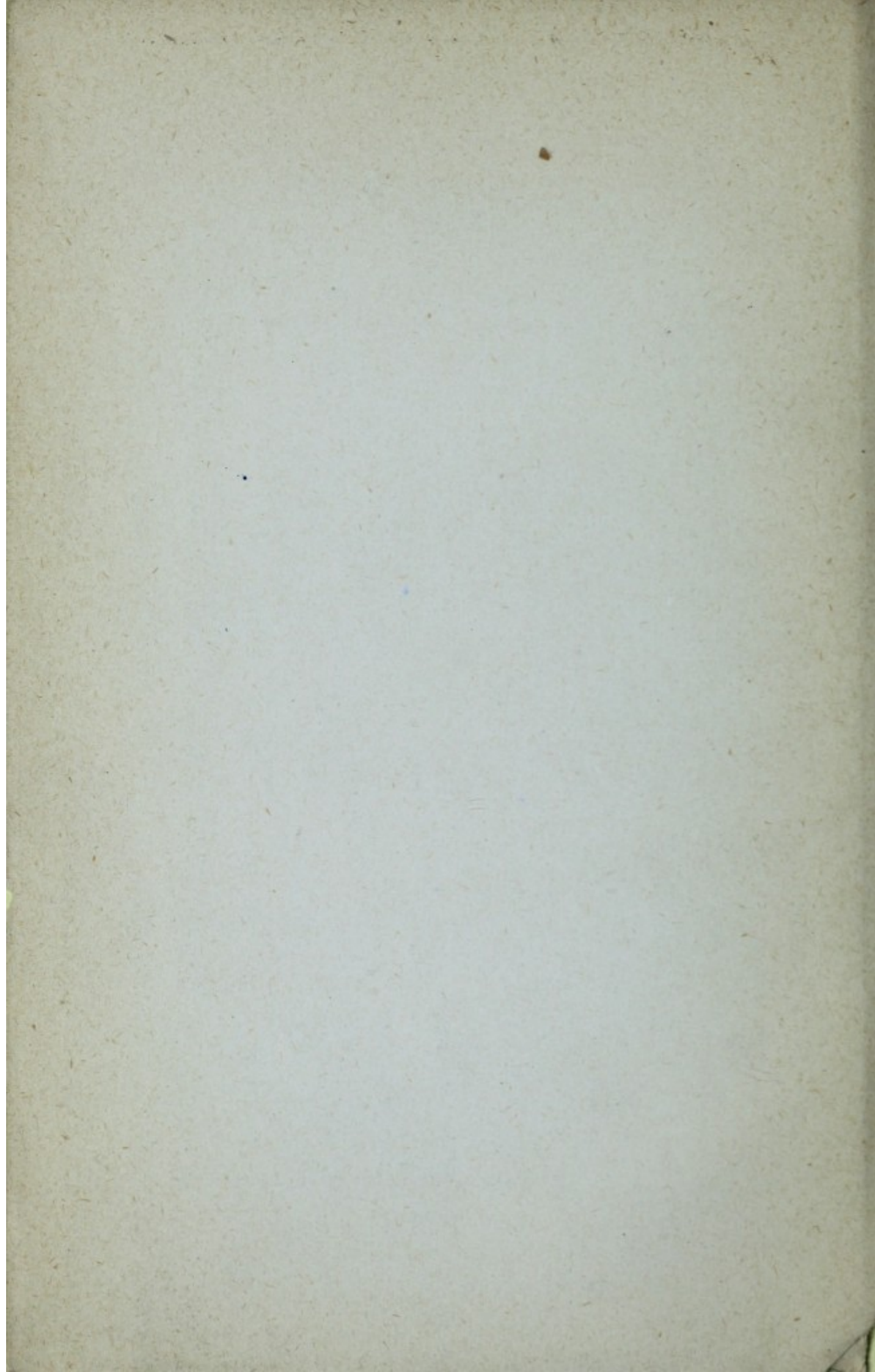
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OBSERVATIONS ON MINERS' NYSTAGMUS
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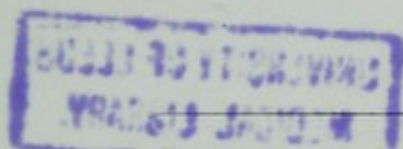
AND OTHER PAPERS.



BY

SIMEON SNELL,

OPHTHALMIC SURGEON TO THE SHEFFIELD GENERAL INFIRMARY, AND TO THE
INSTITUTION FOR THE BLIND.



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Bony tumour of conjunctiva (microscopical section).

FLORENCE W—, æt. 13, was admitted into the Sheffield General Infirmary on September 30th, 1882. Her mother informed me that since earliest infancy she had observed in the right eye "a piece of skin," which protruded when the child turned the eyes to the left. There had been no complaint of pain, and no notice was taken of the condition mentioned, until a few weeks previous to coming under my care, since which time it has appeared to have increased in size and has become more inconvenient. Examination disclosed a tumour situated beneath the conjunctiva, between the cornea and the external canthus, and somewhat under cover of the upper eyelid. It was more distinct when the eye was turned inwards. It was about the size of an almond or less, and felt hard at the centre. On October 2nd the conjunctiva was divided and the growth readily removed; the wound was closed by sutures. On the 6th she left the infirmary.

The growth consisted of adipose and fibrous tissues, with a central hard nucleus about the size of a large pea; it was surrounded by a fibrous covering (periosteum). Dr. J. B. Story, of Dublin, kindly made for me the beautiful section of the hard nucleus which I show this evening. It is an excellent example of true bone. It presents Haversian canals, lacunæ, and canaliculi of typical character.

The presence of a tumour containing true bone in the situation of the case related must be very rare. Mr. Anderson Critchett, in the 'Transactions,' vol. ii, relates

a similar case, which he deemed unique. Mine closely resembles his in its situation, and in probably being congenital.

(July 4th, 1884.)



Two cases of retinal glioma, in one of which shrinking of the eyeball occurred without perforation.

CASE 1.—R. H. T—, a little boy aged about 18 months, was brought to me at the Sheffield General Infirmary on April 13th, 1877. The mother stated that when nine months old the child had a "fit" and was ill for a fortnight; again, at twelve months, he had an attack of "congestion of the brain," and he was subsequently ill in the same way. After the first illness he was noticed to be losing his sight, but his parents observed nothing wrong in the appearance of the eyes; later on, the left eye had become enlarged.

At the time of his coming under my notice there was a yellowish-white deposit situated in the interior of each globe at its posterior part. This appearance was much more marked in the left than in the right eye, which was also somewhat increased in size. The diagnosis formed at this time was that the case was an instance of strumous deposit in the eye (pseudo-glioma). The immediate development of the case appeared to support this view. It was decided for the present to watch its progress.

During the next three months the left eye increased much in size, the globe became filled with the deposit, the iris was infiltrated, and exudation appeared in the anterior chamber. The eyeball next began to soften and shrink, but at this time (September 14th, 1877) it was noticed that the right eye, which had remained almost

quiescent, its condition having altered but little since first observed, now commenced to go through apparently the same stages as the fellow organ. Instead, however, of beginning to soften and shrink like the left, after having reached a similar point, its course was very different. On February 13th, 1878, it is stated that the right globe was enlarged, there was exudation in the anterior chamber, and the pupil was opaque looking. Again, on April 8th—and the patient had not been brought to me between these dates—the eyeball had so increased in size as almost to fill the orbit, the cornea was destroyed in part, and there was a tendency to fungoid protrusion. Removal of the globe was advised and the eyeball was excised at the date just given. Section of the eye showed it to be completely filled with a growth which, examined microscopically, left no doubt as to its gliomatous nature.

