

On stammering and squinting, and on the methods for their removal / by Edwin Lee.

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Lee, Edwin, -1870.
Royal College of Physicians of Edinburgh

Publication/Creation

London : J. Churchill, 1841.

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The Editor of
The Edinburgh Medical
& Surgical Journal

ON
STAMMERING AND SQUINTING,
&c.

STAMMING

SOUTTING

THE METHOD FOR THEIR REMOVAL

LONDON :

WILSON AND OGILVY, PRINTERS,
Skinner Street, Snowhill.

EDWIN LEE MILES

THE METHOD FOR THEIR REMOVAL
FROM THE SURFACE OF
PRINTED MATTER
AND THE METHOD FOR THEIR
REMOVAL FROM THE SURFACE
OF THE TYPE

LONDON

JOHN CHURCHILL, PRINTER, ST. MARTIN'S LANE

1841

ON
STAMMERING
AND
SQUINTING,
AND ON
THE METHODS FOR THEIR REMOVAL.

BY
EDWIN LEE, M.R.C.S.

CORRESPONDING MEMBER OF THE MEDICAL AND CHIRURGICAL SOCIETIES OF
PARIS, BERLIN, FLORENCE, NAPLES, BORDEAUX, LYONS, MARSEILLES,
AND TOULOUSE; AUTHOR OF THE "BATHS OF GERMANY,"
"TREATISE ON SOME NERVOUS DISORDERS," &c.

LONDON :
JOHN CHURCHILL, PRINCES STREET, SOHO.

1841.

P R E F A C E.

AMONG the principal disadvantages attending the proposal of new remedial measures may be reckoned, the degree of prejudice with which they are viewed by some persons, and their indiscriminate employment by others : hence several new remedies, in themselves very efficient, if restricted to the proper cases, have fallen into unmerited oblivion of late years, from the results not having corresponded to the exaggerated expectations which were raised respecting their efficacy. This is not unlikely to be the case as far as Stammering is concerned, different teachers and operators having each their particular method, which is applied indiscriminately to all the cases which present themselves to them, notwithstanding that this complaint does not always depend upon the same cause, and presents various complications, which require to be taken

into consideration. The consequence is, that the failures are numerous in cases which might admit of relief by a treatment adapted to the circumstances in individual instances.

It is the chief object of this publication to endeavour to elucidate these causes and complications, and to point out the treatment most suitable to particular cases,—my opportunities of examining the peculiarities of stammering in a large number of individuals, and of ascertaining the results of the operations for the relief of this infirmity, as performed by different operators both on the continent and in England, having, I trust, enabled me to take an unbiassed view of the question, and to suggest such an application of the means of relief as may lead to a less indiscriminate employment of them, and consequently be conducive to a more successful treatment.

In order to the more general diffusion of information among the profession upon a subject which has of late excited so much interest, the account of Stammering now presented to the public was printed in some

of the late numbers of the *Medical Gazette*, with the exception of the conclusions, which have been subsequently added.

With regard to Squinting, respecting which so much has been written and said within the last twelve months, it was unnecessary that I should enter fully upon its consideration ; I have, therefore, restricted myself to giving a brief notice of the operation for its removal, as performed by different operators in England and on the Continent, and to offering a few remarks deduced from the numerous cases which have fallen under my observation.

LONDON, 38, GOLDEN SQUARE,
May 28, 1841.

ON
STAMMERING,

&c.

PREVIOUS to entering upon the consideration of stammering, I shall briefly notice some points connected with the functions of the voice and speech.

The first condition necessary for the production of the voice is that the air contained in the lungs should be carried, by the action of the muscles of expiration, against the vocal chords, during its passage through the larynx; but as this takes place in breathing without sound being occasioned, the action of the small muscles which enter into their composition, under the influence of the will, is a condition no less essential than the former. The quantity of the air, the greater or less rapidity with which it strikes the vocal chords, and the varying degrees of tension or contraction of these latter, are the circumstances which cause the innumerable modulations of sound in speaking, singing, and other exercises of the voice.

This function may then be considered as intimately connected with, and as superadded to, that of respiration ; and its performance depends entirely upon the lower vocal chords ; as, if the recurrent or inferior laryngeal nerve, which supplies them with nervous energy, be divided or paralysed, the voice is lost, which is not the case when the upper vocal chords are deprived of power by the lesion of the superior laryngeal nerves, which, as well as the recurrent, are branches of the eighth pair. The voice may also be impaired or lost by lesions of the brain affecting the origin of the nerves, or by moral impressions and other causes which interfere with the exercise of volition, of which the nerves are merely the agents or conductors, as far as muscular action is concerned ; and it is liable, as is well known, to a variety of alterations, according to the state of excitement or depression of the cerebral faculties, as illustrated by the various passions and emotions—joy, anger, fear, sorrow, &c.

Of the cerebral nerves, some are exclusively agents for the transmission of special sensation, as the first and second pairs, and a portion of the seventh (which, however, is essentially a separate nerve) for smell, sight, and hearing. Others serve solely for the transmission of volitions, and the performance of muscular action—as the third, fourth, sixth, a part of the seventh, and the ninth pairs ; while others again, as the fifth and eighth,

are agents both of sensation and muscular motion.

It is scarcely necessary to repeat the obvious truism, that speech cannot be produced without the voice; but the voice may exist, and indeed does exist in the greater number of animals, without speech, which is peculiar to man, being bestowed upon him for the expression of his thoughts and ideas. Idiots, who have no ideas to express, are generally dumb, or can merely articulate a few words or phrases without meaning, or which they know will cause their ordinary wants to be supplied, but they are incapable of conversing. Speech, however, is not a natural gift, but is acquired by education: hence those born deaf are also dumb: and instances are on record of individuals who have been found in solitudes far from the haunts of men, who, though not deaf, were dumb, and had acquired the voice of animals with whom they had associated, but who were afterwards taught to speak. Dumbness, therefore, does not consist in the absence of voice, but of speech and the deficiency of ideas, as most dumb persons can utter a variety of inarticulate sounds; but it by no means follows that a facility in speaking necessarily exists in proportion to the quantity of the ideas or the power of the mind. Many men of genius and great imaginative powers are but little talkers, and some not unfrequently experience difficulty in express-

ing their thoughts on any particular subject ; while empty-headed fellows are frequently very loquacious, and, like Gratiano, “ speak an infinite deal of nothing ;” for—

“ Talking is not always to converse ;
Not more distant from harmony divine,
The constant creaking of a country sign :”

And, as has been observed by a powerful writer, a great fluency of speech is frequently owing to a scarcity of matter and a scarcity of words, “ for whoever is a master of language, and has a mind full of ideas, will be apt in speaking to hesitate upon the choice of both ; whereas common speakers have only one set of ideas, and one set of words to clothe them in, and these are always ready at the mouth : so people come faster out of a church when it is almost empty, than when a crowd is at the door*.” On the other hand, many highly intellectual men are great talkers, and not unfrequently jest or talk nonsense by way of relaxation ; so that silence and gravity of demeanour are not always a proof of superior wisdom, though they are frequently considered so by the multitude, and are in consequence sometimes assumed by persons who either have nothing to say, or who wish to impress others with a sense of their superiority†.

* Swift.

† “ Reserve is no more essentially connected with understanding, than a church organ with devotion, or wine with good nature.”—*Shenstone's Essays*.

“ Since silence seems to carry wisdom’s power,
Th’ affected rogues, like clocks, speak once an hour*.”

Such individuals are likewise noticed by Shakespeare, as the sort of men

“ Whose visages
Do cream and mantle like a standing pond,
And do a willful stillness entertain,
With purpose to be dressed in an opinion
Of wisdom, gravity, profound conceit.”

The immortal bard adds—

“ I do know of these
That therefore only are reputed wise
For saying nothing.”

A complicated mechanism is required for the correct articulation of words or speech, in the production of which various parts are concerned, which should be in a perfect state, and act in harmony. If a portion of the upper or lower jaw, or if the bony palate, be destroyed, if many of the teeth be lost, the speech will be more or less affected. A similar effect will ensue if the soft palate be perforated by ulceration; if the passage through which the air has to pass be narrowed, or its sensibility increased by inflammation or swelled tonsils; if there be paralysis or other serious lesion of the muscles of the cheek, lips, or tongue, though this organ may be in great part extirpated without speech being lost†.

* Dryden.

† A case is recorded by Tulpius (*Observationes Medicæ*), which is quoted in the *Dictionnaire de Médecine*, of loss of

Now, the pharynx, fauces, the soft palate, the uvula, the tonsils, derive their nervous influence from the eighth pair (which we have seen supplies also the laryngeal muscles), by means of the glosso-pharyngeal branch (which, however, is considered by some anatomists, Gall and Bichat, &c. as a distinct nerve), by means of which their muscles contract on the application of their appropriate stimuli—food for deglutition, the air for the formation of speech, &c.; being but partially under the control of the will as far as other actions are concerned. This nerve likewise endows these parts with their peculiar sensibility, and also supplies the muscles of the posterior part of the tongue, being finally distributed to the papillæ on its surface; and is in all probability not only the nerve of taste, but is likewise concerned in some of the movements of the base of the tongue, the associated action of which is necessary in speaking, in deglutition, &c.* It forms inosculation with the respiratory nerves, and with the sympathetic, participating in their healthy and disordered conditions. The tongue is likewise supplied by the fifth pair for common sensation, and by the ninth, which, being purely a nerve of

speech after extirpation of one-half of the tongue, but in which it was restored after an interval of three years, in consequence of the fright caused by a storm. Here the moral impression from the operation doubtless occasioned aphonia.

* Galvanism of the trunk of this nerve, after death, produces contraction of the muscles of the fauces, &c. which it supplies.

voluntary motion distributed to the muscles, brings it more directly under the control of the will than those parts which are supplied by the glosso-pharyngeal; as may be seen on comparing the flexibility, rapidity, and great variety of the movements of this organ, with the limited action of the fauces*. The same remark applies to the muscles supplied by the portio dura, which is also exclusively a motor nerve.

In the article *Bégaiement*, contained in the "Dictionnaire de Médecine et Chirurgie pratique," (which I read two or three days ago), I am happy to find an opinion which I expressed on the cause of stammering at the Westminster Medical Society, corroborated by the high authority of M. Magendie, who says, in the above-mentioned article—"Of the muscles which serve for articulation, some are subject to the will, as those of the lips and cheeks; those which carry the point of the tongue upwards or forwards, to protrude it out of the mouth; and those which draw it back. But the other muscles of the tongue, viz. those which carry its root upwards, downwards, or backwards; the muscles of the velum palati, those of the pharynx and of the larynx, are only

* The size of the lingual nerve has been found to vary in a direct ratio to the quantity and rapidity of the movements of the tongue, either for mastication, the prehension of food and drink, as for the exercise of the voice. It is consequently larger in dogs and cats than in the ruminating animals and in the rodentia.—*Sarlandière, Traité du Système Nerveux.*

incompletely under the influence of volition: thus, what a great difficulty most persons experience when requested to show the physician their throat or fauces. We may well tell them to depress the tongue, because it hides the tonsils; they make many efforts, and it is more by chance than by a true influence of the will that the desired action is obtained. If they be required to raise the velum palati, the will is most frequently powerless: and it would fail entirely in the attempts to contract separately the muscles of the pharynx or larynx. The muscular organs only act in a complete manner to attain a certain end—deglutition. In order for deglutition to be performed there must be something to swallow, even if it only be a little water or air. Thus, in one point of view, the muscles of deglutition are not subject to the will.”

“What has been said of deglutition is applicable to other phenomena which take place in the mouth. Nothing is so simple as to gargarise, to spit, &c.; but in these instances, as in swallowing, we attain the end by means of organs which serve us, without knowing exactly the part which each takes in the action. It is the same with respect to the production of sounds in the larynx; and in speaking we form the voice, we articulate, without knowing exactly what movements take place either in the larynx or in the mouth. There are numerous vocal phenomena of which

the mechanism is yet far from being known to the physiologist. We will the end, and we attain it ; that is all."

