On megrim, sick-headache, and some allied disorders : a contribution to the pathology of nerve-storms / by Edward Liveing.

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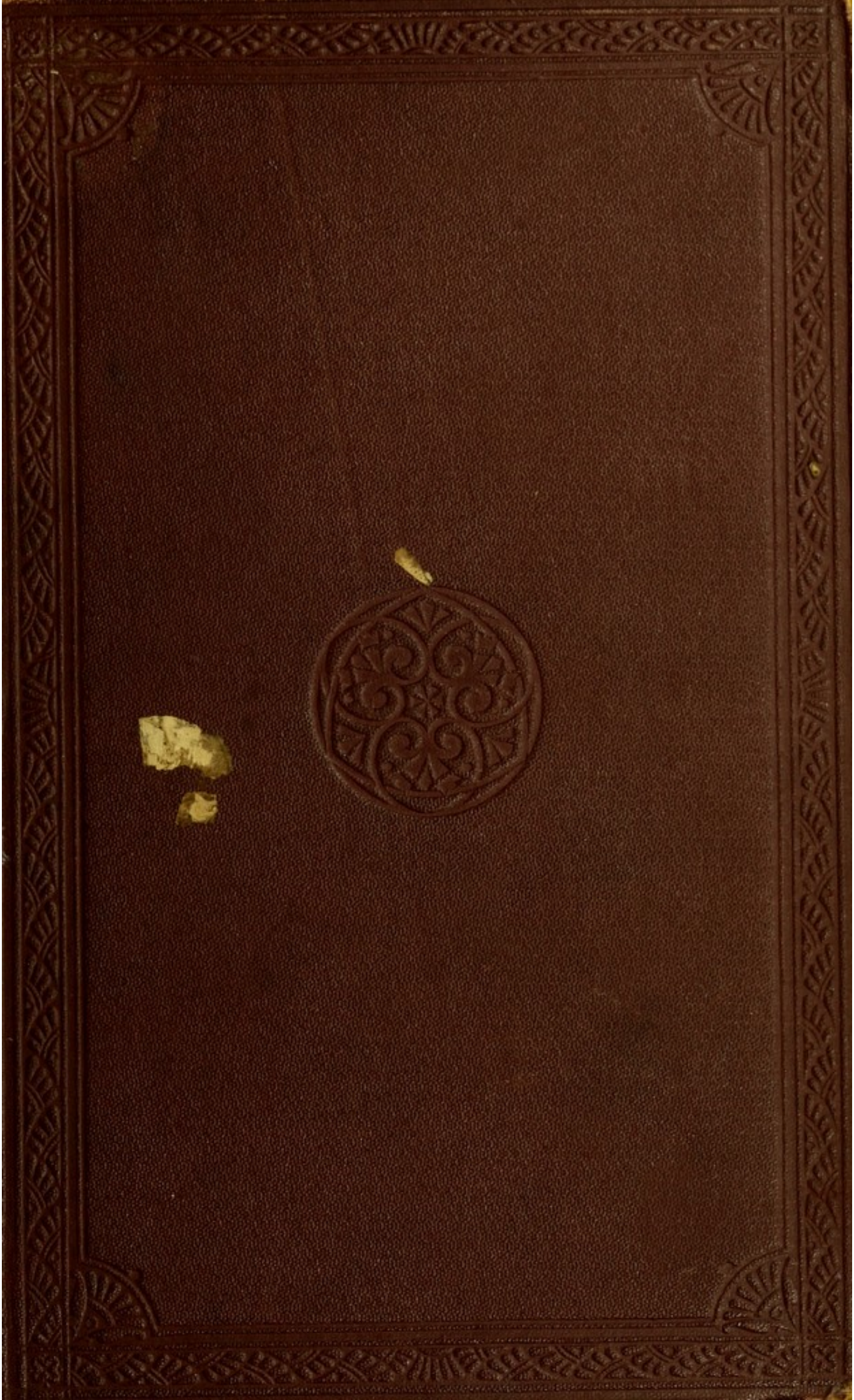
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ON MEGRIM, SICK-HEADACHE,

AND

SOME ALLIED DISORDERS.