In a few weeks the disease had returned in the orbit, and after filling this cavity appeared on the cheek, forming a tumour as big as a large orange. The patient died from exhaustion on August 28th, 1878.

A post-mortem examination was made the next day. It was limited to the head. The left orbit contained the merest stump of the globe. The tumour was traced into the right orbit and found to be continuous with the optic nerve. There was considerable emaciation of body.

CASE 2.—Early in 1877, a little baby, Sarah D—, aged about 8 months, was brought to me on account of a peculiar appearance the parents had noticed in her eyes. The child had had no “fits.” Since she was three months old attention had been directed to her eyes, but the father recently in playing with her had particularly noticed a “shining” in the right eye. When brought to me, in the interior of the right eye at its posterior part was a whitish-looking growth (?) and vessels were distinctly traced over its surface. A similar appearance, though very much less developed, was noticed in the left eye. The diagnosis made was glioma in both eyes, and in this

opinion my esteemed friend, Mr. Gillott, who saw the case, concurred. The right eye was blind, but in the left a measure of sight remained. The patient was admitted into the Sheffield General Infirmary, and on February 25th, 1877, the right eyeball was excised.

My friend, Dr. Dyson, was good enough to examine with me the growth in the interior of the excised globe with the microscope. As the result of the examination we were lead to hope it was not gliomatous but rather caseous tubercular matter with calcareous concretion. The child remained under observation for some time and then the mother ceased attending at the Infirmary with her. Three years later, however (April, 1880), she was again brought to me in consequence of the altered condition of the remaining eye. After the excision of the right globe, the child had been able to see big objects, and up to about two years of age could play with her toys. For the last three months especially the eye had been getting worse, and quite recently its progress had been rapid. Now the interior of the globe was filled with the growth. On April 19th the left eyeball was enucleated.

Dr. Dyson also in this instance kindly gave me his valuable assistance in the microscopic examination of the contents of the removed eyeball. The gliomatous nature of the disease was readily recognised.

After a short time the patient ceased to attend, and it was not until the succeeding March (1881) that I again saw her. My attention was directed to a prominence on the forehead a little above the left eyebrow. It was not larger than a walnut and it had been noticed only for a few weeks. The parents had observed it first when no bigger than a pea. There had been no return of disease in the left orbit, and the right remained, exactly as it had done since the enucleation of the globe four years and a half previously, perfectly healthy. The tumour on the forehead rapidly increased in size, and by the early part of May was larger than an orange.

On July 15th it measured nine inches across and seven inches from above downwards. Its limits on the right were more defined, but on the left it extended gradually into the temple as far as and above the ear; the left upper lid was drawn out and somewhat involved, and the growth reached well down the nose. Large veins coursed over its mottled and distended surface.

On September 2nd the measurements of the tumour were fifteen inches across by thirteen vertical, and there had been some bleeding from one of the veins over the left orbit; this recurred at different times, and the surface towards the inner side became more or less ulcerated. The patient died on September 28th.

Permission to remove the tumour for preservation was granted. It was found firmly attached to the bone, which was honeycombed and sent numerous bony spiculæ into the substance of the growth. The frontal bone was densely thickened at some parts and very much thinned at others. During a change of house surgeons the specimen became lost.

It must be mentioned that the parents stated that the child received a blow on the forehead before the formation of the tumour in that situation.

The cases I have related are not as complete in some particulars as one would have liked, but I believe they are of interest and worth placing on record.

The first one would appear to be rare; at least I cannot find a precisely similar one recorded. When the patient was first seen the diagnosis was by no means easy, but after short observation the appearances seemed more in accord with those one is accustomed to associate with strumous deposit, pseudo-glioma. The subsequent shrinking of the left eye, and that without perforation, apparently confirmed the diagnosis. The development, however, in the right eye ultimately of unquestioned glioma with the return of the disease, naturally calls in question the accuracy of the opinion formed in the first instance. It will be admitted that the left eye underwent the changes expected

of it, if the disease were one of the varieties described under the term pseudo-glioma, and it may be added that up to a certain point the processes in the two eyes were identical. It may be regarded as possible that, in the right eye, the glioma was engrafted on such a condition as the diagnosis would indicate. Sarcomata, it is well known, are in a similar manner met with in eyes damaged by injury or disease, as well as in other regions.

On the other hand, it is possible, looking at the case with the after-history before us, to regard it from the outset as glioma with an unusual course. I have never seen a glioma present the appearances this case did at the commencement of the attendance. Temporary shrinking has sometimes been reported in glioma.

Dr. Brailey tells me of a case of his in which a semi-shrunken globe was filled with degenerated glioma. Such an amount of shrinkage, ultimately to a mere button, has not, I fancy, been previously reported in a gliomatous eye. It is to be regretted that at the time the remains of the left globe were not examined microscopically. Atrophy of malignant growths, it is well known, is met with in other regions. I extract the following quotation from 'Bryant's Surgery': "In rarer cases, the cancer withers 'atrophic cancer,' the disease slowly progressing to a point and then disappearing by a gradual process. In this way cancerous tubercles will appear and disappear, cancerous nodules will form and fall off by the contraction of their own fibres. In this way cancer may become cured or so stationary as not to interfere with life."

It appears to me that opinions may well differ on these hypotheses. Perhaps the latter will be more readily accepted, and I may add that Dr. Brailey takes such a view of the case. My thanks are due both to him and Mr. Nettleship for kindly looking through my notes and giving me their opinions.

The second case is also of interest, though it cannot be viewed in the same light as the first. The microscopical examination of the eye first removed led Dr. Dyson and

myself to hope that the condition was non-gliomatous. It is, however, probable that it was in reality glioma; indeed, the subsequent history points to its having been of this nature.

There can be little doubt that the disease was congenital in both eyes. The other points of interest are:

(a.) The non-return of the disease in the right orbit up to the death of the child, a period of four years and a half.

(b.) The quiescent state of the disease in the left eye for two years or more.

(c.) The non-return of the disease in either orbit, but on the forehead, and that, it is stated, following a blow.

(*March 13th, 1884.*)



Observations on miners' nystagmus and its cause.

(With Plate X, figs. 1, 2.)

WITHIN comparatively recent years, the nystagmus, found in the workers in coal mines, and commonly called miners' nystagmus, has received a good deal of attention. The experience of most observers indicates the peculiarities of pit life and the mode of employment of the miner, as the direction in which the cause of the affection is to be sought.

At the meeting of this Society, however, in July, 1882, my friend, the late Mr. Oglesby, advanced the theory that the disease was of central origin, and partook of an epileptiform character. A perusal of his paper, published in the 'Transactions,' vol. ii, p. 243, will, I believe, be found not to support the theory indicated, and in the discussion which ensued after it was read, I intimated my dissent from the author's conclusions, and briefly stated my conviction that the affection depended for its causation on the position the miner assumed whilst at work. This opinion I have long held, and it is the object of this paper to more unfold the manner in which, I believe, the nystagmus is occasioned.

