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ON A
NEW METHOD
OF
TREATING NEURALGIA

BY THE
DIRECT APPLICATION OF OPIATES TO THE
PAINFUL POINTS.

BY
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EDINBURGH :
MACLACHLAN AND STEWART.
MDCCCLV.

NEW METHOD

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PREFATORY NOTE.

THE author of the following suggestions makes no apology for offering them to the profession. There is no doubt that the neuralgic affections form a class of diseases in which our present mode of treatment offers little that is satisfactory, and there is no practical physician who will not confess that after exhausting every rational method of treatment, he has often been compelled to fall back on the empiric administration of remedies. A method of treatment is pointed out in the following pages, generally palliative, and often curative ; and this is coupled with an explanation of the method of action of the proposed remedy, calculated to show on what its beneficial effects depend. Whether this explanation of the *modus operandi* be accepted or not, there can be no doubt as to the power of the method of treatment proposed, when employed in cases suitable for it, and one great advantage which it offers appears to be, that even in cases where it does not cure, from the relief which it affords, it enables the sufferer patiently to persevere in a course of treatment adapted to the morbid state in which his disease has originated.

Another advantage which this plan seems to offer, even in those cases where it only acts as a palliative is, that it preserves the medical attendant from the temptation of giving

opiates by the mouth to relieve the distressing suffering. Some of the most melancholy cases of *Tic douloureux* which I have witnessed have been where opium has been taken to mitigate the pain. Time after time the dose has been increased, until, to the original morbid state, inducing the neuralgia, has been superadded the marasmus of slow opium poisoning, demanding a combination of moral and medicinal treatment of no ordinary kind to overcome.

The instrument originally employed and recommended has been abandoned for a much simpler one, constructed for the author by Mr Young, the surgical instrument maker of this city. It consists of a common trochar-exploring needle. This is first inserted, and the trochar being withdrawn, the canula is left in the wound. To it a small glass syringe is adapted by which the narcotic is injected. This instrument is not so liable to get out of repair as Mr Ferguson's, and can be obtained for less than one half the price.

EDINBURGH, 2 ST COLME STREET,
April 1855.

NEW METHOD OF TREATING NEURALGIA.

The class of diseases to which this new treatment is applicable are variously designated. Under the names of Neuralgia, *tic douloureux*, *sciatica*, *hemicrania*, are comprehended a variety of affections, possessing in common but the one symptom of a pain more or less violent, situated in the course of a nerve.

The attack may be sudden and violent, or gradual, increasing in intensity as it proceeds, the paroxysms may occur at regular intervals, or appear only at uncertain periods. In many cases they occur in individuals of a feeble habit of body, who have never been strong, or who have had their original strength impaired by care, mental anxiety, or profuse and weakening discharges. In other cases, again, they occur in the plethoric and robust. To test the value of the proposed method of cure, its application must be limited to real neuralgic affections, where the pain is actually seated in the course of the nerve. But we must go a step farther and endeavour to ascertain whether the disease is central or centripetal;—in other words, whether the morbid process on which it depends be seated in the brain, the grand centre of nervous influence, or in one of the conducting trunks by which irritations affecting the ultimate distribution of the nervous fibrils are conveyed to that central organ.

The essential character of all these diseases is exalted irritability, and increased irritation of the nerves of sensation. When the irritation is increased, a paroxysm of suffering ensues; but even in the absence of the paroxysm the irritability induces locally a morbid sensibility and tenderness of the affected nerve, and generally an unusual sensitiveness to atmospheric and other influences.

It is evident that although these affections sufficiently resemble one another to admit of their being conveniently grouped together as one family, yet, depending, as they do, on so many and such dissimilar causes, and arising, as they

do, in so varied and such opposite constitutional states, no one remedy or no single class of remedies will suffice for their cure. In the following pages no single remedy is contended for as universally applicable. After seeing the rise and fall of many remedies which have been in succession proposed, I have observed that the most successful methods of treatment have invariably combined a sedative treatment with that more especially adapted to the morbid state, and all that I propose to do is, to show a new method of applying sedatives, capable of universal adoption, but more especially applicable to those cases where the sedative is required to exercise a purely local effect.

The cases where the disease arises from disorder within the cranium should be ranged in another category; yet even in these, the local manifestation in the conducting nerve is to a great extent under the influence of treatment directed specially to it.

When it is remembered, however, that agreeably to the laws by which nervous action is propagated, the irritation may be seated directly in, or reflected indirectly on the nerve at any point between its extreme peripheral distribution, and the point at which it joins the brain, the difficulty of determining the precise seat of the irritation, and the point for the proper application of local treatment, becomes apparent.