"Or, tel est le sujet de ce mémoire, sujet qui présente pour moi d'autant plus d'importance qu'il me paraît devoir éclaircir quelques points de l'histoire des névroses . . . . La physiologie et la clinique, comparées, rapprochées, forment par leur ensemble un flambeau qui éclaire plus d'un point où l'anatomie pathologique n'a pas encore porté de lumière."—PIORRY, *Mémoire sur la Migraine*. 1835.

"Nothing is so common—nothing is viewed as of such trifling import—as the seizure termed 'Sick-headache.' Yet I have known Sick-headache issue in paroxysmal attacks of a very severe nature, both apoplectic and epileptic."—MARSHALL HALL, *On the Relations between the various Paroxysmal Nervous Affections*. 1849.

"All nervous distempers whatsoever, from yawning and stretching, up to a mortal fit of an apoplexy, seem to me to be but one continued disorder, or the several steps and degrees of it."—CHEYNE, *The English Malady*. 1733.

"The actions of every part of animal bodies may be advantageously compared with each other. This strict analogy contributes much to the investigation of Truth; while those looser analogies which compare the phenomena of animal life with those of chemistry or mechanics, only serve to mislead our inquiries."—R. DARWIN. 1796.

"Quod si *explosionis* vocabulum, in Philosophia ac Medicina adhuc insolitum, cuipiam minus arrideat; proinde ut pathologia σπασμώδης huic basi innitens, tantum *ignoti per ignotius explicatio* videatur; facile erit istius-modi effectus, circa res tum naturales, tum artificiales, instantias, et exempla quamplurima proferre; ex quorum analogia motuum in corpore animato, tum regulariter, tum ἀνωμαλῶς peractorum, rationes aptissimæ desumuntur."—WILLIS, *De Morb. Convuls.* 1670.

"Every relation to general principles is of so much practical as well as theoretical value in medicine, that there is often advantage in viewing diseases under new connexions, even though less intimate than those previously adopted into use."—Sir H. HOLLAND, *Medical Notes and Reflections*. 1839.

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ON MEGRIM, SICK-HEADACHE,

AND

SOME ALLIED DISORDERS:

A CONTRIBUTION

TO THE PATHOLOGY OF NERVE-STORMS.

BY

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TO

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LATE REGIUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF CAMBRIDGE;

AND

G. E. PAGET, M.D., F.R.S.

REGIUS PROFESSOR OF PHYSIC IN THE UNIVERSITY OF CAMBRIDGE,
PRESIDENT OF THE GENERAL MEDICAL COUNCIL, ETC.

These Pages are Inscribed

WITH THE HIGHEST SENTIMENTS OF RESPECT

AND PERSONAL REGARD

BY THEIR FRIEND AND FORMER PUPIL,

THE AUTHOR.

PREFACE.

THE greater part of the materials for this Essay were collected and roughly put together, very much in their present form, in 1863–65, and I am indebted to the kindness of several medical friends who were then asked to contribute cases. The task was then laid aside, partly from more pressing engagements, partly from a feeling of diffidence as to how far the matter might be thought worthy of publication.

Some time later, when other papers were appearing on the subject, I took the opportunity of reading portions of what I had prepared as a Thesis for the degree of Doctor in Medicine in the Public Schools at Cambridge (April 7th, 1870). These comprised the first chapter, very nearly as it now stands, together with the observations of Abercrombie and Piorry in the Appendix; an abstract of the fourth chapter; the remarks on the doctrine of "biliousness," and the sketch of the anatomical course of the "nerve-storm," in the fifth; while the Tabular Analysis of cases, down to No. 53, was suspended for reference.

The observations on the disorder of the Speech-faculty were introduced into the *Thruston Address* delivered in Caius College in the May Term of the following year.

A short abstract of these views appeared in the *British Medical Journal,* April 6th, 1872.

