On the whole, I think in this district the Act, so far as the medical part is concerned, is now working smoothly, and the fact that during the whole of 1913 it was only necessary to call one meeting of the Medical Service Subcommittee, and that for the purpose of electing a chairman, speaks for itself. This state of things is largely due to the amiable relations that have always existed between the Local Medical and the Insurance Committees. I consider we owe a debt of gratitude, on the medical side, to Dr. Don and Mr. Willan and the other members of the Local Medical Committee, and on the lay side, to Mr. Stableforth, Mr. Schultz, and the Insurance Committee as a whole, for the excellent work done, during a trying time, in our interests. The Insurance Committee has always endeavoured to meet our expressed wishes, to help us in our difficulties, and last, but not least, has been most punctual in its payments to us.

There is one arrangement under the Act to which the committee quite willingly agreed which is deserving of all praise—I refer to the limiting of consulting hours to 9 to 9.30 a.m. and 6 to 7 p.m. I appreciate the 7 o'clock limit most. The sonatas of Beethoven are delightful; the music of Schubert is charming; the musical cadence in Grinling's voice when reciting his own poetry, and in Campbell's when, with exquisite pathos, he sends it reverberating among the "Mountains of Morne," cannot be denied; the booming sonorosity of Russell is a thing to be remembered; but there is nothing so pleasing to my ear, so full of a nameless charm, so wholesome and refreshing, as the sound of my hall clock striking 7.

The Milroy Lectures

ON

THE HYGIENIC ASPECT OF THE COAL-MINING INDUSTRY IN THE UNITED KINGDOM.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON.

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LECTURE IV.

MINERS' NYSTAGMUS.

MINERS' nystagmus must be regarded as the commonest of all occupational diseases. This may be due to the fact that the mining industry is, after agriculture, the largest industry in the country. In my opinion the number of cases of miners' nystagmus far exceeds the numbers which would be given in compensation statistics, which take account only of cases in which undoubted incapacity for work has been produced, and not of the much larger numbers of early cases in which the patients are able to continue in their employment.

This disease was first recognized by Gillett of Sheffield about 1854, although no case was mentioned in medical literature until 1861, when the symptoms were described by de Conde, a Belgian physician. Cases were reported by Pepp Müller as early as 1860, by von Graefe in 1873, and by Bell Taylor of Nottingham and by Neiden in 1874. In this country we are indebted to a very large extent to the observations and writings of the late Simeon Snell and for his pioneer work on this many-sided disease; in France, Dransart occupies a similar position.

The disease is now recognized in this country and in all the principal coal-mining countries as a disease affecting the earning capacity of coal-miners, and in 1907 it was scheduled as an occupational disease under the Workmen's Compensation Act in order to entitle sufferers to compensation.

FREQUENCY OF THE DISEASE.

Dr. Court has stated, as a result of the examination of several thousands of workmen, that 35 per cent. of coal-getters are subject to this disease to some extent, Snell

estimated that 5 per cent. of all colliery workers were affected, but he did not discriminate between different kinds of work in the coal pit. Nieden, who examined nearly 30,000 coal-miners, agrees with Snell that the frequency of nystagmus in underground workers is somewhere about 5 per cent. In the North of France, Dransart and Famechon have given 10 per cent. as the number affected. Romée and Thibert of Liège during 1908 and 1910 examined 5,000 workmen in twenty-seven collieries. More than three-fifths were coal-getters, and on the average 21 per cent. were affected with symptoms of nystagmus; in collieries lighted by lamps burning heavy oils 37 per cent. of the coal-getters were affected. Romée had made a similar inquiry in the same district in the years 1877-8, and the result of his later inquiry was to show a marked diminution in the number of cases as well as in the severity of the symptoms. Stassen, who in 1909 examined 3,385 colliers descending into the pit, and also on their return to the surface, found that 15 per cent. of the workers were affected before commencing their work, and 22 per cent. at the end of the shift.

