lieve, the explanation of this disease of hop pickers, and one of the reasons why it is most prevalent at the hop harvest.

Fig. 3.—A microphotograph of the spines upon the bracts of the hop.

PROBABLE MODE OF PRODUCTION OF THE OPHTHALMIA.

Belonging, as the *humulus lupulus* does, to the same family as the *urtica urens* or common stinging nettle, and the order *urticaceæ* (which also includes some very severely stinging foreign specimens), and knowing that the hop plant possesses these sharply pointed appendages, is it not probable that this

Fig. 4.—A microphotograph of the spinous hairs of the hop plant.

painful affection, which is produced immediately and often continues to become worse, is explained by the introduction either by movements of air, by gravitation, or upon the hands of the hop pickers, of some of these spinous processes of the hop plant, which, becoming impacted into the conjunctiva or

cornea, form the initial cause of the disease? It is also probable that upon them the volatile and resinous matters, etc., of the hop itself, or even micro-organisms, are introduced, which may vary and modify the subsequent features of the trouble.

The physical signs are primarily those of a mechanical irritant in this disease. All surgeons doubtless have noticed the white opaque appearance of the corneal tissue which surrounds a foreign body impacted in its substance; this appears to be due to an infiltration of the tissues with leucocytes, a local cell proliferation around the seat of injury. In this process of softening and necrosis, new cells are formed which repel and refuse to unite with dissimilar cells; they in turn degenerate and are cast off; some of which pass by gravitation from the posterior surface of the cornea into the anterior chamber, and collecting form the hypopyon. Thus I have removed foreign bodies from the anterior chamber, which, having previously become impacted in the cornea, have thus become detached and fallen with the viscid purulent collection into the space between the cornea and iris.

The explanation I would offer of this so-called "necrosis of the cornea," in this disease is due to the efforts of the tissue to get rid of these impacted spines of the hop plant. This coincides with the sequence of events I have noticed:

First, a local injection or conjunctivitis (mild cases).

Secondly, corneal inflammation and necrosis (more severe cases).

Lastly, hypopyon (most severe cases).

TREATMENT.

The disease varies in its degree of severity. If purely conjunctival, sedative lotions and irrigation of the conjunctival sac, combined with hydrochlorate of cocaine, are most efficacious. In the more severe cases the local application of a belladonna lotion in the form of a graduated and saturated compress, the artificial leech, and the administration of a grain or so of calomel internally are to be recommended. As indicated above, great attention to cleanliness, and rest of the lids from movement over the inflamed surface, and from the stimulus of light are essential. Hospital treatment for such as are placed under the unfavourable and insanitary conditions of the hop gardens is imperative.

The employment among the operatives of glass protective spectacles, and the use of gloves during the operation of hop picking to be at once abandoned on the termination of the work, together with more personal cleanliness, are most important prophylactic measures, though difficult to enforce.

In conclusion, I beg to tender my warmest thanks to Mr. Charles Whitehead,² the Technical Adviser of the Board of Agriculture, for the kind assistance he has rendered me with information regarding hop cultivation, together with Mr. Higgins and Dr. Brailey, and many others.

MINERS' NYSTAGMUS AND TESTING FOR FIREDAMP: A PRACTICAL POINT.

By SIMEON SNELL, F.R.C.S.Ed.,

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THE detection of firedamp is a vital matter to all concerned in a coal mine. So much indeed is its importance recognised that we have lately had the researches of Professor Clowes resulting in a very delicate hydrogen lamp for detecting small proportions of firedamp, since it is held by some mining engineers that the proportion of less than 1 per cent. of gas may be explosive in the presence of coal dust. The ordinary method adopted in coal mines, much less delicate than that just indicated, is by reducing the size of the oil flame of the safety lamp until the luminosity almost disappears, and the firedamp then appears as a pale flame or "cap" above it, this "cap" being due to the presence of gas in the air. The amount of gas present can be estimated by the appearance and dimensions of the "flame cap." This method Professor Clowes says does not detect less than 2 to 3 per cent., whilst for some purposes it is necessary, he asserts, to recognise as small a quantity as $\frac{1}{4}$ of 1 per cent. It will therefore be readily seen how desirable it is that, with the ordinary and less deli-

² When looking through the proof of this paper, Mr. Whitehead kindly suggested, and I fully concur with his opinion, namely, that the function of the spines upon the hop bine is prehensile—that is, rendering the holding power of the plant in climbing more tenacious.

cate method, indications of the presence of gas should be at once recognised.

The class of men in a mine who are chiefly perhaps responsible for seeing that the pit is free from dangerous quantities of gas are those called "deputies" or "firemen." It is part of their duty to visit the "workings" before the colliers go to their work, and during their working shift, to ascertain that gas in any amount is not present. Throughout their regular day's work, also, they are constantly on the look-out for any indication of firedamp. Those who are familiar with my writings on nystagmus in miners will be aware that I particularly mention its presence among this class of underground worker. In my book on miners' nystagmus¹ this part of the subject is dealt with at some length, and the manner of their work is represented by photographs.