The peculiar characteristics of the affection have been so often well described that I need only make reference briefly to them. The oscillations are of two kinds, to and fro and rotatory, round the antero-posterior axis; the rapidity of the movements varies much in different cases. A miner coming under treatment for this affection will mention that for a varying time he has suffered from the lights and other objects dancing before him, and may complain of giddiness. Many of the patients are able to

bring the oscillatory movements to a standstill by looking fixedly, generally in front or below the horizontal line, and this even in moderately bad cases. On the other hand, any movement above the horizontal line will increase the rapidity and distinctness of the movements, and particularly if the eyes are turned obliquely upwards to the right or left. Movements of the patient's body, running or walking quickly, will also bring on or aggravate the condition, as will also bending low the head and raising it rapidly. Cases vary much in severity, some there are in which the movements apparently never cease, and then again, there are others in which the disease may be called latent. It is not evident to casual observation; the patient complains of objects dancing before him, but still there is no apparent nystagmus, and it is only after pursuing the methods already mentioned to induce the oscillations that any movements are to be detected. Whilst, moreover, these may suffer a good deal of discomfort, occasionally others are met with who have been the subjects of the disease, it may be for many years, who think little of the inconveniences it occasions.

Many have been the causes assigned for the production of this kind of nystagmus. The impurities in the atmosphere of the pit have been credited with occasioning it, and so has the employment of "safety" lamps, but to this further reference will be made.

My residence in a district where collieries abound, first in Leeds, and for the last ten years in Sheffield, has afforded me excellent opportunities of becoming conversant with the affection of which we are speaking. A varying number of such cases are always under treatment. I have seen nothing to lead to a supposition that the affection was dependent upon central disease. I have never seen a case which raised such a question. There has never been any optic neuritis, and the nervous symptoms when present, such as vertigo, are readily enough explained by the ocular condition. The fundus oculi has not shown abnormal changes. The disease may be found, moreover,

in the emmetropic, the myopic, and hypermetropic. Thus one case had a myopia of 5 D. and another a hypermetropia of 7 D.

My experience has led me always to regard the mode of working of the miner as directly causing the nystagmus whatever subsidiary parts other influences may play in its production.

It will be readily understood that the men engaged in a coal pit are of various classes, and the kind of work performed by each class is very different. Thus there are labourers and trammers, the former occupied in the different cuttings in clearing them, &c., and the latter in attending to the cars on the tram lines, these are not employed in coal getting, and do not, I believe, suffer from nystagmus, or at least I have not met with cases among men so occupied. Then there are coal-getters, some of these are employed "cutting to make the headings," and they work directly forwards with the pickaxe; others are employed a good deal at what is called "holing." This consists in driving a cutting underneath the seam of coal which is afterwards brought down by wedges. Work of this kind necessitates the men lying on their sides, as the "hole" they make may only be about eighteen inches to two feet high, and may reach inwards for a yard or more underneath the coal. In this "hole" the miner will lie at work on one or other of his sides. There are many men whose principal or entire work consists in "holing;" other men work at this as well as other ways of coal getting. There are some men, again, probably also some from both classes I have already mentioned, who work in parts which are more "open" on what is called the "bank."

It is with the coal-getters, whose work necessitates their lying on their sides, that in my experience the nystagmus is associated. Later on I shall explain the manner in which, I believe, the position assumed tends to produce the oscillation of the eyeballs.

Observation of cases of nystagmus soon taught me that

the patients so suffering had worked on their sides, and I believe that of all the many instances at different times which have come under my notice, without exception, as far as my memory and records go, the miners attacked have been those whose work has been done on their sides more or less. The evidence in support of this contention may be thus detailed :

1. In a letter of mine to the 'Lancet,' 1875, vol. ii, p. 81, the following sentence occurs:—"Four cases of miners' nystagmus have come under my observation during the last few months, and from these and other cases previously noticed, it seems to me that the disease occurs chiefly, if not entirely, in those colliers who are compelled to do their work whilst lying on one of their sides."

My further experience corroborates the opinion thus expressed in 1875, and I recollect no case of nystagmus occurring in a miner whose work was not of this character.

2. I felt tolerably certain that if I had an opportunity of seeing miners at work in the pit, I should find the ones suffering were those already alluded to. Accordingly, last June (1883), I went down a coal pit in the neighbourhood of Sheffield to test the opinion I had formed. The pit, I may say, was a well ventilated one; several hundreds of hands were employed; Davy's safety lamps were used and no naked lights. My guide, a former patient, at first took me to the "coal-getters." Three sets of these men were examined who were engaged in "cutting the headings," working with the pick directly forwards in the manner I have already described. In none of these men was any nystagmus discovered. Then I was taken to the men engaged in "holing," and four of the six men working at the situations I went to, suffered from nystagmus; the two who were not affected were young men. It was this class of miners, who had to work whilst lying on their sides, often creeping underneath the coal; these were the men I expected to find affected.

Trammers, and men otherwise engaged in the pit were examined, and nystagmus was not found among them.

It cannot be asserted that my examination of the workers in this pit was a thoroughly exhaustive one. The time at my disposal did not admit of it, and it will readily be understood, by those in any way familiar with a coal pit, that a regular and systematic examination of the miners at their work in a fair sized colliery, means an immense expenditure of time, and a long distance to be travelled. My observations are, however, of value, as they distinctly confirmed the impressions gleaned from clinical experience as to the men I should find affected. An overlooker, a very intelligent man who accompanied me, wrote subsequently saying "that I am nearly of the same opinion as yourself that the men who suffer most are those you spoke of." Other men have also given confirmatory opinions, and this, in spite of the deeply-rooted conviction that nearly all colliers have, as to the malady being caused by the "safety lamps." Another miner, himself a sufferer from nystagmus,* recently expressed himself in the following manner:—"I think you are right," he said, "about the position causing it (nystagmus) and I will tell you why. A young man suffered like me from his eyes, but for the last year he has given up working on his side, and he has been getting coal by digging straightforwards "ribbing and packing" all leg work, ribbing down to make the roads, and he has got considerably better."

3. The cases referred to by Mr. Oglesby in his paper, though recorded with a different intention, afford, I believe, confirmatory evidence as to the class of miners who suffer from nystagmus. In the first case he states "that it would appear that when the head and neck were

* He has done nothing but "holing;" his eyes have become affected, especially lately, since he has made a change in his mode of work. He still "holes;" but where he had nine inches, he now has two feet to get out and clear down, which necessitates a good deal of turning of the head when he is on his side.

bent on the right shoulder,* the discharging lesion, so to speak, was at full pressure; but when the head and neck were flexed on the left shoulder, the nystagmus ceased altogether. Then comes a time when the left shoulder flexion was useless." Respecting his second case, he says "A peculiarity in this case is that the man is left-handed, and when getting coal the head and neck are flexed on the left shoulder. At the present time he had much difficulty in getting coal when in that position, but by flexing the head and neck on the right shoulder he can still do a fair amount of work."

4. Dransart, whose painstaking observations on the affection we are discussing are well known, alludes in a footnote, attached to his paper in the 'Annales d'Oculistique,' 1877, vol. ii, p. 121, to the men working in the shallow "inclines" constantly lying, and adds,† "We ought to note this fact, that all our workers attacked with nystagmus worked in these inclined bearings."

5. The following very complete report by my friend, Mr. C. S. Kilham, is valuable, as testifying to the absence of nystagmus, in a colliery district where the conditions I have before described were wanting. As formerly a resident in the Sheffield Infirmary, and assisting me with the ophthalmic patients, he was very familiar with miners' nystagmus, and was thus well suited for the work he kindly performed. I wish to record my appreciation of the readiness with which, at my suggestion, he undertook a by no means slight task. In reply to my inquiry as to the frequency of nystagmus among the miners in the district in which he was then residing (County of Durham), he immediately stated that the percentage must be very small, as he must have seen cases if there had been any, but he had noticed none; and referring to their mode of work, he said that they did not work on their sides

* It is presumed the right was the side he was most accustomed to work upon.

