ON THE MYDRIATIC PROPERTIES OF HYDROBROMATE OF HYOSCINE.

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THE researches of Ladenburg have shown that three different mydriatic bodies are contained in the atropaceous alkaloids—namely, pure atropine in belladonna and stramonium; pure hyoscyamine (crystalline) in belladonna stramonium, hyoscyamus, and duboisia; and lastly, hyoscine, which is associated with hyoscyamine, in hyoscyamus. Pure duboisine is identical with pure hyoscyamine. The relationship which scopoline, another atropaceous mydriatic obtained from *Scopolia japonica*, bears, chemically and physiologically, to those just mentioned, has not, I believe, up to the present been precisely determined. Though atropine,

hyoscyamine, and hyoscine are isomeric, they possess somewhat different physical, chemical, and physiological properties. The last named, hyoscine, is the most recent of these therapeutical agents, and appears to have been little used in England. In America, on the other hand, it has been extensively employed, chiefly on the recommendation of the very elaborate experimental and clinical investigations of Professor H. C. Wood of Philadelphia. In the current (November) number of *The Practitioner*, Dr. Mitchell Bruce has called attention to the remarkable efficacy of hyoscine in controlling "those conditions of cerebral excitement variously known as delirium, mania, and insomnia, with restlessness." The prompt and satisfactory results which Dr. Mitchell Bruce had obtained suggested a special trial of hyoscine as a mydriatic.

In commerce there are three crystalline salts of hyoscine: the hydriodate, the hydrobromate, and the hydrochlorate. The first occurs in large prismatic orange-coloured crystals, which are not freely soluble in water; the hydrobromate in small crystals, which are readily soluble in water. Partly on this account, and partly because the hydriodate might contain free iodine, the hydrobromate seemed better suited to ophthalmic purposes. The experiments whose results are here recorded were made with a solution of the latter salt of the strength of 1 in 200, prepared by Mr. Martindale of New Cavendish-street. The solution proved to be a rapid, powerful, and unirritating dilator of the pupil alike in the healthy and in the inflamed iris, and a paralysing of the accommodation. Notwithstanding its great activity when given internally or subcutaneously, I have not yet met with an instance of its producing toxic effects such as occasionally follow the use of duboisine, though this contingency may be possible with stronger solutions. Having tested the general mydriatic action of the drug in healthy and in diseased states of the eye, I asked Mr. E. T. Collins, senior house-surgeon at the Moorfields Ophthalmic Hospital, to undertake some comparative observations with a solution of atropine of corresponding strength. The results of his observations are shown in the annexed diagram. The horizontal rows of figures indicate the time of action in minutes, the vertical column the position of the nearest point of distinct vision (*pp*) in centimetres. The effect of the hyoscine is represented by the continuous line; that of atropine by the broken line.

Before applying the solutions, the "nearest point" was ascertained to be at 15 centimetres in both eyes. Hyoscine was applied to the right eye, and atropine to the left. Hyoscine removed the nearest point to 38 centimetres in ten minutes, whereas it took the atropine thirty-five minutes to do this. In twenty-five minutes the accommodation was completely paralysed by hyoscine, the nearest point having receded to 100 centimetres; whereas with atropine this was not attained for sixty-five minutes. Similarly, the pupil was fully dilated by hyoscine in fifteen minutes, while it required twenty-five minutes to produce an equal effect. (See diagram.) Further, the effects of hyoscine also last longer than those of atropine, and are not so easily counteracted by eserine.

The indication seems to be that, if hyoscine is to have a place in ophthalmic therapeutics, it will be chiefly in cases of iritis and in other conditions where it is desirable to produce as much dilatation of the pupil as possible and for as long a time as possible. It is worthy of note that the application of hyoscine to the eye does not seem to cause the unpleasant taste and feeling in the throat which often follows the use of atropine. This circumstance accords with the observations of Dr. Bruce and others, that when given internally it does not produce unpleasant dryness of the throat and skin like atropine.