In other parts of the body, the movements of which are completely under the influence of the will, as the trunk and extremities, a certain degree of harmony, or unity of action, must exist not only between certain sets of muscles, but also between muscles and their antagonists. When the flexors, for example, are employed in the performance of an action, their antagonists are not altogether relaxed, but serve to modify the muscular contraction, in the appreciation of the degree of tension and resistance, in the preservation of the equilibrium of the body, &c. ; as seen in the instance of rope-dancing and other feats of agility, in which this harmony is carried by education and habit to the highest perfection ; whereas the deficiency or want of it is illustrated by awkwardness, and in cases of drunkenness or chorea. Let two boys attempt for the first time to slide upon the ice, or to skate ; one will preserve his equilibrium tolerably well, while the other will probably fall down every two or three minutes. Or, let them be taught to dance or fence ; one will acquire easy and graceful movements without difficulty, while the other will probably retain much of his awkwardness, notwithstanding the instructions of the master. This greater or less aptitude to acquire perfection

in muscular exercises, as well as the difference which is seen in the gait of individuals, depends, then, upon the greater or less degree in which this harmony exists between different parts of the muscular system, which derive their nervous power from the brain.

Some cases of paralysis, which serve to illustrate the destruction or interruption of the harmony existing between sets of muscles which are naturally associated in their actions, are thus referred to by a modern writer on the nervous system :—

“ C’est ainsi que certaines paralysies partielles, en détruisant l’harmonie fonctionnelle, dénaturent les directions et l’équilibre ; j’ai vu souvent dans de telles paralysies les médecins croire, d’après M. Flourens, à une lésion du cervelet, parcequ’ils remarquaient que l’équilibre étoit rompu ; ou que les mouvemens n’étoient pas convenablement *balancés* ; ou auroit pu croire aussi dans ces cas, en voyant l’individu manœuvrer autrement qu’il ne vouloit, que l’organe des directions étoit lésé ; mais en observant mieux, il ne reste aucune incertitude à ce sujet ; on s’aperçoit que les directions sont appréciées voulues et indiquées, mais que l’indication n’est nullement suivie, non par ineptie, mais par défaut d’ensemble des instrumens d’exécution, dont les uns sont plus ou moins faibles, ou manquent totalement à leur mission, et dont les autres manquant d’antagonisme ne

sont pas pondérées ; de là ces mouvemens brusques, saccadés, ou trop énergiques sans mesure ni précision, qui lancent les paralytiques incomplets dans des directions qu'ils n'ont pas résolues, par la desharmonie d'action, le non-concours régulier, la non-coordination entre les instrumens d'exécution, dont les uns répondent mal ou même ne répondent pas aux directions imprévues, et dont les autres n'étant pas pondérés par leurs antagonistes, agissent trop vivement ; il y a donc bien là non-coordination, mais non pas à la manière dont l'entend M. Flourens, qui place à tort la faculté coordinatrice dans le cervelet, au lieu de la direction des mouvemens en avant*."

We may thus see, from what has preceded, that speech is dependent upon a variety of movements ; and that for its formation, not only is harmony required between muscles completely under the control of the will (as are those of the lips and tongue), but also between such muscles and others which are but partially so : a free respiration, a regulated contraction of the muscles of expiration, of those of the larynx, palate, tongue, cheeks, and lips, in obedience to volitions conveyed to several of them simultaneously, or in rapid succession, being necessary for perfect articulation. It will therefore excite no surprise, on considering these circumstances, that speech should be so frequently affected in various dis-

* Sarlandière, *op. cit.* Paris, 1840.

eases, and by various conditions of the nervous system, which destroy or interrupt, for a longer or shorter period, the harmonious action of these several parts. Persons labouring under concussion of the brain, apoplectic attacks, in the debility caused by exhaustion, or which supervenes in the latter stage of acute disease, can very frequently put out their tongue, and move their lips, but are unable to perform the associated actions required for speech, which inability is likewise frequently a premonitory symptom of paralysis or cerebral disease. After active exercise, as running, a person will frequently be speechless for some time, not merely from the want of air, but also from the temporary disorder or exhaustion of the nervous energies. The same circumstance may occur from mental emotions, as fear, surprise, agitation, and may even last for a long period ; as the effect does not always cease with the action of the causes which produce it. When these causes act in an aggravated degree, they may induce loss of power over the more strictly voluntary muscles, as those of the extremities, and the individual will be unable to move*. I have entered more fully

* The fascination of some birds by the aspect of certain serpents rendering them unable to escape, or even to keep their position upon the tree, is in consequence of volition being paralysed by fear. The same circumstance occurs, in a minor degree, when an individual becomes speechless from strong mental emotion. — *Treatise on some Nervous Disorders*, 2d edition, 1838.

into the consideration of these points in my work on Nervous Disorders, and will terminate these remarks by quoting from it a passage or two bearing upon the present inquiry. "Those parts which, though necessary for the performance of ordinary actions, are not so directly controlled by the will as some others, and hence require more exertion of this faculty for the healthy performance of their functions, appear to be most liable to be affected by its debility. Thus it has seemed to me that the muscles of the larynx are more subject to atony than the muscles of the extremities, when moral causes have been instrumental in producing the affection, and that the inferior extremities are more frequently affected than the superior."

"Loss of voice, depending on a state of atony or paralysis of the small muscles of the larynx, from suspension of their nervous power, is of frequent occurrence. It may be total or partial, in which latter case the patient can make himself understood in a low whisper. The lips and tongue can be freely moved in this variety of aphonia. It may supervene upon mental emotions, convulsive or other nervous affections, irritation of the surface or of viscera; or it may come on without any obvious cause. A case is mentioned, in the *Dictionnaire de Médecine*, of a lady who was deprived of her voice during several years from excessive joy succeeding a state of great

anxiety, which resisted all the means employed for its relief, and disappeared, when least expected, after strong emotion. In another case, the patient, during fourteen years, could only speak, every day, between the hours of twelve and two or three. Some years ago I saw a young man who suddenly lost his voice completely, for which no cause could be assigned. I stated that, although he might not derive relief from medicine, that the voice was not unlikely to return at some future period. This has since occurred, after an interval of twelve years from the attack. M. Olivier mentions a case of intermitting aphonia, which, he says, 'existed more than thirty years, and was only cured for the time by abstraction of blood.' He adds, 'what is curious, however, is, that the voice suddenly returned after one or two spoonsful of blood had flowed.' In this case it can hardly be supposed that the quantity of blood lost could have had any influence in the restoration of the voice; and I am inclined to believe that it was in consequence of the impression on the patient's mind that the voice must necessarily return at the time of the bleeding. The long duration of the disorder may be ascribed to the habit of having it recur at stated periods. These cases also tend to corroborate the opinion of their nature which I had been led to entertain; and there is every reason to believe that, could the patients' minds have been diverted from the

expectations of the attacks at the accustomed period, they would not have occurred."

I might adduce several other cases illustrative of the action of mental impressions in the production and removal of disorders of the voice and speech ; but as such would be out of place on the present occasion, I will merely extract the following from another of my works, as serving to exhibit the powerful influence of the imagination over those disorders :—

“APHONIA OF SIX WEEKS’ DURATION CURED IN A FEW HOURS BY STARCH PILLS GIVEN HOMŒOPATHICALLY.

“A girl, æt. 20, was admitted on the 14th of January, with complete loss of voice, which had existed since the middle of November. She had experienced a similar attack in the preceding year, but had recovered in fifteen days. The menstruation was regular. A few days rest, and the usual hospital regimen, producing no effect, she was consequently placed in the department where the homœopathic experiments were made, and was ordered two pills composed of starch, which she believed to be homœopathic remedies. The first was to be taken in the presence of the physician, the other at the expiration of four hours. A few minutes after the first pill had been swallowed the following symptoms manifested themselves :—Anxiety, pain, and uneasiness in the region of

the heart and thorax ; perspiration, with heat and eruption on the skin. The second pill appeared to aggravate these symptoms, with the addition of hiccough. She afterwards fell asleep, and on awaking she was astonished to find she could talk in a loud tone. The complaint did not recur, and she soon quitted the hospital*."

Similar cases to the above will not of course be confounded, by the discriminating practitioner, with the loss or alterations of the voice and speech arising from obvious local irritation reacting upon the spinal cord or nerves, as in the instances of traumatic tetanus, worms in the intestines, &c.

* Animal Magnetism and Homœopathy, with Notes illustrative of the Influence of the Mind on the Body. 2d Edition, 1838.

ON STAMMERING.

This affection has been confounded with the hesitation, difficulty of expression, or repetition of words—*balbuties*, which so commonly occurs in children in their first attempts to talk, and which generally ceases as they grow up ; though, in a few instances, stammering supervenes upon it, which leads parents, and those who have the charge of them, sometimes to say, that the stammer has existed from the time they began to speak, which is not the case. A degree of hesitation, difficulty, or stuttering, may arise from other causes—as bashfulness, stupidity, confusion of ideas, apprehension, surprise, &c. which may occasion considerable embarrassment in the articulation of words ; and, as a foreign author has observed, “ It frequently happens even in persons highly endowed, and who usually express themselves with facility, to be wanting, as it were, to themselves, and to stammer out with difficulty the most trifling excuse, the most simple compliment, or the most ordinary answer, to a question which requires on their part some little presence of mind*.” The imperfect articulation

* Dictionnaire de Médecine, art. Balbutiement.

in certain states of cerebral congestion, inebriety, or weakness from disease, must also be distinguished from stammering.

Stammering, then, as may be inferred from what has preceded, may be considered as a spasmodic affection in the great majority of cases; not, however, of that kind which is caused by irritation of the surface, or of internal parts, or by lesions of the nerves or spinal cord, but of a cerebral origin, and depending upon a temporary disorder or a faulty action of the faculty of volition, as far as certain muscles employed in respiration and articulation are concerned, which induces a want of consent or harmony of action between these muscles and others, which are more directly under the influence of this faculty*. In the peculiarities which it presents it has great analogy with other nervous affections, especially chorea. It seldom occurs before the age at which children possess consciousness, and are able to pronounce words with facility, viz. about four or five years. Like chorea, it may be acquired by imitation; is almost always increased by agitation, or when it is remarked by others; and affects, for the most part, individuals who are endowed with a high degree of susceptibility. It may be frequently stopped

* Stammerers, when not attempting to speak, can, like other people, move their lips and tongue freely in all directions, except in those cases where the tongue is larger, or more bound down, than natural.

by measured and regulated movements, as speaking slowly after a full inspiration, reciting or singing; in the same way as the irregular muscular action in chorea may often be suspended for a time by the patient's playing the piano, skipping, or performing other actions which require attention, and a regulated exertion of volition. Like other nervous affections, stammering is more common, and usually increases in intensity, about the period of puberty, and the succeeding years, when the mental sensibilities are so strongly called into play; but it diminishes towards the decline of life, and ceases altogether when the nervous sensibility is blunted by the approach of old age. When the stammerer is alone, or with an intimate friend or relation, he can usually speak very well, or at all events better than when he is in company, or in the presence of strangers. This fact is not invalidated, but is rather corroborated, by the circumstances that some persons lose their stammer after a good dinner and wine, though in company; and that others, having began a speech on a subject which interests them, in a public assembly, have been able to go on speaking for a considerable time without impediment; as in point of fact they are then in much the same condition (with respect to the stammer) as when alone, having confidence in their powers, or forgetting their infirmity for the moment. It has been stated by a French

author, that stammerers can generally speak very well when disguised by wearing a mask; and M. Itard mentions the case of a boy, eleven years old, "who was a great stammerer whenever he spoke in the presence of persons who looked at him; but he did not stammer when he knew that he could not be seen, and could speak to people very well when in the dark. The attempt had been made to cure him when he was younger by bandaging his eyes*." These cases are obviously explicable upon the same principle. Most stammerers, again, are made much worse when put in a passion; though some, by being put in a passion, become extremely voluble, from their attention being altogether diverted to other matters. Stammering also resembles other nervous affections, in presenting frequent intermissions at regular or irregular periods; some stammerers are affected by the state of the atmosphere, being frequently worse in wet than in dry, and warm than in cold weather. A few find their stammer better or worse according as the moon is in its first quarter or at the full. I have seen two persons in which this was the case. Some, again, lose their stammer for a few days, or even for a much longer period, after which it recurs without their being able to ascribe the recurrence to any particular cause; and as a further corroboration (if any be needed) that stammering is essentially a nervous complaint,

* Dictionnaire de Médecine, art. Bégaiement.

and of the view which I have expressed respecting its nature, I may allude to the fact, that the great majority of cases may be cured by systems of education which have for their object the regulation of respiration, and of the muscular powers concerned in speech.