† Nous devons noter ce fait que tous nos ouvriers atteints de nystagmus travaillant dans des gisements inclinés.

but sat on a low stool instead. The other medical men in the district had never seen anything of the disease, and a like answer came to his inquiries of several managers, viewers, and others.

The following is Mr. Kilham's detailed report. He examined only men engaged in the pit and not those employed at the mouth of it or on the pit bank.

"I have examined the men of four pits in this district, more than 500 in number, made up as follows :

a. Coal-hewers	324
b. Putters and drivers . .	149
c. Labourers	33
	—
	506

"I have examined those men and boys who work down the pit (*i.e.* excluding those engaged up the mine, at the bank, &c., in daylight), and I examined them as they came out from work. The seams in these pits average from two feet ten inches to six feet or so. Naked lights (candles) are used excepting in a very few places in one pit where Davy's lamps are employed. The miners as a rule are very healthy, though rather anæmic, and many of the hewers are flat-backed. They work eleven shifts of six hours every fortnight.

"*a. Coal-hewers.*—In the large seams they stand at work, in the smaller ones even (2 ft. 10 in. to 3 ft.) they sit on crickets or small stools bent forward, hewing from above downwards in front of them, with their eyes directed forwards and up or down as may be necessary. They place their candles in lumps of clay on one side of them so that the light is steady. In these pits they never work on their sides.

"*b. Putters* are strong youths up to eighteen or twenty years old, who push the tubs (little waggons containing the coal) from the hewers to the larger workings, where ponies are fastened to them. The drivers are lads who look after the ponies.

“*c. Labourers* or off-hand men.—They are men who are unable to hew from age or infirmity, and they go down the pits generally during the night, and make all the workings safe for the others, and clear up generally. I was not able to examine all the labourers employed, as they mostly come up at 4 a.m. or irregular hours.

“I have not seen a single case of nystagmus among the men examined; in fact it seems to be an unknown thing in this immediate district, as many of the oldest men have never heard of it, or seen any cases.”

He closes his report by remarking that the results of his examination are entirely negative, and, he thinks, prove that in pits where the men can sit or stand to hew and the light is good enough to prevent great straining of the eyes, nystagmus is very rare indeed.

I have said enough, I conceive, to support my contention that the miners who suffer from nystagmus are those “whose work necessitates their lying on their sides.” Before, however, considering how this position occasions the nystagmus, let us say a few words as to influences assigned by others for its causation.

A great deal has been said by some writers as to the unhealthy condition of the miners, and it cannot be denied that their occupation is prejudicial to health, and that a large number suffer from anæmia. But the patients who come for treatment for nystagmus are, in my experience, by no means an unhealthy looking lot of men. On the other hand it is not unusual for them to express their opinion as to their health being good. Thus the most recent case I have treated has more than once alluded to his robust state of health.

Neiden (‘Transactions of International Congress,’ London), who has extensively studied this disease, has come to the conclusion that its cause is to be found in the employment of the “safety lamps.”* Anyone familiar

* Nystagmus has been found to exist amongst workers in mines where safety lamps were not employed.

with a coalpit well knows, of course, the poor illumination given by these lamps. Neiden states that an examination with Bunsen's photometer displayed the differences between the light from an open lamp, a freshly-lighted safety (Davy) lamp, and one in use in the coal-dusty air as 10·0 : 4·0 : 3·0. It is possible that the effect the feeble light has in the accommodation, as Neiden suggests, may have an influence in occasioning the disorder ; but I believe it cannot but be a very secondary one. Otherwise why should the disease be confined to the hewers of the coal, and not be found among the trammers and labourers, considering that all workers in the pit employ equally the safety lamp? Certainly if this were the prime cause the disease should be more equally diffused amongst the various classes of miners. The fact of the sufferers from this disorder being, as I have stated, found in one particular kind of workmen, ought of itself to indicate, as the cause of the nystagmus, some peculiarity in their work.

Dransart,* to whom allusion has previously been made, has most fully and ably studied this disease. He has expressed his belief that the disorder is due to the fatigue induced in the elevator muscles in consequence of the cramped position of the miner producing strain and a constant upward movement of the eyes. "The myopathy," he says, "will have its principal seat in the superior rectus and inferior oblique ; alone it occasions a weakness in the organs. The pair of elevators having a feebleness cannot overcome its antagonist ; it is obliged to attempt it several times by means of a series of little successive and rapid contractions. It then produces nystagmus, or rather gives occasion to the vertical oscillations. To explain the horizontal oscillations which are noticed in miners' nystagmus we have recourse to the paresis of the internal recti and the accommodation. The importance of the internal recti may suffice to explain the horizontal oscillations ; they are produced by the above-

* 'Annales d'Oculistique,' 1877, vol. ii, p. 128 ; ib., 1882, vol. ii, p. 150.

mentioned mechanism. But the accommodation contributes to increase the muscular disorders by virtue of the relations which exist between convergence and accommodation, or, in other words, between the ciliary muscle and the internal rectus."

Now, if the miners suffering from nystagmus are those employed in the position mentioned by me, the "constant upward movement of the eyes" is not, as I shall show, the direction in which the eyes move and is not therefore the cause of the nystagmus. A miner lying on his side, engaged in "holing," either whilst making the "hole" or whilst continuing his work in it, will of course fix his gaze at different parts according as it is necessary to strike, but the tendency will be for the eyes to assume a direction obliquely upwards. This is rendered evident to anyone seeing a man assume on the floor the position occupied in the pit. The engraving (Plate X, fig. 3) illustrates this. A man in this position cannot well look directly upwards; he may look to a point in front of him as he strikes, but not so well beyond the vertex of his head. The miner, therefore, occupied in "holing" will lie on his side, sometimes the left and sometimes the right, as is most convenient; his legs will be crooked up, his head thrown back, and the eyes will have the tendency to look in a direction obliquely upwards. Simply looking upwards may be tiring, but it may be safely asserted we are more accustomed to fix our gaze in that direction than in an oblique one. Most persons will, I conceive, feel the strain greater of looking obliquely than if they merely gaze directly upwards, and the difference will be evident if the eyes are turned for a little time in the direction indicated.

Dransart, as has been pointed out, assigns the muscles suffering and occasioning nystagmus, as the elevator, the superior rectus, inferior oblique, and internal rectus, but of course it would chiefly be the first-named, aided by the inferior oblique and in a less degree by the internal rectus. Now, if the position—obliquely upwards—be correct, it follows that the muscles suffering from chronic

fatigue will be somewhat different to those indicated by Dransart. Thus, if a miner be working on his left side, and fixing his gaze upwards and to the right, he will be using in the left eye the superior rectus, inferior oblique, and internal rectus; in the right the same two first-mentioned muscles, and substituting the external for the internal rectus. If he lie on his opposite side of course the arrangement would be reversed. Besides the more complete employment of the internal recti than the mode of Dransart allows for, we have, in addition, the external recti at work, and it need hardly be said that the inferior obliques are much more used than in the arrangement he suggests. The to and fro movement is thus accounted for by the weariness of the outer and inner recti; the rotatory oscillations by the inferior oblique, and the superior rectus aids here, or in occasioning the vertical movements.

A point worthy of remark is the ready manner in which the nystagmus is occasioned by placing the eyes in the obliquely upward direction. The miner whose position is represented in Plate X, figs. 2, 3, was for several months previous to his picture being taken "cured," and after leaving the pit followed another occupation, gardening, without discomfort. When he placed himself in "position" for the photograph he felt discomfort in his eyes and could not bear it long.