Harley-street, W.

SOME CASES OF LOCAL NUMBNESS OF THE EXTREMITIES,

WITH COMPARISONS BETWEEN LOCAL SYNCOPE AND "NIGHT PALSY."

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CASE 1.—E. G.—, aged eighteen, tailor, came under my care in March, 1884, complaining of numbness or deadness of the fingers and of giddiness. He is a tall, broad-built, well-developed lad, with thick lips, fair complexion, and light wavy hair. The numbness of his hands is not constant, but occurs about once every day, generally about midday. It appears to be induced by washing in cold water when the hands are already cold. Although he washes his hands in cold water when he gets up, this does not make them "go off," as, having just got out of bed, they are then warm." At several of his visits I had the opportunity of seeing his hands in the condition for the relief of which he applied, and the following was their appearance on one occasion: "The middle finger of the right hand is quite white to the centre joint; the rest of the hand, with the

other fingers, is dark blue, the whole feeling intensely cold to the touch. A needle-prick in the white finger is not felt, and there is no bleeding; in the blue part of the hand the prick is felt. He can move the hand and fingers, but has no feeling in the white part and tingling in the rest. Pulse 60, and fairly strong at the wrist. Soon the blue colour in the back of the hand becomes mottled with bright red (vermilion); this marks the commencement of the return of the hand to its natural condition. The red points enlarge and coalesce, and soon the whole hand is a good colour again, and warmer." During the return to warmth the hands perspire and tingle and feel burning hot. Both hands "go off" in this manner; usually all the fingers are affected, and also the thumbs to a smaller extent. The fingers, when I first saw the patient, never became absolutely white and bloodless above the middle joint. The wrists and all the rest of the body are warm during the attacks. The numbness lasts usually from five to fifteen minutes, and his arms seem weaker for a time after an attack. Between the attacks both the hands and axillae perspire very freely. The attacks only occur in cold weather. There is no history of nervous diseases in the family, and the personal history of the patient is very good; he states that he has hardly had a day's illness that he can remember. He is the eldest of seven, his parents having been married probably two or three years before his birth. His teeth are notched. When at school he used to have urticaria, but never has that now; and three years ago he had attacks of "fainting brought on by cold air." He thus describes these attacks: first he felt cold on the brow, everything seemed red and then black, and then he lost consciousness and fell. Physical examination: The chest is long, with acute costal angle. The breath-sounds are weak, and the heart-sounds are plainly heard over the right side. The upper border of the cardiac dulness is in the fourth space, and the apex beat is low, being two inches below the nipple and an inch and a half to the inside. The beat is natural and distinct, not by any means heaving, and the sounds are clear and without murmurs. There is no *bruit de diable* in the neck. Spleen not enlarged, and no signs of inter-thoracic tumour. There is no *tache cérébrale*. Temperature 97.6°. Urine very pale (sometimes dark-coloured), free from albumen or sugar; boiling with Fehling's copper solution gives a reddish discolouration with a flocculent precipitate on standing, but no reduction of copper. Under treatment, in which iron was prominent, his condition improved, and on May 7th I made the following note: "He can now generally keep the hands from 'going off' by beating them across the chest, like a cabman, as soon as they begin to get numb; his thimble seems to press on the finger and to start it off on the body side of the rim. The fingers perspire much when he is out walking." The weather continued cold, and it was not till the beginning of June that he was free from the attacks of numbness for the summer. About the beginning of September he had an attack on the weather changing from very hot to chilly. Early in October the middle and ring fingers of the right hand "blistered" during the night. They were bad a week, and when at the worst the fingers were numb. Also on a cold day, when the wrists became numb, an old scratch on the right wrist broke out again, and was bad some days. By October 24th, although the weather was much colder, he reported that his hands were almost always in a glow, and that he felt much better. The fingers kept well, in spite of very cold weather, till November 14th, when the middle finger of the right hand became numb round the old wound after washing. On Dec. 29th, the patient reported that twice during the week he had had an attack of giddiness and partial insensibility. His hands did not "go off," but his feet did. On Jan. 14th his hands became quite numb from the finger-tips to the metacarpo-phalangeal joints. Shortly after this I lost sight of him.

