

the sporules, as paste or cheese or wet wood is of the cryptogamic parasites. We do not presume in this comment to determine this dilemma of opinions, but merely observe that the inflammatory action must be slight, as an areola is seldom seen around the honeycomb crusts.

The treatment, however, is a point of great interest.—The French empiric, Mahon, first discarded the barbarity of the pitch cap and other cruel depilatories. His nostrum seems to have consisted chiefly of lime and carbonate of potass. At St. Louis, at the present day, the favorite applications consist of subcarbonate or sulphuret of potass, two drachms to a pint of water, and the ointment of ioduret of sulphur, about a scruple to an ounce of lard. Dr. Burgess still prefers the vapour of iodine and sulphur. The author also recounts Professor Hebra's plan of softening and removing the crusts, and the subsequent applications of deuto-chloruret of mercury, nitrate of silver or lime, &c.

In Psoriasis and other Squamæ assuming an asthenic type, Dr. Burgess recommends phosphorus, in the forms of pills and ointment.

The account which the author gives of the *Acarus scabiei* is very interesting. The experiments of Renucci and his followers have demonstrated the reality of that which had been *conjectured* even by Aristotle, and firmly believed by Avenzoar in 1179. Dr. Burgess has witnessed experiments by Dr. Bourginon at St. Louis, which confers a high degree of truthfulness on his comments.

He is, also, of the few who have seen the loathsome Pellagra in its own selected region, Lombardy. Since his book appeared, Dr. Burgess has published a more elaborate account of the disease, which will be read with great interest.

At the end of his work the author has appended a very concise and practical pharmacopœia, which will be found amply sufficient to compass the whole catalogue of diseases of the skin; well calculated indeed to refresh and remind the experienced dermatologist. The plates contain sketches of the anatomy of the cutaneous tissues, from Breschet and Roussel's work; and four coloured delineations of prominent diseases, of which three are copied from Cazenave. They are too small, but have the merit of fidelity.

With this slight reservation, we repeat our very favorable opinion of the conciseness and practical merits of Dr. Burgess's book;—the highest eulogium that can be passed on any labour that aims at the alleviation of a troublesome class of maladies.

ART. VII.

A Treatise on the Pathology, Diagnosis, and Treatment of Neuroma. By ROBERT W. SMITH, M.D. T.C.D., M.R.I.A., Fellow of the Royal College of Surgeons in Ireland, Lecturer on Surgery at the Richmond Hospital School of Medicine, Secretary to the Pathological Society of Dublin, Fellow of the Royal Medico-Chirurgical Society of London, &c. &c.—*Dublin*, 1849. Folio, pp. 28. Plates XV.

In these days of Students' Manuals and duodecimo editions, the prospect of a magnificent folio monograph, such a one as Hunter, or Home, or Cooper would have loved, is as cheering to the reviewer's eye as the first

glimpse of an oasis to the weary traveller in the desert. When, too, as in the case before us, we recognise in a familiar name on the title-page a guarantee for the quality of the literary banquet, and observe that the work is published by subscription, which banishes our fears for the caterer's pocket, we sit down to the enjoyment of the treat with a whetted appetite, the rarity of whose occurrence only makes it the more keen.

The "getting-up" of this volume is perfect. Printed on the finest elephant paper, in a clear bold type, and illustrated by fifteen large plates, admirably drawn on stone, it will form an honorable and lasting monument to the taste and skill of all concerned in its production. Its costliness will of course prevent its extensive circulation; and on this account, as well as because the subject to which it relates is little understood, and also because a treatise from the pen of Dr. Smith is sure to deserve and command attention, we propose to submit to our readers a digest of its contents.

The subject of *Neuroma* is confessedly difficult and obscure; any attempt, therefore, to elucidate it deserves our thanks, and these we cordially tender to Dr. Smith; but at the same time, while giving to him his full meed of praise, we must, even at the risk of appearing ungrateful, confess to a little disappointment. It may seem unreasonable to quarrel with the quantum provided for us, when the difficulty of procuring even that quantum is so great; still, with every disposition to be satisfied, we must, like Mrs. Squeers's hungry scholars, acknowledge that we have only had enough to make us wish for more, and not by any means sufficient to satisfy the craving of our hungry nature. There is a deficiency in the treatise of what we should call "*exact information*;" the literature of the subject certainly seems nearly exhausted; and of this we have no complaint to make, except as regards the absence of any mention of Rokitsansky; it is rather to Dr. Smith's own investigations that we refer. He has met with unusual facilities for the study of the subject; and it does not seem to us that he has profited by them as he might.

Very little has been made of that important part of the investigation, the microscopical characters of these growths. With the exception of a loose and meagre account of the appearances under the microscope, of a section of a neuromatous tumour which fell under the author's own observation, nothing whatever is said upon the subject. We the more regret this, because if Dr. Smith felt himself incompetent to the investigation—and it is no reflection upon him to suppose him so—there are plenty of younger men in Dublin who are excellent microscopists, and whose labours would materially have enriched this portion of his work. Again, the "comparative" part of the subject has been left wholly untouched. Are the lower animals altogether exempt from this disease? or could nothing be learned from the study of it in them? With respect to a publication of this kind, we have a right to ask such questions. They are blemishes in a great work that must be permanent ones; for it is not likely that a second edition of so large and expensive a treatise will be called for. Far more agreeable to our own feelings would it be to thank Dr. Smith for his beautiful work, and to commend the matter as worthy of the dress in which it is presented; but conscientiously feeling as we do, we shall not shrink from the discharge of our duty to the readers of this Review, because that duty is in some respects a disagreeable one.

Tumours implicating and connected with nerves have long been recognised by pathologists; and, according to one opinion, were referred to by Hippocrates and Galen under the name of ganglions. This, however, is probably incorrect; and, at all events, it was not until the publication of M. Odier's 'Manuel de Méd. Pratique,' in 1803, that they received the name, by which they are now known, of Neuroma. They may be divided into idiopathic and traumatic: those which are spontaneous, and for whose appearance no external origin can be assigned; and those which follow injuries to nerves, as wounds made in amputation.

