LECTURES ON HUMAN MYOLOGY.

*Delivered at the Royal College of Surgeons
of England.*

By G. M. HUMPHRY, M.D., F.R.S.,

Lecturer on Anatomy and Physiology in the College; Professor of Anatomy in the University of Cambridge; etc.

LECTURE I.—*June 17th, 1872.*

It is my desire, Mr. President and gentlemen, in the three lectures which I hope to have the honour to give in this theatre, to consider, and it must be briefly, superficially, and imperfectly, the muscular system of man from morphological and teleological points of view. I say morphological and teleological, because the ideas and principles conveyed by those two words should constantly be borne in mind in a philosophical investigation of every structure—above all, in the investigation of that highest of structures with which it is our great privilege to deal. Peculiarly should it be so in this theatre where the mantle of scientific work, woven by the great master hand and presiding genius of the place, has descended upon a succession of such worthy inheritors as to embolden me to the statement that in no other theatre in the world has so much been done to weld the facts of Anatomy into the great science of Physiology. Surely, sir, when the thought is vibrating in the mind of any member of this College, and, finding a faltering—and it never does find more than a faltering—expression through the lips, “what does the College of Surgeons do for me?” it must be, or ought to be, at once met and stifled by the recollections associated with this theatre, by the conviction that more has been here done, and is still being done, to raise the intellectual and scientific character of the profession, and, therefore, the social status of its individual members, than in any other place. But, Mr. President, by such remarks I am realising to myself too heavy a consciousness of the responsibility of one who ventures to address you from this spot. I will, therefore, at once revert to my statement that morphology and teleology should be united in our thoughts as they are in nature, and should be associated in our minds with the investigation of structure.

The very essence of development, of which morphology contemplates only a branch, is prospective, is the preparation of structure for future relations and future work; and the processes of development are ordered with reference to that work. Structure—perhaps we may say every structure—has its use and its future, as well as its development and its past, its prophecy, as well as its history and its present. The combinations of the present are the effect sought by the workings of the past, and are progressing in an orderly course to the development of a known and predicable future. This our pigmy faculties can discern from the little stand-point we are allowed for a moment to occupy in the great drama. The present condition and purpose offer our easiest problems, those which we can most safely work. The present and the little we know of the past must be used to explain one another, for the present is not only the consequence but the object, and so, in some sense, the cause of the past. Every muscle and every fibre of every muscle has its quality, its size, its length, and its surroundings adapted to the work it has to do, and to the way in which it may do that work best; and every stage of its development had relation to this end. Each muscle belongs to the brotherhood of muscles, and was evolved, so far as their common function is concerned, by impulses common to it and them, and, so far as its own special work is concerned, by impulses peculiar to itself. What these impulses are, and how the impulses common to muscles come to be modified by those peculiar to each muscle, how individuality is grafted upon community, we know not; and we have no right to dogmatise about it.

I would, as a preliminary, direct attention to a few points in the development and arrangement of muscular fibres, which have a bearing on the foregoing remarks.

First. Wherever movement is needed—I mean, of course, movement of a certain range and velocity—muscular fibres are found adequate for the purpose; and although function is, as we know, requisite for the maintenance of muscular structure, it is not necessary for, and indeed seems to play no part in, its formation. Though it is attended

with, and is, indeed, productive of, the impulse to repair after exhaustion, and is so a preventive of deterioration, it is not an impulse in, or a stimulus to, development. This is well illustrated by the muscles of respiration, as well as by the other structures which minister to that process. They are all developed of the exact size, number, and position, and with the complicated relations necessary for effecting the required movements of the chest before those movements begin. They are ready to start into activity at the given signal, which they await; and of which, and of the changes incidental to which, they are prophetic. They are a provision to meet a future requirement, which requirement is consequently, in one way, their cause, though, if we were conversant with the conditions of intra-uterine life alone, we could probably never have interpreted the prophecy or divined the cause.