It was thus that an immense improvement was effected in our treatment of these affections, when M. Valleix directed attention to the fact, that while, on the one hand, the superficial nerves of the body are of all others the ones most commonly affected with this disease, there are some points of their course in which it is much more liable to be seated than in others, although, in these, no structural alterations can be discovered to account for this liability. These points are usually more or less morbidly sensible to pressure, even in the intervals between the attacks of the sharp lancinating intermittent pain. A very slight touch in these situations is often sufficient to excite acute suffering; in other cases, however, even firm pressure is borne without any complaint. The points in the course of any nerve which are thus liable to be the seat of tenderness are, according to Valleix:—

1. The place of emergence of the nervous trunk.
2. The point where a nervous twig traverses the muscles to ramify on the integuments.
3. The point where the terminal branches of a nerve expand in the integuments.
4. The point where nervous trunks become superficial during their course.

It is perhaps scarcely necessary to remark that all these points are precisely those where the nerve tends towards the surface, and therefore where, of course, it is the most amenable to local treatment.

Acting on the result of this observation, M. Valleix introduced a plan of treatment, which, as an external remedy, I have largely employed ever since my attention was first directed to his work in 1842.

It consists in the application of a succession of small blisters *over the points* in the course of the nerves which are painful on pressure. Valleix does not recommend, as a general rule, the application of morphia endermically, but suggests that it may be attempted with advantage in some cases. I have almost invariably employed an ointment containing morphia to dress the blistered surface, and have been accustomed to ascribe much of the benefit of the treatment to this. In some cases, I have seen relief follow the application of an ointment containing strychnine to the blistered surface, but this must be used with great caution, as very disagreeable results often ensue from its use.

It has frequently occurred to me, however, that a more direct application of the narcotic to the affected nerve, or to its immediate neighbourhood, would be attended with corresponding advantage, and as the painful points so frequently correspond with those in which the nerve becomes superficial, I thought this might perhaps be accomplished. In pursuit of this object, I have made several attempts to introduce morphia directly by means of acupuncture needles and otherwise, but without success.

Having occasion, however, about the end of 1853, to endeavour to remove a nævus by injection with the acid solution of perchloride of iron, I procured one of the elegant little syringes, constructed for this purpose by Mr Ferguson of Giltspur Street, London. While using this instrument for the nævus, it occurred to me that it might supply the means of bringing some narcotic to bear more directly than I had hitherto been able to accomplish on the affected nerve in neuralgia. I resolved to make the attempt, and did not long lack opportunity.

CASE I.—Miss —, an old lady, who had long laboured under gastric and nervous symptoms, had suffered severely for four days from cervico-brachial neuralgia. This lady had the idiosyncrasy of not being able to take opium. Of this she had warned me many years before, when she first came under my care, and I consequently never prescribed it for her; however, once, when she was seen with me by the late Dr J. H.

Davidson, he, disbelieving her former experience, prescribed opium, with the effect of bringing on a severe fainting fit.

The narration of her case may date from November 26th. She had not been able to sleep for the three previous nights from the violence of the neuralgic pain, and was quite exhausted with severe suffering. The usual internal remedies, with the exception of opium, had been tried, but without the least alleviation of her agony. Under these circumstances, I resolved to put in practice the plan which I had so long revolved in my mind.

Accordingly, on November 28th, I visited her at 10 P.M. to give the opiate the benefit of the night. Having ascertained that the most tender spot was the post clavicular point of Valleix, I inserted the syringe within the angle formed by the clavicle and acromion, and injected twenty drops of a solution of muriate of morphia, of a strength about double that of the officinal preparation.

In about ten minutes after the withdrawal of the syringe the patient began to complain of giddiness and confusion of ideas; in half an hour the pain had subsided, and I left her in the anticipation of a refreshing sleep.

I visited her again about 11 A.M. on the 29th; was a little annoyed to find that she had never wakened; the breathing also was somewhat deep, and she was roused with difficulty. Under the use of somewhat energetic stimuli, however, these symptoms disappeared, and from that time to this the neuralgia has not returned.

CASE II.—Mrs —, aged 30, of a gouty family, four years married, no family, short, and plump habit, very pale, menstruation scanty and painful, countenance anxious, urine high coloured, suffers much from flatulence and indigestion, tongue loaded, pulse 98.

After exposure to cold and damp, was seized with shivering and pain in the loins on the 9th December 1853. I saw her on the 13th. The pain in the back had then subsided, but the whole region of the left hip was tender, a distinct painful point was felt near the posterior superior spinous process of the ilium, and another farther down, about the middle of the thigh.