Neuromatous tumours are generally ovoidal, and have their long axis corresponding with the direction of the nerve upon which they are seated; they may often be moved from side to side without much inconvenience. Extreme suffering is occasioned when this is attempted in the longitudinal direction. They never contract adhesions to the integuments, unless from continued pressure, nor is the skin over them discoloured; and they are scarcely ever spontaneously cured. They are subject to great variety both in size and number—occasionally no larger than a grain of mustard-seed, they have been met with of the dimensions of a large melon. Frequently single, affecting one nerve only, they are at times to be counted by the hundred, and affect all parts of the nervous system alike.

The solitary neuroma is nearly always the source of acute agony to the patient, and is most often of the traumatic variety. When kept at rest, a tingling or numbing sensation may alone indicate its presence; but, influenced by changes in the state of the atmosphere, disorders of digestion, and so forth, it is liable to exacerbation of pain terrible to witness, as severe as the acutest neuralgia, and comparable only to an electric shock darting through the trunk and branches of the affected nerve. It has been noticed that in dry weather the pain sometimes ceases altogether. Idiopathic neuroma is generally met with as a single painful tumour; yet, occasionally, these growths are numerous on the same nerve, and in such instances are often free from pain. They are relatively much less frequent in the nerves of the ganglionic than in those of the spinal system. Both kinds of neuroma may be solid throughout, or may contain a cyst filled with fluid; and it has been remarked of both of them, that when the trunk of the affected nerve is compressed above the tumour, the pain occasionally ceases entirely.

There is no ground for the assertion of Bayle, Cayol, and others, that neuromatous tumours are of a scirrhus or malignant character. They never involve neighbouring parts, nor affect the lymphatic glands; and do not return when once removed. It is necessary, however, carefully to distinguish those cases in which malignant diseases implicate nerves, and which are not examples of neuroma at all. Of the causes of this disease we know little; mechanical irritation of a nerve by the presence of a foreign body, pressure, blows, the division or wounding of nerves by cutting instruments, and such like injuries, may be assigned as influencing the production of traumatic neuromas; but concerning the origin of the idiopathic variety we are wholly ignorant. It seems to us better to confess this at once, than to gloss over our want of knowledge by such terms as inflammation or the rheumatic diathesis. Dr. Smith has adopted as his motto a statement of Cruveilhier's, which will probably long remain true—" *L'anatomie pathologique des nerfs est encore à faire.*"

However great may be the diversity in the causes of neuromatous growths, their anatomical characters are remarkably uniform. It has been before stated that they are either solid or cystiform; it remains to consider each of these varieties, and for this purpose we transcribe entire Dr. Smith's description of them :

"The solid idiopathic neuroma originates either in the cellular structure which connects the neurilemma or external sheath to the trunk of the nerve, or within one of the smaller sheaths, by which each of the fibres, the aggregate of which constitutes the nervous trunk, is enveloped. In these two cases the disposition of the nervous fibres upon the surface of the tumour, as also the coverings of the latter, are somewhat different. In the former, when the tumour originates in the neurilemma or its connecting cellular structure, we usually find that the nervous fibres, although flattened and increased in breadth, are not separated from one another as widely as in the latter, supposing the tumour to be of the same size in each case: they are more confined to one surface of the tumour, generally its deep aspect; but when the neuroma originates in one of the central sheaths, it presses, as it grows, more equally upon the surrounding fibres which are, in such cases, found more widely dispersed over the surface of the morbid growth. Again, in the latter case, the tumour, when large, is generally invested by a greater number of coverings than in the former; its immediate capsule is the sheath of the fibre where it has originated; external to this we find a thin investment, formed by the condensation of the cellular tissue, which constitutes the general sheath to the trunk of the nerve; this sheath or external neurilemma forms the most superficial covering, with the exception, of course, of the subcutaneous cellular texture. In some cases, the coverings of the tumour are easily separated from one another, and with very little dissection can easily be shown to be distinct membranes; but in others they are intimately united, forming a dense capsule of considerable thickness. The degree of adhesion of the tumour to its immediate investing membrane also varies considerably in different instances, the connexion being sometimes so close, that it is impossible to remove the tumour from its sac without the aid of the scalpel; while in other instances, when the sac is opened, the tumour can without difficulty be detached by the finger from all its connexions.

"I have never seen the capsule undergo any cartilaginous or osseous transformation; it is smooth and shining externally, and its internal surface presents in general a glistening aspect, more especially when it is but loosely connected to the tumour. The oval or oblong form, which so large a proportion of neuromatous tumours acquire as they increase in size, is to be ascribed to the circumstance of their being covered by the neurilemma, which admits more readily of their growth in the direction of the trunk of the nerve. A section of a neuroma usually discloses an exceedingly dense homogeneous texture; the surface is smooth, of a grayish-white colour, and frequently the elasticity of the structure is such that the cut surface becomes convex; it seldom presents the same shade of colour as the nervous tissue; its texture is essentially fibrous, or fibro-cellular, but so exceeding close and dense, that the unassisted eye can scarcely even detect the course or arrangement of the fibres. In the majority of cases, the tumour is solid throughout, and everywhere presents the same appearance, and an equal degree of density; indeed the uniformity of the aspect of the interior of neuromatous tumours is not one of their least remarkable features.

"It has been stated by Dupuytren that one of the characters which distinguish neuroma from the fibro-cellular encysted tumour (or painful subcutaneous tubercle of English authors) is, that in the former there is a cavity containing fluid, the latter being always solid throughout. This I believe to be by far too general an assertion, and my experience would lead me to say that it is only in exceedingly large tumours that cavities are occasionally found; as neuroma may even attain the size of an infant's head, without any cavity being formed in it. The existence of a cavity containing fluid in the smaller neuromatous tumours, I believe to be the

exception. When, however, the tumour has attained a very large size, cavities occasionally form in its interior, they vary considerably in their dimensions, do not communicate with one another, and are lined by a distinct shining membrane, which, sometimes villous, is generally smooth. Some contain a serous fluid; in others the contents resemble rather synovia or albumen, or may present the characters of purulent matter; others, again, are filled with fibrine; and finally, some are empty.