Secondly. Each fibre is formed of a length proportionate to the range of action required; that is, to the distance through which its less fixed point is required to be moved. The range of contraction of muscular fibre is about a third of its length (I am speaking of the voluntary, or rather the striped, muscular fibres); and it will be found that the extent to which any given point of the body can be moved measures about a third of the length of the muscular fibres which effect the movement. Thus, in persons in whom the point of attachment of the sartorius can be approximated to the spine of the ilium about six inches, the length of the fibres of the muscle is about eighteen inches. Now, although the parts of the individual fibres may, and commonly do, act successively, it does not appear that this is the case with the several fibres of a muscle. These are all banded together in synchronous action by the nerve agencies. Hence it will be found that the several fibres converging upon a given tendon, or bony point, are usually of equal length, allowance being made for varieties caused by the position of the several points from which they converge. Thus a measurement of the numerous fibres which make up the somewhat complicated mass acting through the tendo Achillis, shows that they are all about two and a half inches in length; and the range of movement of the tendon is somewhat less than an inch. That the fibres are no longer than is necessary is illustrated by the fact that, when the end of the thumb is pressed to the palm in the flexed position of the wrist, the flexor longus pollicis is unable to retain it there.

The flickering movements occasionally seen in the muscles of enfeebled persons—those, for instance, induced in the pectoral by smart tapping on the skin over it, or after removal of a limb by stimulating the muscular fibres—are instances of partial contraction; but this is not a phenomenon of ordinary, healthy, nerve-regulated action. These irregular movements and cramps, and various abnormal contractions, are most frequent in the flexor muscles of limbs and in the flexed positions of the limbs, *i.e.*, when the flexor muscles are relaxed, which is the reason for preferring the extended position in cases of fracture, disease of joint, etc., when it can be maintained.

Thirdly, a variety of arrangements are provided for the purpose of economising muscular action, or rather of causing the range of movement produced by a given amount of muscular contraction to be as great as possible, and that the muscular fibres themselves may be as short as possible. This must be taken in connexion with the facts that a given muscular fibre contracts in only part of its length at one time, and that the non-contracting portion is less able to bear tension than the contracting portion. Hence, as I shall again have occasion to observe, if the fibre were long, the strain upon the non-contracting portion would be too severe in cases in which strong muscular action is requisite; and practically a long muscular fibre is proportionately less strong, and less capable of powerful contraction, than a short one. Thus, as observed by Borelli and others, muscles are usually inserted near to the centre of motion, and fibres commonly pass obliquely between their points of attachment; the power thus sacrificed being more than compensated for by the velocity gained. This last point is illus-

Fig. 1.—A D and B C represent the fibres of the intercostal muscles forming between the ribs.

trated by the disposition of the fibres of the intercostal muscles. Suppose A D in the diagram to represent an intercostal fibre passing obliquely between the ribs, and that the part A E of it is equal to the distance from A to B. Then D E will represent the amount of shortening that would take place in it during the approximation of the ribs;

whereas, if the fibre took the straight course from B to D, the shortening would be in the whole length from B to D.* The same point is illustrated in an interesting manner by the disposition of the fibres of the pectoralis major. Instead of each fibre passing from its origin directly to the nearest part of that ridge of the humerus which gives insertion to the muscle, the fibres arising lowest in the chest, and represented in the diagrammatic figure (2) by the dotted line passing

Fig. 2.—The dotted lines running from A and B may be supposed to represent the fibres of the pectoralis muscle.†

from B to Q at the upper part of the ridge on the humerus (O C) are crossed by the clavicular fibres descending, in front of them, from A to P, which is at the lower part of the ridge on the humerus; the result of which is, that a given amount of contraction of each set of fibres, in consequence of the obliquity of their course, produces a greater amount of movement of the arm. Moreover, the range of movement of the point of insertion of each set of fibres into the bone, in the elevation and depression of the arm, is rendered more proportionate to the length of the fibres of each than would otherwise have been the case. This is stated more clearly in the foot-note accompanying the figure. A similar crossing of the fibres of a muscle is observable in other instances, and for the same reason, more particularly in the latissimus dorsi, where the upper fibres descend superficially to the lower fibres, on their way to the lower part of the ridge behind the bicipital groove.