Roger of Hondeng-Geognies, as a result of examining over 7,000 workmen, came to the conclusion that 17.5 per cent. were suffering from nystagmus. Libert, the Chief Inspector of Mines to the Belgian Government, found different percentages of miners affected in different districts. In one series of examinations which he conducted with the help of Romée and Thibert he found that of 305 workmen examined in one pit 73 were affected with miners' nystagmus, giving a percentage of 23.9, and he refers to a memoir dealing with 3,685 workmen, among whom 704 showed symptoms of this disease, or a percentage of 19.1. The following table gives details of the work and the frequency of nystagmus among the different classes of workers:

	No. Examined.	No. of Cases of Nystagmus.	Per-centage.
Deputies	76	33	43.4
Workers at the face	1,346	432	32.11
Workers in stone	374	77	20.6
Timberers and repairers	332	94	28.3
Hauliers, horse drivers, and hookers on Putters	626	45	7.2
Putters	542	22	4.1
Miscellaneous	389	1	0.03
	3,685	704	9.1

Nystagmus is almost unknown in ironstone and metalliferous mines, and in naked-light pits from which coal is obtained it is very much less frequent than in mines in which safety lamps are used. In two naked-light colliery districts in which over 12,000 underground workmen were employed, Llewellyn records that there was only one known case of miners' nystagmus. This, however, may be accounted for by the fact that this was the only case for which compensation was paid, and a systematic examination of the men would probably reveal that many more workers were affected.

Llewellyn, as a result of careful examination of 173 officials, chiefly firemen, found that 61, or 35.2 per cent. were affected with nystagmus of a latent type. He draws a distinction between the grave types of this disease and the milder types which he calls "latent," and the same classification has been made by Dransart and Famechon.

Symptoms of nystagmus are most commonly found among miners engaged in holing, a process which consists of cutting the coal seam so as to get out the coal in pieces as large as possible. The holer lies on his side with his knees drawn up and his head thrown backwards, and he strikes the coal with a horizontal swing, the lamp being placed near his feet. He may undercut the seam or "top cut" it, but in either case the muscles of the eyeballs are continually in a strained position, generally in an upward or oblique direction. As a result of this eyestrain the elevator muscles suffer from strain and cramp. Similar effects are found in other muscles, producing wry-neck, twitching of the eyelids, and tremors of the head. Holers

as a class are undoubtedly more predisposed to nystagmus from the nature of their constrained work; hewers and the loaders who are working at the face come next in liability to the onset of the disease. Dransart and Snell considered that 97 per cent. of the cases of miners' nystagmus are found among coal-hewers. Romiee, on the other hand, believes that timberers and roadmen form a much larger percentage, varying from 7 to 30 per cent. of the cases of nystagmus found in different districts. All observers agree that the workmen who work hardest and who earn the best wages are most likely to be affected. The disease is also found among loaders, datallers, packers, as well as among the firemen and colliery managers, and in these occupations, like that of the holer, eyestrain may be produced through lowness of the roof of the roadways and the workings in the mine.

AGE.

Miners' nystagmus seldom occurs before the age of 25, and not usually before a miner has worked for ten years underground. It would seem that the longer a man has worked in the pit the more likely is he to develop nystagmus. This may be regarded as a general rule which may be applied to all workers up to the time when they have worked thirty years in the pit, after which they do not appear to be so susceptible. The youngest case that has come under Llewellyn's notice is a boy aged 15, and 47 of his first 600 cases developed the disease before the age of 25. In McMurray's series of 120 cases, nine of the patients were 25 years and under. The shortest time in which the disease has been known to develop after underground work is five months.

SYMPTOMS.

In miners' nystagmus we are dealing not with a disease localized to the eyes, but with a general disease one symptom of which is oscillation of the eyeballs. I believe that the term "miners' nystagmus" is unfortunate, as it simply relates to one symptom of this complaint, and the symptoms are not confined to oscillation of the eyeballs and effects resulting from this phenomenon. There may be, and generally are, symptoms such as headache, nausea, attacks of giddiness, muscular tremors, twitching of the muscles in different parts of the body, especially the muscles of the eyelids and the face and neck; neurasthenia may be a prominent symptom, with its associated conditions, such as a quickened pulse, exaggerated reflexes, increased vasomotor irritability, sleeplessness and nervous depression. All these symptoms may be present in any case of miners' nystagmus, but in many cases only some of them are present, and at given times the prominent symptom—the oscillation of the eyeballs—may actually be absent, although the patient is undoubtedly suffering from this disease.

Headache.

Headache, in cases of moderate severity perhaps the most frequent symptom, may vary in the same patient from time to time, and its character may vary in different patients according to whether there is any refractive error or not. When there is loss of muscle balance due to uncorrected astigmatism the headache will be most pronounced in the occipital region, but if there be no refractive error it is common to find that the headache is frontal. In some cases the patient complains of tightness round the head. The headaches may be aggravated either by physical or mental exertion; stooping, walking downhill, lacing the boots, getting into bed or getting out of bed, have all been described as causes for the headache coming on, as well as for increasing the severity of this symptom, and mental work, even going to see the doctor for medical examination, is also a frequent cause of aggravation of this symptom. In many cases headache is continuous, although it may be better at some times than others, and will be aggravated in the way which I have just indicated.