"The lining membrane, generally pale, is sometimes very vascular; but I have never seen in any of the cavities of neuromatous tumours fluid or coagulated blood, lardaceous or medullary matter, or any of the substances which are found in malignant tumours; nor have I ever known the neuroma itself, no matter how long it may have existed, or to whatever size it may have attained, assume the external character or acquire the internal structure of cancerous or encephaloid growths. The trunk of the nerve, immediately above and below the tumour, is normal in appearance, and the intermediate portion is merely altered in form, and thrown out of its usual course; it either passes as a single trunk along the posterior or lateral surface of the tumour, or else its separated fibres are dispersed over the surface of the neuroma. In a few instances I have seen some of the nervous filaments enter the superior extremity of the tumour, although I am unable to trace them through it; but I have not yet met with any example of the passage of the entire trunk of the nerve through the neuroma, as is stated to happen occasionally: '*Mox nervus cum toto trunco suo in uno latere tumorem intrat, altero autem ex eo rursum egreditur, mox complures rami et intrant et exeunt.*' (Knoblauch.) When the neuroma is of large size, it is exceedingly difficult to trace all the separated fibrillæ joining again into a trunk below the tumour, and in some instances it is quite impossible to follow them with the scalpel; but if the tumour and the portion of the nerve connected with it be left for some time in nitric acid, it will become manifest that there is no interruption of continuity in the fibrillæ. It should, however, be mentioned that in the first case recorded by Aronssohn, the author states that the continuity of the nervous fibres was destroyed; perhaps if the preparation had been macerated in nitric acid, it would have been found that this opinion had been hastily formed." (pp. 5 et seq.)

Dr. Smith relates several instances of the cystic variety of neuroma.

Owen Nolan, an old soldier, who died of fever in the Hardwicke Hospital, had, consequent upon an injury to the elbow, a swelling a little above the internal condyle of the humerus, which had existed for a considerable period. In general it was not painful, becoming exceedingly so, however, when touched. After death, the growth was found to be a neuroma of the ulnar nerve, an inch and a half long, exhibiting upon section a cyst filled with a transparent albuminous fluid. It had originated within the neurilemmatous sheath, and the filaments of the nerve were separated from each other, spread out over the surface of the cyst, and reunited below the tumour to form a trunk.

Occasionally, however, the cystic neuroma is not painful, as the following case related by M. Bertrand will prove.

An old man had a tumour as large as a hen's egg on the inner side of the right arm. It presented a sensation of obscure fluctuation, occasioned no inconvenience whatever, and was not particularly noticed until after death. A section of it looked very like an aneurism, for out of it flowed bloody serum mixed with clots of blood; but careful dissection demonstrated that it was a cyst developed among the filaments of the brachial nerve.

It recently occurred to us to witness the removal of a neuroma from the arm of a female, to whom it had long been the cause of extreme suffering.

The growth, not larger than a common pea, presented itself between the heads of the triceps muscle, and was situated on the musculo-spiral nerve, the fibres of which it separated and pushed aside. It was of a reddish-brown colour; of compact structure externally, but softer in the centre, which was composed of a soft light-coloured mass. The microscope showed it to consist of cytoblasts in various stages of development towards fibrous structure, interspersed with oil-globules and some granular matter.

This appears to be the most appropriate place to append some observations which we have extracted from Rokitsansky, to whom, as we have before observed, Dr. Smith makes no reference.

Rokitsansky, in his pithy way, remarks that cysts are sometimes found in the trunks of very large nerves, and from the condition in which they are developed, it is clear they perform the part of a bursa. With the exception of cancer, neuroma is the most frequent morbid growth which occurs in the peripheral nerves, and cancer is very often only a secondary affection supervening on the contiguity of the nerve to other organs. The tumours are interspersed amongst the fasciculi of the nerve, and interwoven with their neurilemmatous sheath. It is important and worthy of observation, in reference to the symptoms to which it gives rise, and to those which may be set up by experiments upon it, that, as a general rule, neuroma is never developed in the *centre of a nerve*, but *on its side*, so that only a small portion of the nervous fasciculi are displaced, spread abroad, and stretched over the neuroma; while the greater mass of the nerve remains on the side uninjured, and with its fibres in connexion with each other.

The diagnosis of neuroma is generally sufficiently easy: "The extraordinary sensibility of the tumour, the peculiar electric character of the pain, its terrible severity, paroxysmal type, and extension along the trunk and branches of the nerve," are symptoms alone sufficiently characteristic of the disease.

With respect to the treatment, it may be observed that every measure, short of excising the disease, has been wholly unsuccessful. This may be accomplished in three ways: in the first, the tumour is cut away, together with the piece of nerve to which it is attached; in the second, the tumour is dissected out of the mass of nerve-fibres amongst which it has grown; and there still remains the severe measure of amputation, when the disease is situated in either of the extremities. The first-named operation, that of removing a portion of the nerve, together with the morbid growth, is in general a safe and practicable proceeding. No fear of any evil result need be entertained; for there is ample evidence to prove that several inches of large nerves may be removed without danger; and frequently both sensation and the power of voluntary motion return after the lapse of a few months, a sensation of remarkable coldness only remaining in all the parts supplied by the affected nerve. Reich removed four inches of the ulnar nerve; a slight degree of insensibility in the little finger being the only permanent effect of the operation. A similar favorable result has followed the removal of portions of the median and tibial nerves. Malagodi cut away a portion of the sciatic nerve in a case of neuralgia, and at the end of a year the functions of the limb were perfectly restored.

Indeed the restoration of the functions of a divided nerve is a fact painfully evident in cases where the division has been performed for the

cure of neuralgia; and to the veterinary surgeons, who frequently practise neurotomy, it is often a source of great annoyance.

From a number of cases in which this operation has been performed, we select one or two related by Dr. Smith.