CASE 2.—J. F.—, aged sixty-five, tall, thin, and of nervous temperament. Suffers from neuralgic pain, and lately vertigo. Is dyspeptic, with a red fissured tongue. Urine sometimes deposits uric acid. No articular swellings. Knee-jerk well marked. Pulse always slow, mostly below 60. Bowels easily acted upon. Sleep fairly good, but easily disturbed. In June last, while dressing one morning he was alarmed with sudden loss of feeling and power of movement in the index, ring, and middle fingers of the left hand. He rubbed, pinched, and moved them about, but they were, as he said, "as dead as a doornail." Soon they were slightly numb, and then all right again.

CASE 3.—H. M.—, aged thirty-four, a clerk, height 5ft., weight 6st. 4lb. Weak and neurotic; feels giddy while dressing; the limbs tremble; he fears to move lest he should fall. He has a numbness in some parts of his legs and feet; this sensation soon goes. He often wakes with numbness of one hand, mostly the left; this will sometimes come on in the morning, so that he has to pause in his work, fearing also lest he should put the wrong letters into envelopes. No weakness of the right hand in writing. He has defective teeth, phosphatic urine, and often has hay-fever in the summer; has no headache; sometimes hæmorrhage from piles.

CASE 4.—Miss E. B.—, aged thirty-two, tall, dark, and pale. Suffers occasionally with neuralgic pain and pulsating noise in the left ear. She has an anæmic bruit, and her teeth are defective. Menstrual period regular, but painful, and for one or two days only. At the end of October, during an attack of neuralgic pain of the left intercostals and in the right arm, one day the right middle finger suddenly became numb and useless, so that she could not hold a plate or feel it distinctly. During the winter she had faceache on the right side and pain down the right arm, which aches while writing, and she fears it may become useless. She suffers much from close desk-work in the summer, and from neuralgia, and wakes up in the early morning with numbness of the right hand and arm, which makes her fear writer's cramp. She has to have the hand rubbed before attempting to get up. This ceased when the health improved, after the removal of some bad teeth on the right side, and on obtaining rest from work and change of air; and she has since continued her duties at the desk without any failure, but has at times temporary fulness of the tonsil, migraine, or facial neuralgia, with photophobia.

CASE 5.—Miss E. S.—, aged fifty, stout, florid, and robust. Menopause after typhoid fever three years since. Some flushing of face and fatigue in walking. Good appetite and regular bowels. Suddenly roused in the night by "deadness" of one thumb. This caused alarm, and the thumb was bitten severely "to bring it to." The bite left a mark, but was not felt at the time. This recurred so as to negative the idea of its being the result of pressure on the arm during sleep.

CASE 6.—M. C.—, milliner, single, aged forty-nine, tall and dark, neurotic, but otherwise strong and robust. Troubled with constipation. Menopause last year; before that always dysmenorrhœa. Pain in left side and shoulders most days; sometimes it extends down the arm. At times the fingers of both hands become dead half-way up, so that she is obliged to stop work. Sleeps badly, and sometimes is awakened by numb pain in the left arm or in both hands. Before the deadness and the numbness occur she often notices that the fingers look blue. She is conscious also of a numbness round the lips at times, both by day and in the night; and is sometimes told that she has turned blue in the face when this sensation occurs. The heart is healthy. She has seen the lips sometimes pale with this dark look round them; they then look and feel withered, and she has to rub them before they return to their natural sense and colour. She often wakes up in the night with both hands going dead along their ulnar aspects up to the wrist, or half way up the left arm.