In preparing the work for the press I have introduced, wherever I found it possible, any additional matter which has come under my notice since I first took the subject in hand, more particularly the theories of Drs. Du Bois-Reymond and Möllendorff.

In conclusion, I must express regret for the many months' delay which my very indifferent health has occasioned in the publication.

EDWARD LIVEING.

52, QUEEN ANNE STREET, CAVENDISH SQUARE,
June, 1873.

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ON

MEGRIM, SICK-HEADACHE,

ETC.

CHAPTER I.

Megrim; Identification of a Natural Group of Disorders under this Name; Illustrative Cases.

THE maladies commonly known by the names of Megrim, Sick-headache, Blind-headache, Bilious-headache, and some others, form a natural group or family of disorders which has not received adequate recognition in our nosologies, although such names as Hemicrania, Cephalalgia biliosa, Suffusio dimidians, and the like, correspond with or include them more or less perfectly.

The popular names recognise some of their most important features—namely, headache of a very intense kind, which is, perhaps, the most constant character of the group, while "Sick" and "Blind" indicate the special features of a certain proportion of them; and "Bilious" points to a theory of their causation, which, as we shall see in due course, carries us back to the days when the ancient humoral pathology still prevailed.

I think, however, that the vernacular *Megrim*, which is of great antiquity, and has an equivalent in most European languages—the *Migraine* of the French, and *Migräne* of Germans—has acquired by conventional usage a meaning more nearly comprehensive of the whole group than any other. The word itself, as is well known, is a mere mediæval corruption of the Greek ἡμικρανία, *Hemicrania*,

a term still retained in our medical treatises, but, owing to its etymological signification of *Half-headache,* having so very restricted an application, that its use has rather cramped than extended our knowledge of this class of disorders. We shall see that a unilateral character is a common but by no means a constant feature of the maladies which we are about to consider, and that they are otherwise intimately allied.

Here on the other hand, in defiance of etymology, is the notion of Megrim in Bacon's time :—

"In every *megrim* or vertigo there is an obtenebration joined with a semblance of turning round."*

So Blaine in his Veterinary Surgery observes :—"The *meagrims,* sturdy, or turn-sick, may be considered as a species of epilepsy, to which horses are not unfrequently subject ; and in which, without previous notice, the animal, if in exercise, stops short, shakes the head, looks irresolute and wandering : in which state he continues a few minutes, and then proceeds as before. In more violent cases he falls at once to the ground, or first runs round and then sinks senseless."†

It will be my first object to show that the disorders to which I have referred, and which have hitherto been considered in too disconnected a way, form a very natural group : I believe them to be intimately allied ; to be, in fact, merely different degrees of development, or perhaps slightly different localizations of the same essential kind of disturbance traversing the sensory tract of the encephalon. Popular instinct has here, I think, as in some other instances, outrun science fettered by its terms and traditions, and recognised some real pathological affinities in its use of the word Megrim, which, on all these grounds I propose to retain.

I may take this occasion to observe that continental medical writers, and especially the French, have been in

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* "Natural History," § 725.

† "Veterinary Surgery." Third Edition, p. 471.

this matter much in advance of our own, and some of their treatises on Migraine are very complete and valuable, and go far beyond anything with which I am acquainted in our language in the recognition of the varied phenomena of the disease. I would especially mention the well known treatise on Migraine by Tissot;* the thesis of M. Labarraque;† the article on this subject in Adelon's Dictionary by M. Calmeil,‡ and the memoir by M. Piorry.§

As most of what I have to bring forward will be in the way of direct inference from a collation and comparison of cases, I have drawn up in a tabular form, for easy reference, the results of an analysis of sixty cases from my own notes and other sources.‖ For the same reason I shall now proceed to give, with such comments as may be necessary, the particulars of a certain number of them which I have endeavoured so to select and arrange as to exhibit, as far as I am acquainted with them, all the more typical varieties of the seizure, and at the same time their true affinities and transitional character.