Mr. Hunter and Sir Everard Home removed a neuroma which had existed for several years in a young lady. It was as large as a pullet's egg, and situate about the middle and on the outer side of the right arm. Three inches of the musculo-cutaneous nerve were taken away along with the tumour, and produced the effect of paralysing the thumb and forefinger, and causing desquamation of the cuticle. The narrative is silent as to the final result of the case.—The case operated on by Reich, to which allusion has been already made, occurred in a gentleman who had been troubled with it for upwards of thirty years, having followed a severe blow with a stone upon the right elbow. At the time of the operation it was two inches long and one broad, slightly elevated about the surface, and exquisitely painful to the touch. The patient's sufferings during the operation were dreadful, but ceased immediately afterwards, never to return; and in less than a year the condition of the limb was as perfect as it had ever been.

The second operation alluded to, that of dissecting out the tumour from amongst the nervous filaments in which it is imbedded, has been rarely practised, and without encouraging results. Sir Everard Home extirpated one of these tumours from the axilla of a Frenchman, which was as large as two pullet's eggs. He relates that upon laying bare the growth, he found it to terminate in a white nervous cord, and to be covered by a membrane, which on division permitted it to be dissected out.

"The tumour, of a yellowish-white colour, was about three inches and a half in length, and two in thickness; it was of an oval form, and when cut through, was found to consist of a fibrous structure of great density. Towards the surface the texture presented a radiated appearance." (p. 9.)

The patient died from the effects of the operation, and the post-mortem examination is thus described:

"Upon examining the part after death, the tumour was found to have been encased in one of the large nerves of the axillary plexus; the principal portion of the nerve passed along the posterior surface of the tumour. The cyst which had surrounded it was contracted, and more than four times thicker than at the time of the operation. In consequence of having been inflamed, the cavity was lined with lymph, and almost filled with coagulated blood, as suppuration had not completely taken place. The inflammation and swelling had extended some way into the surrounding parts, which were consolidated into one mass. The other parts of the body were found in a natural state; so that Sir Everard remarks, there was no evident cause of death but what arose from a considerable degree of inflammation upon the substance of a large nerve for three inches in length, which also affected the other nerves of the plexus. A similar tumour had formed in one of the other nerves, but was much smaller in size. It lay directly between the axillary artery and the tumour which had been removed." (p. 9.)

A case of neuroma of the median nerve, in which the extirpation of the tumour was followed by a fatal inflammation of the nerve, has also been recorded by Aronsohn. It happened, however, to Velpeau successfully to extirpate a tumour developed in the substance of the sciatic nerve of a lady thirty years old, which was as large as the head of a newborn child,

and having originated without apparent cause, had existed for several years.

The severe measure of amputation has not unfrequently been resorted to in the treatment of this disease. Dr. Smith relates at length the particulars of a case in which Chelius amputated the leg of a female for a tumour in the ham which was of a neuromatous character. It extended from the popliteal space nearly half way up the back part of the thigh, was the seat of intolerable pain, and had resisted every variety of treatment which had been employed for several years in the endeavour to disperse it.

"The tumour, which was of about the size of a pine-apple, was found to be a neuroma connected with the sciatic nerve, which, along with the femoral artery and vein, corresponded to its anterior or deep surface; and from its lower extremity proceeded the posterior tibial nerve and several small branches, destined for the gastrocnemius muscle and the integuments, but the peroneal and communicating or external saphenus arose above the tumour, and ran along its external surface, the fibres of the peroneal being separated from each other where the nerve crossed the middle third of the tumour, to which it was connected by a loose cellular structure. The tumour, though everywhere solid, was not of the same consistence throughout; in some parts, especially below, the feeling of elasticity was so great, that it might readily have been supposed that in these situations fluid existed; other portions possessed nearly the firmness of cartilage. The investment of the tumour consisted of an external capsule, seemingly formed by the condensation of the surrounding cellular tissue, and beneath this of a membranous expansion continuous with and apparently composed of the distended sheath of the sciatic nerve. A section of the morbid growth exhibited a lobulated structure, of different degrees of consistence, but nowhere presenting any of the characters of malignant disease." (p. 3.)

Several similar cases are recorded; among others, one in which M. Louis amputated the arm for neuroma of the median nerve.

From the examination of these and similar facts, Dr. Smith concludes that the first and the last of these operations, viz. excision of a portion of the nervous trunk and amputation, can be performed in almost every instance with success; and with respect to the remaining one, he remarks, "that there may be cases in which it may be practicable, and perhaps prudent, without sacrificing the nervous trunk by division, to dissect out the tumour from the nervous fibrillæ which surround it."

Having thus described the general characters of neuromatous tumours, their varieties, pathology, and treatment, our author proceeds to consider each class rather more in detail.

He commences with giving an account of cases in which these morbid growths have existed in considerable numbers in the same individual, including two remarkable examples which fell under his own observation.

Occasionally throughout the nervous system, alike upon the largest trunk and the smallest peripheral nerve, implicating both the par vagum and the phrenic, and not excepting the sympathetic system, there are developed tumours in vast numbers, which occasion neither pain, lesion of innervation, nor any other inconvenience. These growths were considered by Knoblauch as accessory ganglia, indicating an original vice of conformation—"Vitia primæ conformationis habendi, et vera ganglia sunt;" but this opinion is almost certainly an erroneous one. Two very remarkable examples of this form of neuroma are related by Schiffner,

in the fourth and sixth volumes of the 'Oestreich. Med. Jahrbücher.' They occurred in brothers, cretins afflicted with the worst form of that disease. A vast number of the principal cerebro-spinal nerves all over the body were enlarged, and had tumours developed in their course. In one of the two cases, the superior cervical ganglion of the right side, and the inferior ganglion on the left, had not escaped the disease; and in the other case the sympathetic nerve was also involved. There is another remarkable example of the affection related by Knoblauch, as occurring in the practice of Bischoff, which we pass over to arrive at the cases which came under Dr. Smith's notice, and to which most of the lithograph plates refer.

We extract entire the first of these cases.

"John M'Cann, 35 years of age, was admitted into the Richmond Hospital, under the care of Dr. Hutton, in 1840, having a large tumour on the right side of the neck, of a globular form, and equal to a moderate-sized cocoa-nut in magnitude; it extended from the mastoid process to within a short distance of the sterno-clavicular articulation. It presented an uniform surface, and admitted of being moved freely in the transverse direction, but could neither be pushed upwards nor drawn downwards; the external jugular vein grooved its surface, the integuments did not adhere to it, nor (although it obviously extended deep into the neck) did it appear to have contracted a close adhesion to any important part; the larynx was not displaced, nor was there any interference with the functions of respiration or deglutition. It was solid throughout, and had existed for upwards of fifteen years, but had never been painful, nor was it now (although of so large a size) the source of much inconvenience to the patient, whose general health was not impaired.