Twelve leeches were directed to be applied as nearly as possible in the course of the sciatic nerve, their use to be assiduously followed by that of warm fomentations, and one of the following powders to be taken every sixth hour.

R Pulv. Doveri, gr. v.
Pulv. Colchici, gr. iv.

Hydrarg. c. creta, gr. ii.
M. Ft. pulv.

Next day (14th December) she was considerably relieved; had enjoyed a short but refreshing sleep; the bowels had acted three times freely, the motions being very dark and offensive; thought herself much weakened by the bleeding and purging; directed to continue the powders.

December 15.—Tongue cleaner, gums swollen and spongy, coppery taste in mouth, tenderness of hip gone, the pain otherwise much the same as on the preceding day; feels sleepless and uncomfortable; bowels have not again acted.

Stop the powders; take two turpentine capsules three times a-day; drink plentifully of linseed tea with gum dissolved in it.

December 16.—Feels very uncomfortable, the turpentine has produced severe dysuria, pulse 104, tongue coated, the pain in the hip has not returned, but the pains are more severe and lancinating in the middle of the thigh and round the head of the fibula.

The syringe was introduced at the painful spot in the middle of the thigh, and 10 drops of Battley's sedative solution were injected without any perceptible effect but that of slight smarting at the seat of the puncture. Two hours afterwards the pain ceased, and the patient fell into a deep sleep, from which she woke entirely free from pain in the thigh or leg, but suffering slightly in the region of the malleolus externus.

December 18.—The pain in the malleolus is very severe, and is much aggravated by pressure; the pain in the hip and thigh is entirely gone.

The injection repeated in the malleolar region. This operation was followed by no immediate perceptible effect; but in about four hours the pain began to abate, and ceased altogether in about eight hours from the injection.

The state of the patient's general health required some attention; she is now much better, and her sufferings at the menstrual period are diminished, but she has had two slight returns of the sciatica, for which, at her own request, she has been treated by the opiate injections.

CASE III.—Mrs —, æt. about 50, widow, plethoric habit, hysterical temperament, has suffered since the cessation of the menstrual flux about 10 years ago, from various anomalous symptoms, of a nervous kind, indicating great spinal irritation. Her liver is enlarged, and her heart is often functionally disordered. She has had severe attacks at

different times of visceralgia, and has often suffered from neuralgia, chiefly of the dorso-intercostal and lumbo-abdominal varieties. Her very full habit, as also the cause from which these symptoms obviously arose, coupled with the evidence of cerebral congestion, with which her attacks were frequently accompanied, as also the fact of her pulse being at these times full and firm, her skin hot, and her urine high-coloured, had led me to treat them by cupping, purging, antimonials and salines. Opiates had no effect in alleviating her sufferings, and belladonna and aconite affected too powerfully her nervous system without abating her suffering.

I first tried the syringe with her on the 19th of April 1854, when she was suffering from a severe attack of lumbo-abdominal neuralgia.

The syringe was inserted in the *lumbar point*, a little to the outside of the vertebræ, and 25 drops of Battley's solution were injected.

She had an easier night, and the pain, though somewhat better next morning, was by no means removed, and the following day it returned with such severity that her former treatment had to be resorted to with decided relief. She has certainly suffered less since the operation.

CASE IV.—A married female, aged 23, in the lower rank of life, consulted me May 2, 1854. Had suffered three months previously from a miscarriage which had weakened her much; her countenance is exsanguine, lips nearly colourless, tongue and gums white. A loud bruit is audible over the heart and in the carotids. Has also had a great deal of mental distress.

About three weeks ago came from the country on the outside of a coach, and sat on a very damp cushion. Next day felt as if one leg was longer than the other; she had much pain in the lower part of the abdomen, in which she thought she felt a large painful ball. Pressure on the spinous processes of her dorsal vertebræ gives no pain; but a painful spot is distinctly to be detected a little to the left side. Os uteri open and flabby, very tender on pressure; surface velvety, much mucous discharge.

The following medicine was ordered, with nourishing food:

R Citratis Ferri ʒii .
Syrupi ʒss .
Aquæ cassiæ ʒ v . ss.

m

Sumat coch., amp. ter. indies.

May 16.—Somewhat improved in appearance, pain not

abated; 25 drops of Battley's solution were injected into the painful point. About an hour afterwards was seized with violent vomiting, with shivering and severe constitutional disturbance; pain not abated.