Remarks.—All the above cases have a common symptom—viz., temporary numbness of the upper extremity—occurring in most of them paroxysmally. Cases 1 and 2 are examples of local syncope or dead fingers, one severe, the other slight; both occurring in men. In the remaining cases, the occurrence of this numbness at night justifies their classification under what has lately been described as "night palsy." In three of these also (Cases 3, 4, and 6) the patients suffered from paroxysmal attacks of "dead fingers" during the day. Slight cases of "dead fingers" are not uncommon. In these, generally on exposure to cold, the finger tips become white and numb, regaining warmth and feeling after a variable time, the return to the natural condition being accompanied by tingling similar to that of chilblains. Such cases, however, rarely attain sufficient importance to cause the person to seek advice for that alone, as was done by the boy whose case I have detailed (Case 1). These cases of "dead fingers" are most commonly found amongst hysterical and emotional women. In one lately under my care the finger tips became numb every morning, and feeling did not return for about two hours. The condition is evidently due to spasm of the arterioles, the cause of this spasm being more difficult to determine. The chief interest in such cases comes from

their relation to some more obscure nervous affections and to those more severe conditions in which the spasm of the arterioles is more lasting, if less complete, so that the continuance of bloodlessness leads to impairment of vitality in the part, or to absolute local death. Such cases are known as "Raynaud's disease," the most severe showing symmetrical gangrene. M. Raynaud, in his thesis,¹ from which much of our knowledge of these conditions was derived, uses the term "local syncope" to describe the temporary bloodlessness and loss of sensation seen in such cases as the one detailed. The condition, in which there is partial stasis, but with sufficient passage of venous blood to prevent complete loss of warmth, he calls "local asphyxia." It is with this latter condition that his name is usually associated, though the essential character of both is the same. In some remarks on a case contributed by him to the Clinical Society, Dr. Barlow says, "The essential clinical note of Raynaud's disease, at all events primarily, is the paroxysmal character of the circulatory disturbance." That will apply equally to local syncope and to local asphyxia. One recorded case of Raynaud's disease was attended with paroxysmal hæmaturia, and in several the urine was dark-coloured or contained blood. In some there has been spasm in the arterioles of the retina, affecting the eyesight, and distinguishable by ophthalmoscopic examination. These indicate vascular spasm in various parts, and probably the same primary cause produces all; but what the condition may be which sets up spasm of the arterioles has still to be determined. The other cases I have described were attended with a peculiar paroxysmal numbness and paresis of the hands, described by several observers lately, and called "night palsy," which has some analogy to these conditions. It is said to occur chiefly during the night, and in women of emotional disposition, or at the menopause, when neurotic phenomena are so common. Its occurrence in men has been noted, and is exemplified in Case 3. The patient wakes up to find the hand numb and cold, with tingling "pins and needles" or absolute pain. There is loss of power, and sometimes blueness and swelling of the hand, due to distension of the veins. Narrowing of the calibre of the radial artery has been described. The condition is always relieved by rubbing. One observer finds it always associated with disordered stomach—a neurosis, be it observed, common at the menopause, another sees it only in anæmic persons; and in several cases overwork is traced as a possible cause. Dr. Liveing mentions the occurrence of a similar numbness of the extremities associated with megrim, as in one of these cases (Case 4). Night palsy then occurs under similar conditions to those found in the subjects of "dead fingers," and like the latter it is paroxysmal; in its severer forms it produces coldness of the affected part with diminution of the arterial calibre. Dr. Ormerod,² when describing night palsy, mentions its similarity to Raynaud's disease, and emphasises the points of difference. I should be inclined to look upon night palsy, local syncope (or "dead fingers"), local asphyxia, and even symmetrical gangrene, as phases of one and the same morbid condition, the severity of the case, or the time at which the symptoms occur, determining for each under which name the neurosis shall be described.

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THE PROSTATE MUSCLE.

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In previous communications³ I have drawn attention to the nature and causation of prostatic hypertrophy. There are one or two points arising out of these to which I should like to refer.