The cause I have mentioned is, I conceive, the main one acting in the production of nystagmus. Dransart refers to paresis of accommodation and other points which I must now leave without further reference.

Writers who have not assigned the affection to the attitude of the miner, but rather to the effect of the insufficient light on the accommodation, have, as well as Dransart, thought the consequent strain on the ocular muscles induced a weariness in them similar to that known as writers' cramp. This seems to me the correct pathology. The muscles of the eye are employed in keeping the globe in an unusual position for many hours together.

There is thus prolonged strain, chronic fatigue results, and, atony of the muscles being induced, oscillation of the globes is caused.

A few words as to treatment. It has been my practice to advise the discontinuance of pit life, and their finding some other employment, and after a variable time, according to the severity of the case and the length of its duration, recovery has ensued. Strychnia has been my favourite internal remedy. An important point is, however—and Dransart discusses it—whether as nystagmus is infrequent or, in my experience unknown, in other miners than coal-getters, whether it is not possibly sufficient for the miner to change his mode of work, but still be employed underground.

And, moreover, if the manner of work discussed in this paper is the prime factor in the causation of this disease it may be possible to hereafter encourage managers of collieries to attain by other means the ends they have in view. Comparatively, many miners suffer from nystagmus, and if a relinquishment of the manner of employment spoken of, stamped out the disease or lessened its frequency it would be a matter of great thankfulness to many workers in the pit.

1. *Congenital cysts in the lower eyelids in one case with (apparent) anophthalmos, and in the other with microphthalmos; a case also of coloboma of optic nerve sheath, with other cases of congenital defects.*

(With Plate X, fig. 1.)

1. *Congenital cysts in the lower eyelids with apparent anophthalmos.*—On the 7th of May (1883), a child was brought to me at the Sheffield Infirmary, by its mother in consequence of its not having looked about like other children, nor indeed did the eyes appear like those of others. Fearing something was wrong she sought advice. The baby was just a month old, having been born on April 11th.

Attention was at once attracted to a swelling in the left lower eyelid. Beyond this the appearance and formation of the eyelids were normal, as was also the palpebral fissure. The upper eyelids seemed to fall in as if wanting support from within. A similar swelling, only very small, existed also in the right lower eyelid; except this the eyelids, &c., were normal on this side. On separating the lids there seemed an entire absence of anything resembling an eyeball in either orbit. Chloroform was, however, administered to enable one to make a full and satisfactory examination. The orbital cavities and their bony walls were properly formed, but nothing like an eyeball was discovered. Towards the back part (cone) of each orbit a feeling of resistance was noticed. The conjunctiva lined the entire

cavities. In the left lower eyelid, as before mentioned, was a distinct swelling, about as large as a bantam's egg. It occupied the whole breadth of the eyelid, being continued into the inner corner of the orbit. Its appearance was bluish, and the integument covering it seemed thinned. It was distinctly fluctuating. In the front at its middle it appeared to be a trifle constricted and bulged more on either side. With the infant under chloroform this cyst, as it seemed to be, was found to be well confined within the orbit, not reaching beyond its lower margin, but passing to the posterior part of the cavity. It was traced along the floor of the orbit beneath the conjunctiva by its bluish colour and the swelling it occasioned. The engraving (Plate X, fig. 1) is from a photograph taken shortly after the child was first seen and well exhibits the appearance of the left side. On the right side there was some ectropion, and the cyst in the lower eyelid was considerably smaller than the one on the other side.

The infant was a healthy, well-developed child, its head and limbs were well formed, and there was an absence of any deformity beyond the ones described. The mother of the child was aged twenty-six, and the father, a farm labourer, twenty-seven. Both were stated to be free from deformities. They had been married two years, and there have been two children; the eldest, born not long after marriage at full time, was eighteen months old and was healthy and strong. The mother was the second child of a family of twelve; six of these were dead (four being premature and two dying early); none were, it was said, malformed in any way. The father was the second child of a family of five, all being healthy, and none deformed.

The diagnosis made in this case at the outset was that the congenital tumours were serous cysts, and were associated with absence of the eyeball. To verify the opinion formed as to the nature of the cysts it was decided to puncture the one in the left orbit, and examine the fluid removed in the manner mentioned by Wecker and Van Duyse.

On July 2nd ether was administered, and the cyst in

the left orbit was tapped with a small aspirator. The quantity withdrawn was about two teaspoonsful, but some of it was lost, and the quantity was too small to permit me to ascertain the specific gravity. The cyst was not completely emptied. The fluid corresponded closely, according to the chemical examination to the analysis by De Wecker and Van Duyse (page 344) of the contents of the cysts in their cases and confirmed the diagnosis already made. The fluid was, however, redder than mentioned in other cases, and this is accounted for, I fancy, by the admixture of blood at the time of puncture, as the aspirator was in reality at work before the needle had actually penetrated the cyst. Blood-cells were plentiful under the microscope. The fluid contained albumen, and chlorides, but no sugar.

23rd.—The cyst has refilled, and it was now opened and the wall partially dissected out. A very small rounded body was detected at the back part of the orbit, and was presumed to be a rudimentary eye, but it was not thought advisable to prolong the dissection to render this opinion positive. Nothing was done to the small cyst in the right lower eyelid. I can find no note of the fact, but my recollection is that at the emptying of the left cyst the second time it was of decidedly lighter colour than on the previous occasion.

The child has thriven well, and when seen a short time after the last note the left orbit was still free from the cyst, and that on the right side had not become larger.

June 23rd, 1884.—The child was seen to-day. There is a little fluid in the cyst in the left lower eyelid at its inner part, and it is still bluish on its surface; it is very insignificant to what it formerly was. A small trocar was passed into it, and a small quantity of straw-coloured fluid escaped.

The appearance of what was thought to be a very small cyst in the right lower eyelid (it was never tapped) has just gone. There is, however, at the lower part of the orbit a rounded swelling, not distinctly fluctuating; it is

deep under the conjunctiva; this may be the cyst or a rudimentary globe. No dissection to solve the point could be made.

The child is in the enjoyment of perfect health.

Congenital orbital cyst with microphthalmos.—My friend, Mr. W. Mackerg Jones, of Wath, near Rotherham, has kindly given me particulars of this case, which he permitted me to see with him on one occasion. It is of particular interest in connection with the one already related. I give the case in Mr. Jones's words:

“During the latter end of May, 1883, a child, six weeks old, was brought to me to see if anything could be done for its left eye, which was reported to be absent.

“The parents had a large family of healthy children, and there was no history of congenital deformities.

“On examination the child was apparently healthy and well developed, with the following exception. The left lower eyelid was the seat of a firm dense swelling, with indistinct fluctuation, more prominent on its conjunctival aspect and bulging out between the eyelids. It so completely filled the orbit that I was unable to introduce a retractor between it and the upper lid, which I attempted to do, thinking that perhaps the eye might be found compressed behind it. The conjunctiva over it was in two places slightly raised into blue-looking protuberances.

“Never having seen anything like it before, I concluded it was either a displaced disorganized eyeball, or some sort of tumour growing in the lower lid pressing back the eye. Whatever it was I advised it should be removed and so lessen the deformity. The child was brought again in a few days, and as the swelling had considerably increased the parents wished for something to be done.