Again (and this is particularly illustrated in the extensors at the ankle, and most completely in the biceps flexor cruris of birds), the tendons sometimes pass, on the way to their insertion, under a tendinous band or pulley, which has a marked effect in lessening the range of muscular contraction requisite for effecting a given movement. This is shown in the diagram (Fig. 3), where D may be supposed to represent the ankle, and C B the extensor tendon passing under the annular ligament E. In the movement of the fore part of the foot from B to B', the muscle C E B undergoes shortening to an amount less than the distance between D and E; whereas, if the muscle took the straight course represented by the dotted line C B, it would, in effecting the same movement, undergo a shortening equal to the distance between B and M, which is obviously several times as much.‡ By this and other similar provisions, a loss of force is incurred proportionate to the velocity gained. This is to some extent compensated for by the fact, that a less amount of contraction being required to effect a given movement, the length of the muscular fibres may be proportionately diminished. Hence a greater number of fibres are, through the medium of tendons, brought to bear upon a given point; and a greater, a more forcible, resultant is obtained by the disposition of muscular fibres in a great number of short

* The same is more clearly expressed as follows. Make A E equal to A B, then the contraction of A D, as the ribs come together, is E D, where A E is equal to A B. The contraction of B D, under the same circumstances, is its whole length, which is manifestly greater than E D. In other words, B D, which is opposite to the angle B E D greater than a right angle, is greater than the side D E, which is opposite the acute angle B.

† Let O C be the arm in a vertical position turning about the point O. Let O C' be its position when raised as high as possible. A B are points equally distant from O C, at which the muscles that move the arm are attached. Then, if the muscles A P, B Q, cross each other, two advantages are gained. 1. As the arm moves from O C to O C', the strain on, or the work done by, the muscles A P, B Q, is the same for both. For if A P, B Q, are equally inclined to O C, they are equal in length; but that B Q' may be equal to A P, Q', must evidently lie nearer to O than P' does. This cannot be attained unless the muscles cross. 2. The contraction of the muscle for a given motion of the arm is less, in consequence of the obliquity of the direction of the fibres.

‡ This is more accurately expressed as follows. The change in C E B (fig. 3) is the same as the change in E B, because the part C E is constant; but E B' differs from D B by D E. Now, E B is less than D B; hence E B' differs from E B by less than D E; that is, the contraction of the muscle as the foot moves between its extreme positions, A B, A' B', is less than D E. If the muscle were C B, the change would be B M, which we can see would be about ten times as large as D E.

cords converging upon a tendon than if the same amount of muscular substance had been disposed in longer cords of less number. Consequently, the muscles inserted near the joints are almost always contracted into tendons as they pass over the joints to their insertion.

Fig. 3.

Two additional advantages result from this: first, the enlargement of the ends of the bones, which is requisite for the security of the joints, can take place without undue increase of the size of the limbs at those parts; secondly, the muscular fibres can be packed in the positions most convenient. Thus the fibres of the biceps brachii are accumulated into a mass between the lower edge of the pectoralis and a convenient distance from the elbow-joint. Commonly the muscles are aggregated towards the upper parts of the limbs, so as to diminish the size and facilitate the mobility of the distal parts. This is especially seen in Birds; the muscular fibres in them being, in great measure, massed upon the trunk, or in its immediate proximity. The principle is also illustrated in the well-formed human leg, in which, owing to the shortness, or rather the almost vertical direction of the heel, a small range of contraction is required of the muscular fibres that act upon it; and they are accordingly short and massed in great numbers into the calf, leaving the ankle and the region just above the ankle small and free to be swung through the air. In the less well-formed limb of the lower members of the human family and of animals—the heel being longer and more horizontal—the muscular fibres are also longer, descend lower, and give greater thickness and clumsiness to the ankle.

Thus it follows that, in the construction of the body, strength and velocity are combined. The shortening of leverage, which contributes to velocity of movement, permits a proportionate shortening of the muscular fibres. This allows of their being massed in greater numbers and in more convenient positions than could otherwise have been the case; so that the increased number of the fibres thus brought to act upon a given point is a consequence of and a compensation for the mechanical disadvantages which the point presents from its nearness to the centre of motion.