May 17.—Vomiting has ceased, but returns with every attempt to swallow, pain much worse, no sleep, tongue loaded, bowels costive. Ordered to use ice freely, and to take a drop of Fleming's tincture of aconite every third hour for four times.

May 18.—Stomach much better, but the pain in the back is not abated. Ordered friction with the *Tinctura saponis c. opio*.

May 19.—Pain which was easier during the day, became much more severe at night, and she took an opiate by the advice of a friend. Severe vomiting followed its use, and it had no effect either in allaying the pain or in procuring sleep.

I recommended her to persevere with the iron for some time, but have lost sight of her.

CASE V.—Mr ———, after much exposure to wet, consulted me on the 4th June 1854, on account of a severe attack of sciatica. I prescribed a smart dose of calomel and rhubarb, to be followed by an antimonial mixture, and on the evening of the following day, injected twenty drops of Battley's sedative solution. Four hours afterwards he fell into a deep sleep, and wakened free from pain.

CASE VI.—Miss ———, æt. about fifty, very stout, consulted me some years ago, about a uterine affection, accompanied with severe lumbo-abdominal neuralgia. The pain she suffered was great, and the lameness it occasioned entirely precluded the possibility of walking. I directed attention, in the first instance, to the uterine symptoms, hoping that on their removal, the neuralgia would disappear spontaneously. In this, however, I was disappointed. Great benefit undoubtedly followed the relief of the internal disorder, and the lameness diminished perceptibly; still the pain evinced little or no disposition to abate. On the 2d June 1854, I inserted thirty drops of Battley's solution. Severe vomiting followed, and the pain was entirely diminished.

From that date, I directed my attention chiefly to the constitutional treatment, until the increased severity of the pain drew my attention to it. I injected thirty drops of Battley on the left side on the 13th December 1854.

December 14.—Pain on left side nearly gone; that on right very bad.

December 16.—Repeat the injection on the right side.

December 17.—Pain much relieved.

I saw this lady again on the 29th December. The pain was much easier, but she still continued lame, and the pain was apt to increase after any exertion.

CASE VII.—A gardener, advanced in life, after exposure to cold and wet, was seized on the 18th November with severe lumbago. This had yielded by the 2d December to the usual treatment; but there remained after its disappearance symptoms of that very rare form of neuralgia described by Cotungo and subsequently by Chaussier, and denominated by Valleix crural neuralgia.

He says he has lost the power of his limbs, though this is obviously not the case.

There is a painful point in the loins, another still more marked in the groin, a third at the head of the fibula, a fourth on the dorsum of the foot.

December 12.—15 drops of Battley's solution were injected into the painful point on the loins. Next day the patient reported that he had felt no peculiar effect except that the pain was entirely gone from every point but the knee.

CASE VIII.—Mrs —, aged about 80, has been suffering for some time from severe pain in the chest, cough, with mucous expectoration, which, together with the cough, have prevented her from sleeping for some nights. She is extremely deaf, so that it is not easy to make out her symptoms. I visited her first on the 12th December 1854. The bronchitic symptoms were then so severe that I directed attention exclusively to them. I need not detail the treatment which has no bearing on the matter on hand. On the 21st, I found the cough nearly gone, but she was still sleepless from the pain of the back, which I then for the first time examined. A painful spot was soon pointed out by the patient herself, seated near the trochanter. The integuments here were deeply seamed and scarred; the result she informed me of deep incisions made when she laboured under what she called "white swelled leg" (phlegmasia dolens I presume), 54 years before. Into this point I injected 30 drops of Battley. Next day (22d Dec.), when I visited her, she told me she had enjoyed a capital sleep; but what was that you gave me, she added, I saw the most glorious visions all night. Since then the lancinating pain has ceased, though what she describes as a dull stounding pain remains.

CASE IX.—Miss —, aged about 30. About twelve years ago, while travelling on the continent, suffered from severe influenza; while scarcely convalescent, by the breaking down of a bridge, was precipitated into a river, and had to sit some

hours in a carriage with wet clothes. After this suffered from constant aching in the back, which rendered the supine position essential. Some amelioration of this took place under medical treatment. Her menstruation became scanty and painful; for this she consulted Dr Simpson, and was relieved by his treatment. Since then has had attacks of pain in back at intervals.

Last spring, pain in back became severe, extending down to knee—was recommended to take aconite, which she found to give relief. Her left side is constantly cold. When in the country, her medical attendant scarified the back and rubbed in morphia. This was done nineteen times, and she obtained some relief, but the operation was very painful.

December 24.—The pain was brought on by exertion to-day, but is not very severe. 25 drops were injected—She passed a very restless uneasy night, with much vomiting; pain in back gone.