"A second tumour, about as large as a walnut, existed underneath the left side of the tongue; it likewise was solid, and free from pain, but its presence was the source of much annoyance to the patient when eating. He could not, with any degree of accuracy, state at what period the tumour commenced to form, being unaware of its existence until it had attained such a size as to interfere with the motions of the tongue. In consequence of the size of the tumour in the neck, and its relations to the larynx and great vessels and nerves, as well as from an apprehension of its being of a malignant character (notwithstanding its slow growth and freedom from pain), it was not deemed advisable to attempt its removal, more especially as the existence of the sublingual tumour appeared to confirm the opinion which had been formed respecting the nature of the disease. The patient, therefore, left the hospital shortly after he had been admitted, and resumed his business in the country,—that of a cattle-driver, an occupation which exposed him to the inclemency of the weather, not only during the day, but frequently also in the night-time.

"In 1843 he was again taken into the hospital, having, upon the day previous to his admission, been found by Dr. Adrien, lying upon the side of the road, and complaining of pain in the left hip. Upon examining the part, a large solid tumour was discovered upon the back of the thigh, which the man stated had been growing for nearly two years. It extended from the fold of the nates to the inferior third of the thigh, and exceeded in magnitude the head of the patient; it admitted of being moved from side to side, and, although more prominent in some parts than in others, its general surface was smooth. Several large veins ramified beneath the integuments, which were not adherent to the tumour. The patient suffered no acute pain, the chief inconvenience of which he complained being referable to the existence of so large a tumour in such a situation.

"His general health had, however, undergone a material alteration since the period of his first admission into the hospital; he was now pale and greatly emaciated. He had no relish for his food, nor did he sleep at night; yet he made no complaint of any particular distress, nor could he assign the cause of his restless-

ness; he had neither diarrhœa nor perspiration; his pulse was quick and weak, but respiration was undisturbed. In this condition he lingered for a few months, generally pining and wasting away, and, towards the end of the year, died with hectic symptoms and without pain, but emaciated in the last degree. The tumour in the neck had neither enlarged nor undergone any alteration since 1840, the date of his first admission, nor had the inconvenience arising from the sublingual tumour increased. It was the opinion of all who saw the case, that this immense tumour on the back of the thigh was of a malignant character, and its appearance was looked upon as establishing the correctness of the diagnosis which had been originally formed regarding the nature of the cervical tumour.

"Upon the day succeeding that upon which the patient died, I made a careful examination of the body. Independently of the tumours that have been already mentioned, several others were now discovered, which had escaped notice during life, although most probably some of them had existed when the man was first admitted into the hospital. The largest was situated upon the posterior part of the right thigh, immediately beneath the lower margin of the *glutæus maximus* muscle. It was of an oblong form, and considerably larger than a lemon. There was one upon the outer side of the right arm, near its centre, of the size of a pigeon's egg, and another upon the point of the right fore-arm, immediately above the carpus, nearly as large as a hen's egg; they all admitted of being moved in a lateral direction. The intercostal spaces upon each side, as well as the abdominal parietes and right inguinal region, presented numerous tumours about the size of large peas.

"Upon laying open the cavity of the abdomen, the first object which attracted my attention was a white, solid, oblong tumour, situated in the right iliac fossa, between the *iliacus internus* muscle and the outer margin of the *psaos magnus*. It was three inches and a half in length, and one in breadth.

"It was connected with the anterior crural nerve, several filaments of which, separated from one another, were opened out upon its anterior surface; these filaments were themselves enlarged, and presented numerous smaller tumours.

"Upon tracing the nerve upwards, it was found that all the branches entering into the composition of the lumbar plexus were greatly increased in size, some of them being nearly three quarters of an inch in diameter; this enlargement commenced where the nerve issued from the intervertebral foramina. The anterior crural nerve measured three quarters of an inch in diameter from the lower extremity of the tumour down to its point of exit from the pelvis. Three tumours, each as large as an almond, existed upon the pelvic portion of the musculocutaneous or external cutaneous branch of the plexus, and the trunk of the nerve in the interspace was as large as that of the ulnar in its normal state at the elbow. The anterior division of the nerve was hypertrophied, and studded with tumours throughout the whole of its course along the anterior and external region of the thigh. The branches of the anterior crural presented similar appearances; the long saphenous nerve in particular being crowded with tumours from its origin to the foot. There existed upon the anterior and lateral regions of the right lower extremity upwards of 150 tumours. The nerves of the front of the left lower extremity were similarly affected, and presented, from the lumbar plexus to the knee, more than 130 tumours. They were all of an oblong shape, the smallest being about the size of grape-stones, while the largest exceeded an almond in magnitude. Upon the surface of many of them delicate nervous filaments were distinctly visible, running from above downwards.

"The right sciatic nerve presented, at the lower margin of the *glutæus maximus*, an oval tumour, five inches in length, and three and a half in breadth; the principal portion of the nerve lay upon its anterior surface, but numerous filaments, widely separated from each other, traversed its lateral aspect; it was inclosed in a capsule formed by the distended neurilemma. From the lower extremity of the tumour down to the popliteal space, the trunk of the nerve varied from three quarters of an inch to an inch and a half in diameter, and each of its component fibres presented a series of oval or oblong tumours, several of which were as large as an

almond. The anterior and posterior tibial nerves were in like manner studded with small tumours. The total number discovered upon the right sciatic and its branches exceeded seventy.

"It was, however, upon the left sciatic that the most remarkable example of neuroma hitherto recorded was observed. One immense tumour occupied the posterior surface of the nerve, from the lower margin of the glutæus maximus to within four or five inches of the centre of the popliteal space. Its vertical diameter was eleven inches, and its transverse ten. The extent of its surface from above downwards measured fifteen inches, and from side to side one foot and a half. A dense capsule, formed by the neurilemma, invested its entire surface, to which, however, it did not adhere very closely, except in a few situations, where the connexion was intimate.