Several persons, however, have attributed this complaint to various physical alterations of the tongue, fauces, tonsils, &c. ; and, indeed, in a large proportion of stammerers, some anormal or peculiar conditions may be perceived on examination of these parts ; yet none of them are sufficiently constant to authorize the supposition that the disorder is occasioned by them ; though, no doubt, when existing they tend to aggravate it. In many individuals the tongue is thicker, its muscles being more developed than natural ; in some it is more bound down to the floor of the mouth, either by the development of the genio-glossi muscles, or by the frenum being inserted too near the apex. In others, one side of the tongue (the right) is somewhat larger than the other, and the organ is drawn to one side on being protruded from the mouth. In several, again, the tonsils are swollen, and the arches of the soft palate are lower than natural ; though, from what I have seen, I cannot concur in the opinion expressed by Mr. Yearsley, in his pamphlet, that, "in the great majority of stammerers, the tonsils and uvula are in a diseased state."

On the contrary, I should say that, in many of the individuals who experience great difficulty in speaking, nothing anormal is perceptible in the appearance of the parts; and that the physical alteration most frequently met with is the increased size and more energetic contraction of the muscles of the tongue and beneath it, which sometimes prevents its being freely protruded from the mouth, or its tip from being turned over the lip towards the nose, notwithstanding the person's efforts, as would be the case with an individual whose tongue was swollen from the exhibition of mercury, or any other cause. This alteration I consider to be a consequence of the disordered nervous action, which, by inducing irregular and spasmodic contraction, causes a greater degree of development of the parts, as would be the case with any other muscular structure which is unduly exercised. We therefore see that there is more difficulty and spasmodic action induced by the attempts to articulate words which begin with some of the consonants than with the vowels, the former requiring more the concurrence of voluntary muscles than do the latter, the pronunciation of which is of a passive nature. We also see, in the majority of stammerers, that there is more difficulty in beginning a sentence or speech than in its continuation, as a more direct effort of volition is required to commence a muscular action than for its repetition;

and many individuals can pronounce a difficult word with much greater ease if they are desired to repeat it after another person. These physical alterations may, then, be considered as an accidental coincidence, or as an effect of the disorder. One or other of them is constantly met with in tolerably healthy persons, and others who do not stammer; and it must be obvious that if they were the cause, the effect must be permanent, and stammering would always be present, instead of presenting, as it does, such remarkable variations, which are occasioned by the state of the person's mind at different times, and by other circumstances to which I have alluded. The same may be said of the opinion which would refer the complaint to the incident or reflex action on the spinal cord, to which of late years it has been the fashion to ascribe many diseases, the origin of which is referrible to a higher source*.

* "The instant production of several nervous affections from moral impressions, the variableness of the symptoms, their transient nature and periodicity in many cases, are incompatible with the existence of organic lesion as their cause; and, although there may be some unequal distribution in the capillary system of the brain or spinal cord in many instances, yet this is probably an effect. The immediate cause of the symptoms most likely consists in some modification of the nervous action, with which we are unacquainted."—*Treatise on some Nervous Disorders*, &c. p. 22.

"The frequent variation and the cessation and aggravation of the symptoms at regular or irregular periods, are features peculiar to disorder of the cerebral functions, serving, in many instances, to distinguish it from other diseases. These pecu-

I have, however, seen several individuals (though the number is small when compared with the others) in whom the physical alteration in the size of the tongue, and the energy of the contraction of the genio-glossi muscles, appeared to be the cause of the infirmity, from the manner in which the tongue is bound down, and the resistance which is afforded on attempting to introduce the fingers beneath it. This class of stammerers differs from the other, inasmuch as they do not stammer in general, but invariably upon the same words beginning with a consonant, as C, B, P, K, or T, or any combination of syllables resembling them; they are sometimes a minute or more before the difficult words can be articulated, after which they can go on pretty fluently, and they experience nearly as much difficulty if the word be in the middle of a phrase as if it be at the commencement. They are not, like the generality of stammerers, affected by being in society, as they experience an equal difficulty when alone; neither are they influenced by change of weather, &c. The first individual with this kind of stammer, whom I noticed, was a man who presented himself at M. Amussat's, and who could not pronounce the word *courroyeur*,

liarities may be accounted for by the constant succession of impressions to which the brain is exposed. The disorders of that organ do not consequently follow the definite course pursued by affections of other parts."—*Ibid.* p. 26.

and two or three others which resemble it, but in other respects could articulate tolerably well. Immediately after the section of the genio-glossi muscles, he could speak this word, and the others, without any difficulty ; and when I saw him for the last time, three weeks after the operation, he had no further impediment in his speech. I have little doubt that several of those, whom a long treatment and education have failed to cure, would be found to belong to this class*. There is, again, another class of individuals in whom the nervous or general stammer (which is sometimes upon some words, and sometimes upon others, and to which the preceding remarks principally apply) is combined with the difficulty in articulating particular words ; these persons, though not free from the stammer when alone, can yet speak much better, and are much less liable to gesticulations of the head, neck, or limbs, and to choreal or spasmodic action of the muscles of the face or lips, than when in company with strangers,

* A well-marked case of this permanent or physical stammer occurred in a man who was a patient in the hospital Beaujon for a surgical disease. The tongue was bound down to the floor of the mouth by an extremely short frenum, which even turned its tip downwards. As soon as the membrane was divided, the patient, who previously could scarcely speak a few words in succession, spoke distinctly and without difficulty ; but, as he did not take proper precautions against the part reuniting, he daily lost some of the advantages of the operation.—*Dict. de Méd. et Chir. pratiques*, art. Langue.

or otherwise excited. In several of those whom I have seen, there has been nothing remarkable in the appearance of the tongue or mouth, though the majority of them cannot turn the tip of the tongue upwards over the lip, and the muscles of the organ contract forcibly on the introduction of the fingers beneath it. I am inclined to think that in these persons the difficulty in the articulation of particular words is super-induced upon the nervous stammer; and that, when in an aggravated form and of long duration, stammering would always be found to be connected with increased muscularity of the tongue.

Females, it is well known, are much more affected by nervous disorders than men. Stammering, however, presents this peculiarity—that it is rarely met with in women or girls. Of the 100 cases mentioned in Mr. Yearsley's pamphlet, not more than three or four are females. Of 300, treated by M. Colombat, 286 were males, and only 14 females. Of between thirty and forty stammerers who presented themselves at M. Amussat's, only three were women; and other statistical accounts represent the number to be equally small. This circumstance has never been satisfactorily accounted for, and perhaps the only rational explanation that can be given of it is, that women have naturally a finer organization of the parts concerned in speech, with a quicker apprehension, and that they think quicker than

men; hence their articulation is more easy and fluent, they are capable of greater volubility, and experience less hesitation in speaking. This is even found to be the case at an early age. When children are required to appear and speak in public, as on the stage, girls are almost always found to be best adapted for the purpose. How often do we not see a boy become confused, stammer, and hesitate, on being questioned upon particular subjects, and how seldom in comparison does this occur with girls of moderate intelligence*. Probably, if inquiry had been made of all the

* "Little girls have the organs of speech more supple and flexible than boys; they speak sooner and easier, and women speak more agreeably than men. They are accused of speaking more: such ought to be the case, and I would willingly convert this reproach into praise. The eyes and the mouth have in them the same mobility. Always occupied in pleasing; observing, with the most persevering attention, every thing which passes around them; always expert to profit by their advantages, and reduced by the state of our society and manners, to shine only by singing, dancing, but especially by conversation, they give themselves up to these exercises with ardour, and excel in them more than men. The whole nervous system is also more developed in them; the impressions which they receive are more powerful and multiplied, and hence they have a greater number of sensations and internal feelings to make known: anxious to penetrate the secrets of men, and to ascertain the state of their hearts, speech is for them the most useful instrument, and the most indispensable to their happiness."

J. J. ROUSSEAU.

Here we have at once a rational explanation why stammering should be so rare, and other nervous affections so common, in females.

females who had presented themselves for the cure of stammering, it would have been ascertained that in several of them the infirmity had been acquired by imitation, as it must evidently have been with the two sisters mentioned by M. Magendie, who both stammered badly, and whose mother was also affected. This appeared likewise to be the case in a female whom I have recently seen, and whom I questioned upon this point. She, as well as her sister, thought her stammer was owing to her having been accustomed to go to school with another child who stammered. At all events, the circumstance of the comparative infrequency of stammering in females would be of itself a sufficient refutation of the opinion of those who regard this affection as dependent upon physical causes; as enlarged tonsils, and other anormal appearances of the throat and tongue, are in all probability as commonly to be met with in the one sex as in the other. With respect to the comparative facility with which the majority of stammerers sing, it appears to depend, partly upon the circumstance that the attention is concentrated upon keeping time, and in the variations of the voice, and partly that, in singing, the words glide one into another more than in speaking, and the difficulties may be more easily eluded.

I will now briefly notice the opinions of some writers on the complaint, and the methods which have been proposed for its removal. The earliest

instance on record of the cure of stammering is in the case of Demosthenes, who cured himself by reciting slowly, in a loud voice, long passages from the Greek poets, holding, at the same time, several pebbles in his mouth; and somewhat analogous methods have been found successful in more recent times. M. Itard proposed, in the year 1817, a sort of fork, with two prongs, which carried the point of the tongue backwards, combined with the practice of speaking in a foreign language with which the person was not very conversant, by which means both the attention and the memory were exercised during the conversation; and it will generally be observed that stammerers, if required to read before strangers, will do so much better if they can take an interest in the book or paper presented to them; the attention being thus for the time diverted from the thought of their being observed. The plan of Itard, however, was not very successful: that of Mrs. Leigh, of New York, was more so, especially after the improvements of it by M. Malbouche, who introduced it into France. Mrs. Leigh considered that the difficulty of articulating depended on the circumstance of the tongue not being carried upwards, so as to touch the palate in speaking; she therefore made those under her care persevere in beginning each word by turning the tongue up to the palate; and between the years 1828 and 1830 had sent away from her

establishment 150 persons cured. M. Malbouche superadded to this plan the drawing the lips backwards, so as to make the mouth appear larger, and when the phrase was terminated, the lips were again drawn back against the teeth, in order to recommence a fresh one. It was also required of the pupils to maintain a perfect silence between the interval of the exercises, and to practise declamation and reading aloud before attempting a familiar conversation, which was not permitted until the cure was considered to be effected.

M. Malbouche, however, divided stammering into three kinds, according to the faulty positions of the tongue in speaking, and varied his method accordingly ; but it would carry me too far to enter into the consideration of these varieties, which subsequent observation has shewn to be in great measure hypothetical. He says that the energy of the will is the most essential condition of success, and “ that it is important to concentrate it exclusively upon the object to be obtained by the treatment. Children, and that class of men of the world who are accustomed to dissert upon and discuss every thing, without ever concluding upon any thing, are incapable of this concentration of the attention, and for that reason are difficult to cure : whereas experience has demonstrated that peasants, working men, and uneducated persons in general, are more easily

cured. These individuals having but few ideas, seize with energy those which they can understand, and in which they are deeply interested." A want of confidence may cause any of the methods of treatment to fail altogether. In general, those cures which are the most quickly effected are the least durable.