Dec. 26.—Slight return of pain; but on the whole better. I have heard since that this young lady's health is permanently improved.

For the following cases I am indebted to Dr Thomas Wright, F.R.C.P., by whom the remedy was tried on my suggestion:—

Dr Wright's two cases treated by Dr Wood's method.

1. Mary Ann Forester applied at the New Town Dispensary on account of a painful affection of the ulnar nerve and its branches in the arm, fore-arm, and hand. During the late severe frost she had been discharged from the Infirmary cured of necrosis of the lower half of the humerus, and had afterwards been much exposed to cold, having frequently been obliged to sleep in a common stair. The limb, in consequence thereof, became severely painful, especially at night, and prevented her from either sleeping or following any occupation. She complained of occasional rigors, and there was considerable tenderness over the injured part of the bone, but the pulse was natural and the tongue clean. Forty drops of Battley's solution were injected into the cellular tissue above the inner condyle, the limb was rolled in flannel and bandaged, she was put upon a course of alterative and aperient medicine, and ordered to visit me again in two days. Directly after the injection of the opiate the skin over, and for two or three inches round, the part became erythematous and covered with white patches of urticaria; but the severe

pain in the fore-arm and hand immediately ceased. At her next visit she stated that there had been no return of the pain, but that she had suffered much from vomiting and headache, which came on directly after the injection, and lasted all the next day. She visited me only once afterwards, at which time the pain had not returned, but she had still much tenderness over the diseased bone, and occasional rigors. She was able to carry a basket of vegetables for sale.

2. Mrs A. B., a widow lady, aged 52, has been subject to periodic headache for several years. The attacks recur every fortnight or three weeks, and commence with pain in the nerves of the integument at the external angle of the right orbit and in the posterior branch of the second cervical nerve of the right side. After from four to six hours, during which time the nerves of all the right side of the scalp become severely affected, the pain either ceases altogether or passes to the other side of the head, and runs a similar course. At the commencement of a later attack, the injection of twenty drops of Battley's solution into the cellular tissue around each of the starting points of pain before mentioned was attended with entire relief for several hours, after the expiration of which the pain commenced on the other side of the head, and was attended with more than usual suffering on account of the constitutional effects caused by the opiate.

I have tried this mode of using narcotics on some other cases not so appropriate. I am quite satisfied that in those not unfrequent cases where the disease has a central, not a centripetal origin, it is quite useless, unless from the power which it may for the time exercise on the imagination.

In one case in which I tried it, by the kind permission of Dr John Brown, the puncture was, in a few minutes, surrounded by a blush of urticaria.

In considering the *modus operandi* of this new application of remedial means, I think the following propositions will guide us to a right conclusion :—

§ 1. Medicines when exhibited have usually two effects—1st, *The local or topical*—the particular effect of the medicine on the tissue to which it is applied; 2d, *The remote effects*—being physical, chemical, or vital changes produced on parts at a distance from those to which the medicine is directly applied, or on the system at large.

§ 2. The manner in which the local effect is produced is comparatively simple, and depends on the relation of the medicine to the tissue to which it is applied. Thus, some

applications simply stimulate or irritate the tissue, the effect varying from the least powerful, which merely redden, to the strongest, which produce ulceration, or even gangrene. Others, again, form compounds with the elements of the tissue, thus chemically decomposing or corroding it, while a third class, according to Dr Christison,¹ “neither corrode nor irritate, but *make a peculiar impression on the sentient extremities of the nerves, unaccompanied by any visible change of structure.*”

§ 3. With regard to the manner in which the remote effects are produced, considerable difference of opinion prevails. Magendie² and his supporters contended strongly that they were conveyed by absorption from the part to which they are first applied, while Messrs Morgan and Addison³ are of opinion that the remote effects are exclusively due to sympathy, or an impression transmitted through the nerves.

§ 4. Sir Benjamin Brodie,⁴ Dr Christison,⁵ and others, however, unable to adopt either view exclusively, have contented themselves with admitting this double mode of operation; “a conclusion” which Messrs Morgan and Addison agree “that all fair analogy forbids.”

§ 5. With the exception of Morgan and Addison, who deny the doctrine of absorption only because they strongly hold that of sympathy, and because they think it “contrary to nature’s rule to adopt two ways of attaining the same end,” all authors agree in admitting absorption to be the most usual channel by means of which medicinal agents are conveyed from the part to which they are directly applied, so as to affect remote organs, or the system at large.