Giddiness.

Attacks of giddiness are frequent. In some instances the giddiness may only come on when the patient is bending down or when he is exerting himself, and the patient may fall down either on the surface or in the pit. As a result of this giddiness injuries may occur, and I have seen one case of burns which resulted from the patient falling over the fire. This symptom, therefore, is

of great importance, not only from a point of view of the patient's welfare, but as a symptom that totally incapacitates him from work.

Vomiting and Nausea.

These two symptoms most usually occur after exertion, especially in those cases with a marked degree of astigmatism. Some patients complain that the nausea is worse on getting up in the morning, and in those who have come under my observation I am convinced that this is due to the nystagmus and not to other causes which might produce this symptom, such as excessive drinking overnight.

They must be recognized as important symptoms of miners' nystagmus, and in some cases are those which first attract the patient's notice. He consults his doctor complaining of biliousness; he may never have suffered from indigestion, and there may be no apparent cause, as far as the examination of the stomach is concerned, to account for this trouble.

Subjective Eye Symptoms.

The commonest complaint associated with miners' nystagmus is the jumping about or flickering of the lights in the pit or the gas lights on the surface. One patient may complain that he notices that the lights in the pit whirl round in rings; another may complain that the lights flicker, and run into each other; a third may state that he perceives that at night the gas lamps, the candle light, and everything flickers, just as he has seen cinema pictures flickering; and a fourth may say that the lights whirl round like wheels of light.

Photophobia is a common symptom of miners' nystagmus, and the medical man who is examining the patient has confirmation of the presence of this symptom by the fact that the miner when out of doors generally wears his cap over his eyes to protect them from the light. As Llewellyn remarks, when in the sunlight many of them wear smoked glasses.

Night Blindness.

Night blindness is undoubtedly one of the most characteristic symptoms of miners' nystagmus, and it is regarded by Court and Llewellyn as being present in about 75 per cent. of all cases. Harrison Butler has found the symptom in 60 per cent. of his cases. On the other hand, Snell stated that it was very rare, and Romiee that it never occurred. If night blindness be regarded as indicating that the symptoms of miners' nystagmus are worse in the night time than in the day, then it must be regarded as a very frequent symptom, and my own experience coincides with that of Court and Llewellyn. McMurray is of opinion that night blindness does not exist at all in cases of miners' nystagmus, and that the symptoms are worse at twilight because of the changing light, and not because of the absence of light. Among the rarer subjective symptoms are double vision and photopsia.

General Nervous Symptoms.

Patients suffering from miners' nystagmus very often complain of nervousness, sleeplessness, and mental depression. In some cases these feelings of nervousness appear before any of the other symptoms of the disease, and, if examination of the eye be neglected, the conclusion might be that the patient was suffering from neurasthenia and not from miners' nystagmus. There is the general facial expression which is common to a neurasthenic; there are the complaints of vague aches and pains in different parts of the body, which shift about from one limb to another. The patient may complain of being highly nervous, of being easily upset, of sleeping badly at nights, and of constant mental worry; on examination one may find general arterial throbbing and quickened pulse; exaggerated reflexes and increased vasomotor irritability may be found—or, in a word, the well-known standard symptoms of neurasthenia. Mental symptoms of a more serious nature occur in some few cases; the nervous depression is so great occasionally that the patients have suicidal tendencies.

PHYSICAL SIGNS.

Movements of the Eyes.

In a typical case the movement of the eyeballs is rotatory, rhythmic and involuntary in nature, but may