M. Serres divides stammering into two kinds : the first is characterized by a sort of St. Vitus's dance of the muscles concerned in articulation ; the second, by a tetanic stiffness of the muscles of the voice and of respiration. In the first kind the will loses its influence over the rapid movements of the lips and tongue ; in the second kind the breath fails*. His method of treatment consists in making the sufferer breathe regularly, and combine his breathing with a certain cadence in speaking, as in declamation and singing. Dupuytren likewise recommended stammerers to speak in a manner analogous to the recitative of operas, by which means much of the difficulty was obviated.

M. Rullier considers stammering to be a cerebral affection, and that it is attributable to some modification of the action of the brain. "But," he asks, "in what does this modification consist? Without pretending to explain it, the following conjecture may be hazarded. In the stammerer,

* Mémorial des Hôpitaux du Midi, 1829.

the cerebral irradiation which follows thought, and becomes the principle which induces action in the muscles which are necessary for the expression of the ideas, rushes out with so much impetuosity, and is reproduced with so great a rapidity, that it exceeds the measure of the movements which are practicable by the agents employed in articulation. Hence, as if suffocated by this accumulation of the ordinary exciting cause of their movements, they fall into a state of spasmodic immobility, and of convulsive shocks, which characterize stammering*."

This hypothesis is, however, not borne out by observation. That there is a want of accordance between the cerebral action which occasions the muscular movements, and the agents by which they are effected, will, I think, be clear to all who have paid any attention to the subject; and that this is the essential cause of stammering I have endeavoured to prove, as well as the manner in which it takes place. M. Magendie justly observes, in refutation of the above theory, "I have seen many stammerers; and if I have met with some in whom the degree of intelligence appeared to be very great, I have likewise seen others in whom time was not wanting to the muscles for the expression of the ideas, which were any thing but abundant or vivid. Stammering is evidently a modification of the contraction of the muscles

* Dictionnaire de Médecine, art. Bégaiement.

concerned in speech ; and since by means of physiology we can give no explanation of this contraction itself, how can we expect to explain its various degrees ? Without occupying ourselves with researches which can lead to no useful result, let us limit ourselves to remarks on the kind of contraction of the muscles which take part in the formation of speech, and of which the action is more or less altered in stammering." M. Magendie then continues in the words which I have already quoted in the first part of this paper.

M. Colombat, whose work is the fullest and most recent on the subject*, regards stammering as a nervous affection, the principal character of which is a repetition by catches, or convulsive shocks, of a greater or less number of syllables ; or a painful and temporary suspension of the voice before some consonants or vowels which require a certain effort for their articulation. He divides the affection into two kinds, which he terms *labio-choreique*, and *gutturo-tetanic*. These are subdivided into several varieties. The first kind consists in a sort of chorea of the lips, and in a succession of movements, more or less rapid, of the tongue and lower jaw : it chiefly gives rise to disagreeable repetitions of b, b, b, t, t, t, d, d, d,

* *Traité de tous les vices de la parole, et particulièrement du bégaiement*, 2 vols. 3d edition, 1840.

or q, q, q. In the second kind the stammerer remains with his mouth half open, incapable of producing any sound ; sometimes, even, when the word begins with a vowel : the face and neck become swollen, and the jugular veins distended. In some individuals the tetanic state predominates, in others the choreal, though the two kinds are not unfrequently united in the same person. Thus a stammerer in beginning to speak is stopped at the first word, if it commence with a consonant which is difficult to pronounce ; then the fear of not succeeding renders the breathing hurried, and he becomes dumb, like a person affected with the second kind of stammer. In both kinds the stammering ceases by making a full inspiration ; but it will soon return if the person do not take care to breathe regularly, and recurs more or less frequently, or with greater or less intensity, according as the breathing is more or less agitated, and according as the moral emotions which he experiences tend to increase or diminish the act of the will. “Now,” continues the reviewer, “let us try to teach the stammerer to breathe regularly : let us connect his breathing with a certain cadence, as is the case in singing and declamation, the stammer will not occur ; and if the individual can subject himself to the same constraint in conversation, he will be able to speak without stammering. To this result the method of treat-

ment of M. Serres directly leads; whereas the other methods only attain it indirectly*."

It is foreign to my purpose to enter into the details of these educational methods of treatment: I therefore refer those who are particularly interested in the matter to the work of M. Colombat. In order to enable those under his care to keep, during their exercises, a regular measure, or cadence, in speaking, this gentleman makes his pupils use an instrument for counting, termed the *muthonome*, by which the rhythm may be accelerated, shortened, or kept at the same degree, at pleasure. After having enumerated several of the means which he employs, M. Colombat says, "The combination of the orthophonic means which have been described, constitutes a vocal exercise which has the advantage of acting at the same time physically and morally. It acts physically upon all the muscles of respiration; on the lungs, the larynx, and particularly on the glottis, on the tongue, and on the lips; in fact upon the entire vocal apparatus.

"It also acts morally. Thus the measure which exerts so beneficially its influence over all the organs, by regulating their movements, fixes the attention of the stammerers conjointly with the other parts of my curative method, and becomes an accessory idea, which, joined to the principal one, must necessarily place the nervous

* Gazette Médicale, 1840, p. 153.

action which follows thought more in harmony with the relative mobility of all the vocal organs."

The following are the results which M. Colombat obtained, from the year 1827 to 1833. Of three hundred stammerers treated at his institution, and in town practice, two hundred and thirty-two were cured without relapse, thirty-two relapsed, in fifteen the complaint returned after a second treatment, and twenty-one were incurable. The average duration of the treatment was twenty-five days. Two hundred and sixty-five were adults; twenty, children under twelve years of age; and only fourteen, women.

One of the worst cases of stammering which has fallen under my observation was that of a Savoyard boy, who presented himself at M. Amussat's. The difficulty in commencing most phrases was extreme, and the attempts were accompanied with strong spasmodic actions of the face, neck, and upper extremities. M. Colombat took him out of the room, and brought him back in about a quarter of an hour, when, by attending to the directions he had received, and keeping time by striking the fore-finger of his right hand against the left, he could articulate with much greater facility. The tongue, and the muscles beneath it, were very much developed, and contracted strongly on the introduction of the finger into the mouth. The operation of dividing the genio-glossi muscles was performed,

which produced a considerable amelioration, though it did not effect a perfect cure.

After an examination and comparison of the different methods of the educational treatment of stammering, MM. Rullier and Itard remark that every measure which has been advantageously employed may be reduced to a sort of obstacle or moderator, which is opposed to the irregular, anormal, and embarrassed movements of the organs of speech. This moderator acts physically or materially ; whether it be the pebbles employed by Demosthenes, the instrument for fixing the tongue, of M. Colombat, or the fork of M. Itard. It acts also upon the tongue, and other parts employed in articulation morally or mentally, by means of the attention, the will, the action of the memory, or the efforts at imitation. "The mechanism of speech," adds M. Itard, "is then performed under new conditions, associated as it is with certain voluntary movements, or with certain positions of the tongue, which are ordered, and which had previously been unconnected with the action of speaking. Such are, the movements of the thumb upon the forefinger, or frequently repeated inspirations, as recommended by M. Colombat ; the movements of the arm, as directed by M. Serres ; and the different positions of the tongue, according to the precepts of Mrs. Leigh and MM. Malbouche and Colombat. Such are, likewise, the exercises of the memory

and of imitation, the difficulty the stammerer experiences in endeavouring to learn, and in speaking only in a foreign language, or to adopt, in his familiar conversation, the emphasis of theatrical declamation *.

I now proceed to the consideration of the operations which have been performed for the cure of stammering, and of their respective applicability to particular cases.

The first operation for stammering was performed by Professor Dieffenbach, of Berlin, in January last, who, in a letter addressed to the French Institute, thus states the manner in which he contemplated the removal of the complaint might be effected:—"As I conceived that the disorder in the mechanism of speech, produced by stammering, was referrible to a dynamic cause, which I considered to depend upon a spasmodic state of the air-passages, especially of the glottis, which was communicated to the tongue, muscles of the face, and even of the neck, I was led to think that, by interrupting the innervation in the muscular organs which participate in this abnormal state, I should succeed in modifying or preventing it altogether." Accordingly he proposed the transverse section of the muscles of the tongue by three different methods; first, transverse horizontal section of the root of the tongue; second, transverse subcutaneous section of the root

* Op. cit.

of the tongue, or section of the muscles without division of the mucous membrane ; and, third, the horizontal section of the root of the tongue, with the excision of a triangular portion throughout its whole width and thickness. In performing these operations, the tongue is seized with forceps terminating in double hooks to each blade (*pincers de Museaux*), and drawn out of the mouth. A bistoury is then passed through it at its thickest part, from one side to the other, and its substance divided by cutting upwards. The posterior part is immediately seized with forceps, and held by an assistant, while the operator passes through it from behind forwards three short curved needles, armed with strong ligatures, which are carried to the bottom of the wound, and brought out on the upper surface of the anterior portion, when they are tied together, and approximate the cut surfaces. The second operation is performed in a similar manner, with the exception that the mucous membrane of the dorsum of the tongue is not cut through. In the third, a piece of the tongue is cut through, somewhat resembling in shape a slice of melon, and the ligatures applied as in the first method. This last operation has entirely superseded the others, which were only performed at the outset.

The first operation was performed in four cases ; in one, where there was a paralytic state of the tongue, it was unsuccessful ; in the other three

it was attended with success. The patient first operated upon was a boy, whose stammer was very bad, and who had been considered to be incurable. He experienced more especially a difficulty upon the gutturals, g, k, ch, z, and other consonants. At times he could not speak, and the presence of strangers always produced considerable agitation. The tongue was rigid to the feel, and the action of the muscles of the face and neck was considerable. On attempting to speak, the first word always caused the greatest difficulty : after this was overcome he could speak easier, and the words issued out in quick succession, till, on his becoming confused, the stammer returned. There was a good deal of hæmorrhage during the operation, but it ceased after the ligatures were tied. The stammering was removed, but the contractions of the face continued when he spoke. Considerable swelling of the tongue, and fever, supervened, which, however, subsided, and, on the seventh day from the operation, no remains of stammering were perceptible ; the convulsive movements of the face and lips had disappeared ; his pronunciation was easy ; the presence of strangers or mental emotion did not occasion any recurrence of the stammer. In the case where the second method of operating was adopted, on the introduction of the bistoury the blood gushed out with violence on both sides, and the tongue became very considerably swollen

from the extravasation of blood. The third operation was performed on a boy, æt. 16, who had great difficulty in pronouncing words beginning with certain consonants, and also occasionally upon the vowels, attended with considerable spasmodic action of the muscles. When with his brother and sister, he could frequently speak very well ; but the least agitation, or the presence of strangers, caused a recurrence of the stammering. A slice of the tongue was cut out, and a good deal of bleeding ensued. The stammer was, however, removed, and, on the eighth day, the cure was complete.

The Paris papers having mentioned that a letter had been received, on the 9th of February, from Professor Dieffenbach, stating that he had operated successfully upon the muscles of the tongue for stammering, though the nature of the operation was not mentioned, several surgeons began to operate. M. Phillips first performed the operation of dividing the *genio-glossi* muscles below the tongue in private, and sent a sealed packet to the *Académie des Sciences*, descriptive of the method he had adopted, and the result. I saw the patient at his house, a few days afterwards: he could speak and read with considerable facility. M. Velpeau, however, first operated in public, after describing the operation, on the 14th of February. M. Amussat, who had directed his attention to the subject (before notice of Dieffen-

bach's operation had arrived) in consequence of a patient stammering who presented himself to have the operation for squinting performed (which was likewise the case with Professor Dieffenbach) after having examined the muscles beneath the tongue in this patient, stated to several persons present his opinion that their division would be likely to relieve the stammer. He subsequently performed the operation on several patients, some of whom were presented to the Academie de Médecine. MM. Baudens and others likewise operated with success in many cases.

M. Phillips' operation is as follows :—The patient being seated on a chair, his head resting on the breast of an assistant, the operator seizes the frenum with a small hook near its angle of reflexion with the tongue. Another hook is inserted a little lower down, and an incision with scissors made between the two, and the membrane divided to some extent on either side; a sharp-pointed curved bistoury is then introduced, and carried from one side of the symphysis of the jaw to the other, dividing the attachments of the muscles. The bleeding is sometimes abundant, but is salutary. A piece of sponge dipped in vinegar is placed in the wound to arrest the bleeding.