Having made these few preliminary remarks, I will now proceed to the consideration of the muscles of the trunk. In pursuing this investigation, it is necessary to bear in mind that the whole osseo-muscular system of the trunk consists essentially, in nearly its entire thickness, of a series of transverse alternating skeletal and muscular planes. The skeletal planes, which are primarily, or rather in their simplest form, as in the Lancelet, membranous, become, in parts, converted into cartilage or bone; and the remnants, which are not solidified, become variously inclined and modified. Sometimes they are wholly, or in part, obliterated by the extension of muscular tissue through them; sometimes, on the other hand, two or more membranous planes are fused by the obliteration, or rather by the non-development, of intervening muscular fibres. Moreover, the skeletal planes, membranous as well as osseous, present various flexures and various degrees of obliquity as they extend from the axial centre towards the circumference. This is the case most notably in the lateral muscle of the Fish; and they are seen in their simplest form in the lateral muscle of the tail of a Batrachian. For the fuller statement and elucidation of these and many other points, I must refer to papers published by me in the re-

cent numbers of the *Journal of Anatomy*, and in my *Observations on Myology*. In those papers I have endeavoured to confirm the views expressed by others, that what we usually call the "dorsal" muscles correspond with the dorsal muscle of the Fish; with the part, that is, of the lateral muscle which is situated above the lateral septum; and I have endeavoured to show that the tendons of the dorsal muscles are formed, or are to some extent formed, by prolongations and coalescence of the fibrous layers forming the angles or flexures of the transverse membranous intermuscular septa. A cursory glance at the several tendons of the dorsal muscles in the human subject, and at their mode of attachment in serial order to the successive ribs and the transverse and spinous processes of the vertebræ, is highly suggestive of their being remnants or representatives of the intermuscular septa with which we are familiar in Fishes and Urodelans.

A strong confirmation of such a view is found to be furnished by a careful dissection of several of the dorsal muscles in various parts. I may especially instance the transversalis cervicis, in which, as shown in the diagrammatic drawing (Fig. 4)—for which, as well as most of the drawings, I am indebted to Dr. Wilson, the demonstrator of anatomy at Cambridge—the tendons, ascending to the posterior cervical tubercles, resemble the intermuscular septa of the Fish, and, like them, are connected by muscular fibres passing between them. Any one who is familiar with the muscular anatomy of the Fish, cannot fail to be struck with the similarity presented by the general arrangement of the fibres of this muscle; and, as I have just mentioned, the same thing, the same arrangement of muscular fibres between the tendons or septa, may be found in the multifidus, rotatores, and other muscles of the back. Hence, I think, there can be little doubt that these and the other similarly disposed tendons of the dorsal muscle of Man and Mammals are the equivalents of the septa of the dorso-lateral muscle of the Fish.

The inclination of the tendons or tendinous septal remnants, as in the case of some Fishes, is great, and they form acute angles with the axis of the body. Moreover, as they slope outwards and downwards, they become lost, so that the contiguous muscular planes are merged together; and, instead of passing, as they do, for the most part, in the simpler animal forms, from the ossified skeletal structures within, to the external fascia or the skin at the circumference, they acquire, in most instances, an attachment to the osseous structures at their inferior or distal, as well as at their superior or proximal, extremities. Thus the fibres of the erector spinae, descending from their tendinous attachments to the ribs and transverse processes, are, in most instances, again attached to the ribs and transverse processes, or to the ilium and sacrum. Some of them, however, retain the primitive disposition by passing into the superjacent fascia.

The dorsal muscles are, in Man, interrupted by the pelvis below and by the back of the skull above. In tailed animals, they are not interrupted, or are only partially interrupted, by the pelvis; and they consequently extend upon the caudal vertebræ. In *Lepidosiren*, they pass upon the sides of the skull, and are continued into the temporal and pterygoid muscles. Thus it is shown that these masticatory muscles are prolongations of the dorsal muscles; and an argument is furnished in favour of the view that the temporal fossæ of the skull are serial continuations of the wide channels formed upon the vertebral arches beside the neural spines.

Fig. 4.—Diagrammatic representation of the transversalis cervicis. *a, a, a, a*, the tendinous attachments to the transverse processes of the cervical vertebra. *b, b, b, b*, the tendinous attachments to the ribs.