vary in different patients in direction of movement as well as in frequency; in exceptional cases to and fro movements are found as well. All observers are agreed that vertical nystagmus is of very rare occurrence. The disease usually affects both eyes, but cases have been observed of unilateral nystagmus; in cases of coal-miners who have had the misfortune to lose one eye I have seen nystagmic movements of the muscular stump after the eye has been removed, and I have also seen a rhythmic oscillation of a shrunken eye. The movement may be different in direction in each eye, and the rate will vary in different patients and in the same patient at different times. In the majority of cases both eyes move at the same rate. The frequency in ordinary cases is from 100 to 300 oscillations a minute, but in some the movements are so rapid that it is impossible to count them. According to Snell, the rate of movement is from 60 to 120; Romiee regards from 120 to 500 as the rate of movement, while Llewellyn believes that, generally speaking, the rate is between 100 and 350, although in the cases in which he was unable to count them on account of the great rapidity he estimates the figure at about 500 a minute. The range of movement varies from 1 millimetre to 1 centimetre. Sometimes the movements are so rapid and the excursion so short that it is impossible to detect the oscillation of the eyeball without the use of an ophthalmoscope. Llewellyn has pointed out that the fine rapid movements are much more constant in rhythm than the coarser movements, which are slower and more irregular.

The oscillations are increased by exertion, by excitement, by looking upwards, by rapid movements of the head, either horizontal or vertical, by bending the head and raising it quickly, or during the fixation of some distant object, and in cases in which no oscillations are obvious on medical examination they may be induced by the same means. In some cases, however, where the miner has been absent from work for a considerable time this procedure may not be sufficient to induce the oscillations, and they can be made evident only by placing the miner in a position similar to that in which he works in the mine, and by asking him to go through the same movements of his arms in a darkened room as he would perform in the pit while at work. The oscillations may be arrested by looking down and resting the eyes, and entirely stopped on strong convergence of the eyes; they cease during sleep. Romiee has pointed out that the severity of an attack of nystagmus can be to some extent estimated by the ease with which the oscillation of the eyeball can be induced or exaggerated.

Clonic Spasms of the Eyelids.

Clonic spasm of the eyelids is a common and in some cases the most prominent objective symptom. Sometimes it is an early, sometimes a late symptom, and very often it may remain after the oscillation of the eyeball has ceased. Llewellyn has pointed out that the movements of the eyelid associated with nystagmus are of two kinds, the coarse blinking movement and the fine tremor or clonic spasm, and in the former, although the movements may be quick, they are tonic and not clonic in nature. The rapidity of the clonic movements may exceed 100 a minute, and in some cases the movements may be so quick that it is impossible to count them. These movements may be exaggerated and made more obvious by adopting the same means as I previously described in discussing oscillation of the eyeballs.

Llewellyn found muscular movements of the eyelids in 136 cases out of 600 cases, and McMurray in 28 out of 186 cases. In the latter series of cases McMurray states that in 7 cases clonic spasm of the eyelids was the most troublesome symptom in the early stages of the disease, but it was the first symptom to disappear under proper treatment. In other cases the spasm occurred when apparently the disease was progressing satisfactorily, and in others, again—the most numerous class—the spasm occurred when the disease had almost disappeared. Other observers have found that clonic spasm of the eyelids has been the most persistent of the objective symptoms of miners' nystagmus. The frequency of the clonic spasm and the oscillation of the eyeballs are independent of each other. Ptosis may be observed when the patient has tilted the head back to steady it, but there is no loss of muscular power.

Muscular Tremors.

In addition to oscillation of the eyeballs and clonic spasm we may often find tremors of the facial muscles, of the eyebrows, and even of the whole head. Llewellyn found tremor of the head in 27 per cent. of his cases; McMurray found it after exertion to be an almost invariable symptom, and my own experience coincides with that of the latter observer.

The muscles of the neck and shoulder may also be affected, and in some cases the spasm of the muscles of the neck may be so pronounced that the head is held backwards and wry-neck produced. Very fine tremor of the extended hands is frequently seen, but whether it should be regarded as a symptom of this disease or as a manifestation of neurasthenia it is difficult to say.

Gait.

The gait of a typical case of miners' nystagmus is characteristic. The patient endeavours to compensate for his visual defect by throwing the head backwards and keeping the eyes down and walking stiffly. In severe cases the gait may be ataxic.

Vision.

Many observers are of the opinion that some optic defect is one of the principal factors in the production of miners' nystagmus. We may find evidence of old injury to the eye, such as corneal opacities, while less frequently we find early cataracts, glaucoma, or symptoms pointing to old iritis, but a large percentage of cases show errors of refraction. Brown and Mackenzie found such errors present in 90 per cent., astigmatism accounting for 48 per cent., hypermetropia for 27 per cent., and myopia for 15 per cent. Through the kindness of Mr. McMurray, of Stoke-on-Trent, I have been able to look through his notes of 120 cases of miners' nystagmus, from which it appears that over two-thirds have some refractive error. At the Oxford Ophthalmological Congress in 1912 Harrison Butler stated that 45 per cent. of his cases showed refractive errors, Folker found 75 per cent., Llewellyn 83 per cent., and Normal over 90 per cent. in 200 cases. On the other hand, such authorities as Snell and Dransart considered that there was little association of refractive error with miners' nystagmus.