We have been too much accustomed to regard the prostate from its post-mortem aspect—that is to say, as a mass of muscle about the size and form of a chestnut, in which is contained some secreting tissue. It will be as well clearly to understand that under no circumstances during life, save the rare and momentary one when the bladder is absolutely empty, does the healthy prostate present such a form as that referred to; on the contrary, the muscular fibres of

which it is largely composed are spread out like a funnel, so as to form an ample support for the bladder and its varying amount of contents. The degree to which it is spread out is, of course, relative to the contents. Hence the action of the prostate may be said to be just as continuous as that of the heart. This is a point which can be readily determined by examining persons in different bodily positions, and under varying circumstances so far as the contents of the bladder are concerned. If a person is examined by the finger in the rectum when he is in a semi-erect position, with a healthy prostate and some urine in the bladder, it will be found that the limits of the prostatic area are bounded on either side by a marked ridge of muscular fibre in a state of more or less tone, whilst the centre of this area is softer and more yielding to the touch. In making an examination of this kind for the first time, and taking our idea from what we have previously learnt in the dissecting-room, we naturally expect to find the converse of this—namely, a rather hard centre, which gradually loses its definition as the finger passes towards the sides. It is a matter of common remark that, unless the prostate is diseased, a surgeon has to examine it a good many times before he thinks he can realise what he has learnt as a part of his anatomical studies.

We may, I think, conclude that the primary function of the prostate is that of supporting and controlling the outlet of the bladder. Where there is no such function to fulfil, the prostate muscle is only met with in a rudimentary form, as we see in cases of extroversion of the bladder where there is no receptacle for the urine. In advanced life, so far as I have been able to ascertain, hypertrophy of the prostate in these malformations never occurs.

That this is the principal function of the prostate is further indicated by what follows wounds inflicted on the urinary tract from the bladder downwards. The only incision that renders a person absolutely incontinent for a time is when the prostate muscle is involved. Openings made into the membranous urethra, either for exploration or for median lithotomy, are not followed by incontinence unless the prostate has been temporarily paralysed by over-distension with the finger. In lateral lithotomy the continence of the bladder by the action of the prostate is maintained to the last moment of the deep incision, when the gush of urine will often carry the stone into the jaws of the forceps. Nor does continence return until sufficient time has elapsed for healing to take place.

I have met with several cases where stones in the bladder have occupied unusual and somewhat remarkable positions relative to what may be regarded as the laws of gravity. I refer to those instances where the calculus is lodged in a sort of space hollowed out above the pubes. On two or three occasions I have had to reverse the blades of the forceps to extract stones from this position, and I have twice recently met with instances where the sound passed beneath calculi thus placed without giving a clue, and thus causing errors in diagnosis which this knowledge enabled me to correct. From my observation of calculi in the bladder I am disposed to connect their occasional supra-pubic position with the upheaving movement of the floor of the viscus, which is constantly, though imperceptibly, going on, principally through the medium of the spread-out muscular fibres of the prostate. From the dissecting-room standpoint it would seem almost impossible to understand how a healthy prostate could influence the position of a stone in the bladder in the slightest degree; when, however, we learn to recognise how differently the muscle is disposed and occupied during life from what we previously believed, it is not difficult to see that a vermicular movement of the muscular floor of the bladder, which is constantly going on, might tend to lodge and fix a calculus above the pubes. It is quite clear, however, that a stone independent of sacculation, occupying a resting-place in the anterior wall of the viscus, must have been put and retained there by some agency. These points will, I think, be found to have their bearing upon the practical surgery of the parts referred to.

VICTORIA UNIVERSITY. — The Manchester City Council on the 1st inst. passed a resolution in favour of a Government grant to Victoria University. It was stated that not a penny had been contributed by the Government either to Owens College or Victoria University, both of which were in need of financial assistance, and it was thought that in view of the fact that the Government had paid £12,000 to small colleges in Wales, Victoria University had some claim.

¹ De l'Asphyxie locale, et de la Gangrène symétrique des Extrémités, Paris, 1831.

² St. Bartholomew's Hospital Reports, 1833.

³ THE LANCET, March 6th and Aug. 28th, 1886.