With respect to the muscles of this region, I would welcome a more systematic classification and nomenclature, for the sake both of the teacher and the student, of this hitherto uninviting and difficult to be remembered piece of myology; but the mode in which the fibres of the several muscles are blended forbids any precise division of them. They may, perhaps, be conveniently grouped as follows, in three series. First, those which are straight, or nearly so, and take an anterior-posterior direction between corresponding bony points. This series is intermediate between the other two, and includes the interspinales with the rectus capitis posticus minor, the intertransversales with the rectus capitis lateralis and the erectores spinæ. These last are merely extensions of the interspinales and intertransversales; the difference being that the fibres, instead of passing from a given spinous or transverse process to the next adjacent corresponding process, pass to one more distant. Moreover, some of the fibres have ranged, beyond the proper vertebral area, upon the costal region, becoming attached to the ilium and the ribs. Some bundles, also, which might be assigned either to the sacro-transversalis or the spinalis, pass from the lumbar spinous processes to the dorsal transverse processes and the ribs, and might, therefore, be assigned to the oblique or transverso-spinous series. This is the case with not a few of the deeper bundles. Indeed, dissection shows that the divisions are, to a considerable extent, artificial, and that the several groups are members of one imperfectly unsegmented dorsal mass, which has its representative in the comparatively unsegmented dorsal muscle of the Fish and the tailed Batrachian.

It is in its application to the divisions of the erector spinæ that the nomenclature usually employed by anatomists—by English anatomists especially—is most objectionable, leading to misapprehension, and involving burdens to the memory which are quite unnecessary.

For the misleading term "sacro-lumbalis", I would substitute the far better one, "ilio-costalis", used by the German anatomists, which indicates its relation to the ilium behind, and to the costal parts of the vertebral system in front. Thus the portion of it attached to the costal extension of the lumbar vertebræ is named "ilio-costalis lumborum". The portion connected with the ribs, including both the accessory bundles arising from them, as well as the tendons implanted into them, is named "ilio-costalis dorsi"; and the portion inserted into the lateral parts of the cervical transverse processes is called "ilio-costalis cervicis".

For the name "longissimus dorsi" I would substitute that of "sacro-transversalis", which indicates its relation to the sacrum behind and to the transverse processes of the several vertebræ and of the skull in front. Thus the portion attached to the lumbar transverse processes may be named "sacro-transversalis lumborum"; that to the dorsal transverse processes, including the offsets to the adjacent parts of the ribs, "sacro-transversalis dorsi"; that to the cervical transverse processes, "sacro-transversalis cervicis"; and that to the mastoid part of the skull, usually called trachelo-mastoid, may be named "sacro-transversalis capitis".

The name "spinalis" (spinalis dorsi and spinalis cervicis) sufficiently indicates the relations of the median part of the erector spinæ to the spinous processes of the vertebræ, and may, therefore, be retained. The rectus capitis posticus major is the continuation of this to the skull, and may be called "spinalis capitis".

The second series of the dorsal muscles consists of those which pass obliquely, forwards and outwards, from the spinous to the transverse processes. They lie, for the most part, superficially with regard to the longitudinal or recti series, and may be named "spino-transversales". This series comprises the splenius colli, the splenius capitis, and the obliquus inferior.

The third series is the deepest, lying, for the most part, beneath the longitudinal series, and consists of the numerous muscular bundles passing obliquely, forwards and inwards, from the transverse processes to the spines and arches of the several vertebræ and the skull. They may be named "transverso-spinales". This series comprises the semispinales, the obliquus capitis superior, the complexus and biventer, the multifidus and the rotatores.

The dorsal muscles are covered by the serrati postici, and the rhomboids with the trapezius and latissimus dorsi. These are extensions of ventral muscles from the ribs, the shoulder-girdle, and the arm, over the dorsal muscles, to the vertebral spines. They do not, therefore, belong to the "dorsal" system.

