as he looked upwards violent twitching and vertical nystagmus commenced.

$$R.V. = \frac{3.5}{2} = 1.75$$

-2, axis horizontal.

$$L.V. = \frac{3}{1} = 3$$

-1, axis horizontal.

The fundus was normal but could only be seen with great difficulty on account of the twitching of the lids. He was unable to read even when he looked down.

The patient subsequently improved considerably, but he cannot do any work, for as soon as he looks fixedly at an object the oscillations commence.

This is a most instructive case. In the first place, it shows the classical symptoms—symptoms which have been ameliorated but not cured by rest. Before the Compensation Act this miner would have been discharged and left to starve; now the colliery responsible for his disease has to keep him!

Again, the nystagmus conduced to an accident and the accident aggravated the disease. Dransart and Romée have shown conclusively that nystagmus often starts after an accident, and that it is frequently aggravated by an accident.

It is worthy of note that in this case the nervous agitation becomes evident as soon as the eyes are fixed upon an object. This has an important bearing upon the etiology of the disease. An analogous symptom is the inability of many sufferers to read, even though they have good vision and have no nystagmus in the reading position.

The etiology of the complaint is very obscure. The textbooks say that it is strictly comparable to scrivener's palsy, due to cramp of the elevator muscles of the eye. This is the theory enunciated by Snell, by Nieden, and by Dransart; it was for long accepted without criticism or challenge, and has been copied from book to book, rather as a proved fact than a hypothesis. To be brief, the view that the miner is always straining his eyes upwards, producing muscle fatigue, which results in nystagmus, does not account for the facts. First, the miner does not strain his eyes upwards; like other sensible mortals he makes himself comfortable and moves his head, not his eyes. Secondly, there is no proof that any muscle fatigue exists, and conclusive proof that it does not; and, finally, if muscle fatigue did exist, it would produce a tetanic and not a clonic spasm.

Nystagmus is essentially a disease of the collier; it is not found in metal mines, where men work under similar conditions to those obtaining in coal mines, but with one great difference—the metal mine is not bounded by glittering black walls.

The disease was first described at the time when the Davy lamp was introduced into mines, and as soon as the use of safety lamps was enforced by law it became very frequent—that is to say, as soon as the illumination of the miner's candle, which gives 0.5 candle power, was replaced by that of the Davy lamp with its feeble glimmer of 0.28 candle power, cases of nystagmus became increasingly frequent. The miner's lamp has been improved now, and the disease is much less common than it was. The ordinary lamp used to-day has a candle power when clean of 0.44, but as it gets covered with dust and the wick chars, its light falls off rapidly.

But darkness cannot be the sole cause of nystagmus. The employees in photographic factories who work for hours in absolute darkness, do not contract nystagmus, nor do boiler makers and other artisans who work by feeble light.

The only theory which can explain the disease is that suggested by Reid of Nottingham and Nuel in Belgium. It is a disordered cerebation, a defect in the brain, not of the eye muscles. It is produced by the peculiar work of the miner, long-continued rhythmic movements of the pick in comparative darkness. I have given the facts and reasoning which lead to this conclusion in greater detail in an article which I contributed to the *Ophthalmoscope* for August 1909. There also will be found the references to the various papers on the subject.

Snell attempted to show that compositors and other workmen do at times get occupational nystagmus, but a critical examination of his cases will lead to the conclusion that these men did not suffer from true miner's nystagmus; this disease always was and still is the special disease of the colliery.

The treatment is simple. The miner must leave the mine, and must not return to it.

The prognosis must be guarded. Many cases recover completely, but on the other hand some never entirely lose their symptoms. In any case, no miner who has once suffered from the disease must ever return to work underground.

A CASE OF MUSCULAR DYSTROPHY (ERB'S JUVENILE FORM) OCCURRING IN AN ADULT.

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THE premature death of certain selected muscles, which seems to constitute this disease, occurs without regard to the position of the trophic centres of the respective muscles in the cord. In the segments of the spinal cord groups of actions of muscles are represented rather than groups of muscles themselves; for example, elevation with abduction of the arm are accomplished by the trapezius, deltoid, and supraspinatus, these muscles being chiefly innervated from the fifth cervical segment. In the following case the absence of trophic influence of the segmental centres may be observed, only one of the muscles involved in elevation and abduction of the arm being atrophied.

A "plater" in a ship-building yard, aged 28, had been accustomed to severe muscular exertion, particularly of the arms and back. In spite of careful inquiry, no instance of a similar affection can be discovered among his relatives, past or present. He was a total abstainer, and had had no serious previous illnesses except a suppurating inguinal gland, which he attributed to an injury; he denied having had any venereal disease.