"The portion of the trunk of the nerve, which corresponded to the anterior aspect of the tumour, was spread out into a vast number of flattened fibres, which, following the convexity of the neuroma, formed a series of curved lines, diverging above, and at the lower extremity of the tumour reassembling to form the nervous trunk; these separated and flattened fibres were themselves the seat of more than fifty tumours, the largest of which was about the size of a grape, and upon the surface of some of them numerous fibrillæ could be traced. The trunk of the sciatic, at its origin from the sacral plexus, and for some distance below it, measured an inch and a half in diameter, and several oblong tumours were connected with the enlarged fibres. At the lower part of the popliteal space, there was found a tumour of the form and size of a lemon, connected by its deep or anterior aspect to the posterior tibial nerve, but the external popliteal and several other branches likewise crossed its surface; they presented a plexiform arrangement, and were all enlarged, some of them being equal to the branches of the sacral plexus in magnitude. The nerves of the leg were also of immense size, and covered with tumours throughout the entire of their course, from the popliteal space to the feet. The number of tumours which existed upon the left sciatic and its branches exceeded 200.

"*Nerves of the right upper extremity.* The nervous trunks which enter into the composition of the right brachial plexus commenced to enlarge immediately upon emerging from the intervertebral foramina, more especially the fifth and sixth cervical, to the trunk formed by the union of which there adhered a circular tumour, larger than a cherry; the neurilemma formed for it a loosely adherent capsule, the internal surface of which was smooth and glistening; the plexus itself, before giving origin to the nerves of the arm, presented several oblong tumours, which it was difficult to separate from each other. A perfectly oval tumour, as large as a hen's egg, sprung from the external root of the median nerve, which was flat, like a ribbon, and its fibres separated from one another; this tumour was in close relation to the brachial artery, and was inclosed in a dense, smooth capsule, continuous with the sheath of the nerve. The entire of the remainder of the median nerve presented numerous oblong swellings of various sizes, the most considerable of which was placed immediately above the carpus; it was pear-shaped, two inches and a half in length, and one and a half in breadth at its upper or widest part; it lay upon the front of the nerve, the separated fibres of which, as they ran over its surface, formed a series of curved lines, arranged like the divisions of a melon. The external and internal cutaneous, the ulnar, musculo-spiral, and circumflex nerves were all, in like manner, covered with tumours, more especially the circumflex, which presented one continuous mass of neuromatous swellings throughout the whole of the axillary portion of its course. Upon the musculo-spiral, besides numerous small tumours, there existed two of considerable size, one of which, as large as a grape, was situated near where the nerve reaches the external side of the humerus, while the other, which was of the size of a pigeon's egg, was placed near the elbow, between the brachialis anticus and the supinator longus. Upwards of 100 tumours were counted upon the nerves of the right upper extremity.

"*Nerves of the left upper extremity.* The branches joining the left brachial plexus were similarly affected, and presented bulbous enlargements in their course

across the neck. A pyriform tumour, nearly four inches in length, and two and a half in breadth, was connected with the lower and posterior part of the plexus. It involved the common origin of the musculo-spiral and circumflex nerves, but was more especially connected with the former, which, by the growth of the tumour, was deflected from its course, flattened, and its fibres separated; its capsule adhered so loosely to it, as to admit of being everywhere detached without the use of the scalpel, except towards the apex of the tumour, where the latter sprang from the plexus. Here the capsule was closely adherent and continuous with the neurilemma. Although upon this side the tumours were not so numerous as upon the opposite, yet no branch of the plexus was exempt from them. They were all of an oblong form, existed in the forearm as well as the arm, and were most numerous developed upon the internal cutaneous and musculo-spiral nerves; they numbered upwards of sixty. I may here observe, that, both in the upper and lower extremities, the tumours existed not only in the general sheath which invested the entire nerve, but that they were, in numerous instances, found upon the most delicate fibril that could be separated from the nervous trunk by an ordinary dissection.

"Pneumogastric nerves. The pneumogastric nerve upon the right side was enlarged to an immense size throughout the whole of its course, from the base of the skull to the diaphragm; it exceeded the normal size of any nerve in the human body, with the exception of the great sciatic, and throughout the cervical and thoracic divisions of its course presented a most irregular and nodulated appearance; it resembled a large, tortuous, varicose vein. This remarkable condition was produced by a vast number of oblong tumours, varying from half an inch to one inch in length, occupying uninterruptedly the entire course of the nerve, and so closely connected to each other, that they could not be rendered distinct without a difficult and tedious dissection. One large, solid, globular tumour occupied nearly the whole of the cervical portion of the nerve, which, along with the carotid artery and jugular vein, corresponded to its deep surface. The tumour was five inches in length and four in breadth, loosely connected with the side of the larynx, and covered with a thick and adherent capsule. Upon the summit of this large neuro-matous tumour, and connected with it by cellular tissue, a smaller one existed, which also sprang from the vagus nerve, and resembled somewhat in form the supra-renal capsule. The left pneumogastric was also enlarged from the angle of the gum to the commencement of its thoracic portion, and presented a series of tumours, the largest of which occupied the lower part of the cervical division of the nerve; one equalled an almond in size, and over its surface there ran a delicate fibre, separated from the trunk of the nerve; the latter resumed its normal size shortly after its entrance into the cavity of the chest.

"Lingual nerve. Upon the under surface of the tongue, and towards its left side, there existed nearly twenty tumours, of a white and glistening aspect, and of various sizes, from that of a hemp-seed to that of a walnut; they were all connected with the smaller branches of the left hypoglossal nerve; there were none upon the trunk of the nerve, and but four upon its primary division. They were principally connected with the terminating branches, which could not in every instance be distinctly traced over the tumour to the muscles they were intended to supply. The branches connected with the two larger of the tumours, after a short course, spread out into a number of delicate filaments, which appeared to be lost upon the capsules which invested the tumour. Some of the smallest of the tumours were situated deep between the muscles, and in size, form, and relation to the fibres of the nerve, resembled very much the Pacinian corpuscles of the digital nerves.