“On June 1st, 1883, I dissected back the conjunctiva, causing the tumour to appear as a tense cyst, which I attempted to extract whole, but accidentally pricking it with the knife, it discharged a considerable quantity of clear straw-coloured fluid and then collapsed. Following

back the cyst wall I found it was attached deep down in the orbit, and fearing it was a meningocele I cut it off with a pair of scissors as far back as I could reach. On replacing the conjunctiva I then found deep down in the orbit an exceedingly small eye, having an inferior coloboma of the iris. With the exception of this and its size it appeared quite normal. Cold-water dressings were applied and the orbit was ordered to be syringed out regularly with warm water. In about a week the wound had quite healed and the eye could be seen deep down when the child opened the lids.

“On June 16th the child opened the lids freely, and the eye was not nearly so deep down. The conjunctiva on the upper side appeared very tight, pulling the eye forwards.

“In August the eye had grown considerably and had come forward to its proper place.

“In October Mr. Snell came over to see the child, whom we found in the last stage of tubercular peritonitis; the eye had grown since I last saw it, but it was still much smaller than the other. The child could move it about freely in any direction and could evidently see with it.”

Any examination with the ophthalmoscope at the time of my visit was attended with the greatest difficulty. The child was nearly moribund and died a few days later. The coloboma in the lower part of the iris, mentioned by Mr. Jones, was well marked, and with the ophthalmoscope it was ascertained to extend into the choroid, but I am not certain whether or not it reached the optic disc. The media were perfectly clear. The eyeball had all the appearances of a normal globe, except for its small size and the coloboma. Perhaps it was about a third the size of the normal eye.

We were unable to obtain the eye for examination.

The cases I have just related are among the rarer ocular anomalies. Others, in many respects similar, are on record, and various suggestions have been made to

account for these congenital cysts. They have been found associated with cases either of microphthalmos or anophthalmos, but in this latter condition careful examination after emptying the cyst has often disclosed the presence of a rudimentary organ. Mr. Jones's case is of interest on account of the discovery under these circumstances of a comparatively good eye. Without emptying the cyst it would have passed as a case of anophthalmos.

I propose to add here some particulars of other cases which have been recorded.

Wicherkiewicz* has related a case of double anophthalmos, with cysts in the lids, in a child of eight weeks. Apparently the cysts were situated between the conjunctiva and external layers of the palpebral tissues. The orbit was lined with conjunctiva and had a normal depth. The upper lids and lacrimal puncta were normal. There was complete absence of the rudiments of eyes. The cystic fluid was not able to be collected.

He explains the origin of these palpebral cysts in the following manner:—As a consequence of the void occasioned in the pre-formed orbits by the total absence, little development, or intra-uterine resorption of the globes the eyelids yield to the external pressure and turn themselves into the empty cavities. As they do not fill the void there is formed in the cellular tissue of the lower eyelids a serous transudation to fill the void in question. The liquid encysts itself in a membrane formed from the connective tissue in its own immediate neighbourhood. Subsequently the cysts, partly by their weight, and partly by the dragging of the orbicular muscle, detach themselves from the internal wall of the orbit. He gives no opinion in this as to the anophthalmos.

De Wecker† has also recorded a case of anophthalmos with congenital serous cysts in each orbit. The tumours

* Zehender's 'Monatsb. f. Augenheilkunde,' Oct., 1880. Analysed in 'Annales d'Oculistique,' 1881, vol. i, p. 69.

† "Cas d'Anophthalmos avec Kystes Congénitaux des Paupières inférieures simulant une ectopie des Yeux." 'Annales d'Oculistique,' 1877, vol. i, p. 151.

were situated in the lower eyelids, and had a bluish tint. The cysts were tapped and the fluid examined chemically and found to correspond with the usual contents of these cysts, to be mentioned further on, when treating of the diagnosis of these tumours. Microscopically they did not exhibit any histological element. Examination did not discover anything corresponding to an ocular globe. The article is accompanied by an engraving of the case described.

Streibitzky* met with a case of anophthalmos with congenital cyst developed in the lower eyelids. The patient was a girl, aged six months. There was ectropion of the lower eyelids and the conjunctiva was raised by two tumours of the size of normal eyes, which were prominent in front, fluctuating and moveable to a limited extent, and through the thinned skin exhibited a bluish tint. No examination of the liquid was made, and the absence of a rudimentary globe does not appear to be proved.

A case by Michel,† of bilateral anophthalmos differs materially from the foregoing ones. There was an absence of both optic nerves and both olfactory lobes; a little cartilaginous *cul-de-sac* was present into which were inserted numerous muscular striæ; lids sufficiently developed; arrest of development of half the cranium—orbital very small. The author believes that the non-development of the brain was the primary anomaly.

Talko has recorded no less than seven cases of palpebral cyst associated with microphthalmos or anophthalmos.

I cannot here give a *résumé* of each of the cases. They are briefly analysed by Van Duyse in his very valuable article entitled "Le Colobome de l'Œil et le Kyste Séreux Congénital de l'Orbite,"‡ and in which he deals very thoroughly with the subject.

* Zehender's 'Monatsb. f. Augenheilkunde,' Nov., 1881. Analysed in 'Annales d'Oculistique,' 1881, vol. ii, p. 267.

† Graefe's 'Archiv,' vol. xxiv, 2. Analysed in 'Annales d'Oculistique,' 1879, vol. i, p. 78.

‡ 'Annales d'Oculistique,' 1881, vol. ii, p. 144.

Talko draws the following conclusions from his cases :

1. The serous intra-orbital cysts of the newborn are ordinarily complicated with faulty development of the eyeball.
2. They are localised always between the globe and the lower, or lower and internal wall. They are ordinarily covered by the conjunctiva ; they pass in the direction of the lower eyelid, which they push in front of them, and give rise to the bluish grey colour of the cyst.
3. They are ordinarily filled with a yellowish serosity, which contains much albumen.
4. They are not ordinarily in connection with the conjunctival sac, nor with the bulb when one exists.
5. They can be punctured or excised.
6. Their size is variable. They produce generally ectropion of the lower eyelid, and hinder the development of the eye, which is very little, and which lies deeply in the orbit. These cysts are not produced after birth, but during intra-uterine life.

Talko, moreover, expresses his opinion that these vesicles have nothing in common with the ocular globe (*les vesicles n'ont rien de commun avec le globe oculaire*). Formed during intra-uterine life, these cysts place an obstacle to a complete development of the eye (*microphthalmos*), or hinder entirely its evolution (*anophthalmos*). Talko would, moreover, appear to admit, on the hypothesis of Hoyer, that these cysts arise in the fœtus by the entanglement of the upper part of the lacrimal sac during the process of welding the lacrimal fork, and are cysts by retention.

Vernueil has also described these cysts as occasioned by an ectasia of the lacrimal sac.

Van Duyse in the article to which reference has already been made, together with notices of other cases, reports one by Chlapowsky. The patient, a boy of 16 years, presented on the left side an intra-orbital fluctuating cyst, the movements of which coincided with those of the fellow-eye. Provided in front with a swelling corresponding to the cornea, and behind a pedicle representing the optic

nerve, the tumour, rounded, smooth, and colourless filled the whole orbit. Extirpation demonstrated the adherence to the cyst of muscular fibres, and at the bottom of the orbit a white lenticular body, representing the rudimentary eye. The cystic liquid was not examined, but Biesiadecki found in the walls of the cyst some epidermic elements and fatty tissue which made him diagnose "atheroma."

Sogliano has also reported a case which would seem to have been one of a high degree of congenital hydrophthalmos.

Manz* has recorded the two following cases. The first in a young man, aged 16 years, the other eye was normal. The congenital cyst filled the entire orbit, and was in relation by its inner wall with a rudimentary ocular globe rich in connective-tissue vessels and had a pigmented choroid; there was a sclerotic also and a pedicle (optic nerve without nervous tissue). The internal surface presented a thick epidermic covering and some down. In the second the eyeball was reduced in all directions, with ciliary body and retina very rudimentary. A cyst was situated at the lower part and extended just to the optic nerve, of which the sheaths were hypertrophied. The cyst developing in the sclerotic had induced atrophy of the globe.