About two years before admission he noticed some weakness of his arms, and soon afterwards observed that his neck seemed smaller than before. These defects steadily progressed until his condition on admission to hospital on October 13th, 1909, had become as follows:

The mental faculties and the sensory apparatus are unchanged; the pupil reflexes are normal; the left knee-jerk is brisk, while the right is defective, and the wrist-jerks are absent; the fundus oculi is normal; the blood shows a positive Wassermann reaction. In the muscles of the arms and shoulders atrophy and weakness are to be found. I have drawn up a list of the muscles affected in tabular form, showing the segments of the cord from which the nerves supplying the diseased muscles spring, and have included for comparison sake some unaffected muscles connected with the same segments.

Segment of Spinal Cord.	Muscles.	Condition.
Cervical 2 to 5...	Trapezius... ..	Atrophied (except right upper fibres).
" 4 and 5	Rhomboids	Atrophied.
" 5 and 6	Deltoid, supraspinatus, and infraspinatus	Normal (possibly hypertrophied).
" 5 to 7...	Serratus magnus and biceps ...	Atrophied.
" " "	Pectoralis major (clavicular portion)	Normal.
" 7 ...	Latissimus dorsi	Atrophied.
" 4 to 8...	Triceps and supinator longus ...	Atrophied.
" " "	Other forearm and hand muscles supplied by musculo-spiral and median nerves	Normal.
" 8 ...	Forearm and hand muscles supplied by ulnar nerve	Normal.
Dorsal 1 } ...	Pectoralis major (sternal portion)	Atrophied.
Cervical 8 } ...		
Dorsal 1 } ...		

The condition of the muscles above mentioned exists on both sides of the body, except in the case of the trapezius.

There are no fibrillary twitchings. The condition of the muscles has been verified by Dr. J. C. Rankin, who finds

merely diminished electrical response in the affected muscles, but no reaction of degeneration.

The atrophy of the latissimus dorsi, lower part of the pectoralis major, and supinator longus, with escape of the

Fig. 1.—Showing the apparent lengthening of arms by elevation of scapulae and atrophy of trapezius, especially on left side, as indicated by sharp angle between neck and shoulder.

deltoid, infraspinatus, and hand muscles, form a characteristic picture of the juvenile type of muscular dystrophy; the muscles of the legs, pelvic girdle, and lower back are so far intact. Landouzy and Déjerine's type may be excluded by the complete absence of face lesion. The

Fig. 2.—The patient presses his hands together, showing the atrophy of the sternal fibres of pectoralis major.

deltoids and infraspinati may possibly be regarded as hypertrophied, but this is probably a genuine hypertrophy from overwork rather than the degenerative false enlargement, so that the group of pseudo-hypertrophic paralysis may also be rejected. Absence of fibrillary contractions and of characteristic electrical changes, together with the

distribution of atrophy, remove this case from the group of spinal muscular atrophies. In spite, therefore, of the comparatively advanced age (26 years) at which the disease commenced, and of the absence of hereditary influence

Fig. 3.—Demonstrates atrophy of the serratus magnus.

this case may be regarded as an instance of Erb's juvenile form of muscular dystrophy.

The premature decay of certain muscles in cases of this description may possibly bear some relation to the amount of work the muscles have had to perform. In this instance the atrophied muscles have had an excessive amount of exercise during the adolescent and adult life of the man. The fact that no other occurrence of the disease can be discovered among his relatives may indicate a comparatively slight degree of vulnerability, hence the late period of onset of the disease, which usually commences in boyhood or adolescence.

THE ACTION OF CUTANEOUS ANAESTHETICS.

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IN this investigation we have endeavoured to determine whether the various drugs applied to the unbroken skin with a view to the relief of pain have the action attributed to them, and thus to obtain rational indications for their use. We have not concerned ourselves with the administration of local anaesthetics by the hypodermic method, but only with liniments, lotions, ointments, and other means of introducing drugs by absorption through the skin itself.

The following preparations for this purpose are contained in the *British Pharmacopoeia*:

Linimentum belladonnae	Linimentum opii
Emplastrum belladonnae	Emplastrum opii
Unguentum belladonnae	Linimentum aconiti
Unguentum atropinae	Unguentum aconitinae
Unguentum gallae cum opio	Unguentum cocainae

We have no hesitation in saying that none of these have any anaesthetic effect on the unbroken skin. Belladonna linaments and plasters have been ordered for generations, and glycerine of belladonna finds a place in the casualty room of most hospitals, but when tested by accurate methods they are quite unable to prevent or relieve pain except in so far as that effect may be produced