§ 6. Since the experiments of Hering, and more recently those of Mr Blake,⁶ have shown the extreme rapidity with which the round of the circulation may be accomplished, the tendency has been greater to ascribe to absorption even those very rapid, or almost instantaneous general operations of certain poisons locally applied, which were formerly regarded as the strongest arguments for the theory of nervous transmission.

§ 7. Of the great effect of absorption we will be still more convinced, if we call to mind the rapid disappearance of the

¹ Treatise on Poisons, p. 1.

² Magendie, Annales de Chimie et de Physique.

³ Essay on the Operation of Poisonous Agents, &c.

⁴ Phil. Trans. 1811-12.

⁵ Treatise on Poisons.

⁶ Ed. Med. Journal, vols. liii. and lvi.

agent from the part to which it was applied,¹ coupled with its speedy detection in parts at a distance,² and the no less speedy communication of its qualities to the animal solids and fluids;³ the arrest of the action of the poison by arrest of the circulation from the part,⁴ and the failure of all attempts to arrest the production of remote effects by intercepting the nervous communication.⁵

§ 8. The chief agents by which absorption is effected are the veins, though the lacteals and absorbents take up certain agents, but their operation is both limited and slow.

§ 9. Different tissues vary in their absorbent power. Thus, according to the very interesting experiments of M. Vernière,⁶ the mucous membrane of the intestinal canal absorbs less rapidly than the serous membranes, and they, in their turn, are less powerful channels of absorption than a vein or an open wound.

§ 10. Difference of tissue is therefore found to modify, to a great extent, the action of remedies. Thus, the stomach and intestines, which are the tissues to which medicines are generally applied, possess a considerable power of absorption, as indeed their office would lead us to suppose; nevertheless we find, from the experiments of Christison and Coindet,⁷ "that when oxalic acid is introduced under the same collateral circumstances into the stomach of one dog and the peritoneum of another, the dose may be so apportioned that the same dose which does not prove fatal to the former kills the latter in fourteen minutes."

§ 11. The few experiments which we had, until very recent times, regarding the power of the pulmonary membrane to

¹ Of four ounces of solution of oxalic acid, injected by Drs Christison and Coindet into the peritoneum of a cat, and which proved fatal in fourteen minutes, though none escaped by the wound, scarcely a thirty-second part was found after death.—(Ed. Med. Journal, vol. xix. 335.)

² As in the urine, see the very full experiments of Wöhler and Stehberger (*Zeitschrift für Physiologie*, Bd. für 1824–5.) Or, as in a case quoted from Fricke by Pereira (vol. i., p. 106), where iodine was detected in the tears by the formation of iodide of mercury, when calomel was applied to the eye of a patient who had been taking iodide of potassium. In the blood and chyle, as by the experiments of Tiedemann and Gmelin.

³ Almost all the minerals, and many other substances which are given medicinally, have been detected in the bones, brain, skin, and liver (Pereira, *op. cit.*, p. 104.)

⁴ See the experiments of Ségalas, Emmert, and Blake (*Muller's Physiology*, and *op. cit.*)

⁵ See the experiments of Magendie and Delille (*Physiology* by Milligan, p. 284.)

⁶ *Journal des Progres*, 1827.

⁷ See this *Journal*, vol. xix., p. 330, and Christison on Poisons, p. 29.

absorb poisons, tended to cause it to be regarded as a channel of extreme power. The rapidity of the fatal results which follow gaseous poisoning may be instanced, as also the experiment of M. Ségalas, who found that half a grain of solution of extract of *nux vomica* injected into the windpipe proved fatal, while two grains might be injected into the stomach, peritoneum, or chest, without any fatal effect.

§ 12. The experiments of Professor Simpson on the inhalation of chloroform, oil of juniper, ergotine, and other medicinal agents, also show the value of this channel for the introduction of certain medicaments into the system.

§ 13. The skin, which has at various times been employed as a medium for the introduction of medicines into the system, would appear to possess no very active power of absorption, at least unless it be denuded of its cuticle. "Accordingly," says Dr Christison,¹ "many active poisons are quite inert when applied to the unbroken skin, or even to the skin deprived of the cuticle. Hydrocyanic acid, perhaps the most subtle of all poisons, was found by Coullon to have no effect when dropped on the skin of a dog." On the other hand, Dr Madden, in his work on Cutaneous Absorption,² has shown, from carefully conducted experiments, the power which the healthy skin possesses of absorbing from a gaseous and from an aqueous medium, and has collected from various authors proofs of its power to absorb medicinal substances.