As regards recorded cases, I may observe that we are at once at some disadvantage, and a great advantage. The wide prevalence and familiar nature of the milder and simply hemicranial forms of the malady have made them appear unworthy of scientific attention, while the almost purely subjective and consequently unobtrusive character of the phenomena, even in the severest cases, have prevented their obtaining that share of consideration from competent observers which they undoubtedly deserve.

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* "Traité des Nerfs et de leurs Maladies," chap. xvi., Bayle's ed. p. 383–4, 1834; also "Œuvres Complètes," par Hallé, vol. xi. 1809.

† "Essai sur la Cephalalgie et la Migraine." Thèse de l'École de Médecine de Paris. 1837.

‡ "Dictionnaire de Médecine," par N. P. Adelon. Paris, 1832–46. Tom. xx. p. 5.

§ "Mémoire sur l'une des affections désignées sous le nom de Migraine." Appended to his "Du procédé Opératoire," &c. Paris, 1835.

‖ These tables, together with some cases not contained in the body of the work, will be found at the end of the volume. The numbers in the text affixed to cases refer to the table, which will also furnish a reference to the text.

On the other hand, we possess a limited number of singularly valuable records by patients themselves, who have been at the same time highly qualified observers,—a useless conjunction in most cases of illness, but here of exceptional value, not only on account of the nature of the phenomena, which are cognizable, for the most part, only to the sufferer, but also because it is a distinguishing feature of this malady that in many instances consciousness is perfectly retained and the observing faculties remain acute, at least in the early stages; or, as old Willis has quaintly and figuratively expressed it :—"The disease may pitch its tent very near the confines of the brain, and long besiege its Regal Tower yet not take it, leaving the faculties of the soul sound enough." These persons, in fact, have been able carefully to watch the development of the various symptoms of their malady with the keenest scientific interest, and have left us information of a kind which no observation by others could have furnished, and which it would have been difficult to obtain from patients untrained in physiological observation and description.

I shall commence my illustrations with the simplest forms of the malady, and so proceed to those which present the more complex combinations of phenomena.

I. Du Bois Reymond's own case (No. 23), recorded by himself, may be taken as the type of simple *Hemicrania*. His observations are intended as a contribution to the pathology of the cervical portion of the sympathetic. After some allusions to the general subject of the influence of the Nervous system over the muscular structures of the minute blood-vessels, he thus narrates his case :—

"Since about my twentieth year, though otherwise in good health, I have suffered from Migräne. Every three or four weeks I am liable to an attack, coming on for the most part in consequence of some unhealthy influence, such as long fasting, a fatiguing evening entertainment, and so forth. As a general rule some constipation precedes it. I thereupon awake the next morning with a general feeling of

disorder, and a slight pain in the region of the right temple, which, without overstepping the middle line, gradually extends itself, reaching its greatest intensity at mid-day; towards evening it usually passes off. While at rest the pain is bearable, but it is increased by motion to a high degree of violence. It is aggravated by every circumstance which heightens the pressure of blood in the head, as stooping and coughing. It responds to each beat of the temporal artery. The latter feels, on the affected side, like a hard cord, whilst the left is in its normal condition. The countenance is pale and sunken, the right eye small and reddened. At the height of the attack, when it is a violent one, there is nausea, but as far as I remember, it has only once occasioned vomiting. As the attack approaches its termination the right ear reddens and feels a lively sense of warmth, which is also perceptible to the hand. Sleep often shortens the attack considerably, which leaves behind it a slight gastric disorder; frequently, also, the scalp remains tender at one spot the following morning. For a certain period after an attack I can expose myself with impunity to certain injurious influences which before would have infallibly induced an attack."* The author then proceeds to give his view of the pathology of the disorder, a subject to which we shall return hereafter.