I would only further remark, that the dorsal muscles are massed into the concavities of those lumbar and cervical curves which are associated with the erect posture and with the attendant rotary movement of the head; and the antero-posterior movements in the trunk take place chiefly in these regions. Their weakness in the dorsal region, consequent on the backward curve of the spine at this part, and on the further reduction of space by the backward projection of the trans-

verse processes and the ribs, is a cause of the lateral flexures in early life, and of the bowed back of later years.

The following is a scheme of the dorsal muscles. With respect to it, however, it must be borne in mind that the members of the several groups are a good deal blended, or, as it would be more correctly expressed, are imperfectly segmented from one another. The names in ordinary use of the several muscles are given in italics.

OBLIQUI SUPERFICIALES VEL SPINO-TRANSVERSALES.				
Spino-transvers- ales	--	—	cervicis (<i>splenius colli</i>)	capitis (<i>splenius cap- itis</i>) (<i>obliquus capitis inferior</i>)
RECTI.				
Interspinales	lumborum	dorsi	cervicis	capitis (<i>rectus capitis posticus minor</i>)
Intertransversales	lumborum	dorsi	cervicis	capitis (<i>rectus capitis lateralis</i>)
Spinalis	—	dorsi	cervicis	capitis (<i>rectus capitis post. minor</i>)
Sacro-transvers- alis (<i>Longissimus dorsi</i>)	lumborum	dorsi	cervicis	capitis (<i>trachelo- mastoid</i>)
Ilio-costalis (<i>Sacro-lumbalis</i>)	lumborum	dorsi (<i>accesso- rius</i>)	cervicis (<i>cervicalis ascendens</i>)	—
OBLIQUI PROFUNDI VEL TRANSVERSO-SPINALES.				
Transverso-spin- ales	—	dorsi	cervicis (<i>semispin- alis dorsi</i>) (<i>multifidus spine</i>) (<i>rotatores spine</i>)	capitis (<i>semispin- alis colli</i>) (<i>biventer</i>) (<i>obliquus capitis su- perior</i>)

[To be continued.]

ABSTRACT OF LECTURES

ON THE

SURGICAL TREATMENT OF ANEURISM IN ITS VARIOUS FORMS.

Delivered before the Royal College of Surgeons of England.

By T. HOLMES, F.R.C.S.,

Professor of Pathology and Surgery.

LECTURE II.—June 6th, 1872.

SOME preparations and histories of cases were referred to, showing that in aortic as well as in innominate aneurism, the distal obliteration of one of the arteries leading out of the sac would be followed by the consolidation of that portion of the sac which used to be distended by the stream of blood passing up the occluded vessel. Reference was then made to Mr. Guthrie's objections to the distal operation. These were, first, that the distal operation, when it cures, does so by producing inflammation in the sac. It was shown that this rested only on the history of two cases in which suppuration in the sac had followed the operation. In one instance, however, there had been an interval of a year, and the suppuration evidently depended on accidental causes, and not upon the operation; and it was shown that, in the majority of successful cases of distal ligature, no inflammation has occurred. Mr. Guthrie's other objection rested upon an examination of some preparations in the Museum of the College; but it was shown that these preparations were not sufficient to support any definite conclusion.

The lecturer then proceeded to review the published cases of distal operation in thoracic aneurism, of which forty-three were tabulated. These were as follows. 1. Four cases of successive distal ligature of the carotid and third part of the subclavian. In one of these, Mr. Fearn's well-known case, the preparation and drawing of which were exhibited, a cure resulted—the aneurism becoming lined on all sides by firm coagulated laminæ, through the centre of which a channel remained for the circulation.

2. The second class consisted of eight cases, in which the carotid and subclavian artery were tied simultaneously. Two of these were strictly on Brasdor's method: the subclavian being tied in its first part as it leaves the sac. In one of these cases, Hobart's, the subclavian artery was said to have soundly united. The preparation was exhibited; but the subclavian had unfortunately been removed in making the *post mortem* examination. The history, however, seems to prove the possibility of tying this artery successfully. In the six other cases comprised in this class, the subclavian was tied in its third part. Mr. Heath's case was specially commented on, in which the patient derived

great benefit from the operation, and survived four years—the aneurism being aortic. Another case, under Mr. Holmes's own care, was related, in which the aneurism was innominate; but, the aorta being also affected, the operation failed. In this instance, the arteries were tied with carbolised catgut, and no ulceration had taken place, leading to the division of the arteries.