Van Duyse relates in the paper I have before referred to the following interesting case of his own, which he details at length: The patient was 22 years of age; others in his family had suffered from harelip, cleft palate, &c.

The *left* globe was diminished in size ($\frac{1}{5}$); coloboma of iris below. He gives a detailed account of the appearances of the fundus and the following results of his examination: There existed on this (left) side a certain degree of microphthalmos and a markedly staphylomatous coloboma of the inferior posterior wall; the eye appeared to have compensated, by the development of its posterior half, the

* "Deux cas de Microphthalmos Congénital et Considérations sur la dégénérescence cystoïde du Bulbe Fœtal." Graefe's Archiv, xxxvi, i. Analysed in 'Annales d'Oculistique,' 1881, vol. i, p. 259.

volume which was wanting in its anterior region. The coloboma affected specially the choroid, the sheath of the optic nerve, and at least the pigmentary layer of the retina.

Right eye.—Elastic fluctuating tumour in lower lid not adherent to skin. The eyelid normal as its fellow; the upper eyelid was rudimentary. The cyst extended into the orbit, was covered by the conjunctiva, and had a bluish tint. Eyeball was thought to be absent, and diagnosis made was “serous cyst of orbit with anophthalmos.” The fluid was withdrawn from the cyst; it was like ascitic fluid, the colour of urine. Microscopical examination, negative. The cyst was subsequently opened and a rudimentary globe discovered which was separated with difficulty from the cyst; traction on the cyst occasioned movements of the globe, showing a very intimate connection between the congenital cyst and the eye. The latter followed all the movements of the fellow-eye.

From a consideration of recorded cases, and his own case, Van Duyse considers that the cysts have a diverse origin, and may be divided into three classes:

1. Cysts corresponding to hydrophthalmos, to a high degree of foetal cystic degeneration of the bulb, very probably due to an intra-uterine chronic inflammatory process of the uveal tract.

2. Dermoid cysts, arising from an invagination of the external germinal vesicle, in connection with the eye (Manz, Chlapowski).

3. Subpalpebral serous cysts with microphthalmos or anophthalmos, such as Talko, De Wecker, Wicherkiewicz have described, which appeared to be derived from an encysted coloboma.

Respecting his own case, Van Duyse came to the conclusion that the left eye (slight microphthalmos) presented a sclerectasia, caused by the expansion of a coloboma of the choroid of the optic nerve sheath, itself staphylomatous. The right eye constitutes a degree more pronounced of the same anomaly. It has remained rudi-

mentary (microphthalmos) as a result of the extraordinary development of the coloboma. The latter, encysted itself, and filled the orbit, pushing before it the conjunctiva and lower eyelid.

Of the different theories advanced by various observers, and referred to in the foregoing summary, to account for the origin of these interesting and peculiar congenital cysts, the one which Van Duyse has suggested appears to me to be based on the firmest grounds. The frequent, almost constant association of these cysts with a rudimentary or ill-formed eyeball of itself suggests some causal relationship between that condition of globe and the cyst pressing forward the eyelid. Another point that may be mentioned is the presence of these cysts in the inferior part of the orbit, and the ordinary position for colobomata of the eyeball is at the lower side. Mr. Jones's case is of particular interest from the discovery of such a comparatively speaking well-formed eyeball in the orbit. It is instructive also as demonstrating the possibility of overlooking, an eyeball, and much more so, a very rudimentary globe, if the cyst be not tapped or dissected out, before a final conclusion is arrived at. It is possible that in this way cases described under the heading of "serous cysts with anophthalmos" might have been ascertained not to be so, if the cystic tumour had been treated in the manner indicated, and an eyeball as good as in Mr. Jones's case or merely rudimentary might have been discovered.

Another important question arises in any case in which a fluctuating tumour in the orbit is diagnosed. I refer to its nature. The wiser plan would seem to be to puncture the cyst in the first instance, and then analyse the fluid removed. This was the procedure adopted in my case, and Wecker and Van Duyse have acted in like manner, and urged the importance of doing so.

If the tumour should chance to be a meningocele an incision would be clearly not advisable, for as Van Duyse mentions, "In the first stages of development the connection

between the sac and the cranial cavity is direct, it ceases in a manner sometimes when it exists as an extracranial cyst." A tumour situated at the inner side of the orbit would always lead one to consider the possibility of having to deal with a meningocele. This is the situation where such a tumour would seem to be apt to occur.

A high degree of congenital hydrophthalmos is mentioned as being a condition which it is possible to confound with a palpebral serous cyst. If the general characteristics did not suffice, a chemical analysis of the fluid removed would enable a correct diagnosis to be made.

Dermoid cysts have a varied situation in the orbit. A microscopical examination and the general features of the growth would point out its nature.

Hydatid tumours occur in all parts of the orbit, and are generally attended with pain. If the tumour were tapped, the microscopical and a chemical examination of the fluid would remove any doubt.

Annexed is a table of the various contents of tumours from which it is essential to be able to distinguish the serous cysts. I take it from Van Duyse's article. The fluid in my case corresponded to the features mentioned by Van Duyse as pertaining to the liquid of these congenital cysts.

Fluid of cyst (encysted coloboma).	Aqueous humour.	Cerebro-spinal fluid	Hydatids.	Contents of dermoid cysts.
No formed elements. Colour lemon yellow. Very slightly oily	—	—	Little crowns of hooklets; little sacs	Fatty crystals, notably plates of cholesterine; fatty globules; epidermic elements; soft hair
Feebly alkaline reaction	Alkaline reaction	Alkaline reaction	—	—
By heat the fluid thickens, becomes	—	—	—	—

Fluid of cyst (encysted coloboma).	Aqueous humour.	Cerebro-spinal fluid.	Hydatids.	Contents of dermoid cysts.
gelatinous and milky, and the condition does not disappear with nitric acid				
White precipitate very abundant with nitric acid, increased by boiling (albumen)	Albuminoid matters (fibrine, &c.) very feebly precipitated by acids	Not coagulable (according to G. Gautier)	Absence of albumen	—
White precipitate very abundant with chlorhydric acid; application of heat causes then the coagulation of all the liquid	—	—	—	—
No effervescence with acids	No effervescence with acids	Slight effervescence with acids (carbonates)	—	—
The addition of a solution of nitrate of silver, 1%, produces a white precipitate, soluble in ammonia, insoluble in nitric acid	Contains 7% of chlorides	Chlorides absent	Contains chiefly chloride of sodium	—
No deposit with Fehling's solution	No effect on cupro-potassic reagent	The alcapton (Bodiker) or glucose (Cl. Bernard) contained in this fluid throws down Fehling's solution	Often grape sugar; sometimes succinic acid (Heintz. Honij, &c.), inosite (Wijss)	—

Congenital absence of one eyeball.—Several years ago a little baby was brought to me on account of one eye only being visible. On separating the eyelids no globe could be found. The conjunctiva lined the orbit. The palpebral fissure appeared narrower than on the other side; the lids

were well formed. There was a thin muco-purulent discharge. The other eye was normal. The baby has since grown to a girl of seven or eight, and is strong and quite intelligent. The narrowing of the palpebral fissure now is most decided; and the eyelids are less developed than those on the other side, where the eye and its surroundings are in every way normal.