This case requires little comment. The commencement on waking, the one-sided and culminating character of the pain, the nausea supervening only in severe attacks, and the curtailment by sleep should be noticed. The secondary hyperæmia of parts which have been the seat of severe neuralgic pain of any kind, was long since commented upon by Sir Benjamin Brodie.†

II. The second member of the group which I shall notice is familiarly known as *Sick-headache*. It is a very common malady, and there are few people who have not some ac-

* "Arch. für Anat. u. Phys.," v. Reichert u. Du Bois Reymond, Heft iv. p. 461. 1860.

† "Lectures on Local Nervous Affections," p. 17. Lond. 1837.

quaintance with it either in themselves, their families, or friends. The following brief case from my note-book is a sufficiently characteristic example.

A. M. (No. 29) May, 1864.—A young woman twenty-seven years of age, fair-haired, single. Has suffered ever since she can remember from "Sick-headaches," but has otherwise enjoyed good health, and is strong and industrious in the intervals.

The seizures commence at various times of the day with frontal headache, which gradually increases until the pain becomes most intense; this is accompanied by an intolerable sense of nausea and, sooner or later, by repeated vomitings. Her condition at this time is one of great misery, depression, and suffering, and closely resembles that of a person thoroughly sea-sick; and there is the same sense of reckless indifference as to what may become of her. At whatever time the attack may have begun it lasts the rest of the day, and is only terminated by the night. She then goes to sleep and awakes the following morning as well as usual and feeling no indisposition.

In the ordinary way these seizures return spontaneously about every two months, but they are sometimes brought on by special exciting causes, among which she mentions travelling in a close carriage—as by railway or omnibus. This rarely fails to produce an attack, but any considerable mental excitement she regards as the most infallible forerunner of suffering. It is remarkable that she has never been able to trace an attack to any indiscretion in diet or to any particular kind of food.

She tells me that hers is "a family complaint;" her mother, especially, has been a terrible sufferer through life, and also a sister, in whom the malady has been even more severe than in herself, and is sometimes attended with "faintings."

The points in this case to be noticed are:—First, the hereditary character of the malady, which, as she says, is a "family complaint;" its early commencement, which is

most commonly met with when the disorder is hereditary; a degree of periodicity, or tendency to spontaneous recurrence after a certain interval, if not prematurely determined by certain exciting causes, of which emotional disturbance is the most efficient, but among which, in this instance, gastric or intestinal disorder is not included; the nausea and retching with prostration or collapse of body and mind, closely resembling the condition of sea-sickness; and lastly, the complete and rapid recovery in the course of a single night.

If to these details we add that some patients are attacked (as Du Bois Reymond) on first waking or rising in the morning; that the pain with most people is more or less localized in the forehead or other part of the head, and with some is entirely confined to one side; that the attack is sometimes relieved or terminated by actual vomiting; that in others nothing has been found to do the least good except the recumbent position and natural sleep; that, as regards the sickness, it is sometimes more, sometimes less, and when vomiting occurs the matters rejected are, first, any food the stomach may contain, and afterwards mucus, variously discoloured by biliary matters, and then bile itself, to be followed by empty retching—very much in fact the succession which meets one's eye any fresh morning on a Channel packet-boat; and if we add further that the aspect and expression of the patient are from the commencement completely altered, animation and colour being exchanged for blank, waxy pallor and lustreless eyes, we shall have pretty well completed the picture of typical *Sick-headache.*

It should, however, be added, that there is a still simpler form of the malady than that of which we have just had an illustration, for in some instances the headache is trifling or absent, and the attack is limited to the remaining symptoms, constituting what Dr. Marshall Hall has called *Sick-Giddiness.**

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* "This form of sickness frequently plays an important part in paroxysmal diseases, occurring as it does, in its slightest form in 'sick-headache,' or in what may be termed 'sick-giddiness.'"—*Croonian Lectures,* 1851, p. 11.