M. Baudens plunges a pair of finely-pointed scissors, curved almost to an acute angle, with their blades moderately separated, beneath the

tongue, immediately behind the symphysis of the jaw, and with one cut divides the attachment of the genio-glossi muscles. There is generally little bleeding, as the incision is made close to the bone. A piece of sponge soaked in vinegar is put into the wound, and retained for two or three days, which practice has, in some instances, given rise to inflammation and suppuration. M. Baudens likewise divides the genio-hyoidei in those cases where the muscles of the neck and throat are implicated in the spasmodic action. One of the worst cases of M. Baudens was that of Vincent Zousset, a baker (*boulangier*), who was unable to articulate his name or profession. Immediately after the operation he could pronounce these words with great facility.

M. Amussat divides his operation into two periods or parts. The mouth being opened wide, and the tongue turned back, the mucous membrane of the lower part of the frenum, between the Whartonian ducts, is cut with small scissors, and the incision is extended on either side, the tongue being at the same time drawn outwards, so as to expose the genio-glossi muscles, which are then divided with large scissors curved on the flat. "At the point," says M. Amussat, "where I practise the section of the genio-glossi muscles, there is less difficulty and danger than at any other. You act on a double fibrous band (*faisceau*) or on the summit of the triangle,

whilst higher up, as is well known, the muscles spread out in a fan-like form, and are surrounded by vessels and nerves."

In some individuals it is found that the mere section of the frenum and sublingual membrane on either side of the roof of the mouth is sufficient to remedy the infirmity. Thus, out of fifty-five persons who were operated upon, eighteen were relieved in this manner. There is not in general much bleeding, and in none of the above cases has it occasioned uneasiness; when more than usually abundant, it is stopped by iced water, and small lumps of ice beneath the tongue.

One of the first patients operated on was Alexis Beyeuval, a man, *æt.* 48, who had stammered from his childhood, and had had the frenum divided at two different periods without any advantage. The stammer was of the worst kind. The movements of the tongue were very limited. It was turned towards the right side, and the patient could not protrude it over the upper lip. After the division of the frenum and the sublingual membrane on either side, he could speak some words plainer than before, but experienced great difficulty upon others. The *genio-glossi* muscles were then divided, which was followed by considerable amelioration, though the stammer was not altogether removed. Some muscular fibres which were felt to be still attached to the bone were cut through, and pronunciation

became free and easy, with scarcely any remains of the stammering. The deviation of the tongue was likewise rectified. Two months afterwards (18th April) there had been no relapse; the patient spoke as well as immediately after the operation.

Victoire Courgeot, æt. 16, has stammered since her childhood; her elder sister likewise stammered till she attained the age of fourteen, when it ceased. The father of these girls was a stammerer, which strongly corroborates the opinion I have already advanced; viz. that the majority of cases of stammering in females would be found to arise from imitation. We see, in this instance, that the sister, when approaching to puberty, being probably less under the control of her father, and associating less with him, lost her stammer; whereas, in the majority of cases, the complaint increases at this period of life. In Victoire's case the division of the membrane was sufficient to cure her. Two months afterwards there had been no relapse.

An operation of a different kind was performed by M. Velpeau a few days before I left Paris. In this patient the tongue was longer than natural. He could touch the lower part of his nose and chin. A small triangular portion was cut out of the apex of the tongue, without dividing the mucous membrane beneath. The edges of the wound were brought together with points of

suture. This was attended with some degree of amelioration at the time ; but I hear that as the wound healed the stammering returned, though not so bad as before.

Another method, which I saw described a few days ago in the *Gazette des Hôpitaux*, has lately been tried, as it would appear with success, by the same eminent surgeon. The patient was a young man from whom scarcely a word could be obtained, insomuch that he would have been considered dumb, were it not that the movements of the lips, and the violent efforts which he made to articulate, indicated his actual condition. The tongue in this case was also very long, and he could touch with it the lower part of his nose. Previous to operating, M. Velpeau tried the experiment of raising the tongue with a pair of ordinary forceps, when the patient was able to pronounce some words ; from which it was anticipated the operation would be attended with success. The operator then drew the tongue out of the mouth with his left hand, furnished with a piece of linen rag, and with the right passed transversely through its substance, at the junction of the posterior and middle thirds, a needle armed with four ligatures. Two of the ligatures were tied as far back as possible ; the other two were tied anteriorly, thus circumscribing a portion of the tongue, which, after it had sloughed away, would entail a similar loss of substance as in

Dieffenbach's operation. The patient did not appear to suffer much, and immediately after the operation was able to pronounce some words distinctly. He would not remain in the hospital, but promised to return every second day. During the first four days the size of the tongue was considerably enlarged, and the neighbouring parts were swollen, but no serious accident ensued: a few leeches, with the use of gargles, sufficed to allay the above symptoms. A week after the operation there was only some slight inconvenience felt in the throat. The stammer was in great part removed, so that he could speak with tolerable facility.

About the same time M. Velpeau tied the temporal and facial arteries on a man, æt. 36, affected with epilepsy during the last seven years. The disease was first induced by a fright, and the attacks had continued eight or ten times a month; but within the last three months he had attacks almost daily. The temporal arteries were first tied: the patient had only a slight attack on the same day, and the following day passed without any. On the 5th of April the external maxillary arteries were tied at the point where they pass over the jaws, and the attacks did not recur.

The operation on the genio-glossi, as performed by Mr. Lucas, does not differ materially from the other methods which have been already mentioned, except that a portion of the muscle is removed; but a different mode of dividing these

muscles, viz. the subcutaneous, has more recently been practised by M. Bonnet, of Lyons. A puncture is made in the skin, a few lines behind the symphysis of the jaw : a blunt-pointed tenotome is then introduced, with its sharp edge turned towards the bone, and passed upwards till its point is felt by the finger through the mucous membrane beneath the tongue. The attachments of the muscle are then divided right and left ; the cutting edge of the tenotome being kept close to the bone, and acting only on the superior part of its concavity, the genio-glossi are alone cut, and the genio-hyoidei avoided. Scarcely any bleeding ensued. M. Bonnet had performed this operation in five cases : the two last patients, though labouring under a bad form of stammering, and who even stammered in reciting verses, were immediately relieved, without preserving the least trace of their infirmity. On the other three patients the relief was not so decided, though a considerable degree of amelioration resulted ; which circumstance M. Bonnet ascribed to the mode of operating not being so perfect in the first case as in the last ; though I should think it depended on the former being more strictly cases of nervous stammer than the latter, and that the operation would not be so likely to be permanently successful.

The following cases will serve to illustrate the two varieties of stammering.

Purely nervous stammer.—A young man, who

has stammered since his childhood, states himself to be very nervous. When alone, or when with persons with whom he is very intimate, he can talk very well, but almost always stammers before strangers; sometimes more than at others; especially if he thinks the infirmity is remarked, or if he be questioned respecting it. The stammer is not, however, very bad. There is no particular tension of the muscles of the tongue, which can be turned upwards towards the nose, nor is there any thing anormal perceptible about the mouth or throat. He has two cousins similarly affected.

Physical stammer. — This man always experiences difficulty in pronouncing certain words, especially those beginning with a q or n, as *quatorze, navet*; considerable spasmodic action of the muscles of the face and lips being induced by the attempts to articulate these or other words upon which the difficulty exists. He has as much difficulty when alone as when in company, or before strangers: cannot protrude the tongue far, or turn it upwards over the lip. After the division of the sublingual membrane, and cellular texture on the floor of the mouth, he was able to protrude the tongue, and could speak the above and other words with facility.

Mr. Yearsley's operation consists in the excision of the entire uvula, and also of the tonsils, when these bodies are enlarged or diseased. The part to be removed is seized with an Assalini's

tenaculum, and cut off, scissors being employed for the uvula, and a knife for the tonsils, which being frequently hardened, present considerable resistance, and could not, in all probability, be cut through by the new instrument, or guillotine as it has been termed, recently invented for this purpose, on the supposition of the likelihood of hæmorrhage from this operation ; which occurrence, though it might happen when the tonsils are enlarged and soft, is not likely to take place, and I believe never has happened, when they are indurated. The extirpation of these parts is attended with scarcely any pain in most instances, and the pain from the excision of the uvula is but slight. Nor has any particular inconvenience, as far as I know, attended the loss of this part ; though it is said that singers and others, who have had this operation performed, were more liable to sore-throat and coughs. Mr. Yearsley, however, states that this is not the case when the entire uvula is removed ; but that when only a portion of it is snipped off the pain is much greater, and subsequent irritation is not uncommon, which may be very easily conceived. In some cases, when the palatine arch descends lower than natural, it is snipped on each side previous to the removal of the uvula.

One of the most successful cases of this operation which has fallen under my observation is that of Crawley (the seventh case in Mr. Yearsley's

pamphlet), who was affected with one of the worst kinds of stammer; in whom the tonsils and uvula were enlarged, and who derived immediate relief, which has continued to the present time (two months from the operation). He can now speak with facility and without stammering.

In the boy Wright the stammer came on when he was between three and four years of age: there were occasionally remissions of a few weeks at a time; and as he had not stammered for a long time, his mother supposed that he had got rid of it altogether. Three months ago, however, his father died, which occasioned a recurrence of the stammer. Nothing anormal was perceptible about the mouth or throat. On the uvula being removed he immediately spoke freely, and without impediment. I am unable to say whether, in this case, the relief was permanent.

A man, æt. 40, sailmaker, when alone speaks "as well as any body;" and when with his comrades does not stammer so much as when with strangers, when the inconvenience is sometimes very great. Does not stammer when he speaks in a singing voice. The uvula was removed, but he still stammered, though not so much as before.

A man named Partridge has a difficulty especially upon the p's, and can scarcely articulate his own name; but if he says it without forethought, or if his attention be diverted, can speak it very well.

Snelling, a young man who was in the room when the boy Wright underwent the operation, on seeing its effects, and that the boy spoke without difficulty, was likewise able to speak without stammering. At my suggestion he was sent back to wait a little, and on returning into the room, at the expiration of about an hour, stammered a good deal while being questioned respecting it. There was a warty excrescence on the left tonsil: while he was asked about its origin he spoke fluently, and without the least stammer. This was also the case when questioned about other things which diverted his attention from the complaint. After the wart was removed he thought he spoke better, but still stammered. After removal of the uvula he spoke better, and on reading experienced every now and then some difficulty.

A boy, who had more especially a difficulty on letters beginning with p and l, experienced considerable hesitation when told to say *love-child* or *lollypop*; but after a full inspiration he could pronounce these words tolerably well during the act of expiration. After the removal of the uvula he could articulate them with facility, and without drawing in his breath.

A young woman whose uvula was removed without any perceptible advantage.—The muscles beneath the tongue were a good deal developed, and this organ appeared to be limited in its move-

ments. She is not free from stammering even when alone, but is always much worse when with strangers.

A man in whom the palate had been extensively divided by another surgeon, without any advantage resulting.—The uvula was excised by Mr. Yearsley, but did not produce any amelioration at the time.

Henry Gee, a bad stammerer.—The palate was divided on one side, after which he spoke better. Desired to return in a week. At the expiration of this period he still stammered, though not so badly as before. His mother says that he spoke better the two days succeeding the operation than the three subsequent days. After the uvula was removed, he was able to articulate much easier than before.

Wilkinson (mentioned in Mr. Yearsley's pamphlet), a man in whom the tongue was of large size.—Uvula removed without any advantage.

Henry Smith, a boy who stammered.—The tonsils were enlarged. After their excision was able to speak without much difficulty. The uvula was next removed, but it did not appear that he spoke any better than after the operation on the tonsils.

The above are a few of the cases of which I made a memorandum, and to which I shall have to allude. It now remains that I should endeavour to explain in what manner these various methods and operations were successful in removing stam-

mering, and the causes of their failure in some instances ; and to what cases the one or the other are more particularly applicable.