Astigmatism of various kinds is the commonest form of refractive error; it accounted for nearly half of Llewellyn's cases, and hypermetropic cases were largely in excess of myopic ones. From McMurray's notes I find that of 64 cases in which the observations were complete, there were of hypermetropic astigmatism 24 cases with the rule and 28 against the rule, while in myopic cases 12 were against the rule, without a single one with the rule.

Visual acuity is nearly always diminished, even in convalescent cases where there is no oscillation of the eyeballs. In severe types of nystagmus where the oscillatory movements of the eyeball are constant, it is impossible to estimate the field of vision. Out of between 60 and 70 cases of coal-miners' nystagmus, Cridland found it possible to take the field of vision in 25. Nearly all the patients he investigated were men who had been compelled to give up their work on account of the severity of the symptoms. The results of his examination of these cases showed:

1. That contraction existed for white, blue, and red in practically all the cases examined.
2. The contraction was of the concentric type and symmetrical in shape, although not always in depth.
3. In the majority of cases the colours were in their correct order, but occasionally interlacing of the red and blue occurred, the correct order being recovered as the case improved.
4. The contractions for red and blue were generally greater than those for white and rather greater for red than blue.
5. By grouping the cases into mild, moderate, and severe types the fields broadly showed corresponding contractions.
6. Speaking generally, as the disease improved the fields of vision improved, but contraction persisted as long as any subjective symptoms were present, and although oscillatory movements could not be elicited by any test.
7. Most of the cases showed more or less marked signs of such symptoms as clonic spasm of the eyelid, twitching of the neck, etc., but there seems to be no direct relationship between the presence and degree of these signs.

Cridland points out that there is a great similarity between the fields in miners' nystagmus and in traumatic neurasthenia, and throws out the suggestion that the alteration in the field of vision in nystagmus cases is of

the same nature as that found in traumatic neurasthenia. If we keep in mind the possibility of miners' nystagmus being a neurosis of the same nature as neurasthenia, and that neurasthenia and miners' nystagmus are so often associated in the same subject, and that each may be induced by an injury in many cases, I think we may infer that nystagmus itself should be regarded as a local symptom of neurasthenia.

The condition known as hippus, or the rapid and spasmodic variation of the size of the pupils independent of the action of light and accommodation, may be present, and, according to Dransart, slight paralysis of accommodation exists in almost every case.

Injection of the eyelids and the eyes is frequently observed, and conjunctivitis, sometimes of a chronic nature, may also be present.

I have noticed in many cases of miners' nystagmus that when the patient is sitting down and has put his head between his legs for a short time, say a minute or so, on raising his head the eyes not only have the oscillations and clonic spasm, the oscillations being more marked, but there has been a prominent bulging of the eyes, almost bordering on exophthalmos, accompanied by marked injection. I have found this symptom sometimes of the greatest value in doubtful cases.

Onset of the Disease.

In some cases the onset is gradual, and on the average we may say that twelve months may elapse between the appearance of the first symptoms and the time when the patient consults his doctor. On the other hand, in some cases the onset is strikingly sudden, and when it is so it is generally the result of some debilitating illness, such as influenza or the result of an accident either to the eye or to other parts of the body. The disease may develop in a few months after a miner has worked regularly for twenty or thirty years in the mine without any apparent trouble. When the patient first consults his doctor he may be unconscious of the oscillation of the eyeballs, and he may have no suspicion that he is suffering from miners' nystagmus. He may complain of some of the objective symptoms already described, such as headache, giddiness, and the unsteadiness of the lights in the mine. In another group of cases we may find that the symptoms complained of are purely nervous; the man may tell his doctor that he is simply run down or fearing a nervous breakdown, and symptoms of neurasthenia preponderate to such an extent that miners' nystagmus may be overlooked.

The progress of the disease may depend upon many conditions. Just as illness or an accident may be the cause of the sudden onset of the disease, they may aggravate any form of nystagmus and convert a mild or a latent case into a serious one. If the accident sets up a reurasthenic condition which previously did not exist, the symptoms associated with nystagmus will be still more serious. Excessive drinking or smoking may intensify the condition, and several times I have known miners with a mild degree of nystagmus who have been able to follow their employment without any inconvenience suddenly become unable to do so on account of the nystagmus after a drinking bout, and the incapacity has continued for a considerable time, although the effects of the drink have disappeared in a few days.