The celebrated Dr. Fothergill was one of the first of our countrymen to give a particular description of Sick-headache, from which he was himself a sufferer, with suggestions as to its pathology and treatment. Coming with the weight of his authority, its influence was considerable, and is felt even now after the lapse of nearly a century; yet I cannot say that it is in any sense worthy of his genius or reputation. After stating that the disease, although so common, had not obtained a place in the systematic catalogues,* he gives a bare description of the attack, omitting to notice its prevalence in the same family, periodical return, and other features, and then propounds his view of its causation—viz., the irritation of an "acid or bitter bile" in the empty stomach and duodenum, a condition favoured by indulgence in certain articles of food, especially hot-buttered toast; "indeed," he says, "from numerous circumstances it is most clear that the headache proceeds from the stomach, not the reverse, as is the opinion of many who have suffered from it."† We shall return to this subject when we come to consider the pathology of Megrim.

III. The next form we have to notice is a variety of Megrim commonly known as "*Blind-headache*," from the remarkable obscuration of vision which attends it. The visual phenomena may, and with some people frequently do, constitute the whole of the seizure, the subsequent headache being absent. Here, too, the pain may affect one or both sides of the head, and the blindness may occupy the half or the whole of the visual field.

That excellent clinical observer, Dr. C. H. Parry, of Bath, who was the first to draw attention to the disease of the thyroid, heart, and eyes, which has of late years been more

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* The reason of this I take to be that its frequent bilateral character excluded it from the genus *Hemicrania*.

† "Remarks on Sick-Headache;" Introductory to the subject of Diet and its importance in the treatment of Disease, in a paper read by him in 1778, and printed in "Medical Observations and Inquiries;" also in his "Works," 4to, p. 597.

clearly identified under the name of Graves and Basedow's disease, and who has left us other valuable clinical legacies, was himself a sufferer from the purely visual form of Megrim, and thus describes his attacks (No. 51) :—

"After violent fatigue, more especially when accompanied with fasting for eight or ten hours, which has often happened to me, I have frequently experienced a sudden failure of sight. The general sight did not appear affected; but when I looked at any particular object it seemed as if something brown, and more or less opaque, was interposed between my eyes and it, so that I saw it indistinctly, or sometimes not at all. Most generally it seemed to be exactly in the middle of the object, while my sight, comprehending all around it, was as distinct and clear as usual; in consequence of which, if I wished to see anything, I was obliged to look on one side. At other times, though much more rarely, the cloud was on one side of the direct line of vision. After it had continued a few moments, the upper or lower edge (I think always the upper) appeared bounded by an edging of light of a zigzag shape, and corruscating nearly at right angles to its length. The corruscation always appeared to be in one eye; but both it and the cloud existed equally whether I looked at an object with one or both eyes open. When I shut both eyes, covering them with my hands so as to exclude all rays of light, the corruscation was still perceptible in the same place, and what had been a semi-opaque cloud appeared lighter than the rest.

"When I raised or lowered the axes of my eyes or squinted, the cloud and corruscation, though it moved its place, still bore the same relation to the object at which I looked. In this way they would remain from twenty minutes sometimes to half-an-hour, the cloud lessening as the corruscation continued, and the latter sometimes rather suddenly going off.

"They were, in me, never followed by headache, but seemed evidently connected with the state of the stomach; for though they occurred without any feeling of indisposition

at the time, they generally went off with a movement in the stomach producing eructation."*

The visual phenomena may even be reduced to a simpler form than those described by Dr. Parry, and may be limited to the negative portion or partial obliteration of vision, without any spectral appearances. This was the case with Dr. Wollaston, with this further difference, that the loss of sight was confined to one (lateral) half of the visual field.† His own account of this transient half-blindness is so well known, and has been so often quoted, that it seems almost superfluous to repeat it here, more especially as I shall have to refer to his views respecting the cause of the phenomena by and by.