With regard to the methods of education, the object of which is to regularise the respiration and the action of the different parts concerned in speech, and thus bring them to act in harmony together, there is no doubt that they are calculated to effect the removal of the complaint in a large proportion of cases ; but when we consider the length of time required, the subsequent attention necessary to prevent a recurrence, and the power of habit, we cannot be surprised that many persons should be unwilling to have recourse to them, and that relapses should frequently occur ; for the statistical accounts of teachers and practitioners of these methods cannot always be relied upon, on account of the difficulty which must exist in keeping the patients in view for a sufficient time after the termination of the treatment ; and if the opinions which I have expressed of the varieties of stammering be correct, there are obviously cases in which these means would be attended with no advantageous result, though all are undertaken indiscriminately. This mode of treatment I should conceive to be the most likely to be attended with success in the nervous kind of stammer, particularly when it has arisen from imitation, and in those cases where there exists little or no physical alteration of the

tongue or throat : but even in these it will fail in a certain proportion, and relapses must not unfrequently occur : so that, as stammerers now have other means within their reach by which they might frequently be relieved, it becomes a matter of choice for them to which they would prefer having recourse ; but "*l'un n'empêche pas l'autre,*" and many individuals whom treatment had failed to relieve, may still be cured by operations which are not particularly serious, and in the vast majority of cases entail no unpleasant consequences. And again, in some of those who have undergone operations, educational methods may be had recourse to with advantage when the operation has not succeeded in removing the infirmity, or has been attended with only a partial success. Having just said that the operations are not generally serious, or followed by unpleasant consequences, I of course do not include that of Professor Dieffenbach, which I consider to be attended with considerable danger, and only to be thought of in extreme cases, when the patient is willing to run the risk ; and I have no doubt that many, if not the great majority, of the patients so operated upon would have been relieved by the other operations. It has, I believe, only been performed once in this country, by Mr. Lucas—after the failure of the other operations—with success ; and we have seen that the operation by the ligature, by

M. Velpeau, appeared to be equally efficacious ; though this also is a proceeding by no means to be recommended. Indeed, the hæmorrhage is almost always profuse, and has occasioned the death of one patient, a medical student. Even Professor Dieffenbach speaks of it in such a manner as not to recommend its adoption, unless by very skilful operators. He says, " The importance of so serious an operation, the dangers which may result from it, the loss of the tongue by mortification, a too abundant suppuration, or even the unskilfulness of an assistant, which may cause it to be torn, are so many considerations which require to be taken fully into the account, and which, joined to the difficulty of its performance, will prevent its being undertaken by unskilful operators." The cases in which it might be admissible, and most likely to be attended with relief, are those in which the tongue is of very large size, which impedes the harmonious action of this organ with the other parts concerned in speech.

The division of the genio-glossi muscles, or of the frenum and sublingual mucous membrane, on either side, is the operation which I have seen most successful ; and in which the success has been the most permanent in bad cases of stammering. I consider that the method of performing by the mouth is preferable to the subcutaneous operation, not only because it is more

easy, and because it may be ascertained by the finger whether all the fibres are divided, but likewise because in a certain number of cases the division of the membrane is sufficient, and the patient is spared the pain and inconvenience of the second part of the operation. It may be that the three first patients, on whom M. Bonnet operated, were not completely relieved of the stammer, because the muscular fibres were not completely divided, as in the last two patients; or it may be, that being of the purely nervous kind, the division of the muscles is not so well calculated to remove the stammer as in the physical kind, where the movements of the tongue are limited, or this organ is more fixed than natural to the floor of the mouth, so as to prevent its being duly protruded. The section of the membrane or muscles by the mouth I conceive to be also best adapted to the third kind of stammer, when there is a combination of the nervous and physical varieties. The chief objections to this operation are the bleeding and inflammation sometimes occasioned by it. In the great majority of cases these accidents do not occur to any prejudicial extent; and by keeping the edge of the knife or the blades of the scissors near to the bone, the risk of bleeding is greatly obviated, as there are only small vessels at this part, though they may in some cases become anormally enlarged, in proportion as the muscles

themselves are enlarged. Several of the patients at M. Amussat's lost a few ounces of blood before the bleeding ceased by the application of ice. Hæmorrhage to a considerable extent occurred in one case of M. Phillips, but was not followed by any bad consequences. A case likewise happened to myself, in which at least ten or twelve ounces of blood were lost before the bleeding ceased. The muscles of the tongue, and beneath it, were very much developed in this case. The patient's pulse was quick and full, and the bleeding did not induce faintness, so that I consider it was rather beneficial than otherwise. This was a bad case of mixed stammer; the patient being of a very nervous temperament. The stammer was a good deal relieved, but he still stammers much when excited.

A case of alarming hæmorrhage recently occurred to M. Guersant, but it was not attributable entirely to the operation, as there existed in the boy a hæmorrhagic diathesis, of which the operator was not previously aware. He was subject to repeated bleedings from the nose, and only a few days before, the extraction of a tooth had given rise to troublesome bleeding. There was very little loss of blood at the time of the operation, but it took place subsequently, and the greatest quantity of blood was lost three days after the operation, so that it did not occur from the division of any particular artery. The actual cautery was twice applied,

ice and other means having been previously found ineffectual ; but the hæmorrhage ultimately ceased, and the boy's pulse was not particularly depressed*. M. Guersant had performed the operation on nine other individuals, who considered themselves relieved by it, but the amelioration was not so apparent to M. Guersant. In one of the patients, who experienced the greatest benefit immediately after the operation, the stammer gradually returned as bad as ever. In that case also, where M. Velpeau excised a triangular portion from the apex of the tongue, the advantage resulting from the operation was not permanent : so that in these cases the mental impression must be considered as the cause of the immediate advantage, as it is evident from M. Velpeau's account that there was no physical alteration of the tongue itself; and I purposely mentioned the case of epilepsy, in which he tied the facial and temporal arteries, (as well as those of aphonia cured by mental impressions, in the beginning of this paper), in order to illustrate the power of similar agencies over nervous diseases. Almost every practitioner is aware that the attacks of epilepsy may frequently be suspended for a longer or shorter period by any means in which the patient can be induced to have confidence : hence the histories

* The last accounts state that the bleeding had recurred ; the boy was in a very exhausted state, and tonics were prescribed.

of cures of this disease from animal magnetism, as well as from the host of drugs which have in turns been cried up as specifics, but which have only enjoyed an ephemeral reputation. Any thing tending to break the chain of habitual recurrence will also very frequently produce a similar effect ; as a burn or other accident. And there is not the slightest doubt that in a great many of the cases of stammering which have been cured by operation, the advantage may be satisfactorily accounted for in this manner ; but, on the other hand, there is no doubt that the operations act in many cases by removing physical impediments to the associated and harmonious action of the parts concerned in speech, as in many of the individuals whom I have observed, especially in Paris, where in almost all those persons whom I saw, some degree of shortening, thickening, or other anormal condition of the tongue existed, (which has led M. Amussat to conclude that stammering depends invariably upon these anormal states, but which, I have no doubt, are, in the majority of cases, consecutive on the nervous kind of stammer, as I have already said), and almost all of whom were either cured, or derived more or less permanent advantage from the operation.* In one patient, whom I examined, where it failed to afford any relief, the tonsils

* In a series of cases where this operation was performed with success by M. Dufresse, of Angoulême, the tongue was, in almost all the patients, thicker or shorter than natural.

were considerably enlarged, which shews the necessity of discrimination. The nine cases operated by M. Guersant, in which he did not think any very marked benefit was produced, were likewise in all probability not so well suited to this kind of operation. The circumstance, which I witnessed several times, of the stammer being partly remedied on the section of the sublingual membrane, still more so when the muscles were partially divided, and altogether removed after the division of the muscular fibres which remained attached to the bone, suffices to show the material action of the operation in some cases. Even when the movements of the tongue are not particularly limited, yet, in a large proportion of cases, its muscles are unduly developed, and contract energetically on the introduction of the finger, and consequently, on attempting to articulate particular letters or words which require their active concurrence : here, I conceive, the operation produces a beneficial effect by removing this state of anormal contraction and rigidity, producing a degree of relaxation (to which likewise the loss of blood is favourable) which enables this organ the better to act in unison with the muscles of the throat and of respiration. Dieffenbach's operation tends to produce a similar result. Hence we may perceive why the spasmodic actions of the face and other parts should so speedily cease after these operations ; why the excision of the

uvula and tonsils should fail when there is considerable enlargement of the tongue, or when the motions of this organ are particularly restricted.

With respect to this latter mode of operating, I am convinced that it likewise acts in many cases, though not in all, by the moral impression produced upon the patient: this will be evident on referring to two or three of the cases which I have noted, and also to those reported by Mr. Yearsley. We see in the case of Henry Gee, that he spoke much better when the palate was incised on one side; that he continued to speak tolerably well the first two days, but afterwards he began to lose the advantage, till the uvula was removed, when he again experienced a decided improvement. On the other hand, the man on whom the extensive division of the palate had been made without any benefit resulting, had also his uvula removed without any advantage. In some patients the excision of a portion of the tonsil relieved the stammer, as in the case of Henry Smith. I think it not improbable that the presence of these bodies when enlarged may in some cases produce stammering (not, as Mr. Yearsley imagines, by narrowing the throat, or preventing the free egress of air, but in a similar manner as when the muscles of the tongue are enlarged, and consequently limited in their movements, or when this organ is more bound down than natural), by interfering with the harmonious

and associated action of the muscles of the palate with other parts concerned in speech. But these cases are rare when compared with others. The presence of enlarged tonsils must then be looked upon as an accidental coincidence, though when existing this enlargement doubtless tends to aggravate the stammer. In the case I have mentioned, at M. Amussat's, when the section of the genio-glossi failed to afford relief, and the tonsils were a good deal enlarged, it is very likely their removal would have been productive of benefit. This I suggested to M. Amussat, and he promised to perform the operation; but as I left Paris on the next day, I am not aware whether or not it was done. In Mr. Yearsley's case, to which I have already alluded (Crawley), it may be questioned whether the extirpation of the tonsils would not have been attended with considerable relief to the stammer, even if the uvula had not been excised: I say this, not to call in question the propriety of excision of the uvula in this case, but as a hint for future investigations, which may serve to elucidate the complications of stammering. When, therefore, in stammerers, the tonsils are enlarged, the removal of these bodies may relieve the stammer, by allowing a freer play to the muscles of the throat, by which means their action can be better associated with that of the respiratory and lingual muscles. In corroboration of what

I have now stated, I may refer to the case of Charles Geyer, (in Mr. Yearsley's pamphlet), in which the tonsils were enlarged, and the mere excision of the uvula produced no advantage; of J. Topliss, whom the excision of the tonsils sufficed to cure; and also of James Carter, æt. 12, a bad case of stammer from early childhood, in which the tonsils only were excised, with relief at the time, and progressive subsequent improvement, terminating in complete cure. I think, therefore, that in stammerers, when the tonsils are enlarged, there will often be found, in addition to the nervous stammer, a difficulty upon particular letters (the gutturals), and that the removal of the enlarged tonsils would generally be productive of as much benefit as when the uvula is also excised. The excision of this substance, or the division of the palate, may likewise act in some cases by diminishing the state of tension, or tendency to anormal contraction of the palatine arch, which occasions the impediment in articulating, when the person is in a nervous or excited state; but in many, if not in the majority of these instances, the moral impression from the operation is principally instrumental in producing the amelioration, which may be only temporary, or it may be of a permanent nature; but in which ever way it acts it is unquestionable that several persons have been cured, and many have experienced decided relief; so that in certain

cases, when the division of the genio-glossi muscles, or of the membrane covering them, does not appear to be more especially indicated, I see no reason why the uvula should not be removed: for, even supposing the effect to be merely mental, that is no reason against its adoption, if the complaint can be by this means removed or mitigated, particularly if it be clear that no inconvenience results from the loss of the uvula in those cases where it is not attended with success. In cases of purely nervous stammer it is perhaps as likely to be successful as the more severe operation of the section of the genio-glossi, which, however, I consider better adapted to the physical or mixed cases (unless when there is enlargement of the tonsils), and to those of bad stammerers, where a difficulty exists upon particular letters or words. This operation, as well as the others, no doubt also acts in some cases where nothing anormal is perceptible, purely by the mental effect which is produced.