Coloboma of optic nerve-sheath with microphthalmos (left); coloboma of choroid (right).—Ellen G—, æt. 7, was brought to me at the Sheffield Infirmary in July, 1882, in consequence of the left eye being so much smaller than the right. This condition had existed since birth, the mother stating that at first the eye “was so small one could scarce see it, but that it had since grown.”

The eyelids were well formed on both sides, but the great disparity in size between the two eyes was most distinct. The left, which was the smaller one, presented no abnormal appearances of its structures. The cornea and sclerotic were healthy, and though the eyeball retained its rounded form yet the front of the eye had the appearance of being somewhat flattened. The cornea measured only about 6 mm. across, but the measurement was difficult in consequence of the nystagmus which existed in both eyes. The iris was a lighter-coloured hazel than in the well-formed, right, eye. Generally speaking, the left eye presented the appearance of being diminutive, but not otherwise ill formed.

The pupil dilated well to atropine. With the ophthalmoscope one noticed a large white mark at the fundus. Careful examination showed it to be of the following description (inverted image):—A portion only of the optic disc was apparently seen, the upper part merging into a large white surface above. This was equal in size to six or eight times that of the optic disc. Its broader part was above and it was somewhat heart shaped. At points it was brilliantly (pearly) white, at others more grey. Its surface was apparently undulating, and the course of the

vessels indicated that it was situated at a lower level than the surrounding tissues. Numerous vessels ramified over it, some passed beyond it and rose over the edges ; and whilst some were traced to the optic disc, others were lost on the white surface ; some appeared to run to its edges and then disappeared. Over its expanse were seen several little corkscrew vessels. The margins were well defined and more or less pigmented, but particularly so on the inner side.

In the right eye, some little distance above the disc, about midway between the optic nerve entrance and the periphery, was observed a large, rather oval-shaped patch. It was pearly white, but towards the centre it was less pearly ; it corresponded to quite three optic discs in size. With a little care vessels were traced over it, one (artery) ran its whole length, coming from the optic disc, and another vessel, also from the papilla, skirted its border, at one point making a bend over the white surface, and giving one or more small branches which coursed over it. The borders were well defined and pigmented, especially the right.

The refraction in both eyes was hypermetropic. With the left vision = fingers, and perhaps more ; with the right $\frac{10}{50}$ was made out with the aid of + glasses. In the left eye there was convergent squint.

The case I have just related presents in the left eye an example, I believe, of that rare mal-development described as coloboma of the optic nerve-sheaths. Until quite recently very few cases of the kind were placed on record, and now their number is very limited. Neiden, writing in Knapp's 'American Archives of Ophthalmology' for 1879, was thus enabled to say in publishing the four instances of the defect which had come under his observation, "the number of cases hitherto reported is increased more than twofold." The cases published previously to the date of Neiden's paper were by Ammon, Liebreich, and Wecker. Other cases, however, since then have been recorded by Galezowski, Pooley, and A. H.

Benson, and, moreover, in the 'Annales d'Oculistique' for the present year,* Van Duyse had added another to the list. In Benson's and Van Duyse's cases both eyes were affected, and the same was the case in one of Neiden's. In one eye of the case reported by Benson, the size of the coloboma is given as being equal at least to six times the size of the papilla; in mine I believe it was larger. In the cases reported by Neiden and Van Duyse it was much smaller. The latter observer mentions the size of the coloboma as being at least equal to three disc diameters in the right, and in the left to two. In Neiden's first case, in the right and left eye respectively the size is given as twice and two and a half to three times, and in another it is two to three times the diameter of the papilla. One of Neiden's cases occurred, like mine, in a microphthalmic eye.

The condition observed in the right eye must also, I believe, be considered to be congenital, and to be occasioned by arrest of development. Coloboma of the choroid, without accompanying cleft in the iris and ciliary body, has been described, among others, by Benson. The condition in this instance is interesting in connection with the coloboma of the optic nerve-sheath in the opposite eye.

Coloboma of upper eyelid.—The subject of this defect is a young woman, æt. 26 (June, 1883). She is an only child. Enjoys good health, and has no other deformities; the same remark applies to her father and mother. She is married, and has given birth to three healthy, well-formed children.

The "cleft" is in the left upper eyelid, and is situated at the junction of the inner with the middle third. It hardly extends to as much as a third of the depth of the eyelid; it is particularly noticeable when the eye is closed, as a distinct notch is then left. From the termination of the "cleft" a well-marked ridge (raphé) extends upwards in the eyelid almost to the orbital margin. The eyeball is

* Mars and Avril, 1884, p. 117.

normal looking, beyond a nebulous condition of the cornea at its outer side. Underneath the conjunctiva, also, at the outer part is an aggregation of fat (lipoma).

Ophthalmoscopically the eye appears normal, but there is a degree of amblyopia; the refraction is hypermetropic, $V. + 4 D. = \frac{15}{200}$. The other organ is normal.

I would merely remark respecting this case the absence of any other abnormality. Harelip or other deformity is often associated with coloboma of the eyelids. Van Duyse* has tabulated the cases recorded, in all about twenty-six, by twenty-three different observers, and he appends remarks as to the causation of the cleft.

Remains of hyaloid artery.—Charles K. S—, æt. 11, was brought to me in September, 1883, on account of defective sight in the right eye. Beyond some divergence the external appearances were normal. Vision = fingers at one foot. There was myopia of about 8 D. With the naked eye, an opacity in the posterior pole of the lens was noticed. After dilating the pupil with atropine, it was ascertained, with the aid of focal illumination, that the opacity was situated in the posterior capsule, and was made up of fine striæ. It was also discovered that running backwards from the opacity was a light grey translucent cord, and it was noticed to change sides as the eye was turned. With the mirror this band appeared dark, and gave a peculiar appearance, from its darting about, sometimes to one place and sometimes to another (all radiating from the opacity in lens capsule), accordingly as the eye was moved. With the direct method it was seen as a hollow cord. It reached from the lens to the optic disc, and its connection with a vessel in the centre of the papilla was clearly made out. At this point also it somewhat widened out like a funnel. Between these points of attachment it was a little wavy. It did not appear to contain blood.

Dr. E. J. Gardiner, in Knapp's 'American Archives' for 1880, p. 473, relates a most interesting case of per-

* 'Annales d'Oculistique,' 1882, vol. ii, p. 101.

sistent hyaloid artery. Its attachment at the disc, and anteriorly at the lens were made out, as well as a translucent sheath (Cloquet's canal) around the artery. It spread out in many minute branches on the posterior surface of the lens, and contained blood. The drawing illustrating the case will explain also the kind of fine striated opacity found in my own case.

Gardiner remarks on his inability to find a similar case on record to his own. It is rare also to find the attachment of an impervious cord to the optic disc and to the lens capsule.

(July 4th, 1884.)

STATE OF NEW YORK

IN SENATE,
January 10, 1907.

REPORT
OF THE
COMMISSIONERS OF THE LAND OFFICE,
IN ANSWER TO A RESOLUTION
PASSED BY THE SENATE
MAY 17, 1906.

DESCRIPTION OF PLATE X.

Fig. 1 illustrates Mr. Snell's case of Congenital Cyst of the (Left) Lower Eyelid. From a photograph of the baby.

Figs. 2 and 3 illustrate Mr. Snell's paper on Miner's Nystagmus. Both are taken from photographs of the miner.

FIG. 3 shows the coal miner lying on his left side in position for work.

FIG. 2 shows, on a larger scale, the position of the head and eyes only.



Fig. 1.



Fig. 2.



Fig. 3.