§ 14. Both solids and fluids have been thus absorbed by the skin. Kellie found salivation follow the use of a mercurial plaster. Arsenic employed to destroy lice has been known to produce violent inflammation. Salivation has been produced by the absorption of a solution of corrosive sublimate. Dr Madden, after immersing his hands in a solution of hydriodate of potass, detected iodine in his urine, and he also succeeded in purging himself, by applying to his skin infusions of rhubarb, jalap, and gamboge.

§ 15. There is no more rapid way of securing the action of poisons than by introducing them into a divided vein, or into several divided veins, by means of an open wound. "Some," says Dr Christison, "which act very slowly through the stomach cause instant death when injected into a vein."

§ 16. With regard to the cellular tissue, Dr Christison states, "that it is a ready medium for introducing poisons into the blood, especially if an artificial cavity be made where

¹ On Poisons, p. 28.

² An Experimental Enquiry into the Physiology of Cutaneous Absorption by W. H. Madden, M.D. Edin., 1838.

the tissue is loose, but that its power as a medium of absorption has not been, and cannot easily be ascertained. On the one hand, it is difficult to apply poisons to it without also applying them to the mouths of divided vessels, and, on the other hand, it is difficult to make a set of experiments for comparison with others on the stomach, pleura or peritoneum, as the cellular tissue does not form an expanded cavity, and consequently, the extent of surface to which a poison is applied cannot be made the same in each experiment of a series."¹

§ 17. The experiments which approach the most nearly to direct injection of the cellular tissue are those detailed by Sir Benjamin Brodie in the Philosophical Transactions for 1811-12, in which various poisons were introduced into wounds, and were found to produce very speedy results; but in all these cases the great division of parts exposed so many blood-vessels that it is not easy to say how much of the effect was due to the cellular tissue, and how much to the action of the divided vessels.

§ 18. I am at present engaged in some experiments on this subject, in which, by means of an improved apparatus, various substances have been introduced into the cellular tissue with comparatively little injury to the adjacent vessels, and, as far as these have gone, they would lead to our ascribing great absorbent power to the cellular tissue.

§ 19. The result of what has been stated proves satisfactorily,—

1st, That medicines are more rapidly absorbed by some tissues than by others.

2d, That the stomach is by no means the most rapid way of introducing medicines into the system.

3d, That the cellular tissue has a great power of absorption.

§ 20. It has been further shown by Dr Christison, that the whole amount of difference is not to be explained by the rapidity with which absorption goes on, but is to be ascribed in part to the poison being more liable to decomposition in one tissue than in another. Thus, many remedies are much changed in the stomach, where the powers of assimilation are very strong, and the action of absorption slow.

§ 21. We are thus conducted to this point of the enquiry, Have we no means of introducing medicinal agents very rapidly into the body, in a situation where they will not be

¹ On Poisons, page 30.

readily decomposed, and where, in certain cases, we can secure at once their local and their remote effects?

§ 22. The value of such a method of procedure, in many diseases, will be apparent. We shall instance but one—neuralgia.

§ 23. In neuralgia we have usually a general and a local affection, a morbid state of the system, arising from many causes, displaying various symptoms, requiring varied treatment, and existing in states of the body the most opposite; a local affection, occurring in paroxysms of violent pain, either regular or irregular, plunging-like electric shocks along the course of the affected nerve, ceasing, either to be suspended for a time, or immediately to recur with still more unbearable violence.

§ 24. An affection presenting characters such as have been described would appear to demand at once a local and a general treatment;—a local treatment directed to, and intended to mitigate the fearful anguish, under which the patient is well-nigh driven to despair; a general treatment intended to correct the “*habitus neuralgicus*” on which it depends, and having reference to the causes from which it has arisen, the state of the system in which it exists, and the diseases with which it may be associated.

§ 25. There are other circumstances in the history of neuralgia which seem to point at, and to give peculiar facilities to local treatment. It is admitted on all hands that the *superficial* nerves are of all others the most liable to the disease. It has further been shown by M. Valleix¹ that some points in the course of the nerve are more liable to be affected than others, and that these points are frequently the very ones where the nerve is most superficial.

§ 26. Further, these points can almost always be detected in the course of the disease from their extreme tenderness on pressure. Even in the intervals between the paroxysms, very slight pressure on these points is sufficient in many cases to excite severe suffering, although, in some exceptional cases, firm pressure may be applied without exciting any complaint.

§ 27. The plan of local treatment which M. Valleix proposed was the application of a succession of small blisters over the points in the course of the nerves which are painful on pressure, and in all his cases it seemed to alleviate the symptoms.

¹ *Traité des Néuralgies, ou Affections Douloreuses des Nerfs.* Par F. L. S. Valleix. Paris, 1841.