No one can have a greater abhorrence of charlatanism, or be less likely to countenance it, than myself: I therefore think it due to Mr. Yearsley (though not agreeing with him as to the nature of stammering, or the manner in which excision of the tonsils and uvula afford relief) to state my belief that he has acted with good faith in giving the correct results of his cases, as far as he was able to ascertain them; and I think that

if his operation were performed with more discrimination, he would be enabled to record a greater amount of success.

From a consideration of what has preceded, I think we are justified in deducing the following conclusions:—

1. That stammering is, in the great majority of cases, originally a nervous affection.

2. That in a comparatively small number of persons it arises from physical causes, which interfere with the associated action of the parts necessary for the formation of speech; and that the tongue is most frequently the organ in which anormal conditions are observed.

3. That the nervous kind of stammer is sometimes superinduced upon the physical kind, but that more frequently the physical alterations supervene upon the disordered nervous action, and that, when existing, they add considerably to the severity of the complaint.

4. That the physical alterations most frequently perceived, as the tongue being more bound down, larger or shorter than natural, enlargement of the tonsils, &c. are not necessarily a cause of stammering, as all these alterations are frequently seen in persons who do not stammer, and they exist permanently, though many stammerers are at times comparatively free from the complaint: but they may give rise to, or increase stammering, whenever they present obstacles to

the associated muscular actions required for speech, being sometimes constant in their operation, at other times depending, in a great measure, upon the person's state of mind.

5. That in the purely or principally physical kind, there is always a difficulty upon certain letters or words, which is generally as great when the person is alone as when in company; but that, on the other hand, the nervous stammer is always aggravated by society, unless when circumstances arise to divert the individual's attention from it; and that, when alone, or with an intimate friend and relative, the stammer is frequently absent, or greatly mitigated, but that these two kinds are often combined in the same person.

6. That stammering presents, in many respects, great analogy with other nervous affections, but that it differs from them in the circumstance of its being but rarely met with in females, which may be accounted for by the explanation which has been given in the text.

7. That the reason why stammerers can generally sing without the infirmity being perceptible is, that, in singing, the inspirations are taken at longer intervals, the air issues from the lungs in a more continued stream than in speaking, and consequently less frequent efforts of volition are required: the words gliding more one into another, the difficulties upon particular letters

can be better avoided, but that where the stammer is purely physical, if it do not prevent singing, it is present, though generally in a less degree than in speaking.

8. That the complaint is capable of being cured, in many cases, by methods of education which tend to regularise and associate the respiration and the muscles concerned in speech, but that this treatment is not applicable to all cases of stammering, and that relapses not unfrequently occur.

9. That the operation of Dieffenbach should only be had recourse to in extreme cases, after the failure of other means, and that it is most applicable to cases where the tongue is unwieldy from its increased size.

10. That the division of the sublingual membrane of the mouth, and of the genio-glossi muscles, is the operation most generally applicable, especially to bad cases, and when the tongue cannot be properly protruded or turned up; and that this operation is, in a great many cases, successful in producing a permanent cure, or considerable amelioration.

11. That when, in stammerers, the tonsils are enlarged or diseased, the extirpation of these bodies is advisable, as it may suffice to remove the stammer, without the necessity of having recourse to other means.

That the excision of the uvula is followed by

a cure in some, and is attended with benefit in many cases ; and that there appears no ground for apprehending inconvenience from its removal.

12. That when stammerers are disinclined to go through a prolonged course of educational treatment, or when this has failed, a cure, or considerable amelioration, may often be obtained by operation ; and that the kind of operation most likely to afford relief can be best determined by an examination of the peculiarities in individual cases.

ON SQUINTING.

From the success which attended the division of muscles and tendons, by a small aperture in the skin, for the cure of club-foot and other deformities of the body, the originator of this method, in recent times, Professor Stromeyer (whom I had the pleasure of meeting last spring at Erlangen, when he shewed me several cases, cured and in progress of cure, but who has since been removed to replace Graefe, at Berlin), was led to entertain the opinion that a similar operation might be equally applicable to the cure of squinting; and he accordingly described the method of operating which he recommended for the purpose in 1838*. One or two other practitioners, however, put forward a prior claim to the merit of having proposed this operation. M. Guerin, who is well known to the British medical public as one of the most eminent practitioners of Paris, and as the director of the orthopedic establishment, La Muette, in the Bois de Boulogne, states that, so far back as 1837, he proposed the division of the muscle in cases of squint, which he considered to be an affection of an analogous nature

* Beitrage zur operative Orthopædie.

to club-foot ; but that he was deterred from performing the operation by the apprehension of serious inflammation of the eye. Be this as it may, the first public announcement of the performance of this operation was made by Professor Dieffenbach, of Berlin, from whom a letter was read in the sitting of the Académie des Sciences of February 3, 1840, stating that he had divided, with success, the internal rectus muscle in two cases of convergent strabismus ; and on the 25th of the following May he further announced that he had operated on 118 cases. These announcements excited considerable interest throughout Europe ; the attention of the profession became strongly directed to the subject, and numerous operations were performed in other countries ; the first in England having been performed by Mr. Guthrie, Jun., in April, 1840. Several of the first operations, however, were not very successful ; and some of the failures have been attended with very serious consequences, though these are now of very rare occurrence. This operation now ranks among the most simple and successful in surgery, in the majority of cases. The failures which have occurred are, in some cases, attributable to an improper mode of performance of the operation ; in others, to complications which should have counterindicated it, and which rendered it nugatory : for as squinting depends upon a variety of causes, the

operation is not universally applicable ; though this circumstance has not been sufficiently attended to by some operators, who have undertaken every case which presented itself to them.

According to the opinion of Buffon, squinting was, till lately, supposed by the majority of persons to be the result of a congenital or acquired inequality in the powers of vision of the two eyes ; but it is now admitted to depend, in the majority of cases, on the want of harmony or irregular action of the muscles destined to move the eye, and that the weakness of vision is secondary to the squint, being generally removed after the position of the organ is rectified.

Six muscles move the eyeball in different directions : the four recti or straight muscles rise from the bottom of the orbit, and pass forwards to be attached to its surface. The tendons of the superior and inferior muscles are inserted at about equal distance from the margin of the cornea, so that their antagonising powers are pretty equal ; the inner rectus, however, passes more directly to its insertion than the external, and is likewise attached nearer to the cornea than its antagonist. When one muscle alone acts it necessarily turns the eye in its direction ; the four muscles acting at the same time draw back the eye within the orbit (and there is reason to believe that this action, though imperceptibly exercised, is instrumental

in adapting the powers of vision to different distances); the action of the recti muscles is antagonized by that of the superior and inferior oblique, which tend to keep the eye forward, in which they are assisted by the elasticity of the cellular texture and fat in which it is lodged, and which, when partially absorbed in emaciated persons, after lingering illness or long abstinence, imparts to the organ its sunken appearance. The two oblique muscles acting together, concur with the internal rectus in turning the axis of the eye inwards; to which likewise the inner fibres of the superior and inferior recti contribute; while the external fibres of these muscles tend to cause eversion of the cornea, and act in concert with the external rectus, which draws the eye directly outwards, and is employed when we look at an object sideways. Thus, from the preponderance of muscular power on one side, we may see the reason why people can so easily turn the eyes inwards, or squint towards the nose, whereas it is impossible for any one, by an effort of volition, to squint outwardly with both eyes, and why convergent strabismus, or inward squinting, should be so frequent in proportion to the divergent kind; which I think would be found, in most cases, to depend more upon a want of power, or faulty condition of the internal rectus, than upon an increased power of its antagonist; which opinion is corroborated by the circumstance that division of the external

rectus only partially succeeds, in many cases of divergent strabismus, in rectifying the position of the eye, whereas, when properly performed, the section of the internal rectus, in convergent squint, rarely fails to effect this object. In a few instances, however, after the operation for external squinting, a convergent squint has supervened, thus proving that the internal rectus was in its normal condition : the reverse also occasionally takes place, to a certain extent, after the operation for convergent strabismus : indeed, it was at first apprehended that this would almost invariably be the case, but experience has amply demonstrated that the influence of the oblique, and of the inner fibres of the superior and inferior recti, is sufficient to counteract that of the external rectus.

M. Guerin divides squinting into two kinds, which he states comprise all the varieties of this infirmity. The first is the mechanical or active muscular squint, the other the optic or passive muscular, the characters of which are perfectly distinct from the former ; the one being almost always capable of being cured, or at all events greatly ameliorated, by the division of the muscles, whilst in the other the operation should never be performed. In the first kind, from the muscle being shorter, the axis of the eye is turned in that direction, and the movements of the two eyes do not harmonise together. The second

kind is mostly consequent upon obstacles which prevent the rays of light from being received in the direct visual axis, as in the healthy eye : such as cataract, opacities of the cornea, &c. Mechanical squint generally arises during the period of childhood (which is so prolific in convulsive affections), in consequence of convulsion or other affections of the nervous centres ; and once existing, it usually persists, increasing with the development of the organ and the growth of the individual, and becomes more and more permanent. Mental emotion generally increases it for the time, and when once the spasmodic action has passed into a state of permanent contraction, the affection is incurable except by operation. The sphericity of the eyeball becomes altered, the organ being frequently flattened on the side corresponding to the muscular retraction, and the portion between the eyelids on the opposite side being more prominent than natural. The pupil is, in most cases, more dilated in the squinting eye, which is likewise smaller than the healthy one. The degree of movement possessed by the organ varies from almost complete immobility, or fixed squint—in which the patient feels the eye tied, as it were, to one side—to nearly the perfect motion of health ; which M. Guerin terms the rudimentary squint. In the efforts to rectify the position of the squinting eye, the sound eye participates so as not unfrequently to

induce squinting on that side. When the patient attempts to look at any thing with the squinting eye, its position becomes rectified, and the power of rectification is always in an inverse ratio to the degree of muscular shortening; so that in incomplete strabismus the deformity only exists when the individual is not looking at any thing particular; constituting what has been termed by Buffon and others the *faux regard*. When there is a double squint, equal in degree in both eyes, the position of each eye is rectified alternately, when the patient looks at objects; and the squint thus appears to travel from one eye to the other. In rudimentary squint the patient looks with both eyes; in the double squint, which is equal on both sides, he looks alternately with one eye and the other. Many patients, on looking from both eyes, see double, from the want of correspondence between the visual powers.

It may, however, be questioned whether, in those cases where the patient possesses the power of rectifying the position of the eye, there be any actual shortening of the muscle: this doubtless exists in those cases where the eye is more or less fixed to one side; and the muscle is not unfrequently seen during the operation to be considerably increased in bulk*. It is likewise

* "The active shortening having the effect of occasioning considerable tension of the retracted muscles, these progressively acquire a texture dependent upon their continued tension; that

now admitted that in some of the passive kinds of squinting advantage may be derived from the operation. No reflecting surgeon would think of operating, when, from opacity of the cornea, or other irremediable physical obstacle to the passage of the rays of light through its centre, the eye is turned inwards, so as to allow the light to pass through its lucid part to the retina; though this has been done by some of those who operate on all cases indiscriminately, with the obvious consequence that though the squint was removed the eye was rendered useless for vision. But when squinting co-exists with cataract which admits of operation with a probability of success, it becomes a question whether it would not be better to perform the operation for squinting in the first place. Again, when squinting is induced by paralysis of the antagonist muscle, as the rectus externus, the internal rectus may often be divided with advantage, provided the sight be not impaired; for even if the eye were afterwards to be motionless, it would have a better appearance in the centre of the orbit, and be more useful for vision, than if drawn to one side.