"Phrenic nerves. Upon the phrenic nerves in the neck nothing abnormal was observed; but in their course along the pericardium they each presented three or four small tumours, resembling grains of wheat in size and shape; the neurilemma was continued over them; the nerves between the tumours were of normal size.

"Intercostal nerves. The anterior branches of the dorsal nerve upon each side

were greatly enlarged, from the spine as far forward as the costal cartilage; the enlargement commenced where the nerves issued from between the bodies of the vertebræ, but became much more remarkable after their communication with the thoracic ganglion of the sympathetic, and in most instances appeared to be owing to a general hypertrophy of the entire trunk of the nerve, rather than to the development of distinct tumours upon the individual fibres. The fourth intercostal of the left side had attained such a size at its vertebral extremity as to occupy nearly the entire breadth of the intercostal space, and completely conceal the artery and vein; the sixth was nearly as large; but by far the most remarkable appearance was connected with the fifth. A large oval tumour, about two inches in length, and one and a half in its vertical diameter, occupied the posterior extremity of the fifth intercostal space, the breadth of which was increased by the absorption of the contiguous portions of the fifth and sixth ribs, between which the tumour was firmly wedged; the bones, however, were not carious, nor had they the rough and corroded aspect which the bodies of the vertebræ present when partially destroyed by the pressure of an aneurism; on the contrary, the surfaces in contact with the neuroma were perfectly smooth, and seemingly more dense than any other portion of the bones. The increase of space required for the accommodation of the tumour was provided chiefly at the expense of the rib superior to it. The tumour projected forwards, pushing the pleura before it, and posteriorly had also passed the level of the ribs, and was in contact with the muscles of the vertebral grooves. The intercostal nerve, which was split into three portions as far back as its junction with the sympathetic, traversed the inferior part of its anterior surface; and upon two of these portions smaller tumours existed. The principal tumour was inclosed in a very thick capsule, which was easily divisible into distinct layers, the external being connected with the neurilemma of the intercostal nerve, while the internal appeared to be proper to the tumour itself. The communicating branch of the sympathetic joined an oval tumour, nearly as large as a cherry-stone; and in many other of the intercostal spaces these branches were much larger than natural.

"Two large tumours existed in the pelvis; they lay upon the front of the sacrum, and were connected with the anterior branches of the sacral nerves, several of the filaments of which traversed their anterior surface; these filaments were enlarged, and several small tumours existed upon them. The capsules of the larger tumours were remarkable for the looseness of their connexion. There was no morbid alteration noticed in the brain or spinal marrow, or in their membranes; nor did the enlargement of the nerves, in any instance, extend within the spinal canal; it did not commence until after the trunk, formed by the junction of the anterior and posterior roots, had passed through the intervertebral foramen.

"In this remarkable case the total number of tumours which were removed from the body exceeded 800; they presented a striking uniformity, both in their external characters and in their internal structure; their form was oval or oblong; their colour, a yellowish-white; they were solid, and each surrounded by a capsule, which was continuous with the neurilemma; their surface was smooth; their long axis corresponded with the direction of the nerve upon which they existed, and they were only moveable from side to side. Their section exhibited an exceedingly dense close texture, of a whitish colour, and somewhat glittering aspect, presenting a uniform degree of solidity, and remarkable for a total absence of vascularity.

"Examined by the aid of the microscope, they were found to be composed essentially of a fibro-cellular structure, the fibrous structure predominating in by far the greater number, the areolar preponderating in a few; the fibres were arranged in bands or loops, amongst which permanent oval or elongated nuclei became apparent upon the addition of acetic acid. In no one instance, out of the numerous specimens examined, was there any trace discovered of nerve-tubes, nor any indication whatever of the presence of any of the structures considered by modern pathologists as characteristic of malignant disease." (pp. 13 et seq.)

This most interesting and well-reported case is illustrated by a series

of beautiful lithographic plates, very graphic, and executed in a manner highly creditable to the artist.

A few months only elapsed before another similar case occurred in Dublin. This also is detailed at great length by Dr. Smith, and like its fellow made more instructive by the drawings with which it is accompanied. It will be sufficient here to state that the development of these neuromatous tumours was still more numerous than in the person of M'Cann, amounting, it is believed, to at least 2000 of various sizes and shapes.

In a third instance, which came under the care of Mr. Colles, an attempt was made to control the growth of one of these tumours by means of graduated pressure; only, however, with the unpleasant effect of accelerating its development. Whenever one of these tumours was in process of formation on any of the nerves, the patient experienced a remarkable feeling of general irritability, together with a peculiar sensation in the part, something like a rheumatic pain, but not always referable to the exact situation in which the neuroma was about to appear. This case and the preceding ones sufficiently disprove the correctness of Knoblauch's opinion, that neuromas are accessory ganglia, being the result of an original vice of conformation; and it will not have escaped the attention of the reader, that in no one instance was there anything like a fresh formation of true nervous substance; a circumstance which it is important to note, inasmuch as it differs from what happens when the ganglionic system of nerves is the seat of the disease. When this part of the nervous system is affected, the disease consists generally in a hypertrophied condition of some of the elements of the ganglia, and not in the formation of distinct tumours upon the nervous branches.

That remarkable example of the affection which is recorded by Cruveilhier, where the cervical ganglia of the great sympathetic nerve were enlarged, will occur to most of our readers.

The instance which Dr. Smith details as happening in the Richmond hospital is not so well known.

A female patient of Dr. Hutton's, 40 years old, suffered from the most intense neuralgia, in the course of the branches of the fifth pair of nerves. The pain commenced at the point of exit of the superior maxillary nerves from the infra-orbital foramen, and was of so acute a character as eventually to destroy the sufferer four months after her admission into the hospital; having in that time almost entirely prevented the motions of the lower jaw in speaking or eating.