§ 28. The plan of blistering is not new, but for the application of it to the tender points we are indebted to M. Valleix, and that author has effected an immense improvement in practice by showing where our local treatment, whatever that may be, ought to be applied.

§ 29. Our own experience has not confirmed the value of simple blisters, and we prefer following them up by the endermic application of morphia.

§ 30. Two strong objections, however, apply to blistering, or the endermic application of narcotics in this disease—

1st, The painful nature of the remedy.

2d, The mark which it often leaves, which is very objectionable when the disease is seated in the nerves of the face.

§ 31. Various methods of applying narcotic or other remedies more directly to the seat of the disease have been introduced. Thus we have—

1st, The *enepidermic method*, in which the agent is simply applied to the surface of the skin.

2d, The *Iatroleptic*, in which the absorbents are stimulated by friction to take up the agents which are presented to them in solution or in a minute state of division.

3d, The *endermic* proposed by MM. Lembert and Lesieur, in which the obstacle which the epidermis offers to the entrance of the remedy is overcome by previously removing it.

4th, *Inoculation*, which, largely practised for the introduction of small-pox and cow-pox into the system, has been proposed by M. Lafargue St Emilion, to be extended so as to secure the application of remedies. This method was brought before the Westminster Medical Society in February 1837, by Dr Bureaud, but from the account given in the ‘*Lancet*,’¹ he does not seem to have been very successful, as only a slight local effect was produced. A report was made by M. Martin Solon for the Academy of Medicine,² on this method of inoculation by morphia, proposed by Dr Lafargue, which report comes to the somewhat damaging conclusion that the effect produced was very much the same, whatever agent was inoculated even when the experiments were made with agents as dissimilar as belladonna, strychnine, the gastric juice, chyme.

§ 32. From all this it is plain that we are still in want of a method of directly applying sedatives to the affected part, and that could such a method be suggested its value would be enhanced, could this be done almost without pain, and in

¹ *Lancet*, 1837, p. 826.

² *Bullet. de l’Acad. Roy. de Med.* 1836, vii., Nos. 1 and 7.

a manner calculated, at the same time, powerfully and rapidly, to affect the general system.

§ 33. Of the value of such an application locally to the nerve affected, no one can be in doubt who calls to mind the result of the experiments instituted by Müller, which clearly shows that, to quote his own words, "narcotic poisons," when applied locally to nerves, have only a local effect. I held the nerve of a frog's leg which was separated from the body in a watery solution of opium, for a short time, and that portion of the nerve lost its irritability, but below the part that the poison had touched the nerve still retained this function; *opium, therefore, produces a change in the nervous matter itself, but the influence is local.*¹

§ 34. Again, every one who has seen much of neuralgia is aware that, on the one hand, the pain, acute and agonising as it is generally, subsides spontaneously after some time; that on the other, opiates administered through the ordinary channels are usually some hours in taking effect, so that, if this class of remedies are to be of use at all, it must be an immense advantage to secure—

1st, A local effect, applied *directly* to the affected nerve.

2d, A remote effect, ensuing almost *instantaneously* on the application of the remedial agent.

§ 35. Several of the cases which I have detailed show with what rapidity narcotics take effect when introduced in this way; and in a case in which I tried it in the Royal Infirmary, through the kindness of my friend Dr W. T. Gairdner, the man, who was not at all aware of what was doing, told us that he felt as if he was drunk within a very few minutes after the introduction of the narcotic.

§ 36. Such are the advantages which this new method of treatment seem to offer, and on which I venture to recommend it for trial; and I think we may safely arrive at the following important conclusions regarding it from the cases which I have submitted—

1st, That narcotics injected into the neighbourhood of the painful point of a nerve affected with neuralgia will diminish the sensibility of that nerve, and in proportion diminish or remove pain.

2d, That the effect of narcotics so applied are not confined to their local action, but that they reach the brain through the venous circulation, and there produce their remote effects.

3d, That in all probability what is true in regard to nar-

¹ "Physiology," by Baly, vol. i., p. 246.

cotics would be found to be equally true in regard to other classes of remedies.

4th, That the small syringe affords a safe, easy, and almost painless method of exhibition.

5th, That, destitute as we are of any precise experiments as to the applicability of the cellular tissue as a medium for the reception of medicinal agents, the experiments made with the syringe show that it seems to offer an excellent surface for the operation of absorbent action of the venous system.

6th, That the method now detailed seems as extensively applicable as any of the methods of applying remedies to the skin, whether

Enepidermic,
Iatralaptic,
Endermic, or by
Inoculation.