If a miner suffering from this complaint continues in the occupation at which he contracted it, the symptoms will in the course of time increase and assume a more serious form. On the other hand, for the disease to be arrested the sufferer must entirely give up work in the pit.

The period of recovery will depend largely upon the severity of the symptoms and upon the manner in which the treatment is carried out. Even after recovery relapse is very common, and sometimes under conditions favourable to the aggravation of the disease the patient may have several relapses.

DIAGNOSIS.

It is first of all necessary to decide whether the prominent objective symptoms are due to the nature of the man's employment or not. Nystagmus, or oscillation of the eyeballs, is associated with several diseases of the brain and spinal cord, such as Friedreich's ataxia, syringomyelia, disseminated sclerosis and tumour of the cerebellum, as well as some congenital diseases of the eye, but the

history of the case and the presence of other symptoms should be sufficient to make a differential diagnosis from cases of miners' nystagmus.

In all these conditions the movements of the eyeballs or the actual nystagmus are different from those found in cases of miners' nystagmus, in which the movements are much more forcible and rapid, and can be exaggerated much more easily by the methods described.

Clonic spasm of the eyelid is found in many other conditions apart from miners' nystagmus; but by systematic examination it is easy, if the other symptoms are considered, to decide in the case of a miner whether the twitching of the eyelids is due to nystagmus. If, associated with nystagmus and clonic spasm of the eyelids, there are some of the other symptoms to which I have referred, such as headache, giddiness, or muscular tremors, there should be no difficulty in making a diagnosis of miners' nystagmus. It is both important and interesting to know that, although nystagmus may be found in those conditions of the brain and spinal cord to which I have already referred—Friedreich's ataxia, etc.—in these conditions clonic spasm of the eyelids is never found. In a miner, therefore, who shows the two objective symptoms of miners' nystagmus and clonic spasm one can be certain of the diagnosis of miners' nystagmus.

If no oscillation of the eyeball is to be observed, care is necessary in order to come to a reliable conclusion. Not only may the oscillations be present at some times and not at others, but there are undoubtedly some cases of miners' nystagmus in which no oscillation of the eyeballs is observed at all. In such cases clonic spasm of the eyelids may be the most prominent objective symptom, and if with it headaches, giddiness, muscular tremors, and neurasthenia are found, unaccompanied by any of those conditions which may produce clonic spasm by itself, I think that, apart from the subjective symptoms, the diagnosis of miners' nystagmus is justifiable. Llewellyn points out that it is necessary to exclude cases of high myopia, of which he has seen two examples, as well as such congenital conditions as hereditary nystagmus or albinism.

(To be continued.)

Memoranda :

MEDICAL, SURGICAL, OBSTETRICAL.

THE TREATMENT OF RINGWORM.

RINGWORM is such an intractable disease, such a bugbear to schoolmasters and parents of children attending school, that any quicker and more efficient treatment than that known to us at present would be welcomed. Hence I am glad to bring before school medical officers and others a very simple and efficient treatment which leads to rapid cure. The part being first washed with a strong solution of sodium bicarbonate, is swabbed with a piece of lint moistened with spirit of ether to remove grease, painted with tincture of iodine, and an ethyl chloride spray immediately applied. I find it best to work with a pair of ethyl chloride tubes in each hand, as a larger area is covered in quicker time. The deeper the disease process the longer the spray must be applied. It should be used until the integument gets china white and then stopped. It will be found that in twenty-four to forty-eight hours the patch of ringworm has become quiescent. The smallest commencing spots should be looked for and treated in a similar manner, when they also will disappear in from a few days to a week. In ringworm of the scalp three or four applications of iodine and spray are required, but on the face or smooth surfaces one application suffices.

I have succeeded in curing ringworm of months' standing in one week by this method, and it has never failed me since I first thought it out over a year ago. In most of my cases the patients got infected from cattle.

Ethyl iodide readily destroys the tubercle bacillus, and thus might be expected to destroy hyphomycetes; but an ointment of ethyl iodide 25 per cent., I found, will blister, and thus my central idea was to obtain a very minute amount of ethyl iodide which might not penetrate further than the outer layer of the skin by painting on tincture