3. The third class of cases were those in which the carotid only was tied. In eleven of these, the aneurism was innominate. A drawing was exhibited from the case in which Dr. Wright of Montreal was the operator. Here the whole of the aneurism was consolidated, except a channel leading into the subclavian artery. The state of parts exactly resembled that of the spontaneous cure of an innominate aneurism exhibited in last lecture; and there could be little doubt that the patient would have been cured had he survived the operation. In seven other cases, either the carotid or the subclavian was implicated as well as the innominate. In two of these the patient was perfectly cured. Mr. Evans's survived the operation more than thirty years; and Mr. Morrison's died suddenly from disease of the heart, having been perfectly cured of the aneurism, as proved by *post mortem* examination. In four other cases the aneurism was aortic, mistaken for innominate; and in none of these did any benefit result.

CASE OF STRYCHNIA POISONING, SUCCESSFULLY TREATED BY NICOTINE.

By the REV. SAMUEL HAUGHTON, M.D. Dubl., D.C.L. Oxon.,
F.R.S., Trinity College, Dublin.

THE following case was communicated to me by Dr. McEvoy, of Balbriggan, county Dublin, and is written by his assistant, Dr. Johnston. It appears to me worthy of being published, in addition to other cases published by me in the *Dublin Quarterly Journal of Medicine*, some years since.

On Sunday, the 2nd April, 1871, at 11 A.M. (says Dr. Johnston), I was in Dr. McEvoy's house, when a messenger came requesting him to see a young man who was taken suddenly ill. Dr. McEvoy not being at home, I went and saw him. He was about 19 years of age; he complained of pains in the lumbar region, weakness in the legs, dry taste in his mouth, with stiffness about his throat; he also had spasmodic twitching of all the muscles and general tremors. His face was pale and anxious, contracted pupils, cold sweat, and irregular action of the heart. He attributed his illness to a fall he got the day before. I examined him, and could not find any injury to account for the symptoms. I made inquiries about what he had eaten, and stated that he had all the appearance of being poisoned. I then left the house to consult Dr. McEvoy, whom I met in the street. I told him the case, and said that, however improbable it appeared, it looked very like strychnine poisoning. When he saw him, he immediately pronounced him poisoned by strychnine. We gave him mustard emetics, four in succession, but they had not the slightest effect. At 12 o'clock he was much worse; the abdominal muscles and those of the back and neck were in a state of tetanic spasm. He now had violent convulsions and opisthotonos; during the paroxysms his pupils were dilated, and his arms and legs extended and rigid. We were in the act of preparing an enema of tobacco for him, when Dr. McEvoy remembered he had a bottle of nicotine in his dispensary, which he had been using in a case of puerperal tetanus. We immediately got it, and gave it in the way recommended by the Rev. Dr. Haughton of Trinity College, in drop doses with whisky punch, every half hour. After the second dose, the paroxysms were less violent, and the muscles of the abdomen became softer. When he had taken four doses, he was much better; the muscles were relaxed. We stopped the nicotine, and gave him half-drachm doses of spirit of chloroform every hour; we also told him to smoke tobacco constantly. At six o'clock, the paroxysms only came on every hour, and in a slight degree. He was unable to pass urine. We ordered him a warm hip-bath, and gave five grains of calomel and fifteen grains of jalap. When the bolus acted, he was able to pass his urine. On Monday, he had violent headache, jerkings of the limbs, and stiffness and soreness of the muscles of his back and legs. We gave an ounce of compound soap liniment and a drachm of chloroform, to be rubbed in. On Tuesday, he had bleeding from the nose, great prostration, also jerking of the limbs. His headache was better; he was able to be out of bed on Thursday, but continued very weak and tremulous for some months afterwards. He is comparatively well now; but has still slight twitchings in the muscles of the limbs and trunk.

Our diagnosis of this case was confirmed on the day of the poisoning, as it appeared that the boy was in the habit of getting up in the