In the largest proportion of cases the squint is confined to one eye, most frequently the right; probably from the circumstance of the muscles of

is to say, they become fibrous, whilst the muscles passively contracted lose somewhat of their consistence, and tend to pass to the fatty state."—*Guerin, in Gazette Médicale.*

the right side of the body being naturally more developed than the left; and being but little used for vision, it is almost constantly drawn to one side. When, however, it is recent, and not very decided, as in children, it not unfrequently disappears as the child grows up; and may likewise frequently be removed by means which tend to exercise the eye, as bandaging the sound eye, &c., but these means frequently fail, from not being persevered in for a sufficient length of time. When both eyes are affected, it does not frequently happen that they are both affected in the same degree, though it is not always easy for a casual observer to determine in which eye the squint is the most marked. This, however, may be readily ascertained by holding up, at a certain distance from the patient, some small object, as a pen or pencil, and requesting him to look at it, when the eye which is most affected will be turned inwards, and the object will be perceived with the best eye, which likewise will be able to distinguish the letters on a book, or the effigy on a coin, at a greater distance*.

* Montaigne, in the chapter of his Essays headed *De ne contrefaire le malade*, alludes to the disuse of one eye causing it to become weaker, and tending to strengthen the other, in mentioning the case of an individual who, in order to disguise himself, wore a patch over one eye, and who, on removing it, when no longer under the necessity of wearing it, found that the sight of the eye was lost. He says, "Il est possible que l'action de la veue s'etoist affablée, pour avoir esté si longtems sans exercice, et que la force visive s'estoit tout rejectée en l'autre

The operation is performed, in many cases, within a minute, though sometimes a few minutes are required. It is attended with but little pain, and scarcely any effusion of blood; and very rarely gives rise to inflammatory symptoms which require active treatment. Several methods have been proposed by different operators, which, however, with the exception of the sub-conjunctival method of M. Guerin, all consist in exposing the tendon of the muscle before dividing it.

In Professor Dieffenbach's operation, the patient is seated in a chair, his head resting on the breast of an assistant, who, with an elevator, raises the upper eyelid; the lower eyelid is in like manner depressed by a second assistant: the operator then takes hold of the conjunctiva, about three or four lines from the margin of the cornea, with two small hooks, one being held by himself, the other by the assistant: the raised fold of membrane is then divided with small scissors, and dissected from before backwards, by which means the muscle is exposed, and a blunt hook, or director, being passed beneath it, is divided with the scissors, or a bistoury.

The method of M. Phillips does not materially differ from that of Dieffenbach, except that a portion of the muscle is removed.

M. Amussat, after directing the patient to look

œil, car nous sentons évidemment que l'œil que nous tenons couvert renvoie à son compagnon quelque partie de son effect; en manière que celui qui reste s'en grossit et s'en enfle."

outwards (in the convergent squint), seizes the conjunctiva near the caruncula lacrymalis with small forceps having sharp teeth; the elevators are then applied by assistants, to hold the eyelids apart; the conjunctiva is taken up with another pair of forceps near the former, and is divided with scissors between the two to some extent, so as completely to lay bare the tendon, which is cut through with blunt-pointed scissors, curved on the flat, after a blunt hook has been passed beneath it. If the squint be removed, the operation is considered to be satisfactory; but if any degree of convergence remain, the hook is again passed upwards and downwards along the surface of the sclerotic, in order to ascertain whether any fibres or portions of cellular texture exist which tend to keep the eye inverted. In fact, it not unfrequently happens that the fascia which extends from one muscle to the other, and forms attachments between them and the sclerotic, requires to be extensively divided before the squint is removed.

M. Baudens, after directing the patient to look outwards, passes a sharp hook through the conjunctiva, which he divides with a falciform knife, slightly curved on the flat, and sometimes the muscle is seized and divided at the same time as the conjunctiva; a blunt hook is then passed beneath the muscle, or any remaining fibres or bands of fascia which may draw the eye inwards, and these are cut through with scissors.

Mr. Guthrie, Jun. has an assistant to raise the upper eyelid with an elevator, and depresses the inferior one with his fore finger; the assistant likewise seizes the conjunctiva with a double hook, with short thick points, to prevent their entering the sclerotic, and draws the eye outwards; the operator then incises the conjunctiva, near the edge of the semilunar fold, to an extent of three quarters of an inch, with a curved knife; the tendon being exposed, a curved director is passed beneath it, previous to its division with the knife.

Mr. Lucas previously binds up the unaffected eye, and after the eyelids have been separated by an assistant, seizes the conjunctiva with a small hook, and divides it with scissors, to the extent of from four to six lines, near the cornea; he then waits for a few moments, allowing the eye to repose. The eyelids being again separated, a blunt hook is passed beneath the muscle, which is cut with scissors.

M. Sichel likewise allows the eye to repose for a short period after the section of the conjunctiva, previous to completing the operation.

M. Guerin places the patient in the recumbent position on a table, and, after the eyelids are separated by an assistant with elevators, directs the patient to look outwards; he then seizes the conjunctiva with a sharp hook, and holds it till he has implanted a small short double hook in

the sclerotica, after which the first is withdrawn ; the eye being drawn outwards, the assistant next raises the conjunctiva near the semilunar fold, and, consequently, over the insertion of the muscle ; a puncture is then made in a direction parallel with the muscle, with a narrow spear-shaped knife, curved on the flat, its concavity being turned upwards : this is then withdrawn, and the tenotome is introduced into the aperture, and, by a movement of the hand, is passed beneath the muscle : it is then turned round, and the sharp convex edge being brought in contact with the muscle, cuts through it, without dividing the conjunctiva, a noise or crack being generally heard at the moment of division : the instrument is then withdrawn through the minute aperture, and, in almost every instance, the position of the eye is found to be rectified.

This operation has a similar advantage to those performed for the division of tendons in other parts of the body, viz. that it prevents exposure to the air, and consequently is not attended with the inflammatory accidents which occasionally supervene on the other methods : at least I have never seen an instance, during the period of my late sojourn in Paris, when I saw M. Guerin operate on several patients every week. Neither is it followed by the unnatural prominence of the eye which sometimes occurs, or by the fleshy excrescences which so commonly arise after the

others, and require to be excised ; but, on the other hand, there is always a certain degree of chemosis and ecchymosis of the palpebra, which gives the patient the appearance of having received a blow on the eye, or what is vulgarly called a black eye. This generally lasts from a week to a fortnight, or even three weeks, before the blood is entirely absorbed, but it occasions no further inconvenience than the unpleasantness of its appearance. This operation, likewise, requires more practice and dexterity than the others, but from what I have seen I think the results are more generally successful, though they would, in all probability, be less so, in less skilful hands. M. Guerin, however, does not perform this operation in all cases. In divergent strabismus he generally prefers exposing the muscle, and dividing it in the usual way.

With regard to the other methods, I should say that sharp small hooks are preferable to forceps in seizing the conjunctiva, as they occasion less pain ; that the excision of a portion of the muscle, as practised by MM. Phillips and Baudens, is unnecessary, and often prejudicial ; that it is not material whether or not the sound eye be bandaged ; whether the blunt hook or the director be passed beneath the muscle, though the former is, perhaps, the most convenient ; or whether the muscle be divided with the knife or scissors : division of the conjunctiva, and exposure of the sclerotic, are to

be avoided when possible, as tending to occasion serious inflammation and prominence of the eye.

Different circumstances may prevent the squint from being removed, or even lessened, after the section of the muscle. One of these causes I have already alluded to, viz. the adhesion of small bands of cellular texture, which require to be divided; this, however, is sometimes not sufficient, and the squint, though perhaps partially remedied by the operation, is not altogether removed. The division of the inner fibres of the rectus superior, and, if this be not sufficient, of those of the inferior rectus, will not unfrequently be attended with success, these fibres appearing to have acquired an increased power from the altered position of the eye, especially in those cases where part of the cornea is hidden within the inner angle of the orbit. When the eye can scarcely be moved from this position, or is *anched*, as it is termed, it is often at the same time atrophied, and the operation would probably not be attended with any advantageous results, as the division of the rectus and of the inner fibres of the superior or inferior recti would frequently not be sufficient, and these two muscles would require to be divided altogether, but then the eye would be considerably protruded from the orbit, and its visual power would not correspond with that of the other eye. M. Baudens, indeed, practises in these cases the section of four muscles, viz. the

internal, superior, and inferior recti, and the superior oblique. I have, however, never seen any good result from the division of this latter muscle. In one case of this kind the internal rectus was strongly fibrous, and nearly half an inch broad: its division only partially rectified the position of the eye, which, from its prominence after the section of the superior and inferior recti, presented a much greater deformity than before. In some cases squinting is produced, and the eye retains its faulty position after division of the muscle, from the antagonist muscle having lost its power, or having become elongated; and this I consider to be the reason why divergent strabismus is frequently not rectified by the section of the external rectus. In this case, also, the further division of the parts would not be likely to produce much amelioration; but means should be had recourse to, in order to excite the muscle to contraction: as electro-puncture, &c. Sometimes, after the operation, a degree of obliquity of the eye remains, depending upon sympathy with the comparatively sound eye, which, on proper examination, will often be found inverted, though so slightly as to be scarcely perceptible, and is curable by division of the other internal rectus, as recommended by Mr. Guthrie.

In order to prevent the divided muscle from attaching itself to the sclerotic too far forwards, and thus causing a recurrence of the squinting,

the patient is recommended to exercise the antagonist muscle, by frequently looking outward (in convergent strabismus). The same effect may be produced by wearing glasses the inner half of which is darkened, so that the light can only pass through their external half, and the patient, in order to see, is obliged to turn the eye in that direction. This plan will likewise frequently succeed in removing the slight convergence which sometimes remains, without the necessity of having recourse to a second operation.

Opinions are divided as to the propriety of operating on both eyes, in cases of double squint. M. Baudens only operates on one eye, unless when the squint is very decided in both, in which case he operates on the second eye a few days afterwards. M. Phillips has likewise found that the operating on one eye is frequently sufficient; the position of the other becoming subsequently rectified. This, it is true, is sometimes the case, where the squint of one eye is slight, and of a purely sympathetic nature: but, on the other hand, it not unfrequently happens that, in the eye which previously squinted only occasionally, or slightly, the squint becomes more marked after the operation on the other eye; of which I have had occasion to observe several instances. I think, therefore, that when the squint of both eyes is at all decided, especially if there be a difficulty as to which eye squints the most, that it is better to adopt the

plan of M. Guerin, and to operate on both at the same time, by which means a future operation will not be required, and the education for both eyes can be conducted simultaneously*.

Unusual prominence of the operated eye, dependent on the action of the oblique muscles after division of the internal or external rectus, is not of frequent occurrence, unless the superior or inferior rectus have been also divided, though extensive division of the conjunctiva, and exposure of the sclerotic, may, in some instances, give rise to this accident. In order to remedy it, Mr. Lucas has recommended a division of the corresponding muscle of the opposite eye, in order to render it equally prominent. Having never seen a case in which this was performed, I am unable to give a positive opinion as to the results it is calculated to produce, though I should apprehend that it would be likely to occasion a double instead of a single deformity. The prominence of the eye might doubtless be diminished by the recumbent position, and by gentle pressure made upon it, by means of wetted compresses and bandage, in order to allow the divided muscles to attach themselves more forward upon the sclerotica.

With regard to the squinting which depends upon accidental and obvious causes, as blows on

* "The section of the muscle does not complete the cure; there yet remains the consecutive treatment, and the orthopedic exercise of the eye."—Von Ammon, *Monatsschrift*, June 1840.

the head, apoplectic attacks, teething, intestinal irritation, from worms, &c., it is to be treated by endeavouring to remove the causes which produced it, and can only be made the subject of operation after it has become permanent, and these causes have ceased to operate. When depending upon greater weakness of vision in one eye than the other, either congenital or acquired, and also where there exists divergent strabismus, in consequence of the muscle supplied by the third nerve being paralysed, the operation is counter-indicated, though it has been performed under these circumstances, with the effect of inducing double vision, which also not unfrequently exists for a short time after the operation, in ordinary cases, but is seldom of a permanent nature.

But little is required, in most cases, in the way of regiminal and medical treatment, beyond quiet for a day or two, application of cold water immediately after the operation, and attention to the state of the bowels.

THE END.