"*Autopsy.* When the cranium was opened, and the brain removed, a tumour was seen in the right division of the sphenotemporal fossa; it was somewhat of the size and form of a walnut, and occupied the situation of the Casserian ganglion; it extended across the inner extremity of the great wing of the sphenoid bone, as far forwards as the foramen lacerum orbitale, and was covered by the superficial lamina of the dura mater, which was attenuated to a remarkable degree. The trunk of the fifth nerve appeared to enter the posterior part of the tumour, the interior of which, however, presented no trace of nervous structure; the ophthalmic divisions crossed the anterior part of its superior surface; the superior maxillary emerged from it at the foramen rotundum; and the third division seemed to be identified with a remarkable prolongation of the tumour, which passed through the foramen ovale, the circumference of which was increased to nearly double its natural extent.

"The surface of the petrous portion of the temporal bone, which supported the posterior part of the tumour, was absorbed, as well as the superior wall of the horizontal portion of the carotid canal; between this rough and denuded portion of the bone and the deep surface of the tumour ran the median nerve, which, throughout its whole course, from Meckel's ganglion to the hiatus fallopii, was much larger than natural. The tumour was solid, and of uniform consistence; its section exhibited a cellular structure, without any trace whatever of nervous tissue; nerve-fibres could, however, by the assistance of the microscope, be seen upon various parts of its surface. The non-ganglionic portion of the nerve was compressed, but not enlarged." (p. 20.)

Traumatic neuroma is a disease that occasionally comes under the notice of most surgeons, and, as is well known, is always attended with severe suffering; this is not, however, proportioned to the size of the tumour, for a neuroma, no larger than a common pin's head, is often more painful than one as large as a bullet. When this form of neuroma follows the wound of a nerve, it is generally solid, not invested by the neurilemma, and without a distinct capsule; and is especially to be dreaded when a nerve has only been wounded, and not completely divided.

Dr. Smith narrates cases of this disease; but as they are not so rare as the other forms, we shall content ourselves with merely alluding to them. One caution in operating for their removal is inculcated by Dr. Smith, which it is surprising any surgeon should have required; it is, always to divide the nerve upon which the growth is seated—*above* first and *below* afterwards; inasmuch as to adopt the opposite proceeding is a gratuitous piece of cruelty. Amputation can scarcely ever be required in cases of traumatic neuroma, for the tumour is never so large as to make it perilous to remove the corresponding portion of the nerve.

Neuroma succeeding to amputation.—There is good ground for the opinion that a bulbous enlargement is the normal condition of the extremities of nerves divided in amputation. In some instances this enlargement is general, commencing gradually, and ceasing as gradually; in others, it presents the form of a distinct tumour, whose magnitude is determined by that of the nerve upon which it is seated. The general condition of the nerve-filament in these cases, is that of becoming incorporated and finally lost in the substance of the growth; but sometimes the nervous termination is sudden, and in others, filaments pass through and are traceable the whole length of the tumour. Such growths are destitute of vascularity, inclosed in a distinct capsule, and, in by far the greater number of cases, productive of no uneasiness whatever.

This condition of the ends of nerves, evidently designed to protect them from receiving injury by pressure and similar mechanical causes of irritation to which they are exposed, is sometimes the occasion of neuralgic suffering of the most severe character, of which no satisfactory explanation, in the present state of our knowledge, can be offered. Dr. Smith says:

"The adhesion of the end of the nerve to the cicatrix of the stump; its irritation by osseous spiculæ springing from the extremity of the sawn bone; the including of a nervous filament in a ligature; the occurrence of a conical stump: such are a few among the many circumstances which have been stated as the occasional causes of these terribly painful tumours." (p. 24.)

The reader will find an instructive example of this affection detailed by

Dr. Smith; but as similar ones are not of very unfrequent occurrence, we refer them to the work itself for the details of it.

To relieve this condition, it is open to us to cut away a portion of the affected nerve, or to perform a fresh amputation higher up in the limb. When the affected nerve can be clearly demonstrated, the first of these operations is indicated, but it is not to be forgotten that its success is uncertain; for not only may the tumour which is the cause of the distress be situated above the extremity of the nerve, but also there is at times a condition of chronic inflammation of the trunk and sheath of the nerve, which is itself a sufficient cause of the neuralgic distress.

There is yet another condition under which nerves are liable to enlargement, and that is when they are exposed to continued irritation, in which case they follow the ordinary law of hypertrophy. Naegele has described such a state as existing in the tibial nerve of a patient with elephantiasis; and Dr. Smith says, he has often noticed it in the ulnar and posterior tibial nerve, behind the olecranon and malleolus respectively.

Such are not, however, true examples of hypertrophy of nerves, they are swellings caused by the effusion and deposition of plastic matter in the neurilemma and its connecting cellular structure; facts that bear out the statement we have quoted from Rokitansky, that such tumours perform the office of bursæ.

We have thus fulfilled our promise, and placed our readers in a position to judge for themselves of the merits of Dr. Smith's work. We confess to have judged it by a high standard, perhaps the highest—to have adopted a lower one would, we conceive, have been to pay but a poor compliment to Dr. Smith; and if, according to this test, he has failed in accomplishing all that could be wished, he has, notwithstanding, produced a work that will long endure in honorable association with his name.

We repeat, that to all who have been concerned in its production—to author, draughtsman, publisher, and printer—the medical world owes a debt of gratitude, which will, we are sure, be as gracefully acknowledged, as it has been honorably earned.

ART. VIII.

1. *On Parthenogenesis, or the Successive Production of Procreating Individuals from a Single Ovary. A Discourse introductory to the Hunterian Lectures on Generation and Development, for the Year 1849, delivered at the Royal College of Surgeons of England.* By RICHARD OWEN, F.R.S., &c., Hunterian Professor and Conservator of the Museum.—London, 1849. 8vo, pp. 76. With one Plate.
2. *Lectures on the Processes of Repair and Reproduction after Injuries. Delivered at the Royal College of Surgeons of England, for the Year 1849.* By JAMES PAGET, Professor of Anatomy and Surgery to the College. (From the 'Medical Gazette'.)

ALTHOUGH we have freely expressed our opinion, on a former occasion, as to the absence of all effort, on the part of the College of Surgeons, to sustain the dignity of the profession by the public advocacy of its rights, or to elevate its character by raising the tone of its examinations; and