For long it has been my opinion that the dancing of the lights and other objects which forms such a prominent symptom of the disorder would, in especially well-marked instances of the affection, be a hindrance to the delicate detection of the "cap" spoken of as showing the presence of gas. It has been a matter that has been a frequent topic of conversation between myself and my friends among mine authorities. The importance of the subject has been recognised. Further than this my interrogation of "deputies" afflicted with nystagmus showed some time since that there was the interference anticipated in some cases at all events. One deputy in particular told me that it did undoubtedly hinder the accurate estimation of the presence of a cap, and that this became more evident as the day wore on at his work. It is, however, only just now that a definite and, I believe, thoroughly reliable investigation of a man at his work has been made. It arose in this way. An official in the management of a colliery some little distance away was much interested in my published views on miners' nystagmus, and in course of conversation one day he stated that he felt sure he knew a deputy who was the subject of nystagmus. He knew it from the man's manner at his work. When he was in the mine he frequently saw this man. Here was an opportunity for putting to the practical test a nystagmic (presumably) deputy's capacity for detecting firedamp. My friend undertook to do it in the ordinary course on his going into the mine as opportunity offered, and in a way that would not lead the deputy to think that he was being tested. These points he carried out, and I append the account of his investigation which he kindly sent to me.

The deputy and I had been travelling on a low length of faces, and came to a gate in which we suspected the presence of gas, in fact could detect it by its smell. He raised up his lamp toward the roof, and a "cap" began to show upon the top of the flame. He, however, continued to raise his lamp until the flame lengthened out, and then said, "See there it is." I then lifted up my lamp, and asked him to speak as soon as the flame began to show the cap. The result was the same as with his own lamp, for he could not see it until the flame began to lengthen out to a considerable extent, and never noticed the first signs of the presence of gas. I may say that about a minute before he had complained of dizziness, which he said came upon him when he knocked about.

Since this investigation my friend has very kindly afforded me an opportunity of examining the deputy. I find him a middle-aged man, who has been a deputy in different collieries for many years. He has well-marked nystagmus; the oscillations are readily induced on looking upwards; especially is this the case when the gaze is turned up more or less obliquely to the right. On questioning him, he at once says that on looking towards the roof to examine its condition or for gas he inclines the head chiefly on the left shoulder. After the oscillations are once set going by looking upwards; they will be still noticed, but less so, on looking horizontally, but stop immediately the gaze is turned downwards. He is the subject of characteristic and well-marked nystagmus. His complaint of lights and other objects dancing is that they move rather in an ellipse than in a circle.

A "deputy" also, who is an intelligent man, gives an interesting account of the first occasion on which he observed the lights in the mine to dance. He was with a companion going up an incline, at the top of which, at the pit bottom, were some lights. He saw, as he thought, these waving, and taking this to be the signal that a "corve" or "tub" was running away down the incline, he seized and dragged his mate into the man-

hole to get out of the way of it. On his companion looking, he knew at once that all was clear, and told him that there were no lights waving. His symptoms date from two years back, but he states that he is somewhat better the last year, having now higher and better roads to traverse.

As I write this article another "deputy" has been sent to me. He ceased to work in the pit a year ago owing to nystagmus, but oscillations can still be occasioned by keeping his eyes in the position he would have had them at his work. He says that, "to speak the truth, nystagmus does interfere with testing for gas." He was conscious of it himself, and tells me that he watched other deputies, who he felt sure were suffering worse than he was, and he was convinced of their inability readily to recognise the "cap." In a mine with which a deputy is familiar, he knows better where to expect gas, but if one suffering from nystagmus was employed in a new pit that was "heading out," he would, of course, be at much greater disadvantage in detecting small proportions of gas. This man's father was killed in an explosion many years ago. He was a "deputy," but whether he suffered or not from nystagmus is not known.

Enough has perhaps been said to indicate that there is a very practical interest attaching to miners' nystagmus, and different from that which has hitherto been associated with it. It would be well, it seems to me, that in any inquiry into any mine explosions which, unfortunately, are still heard of too frequently, the bearing of nystagmus as a possible element should be borne in mind. Further inquiry will show what practical bearing the subject here discussed has, but mine authorities with whom from time to time I have had the opportunity of discussing it have been of opinion that it is one of importance. Other points connected with this question I must for the present defer.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

RUPTURE OF BLADDER DUE TO ULCERATION AND HÆMORRHAGE.

J. W., aged 75, a coal agent, a hale old man, came to me on October 27th, 1892, complaining that he had been passing blood in his urine for two days. Upon his passing water in my presence I found that about a teaspoonful of bright red liquid blood, followed by clots, which were expelled with great straining, preceded the flow of urine, which was deeply tinged with blood. There was also increased frequency of micturition, so that the urine could not be retained more than two hours at a time. These symptoms continued unabated for about a week, during which he persisted in following his occupation until, owing to the almost constant suffering and the gradually increasing anæmia and exhaustion, he was compelled to take to his bed, and on November 6th his condition was truly pitiable. No treatment seemed to have the least effect upon the drain of blood, and the other symptoms were only palliated by sedatives and fomentations. The passage of the catheter caused intense pain, increased the bleeding, and only drew off a small quantity of bloody urine and blood. The difficulty and frequency of micturition increased hourly until nothing seemed to be passed but pure blood. Nevertheless, he obstinately persisted upon getting out of bed to pass water; and at 2 P.M., upon attempting this, he felt a sudden and fearful pain across the bladder, which caused him to scream out. He fainted, and shortly after had a severe rigor and a sort of convulsive fit. From this time he passed nothing from the bladder; the catheter failed to draw anything, and its end was felt in contact with a large firm blood clot, which filled the bladder. A little boric acid solution injected with the object of clearing the eye of the catheter of possible blood clot passed in, but did not return. From this time the poor old man continued to suffer the most frightful agony, despite all treatment, and the question of surgical interference presenting itself, Dr. Mallett kindly came in consultation with me. We decided that an operation was not advisable. The patient gradually sank, and died at 4 A.M. on November 7th.

¹ *Miners' Nystagmus, and its Relation to Position at Work and the Manner of Illumination.* Bristol: J. Wright and Co.