It may be objected, perhaps, with regard to such cases as those of Parry and Wollaston, that, presenting but a single feature—the disorder of sight—we have not sufficient to connect them with the previous cases, or to identify them with Megrim at all. This no doubt would be a sound objection had we nothing further to add; but these several cases have been selected to stand first for the very reason that in them we have presented to us, in a comparatively isolated way, the particular features of hemicranial pain, sea-sickness, and transient half-blindness. But it is far more common to find two, three, or more of the phenomena associated in the same seizure, of which we shall have abundant illustration as we proceed, and the law of this association it will be a part of our business to trace. Even here Dr. Parry implies and Dr. Wollaston asserts that in other instances, though not in their own, the same visual phenomena are followed by headache or hemicranial pain. "This half-blindness," the latter observes, "is far more common than is generally supposed," and he then refers to the case of a patient, which had come to his knowledge after writing the paper, who "had had many returns of this affection, generally attended with headache, and always lasting about twenty minutes, with very little variation."

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* "Collections from the Unpublished Writings of Dr. C. H. Parry." Edited by his Son, vol. i. p. 557. 1825.

† "Philosophical Transactions, 1824," p. 222.

Turning to the writings of Sir Henry Holland I find the following observation on the hereditary character of this disorder of vision in its uncomplicated form, thus establishing a further affinity with sick-megrim, which we have seen to be a family complaint:—"An example has recently occurred to me of that remarkable affection, the *suffusio dimidians*, where one-half only of the field of vision is perceived by the mind, existing in a father and his daughter; and brought on in each by circumstances singularly alike." Elsewhere he refers to the same case, identifying the malady with that experienced by Wollaston.*

The transition, however, from such cases to fully developed Megrim is completed by the history of the next case, which was kindly communicated to me many years since by Dr. Latham, of Cambridge. This case is likewise an autograph account by the sufferer, and contains a description of similar visual phenomena associated with the ordinary history of sick-headache.

The patient, Mr. B. (No. 16), at the time this note was made (1863), was a young gentleman of about twenty-one years of age. From the age of twelve to twenty he had suffered, generally once a fortnight, from an attack of paroxysmal headache. If a seizure had not occurred at any time for three weeks, a return was confidently expected. During the past year the attacks had diminished in frequency.

His mother, up to the age of twenty-two, had been subject to the same description of headaches, and two sisters suffer from severe neuralgic attacks.

Mr. B. has observed that the attacks are more likely to occur if from any cause his "stomach is out of order" than when he is feeling perfectly well. Among the causes immediately determining a paroxysm he believes he can trace the following:—A sudden emotion, as for instance a fright; unusual changes of posture and muscular effort, as stooping and rising up suddenly, running, lifting heavy

* "Medical Notes and Reflections," pp. 20, 156. Ed. 1839.

weights, and so on. The headache will nevertheless sometimes occur without his being able to refer it to any such exciting causes; and it can scarcely be doubted, I think, that if a record could be kept of such common accidents as those mentioned they would be found insufficient to produce an attack except near the period of natural recurrence.

The following description of the seizure is in the patient's own words:—

"It commences with a slight dimness of sight; then the lower half, rather inclined to one side, of the field of view appears as if hidden by some white (luminous?) object held close to the eye. Gradually a half ring formed by serrated lines of prismatic colours appears in the place of the blank whiteness (see figure), the alternate points seeming to revolve in opposite directions.



"In about three-quarters of an hour, or an hour, this appearance ceases, and a violent headache succeeds. It comes on suddenly, together with a feeling of nausea; the pain extends entirely over the frontal bone, though perhaps it is a little more severe over one or other eyebrow. It is accompanied by a total inability to do anything and a great want of muscular power, together with an indescribable feeling of *dread*, as though something were about to happen.

"This headache lasts about two hours, varying more or less, according as the sensation in the eyes has been of longer or shorter duration. If the stomach be out of order vomiting will sometimes produce an entire cessation of the headache, and if sleep can be obtained it generally has the same effect. No other remedy has hitherto been found to relieve either the appearance in the eyes or the headache."

The points in this case which deserve notice are briefly these. In the first place there are many features common to it, and to some of those which precede: the commencement in childhood, the family proclivity, the tendency to regular periods, and a certain influence of exciting causes, among

which emotion again appears as well as gastric disorder and muscular exertion. But the visual phenomena constitute the most interesting feature, and here again, as in Dr. Parry's case, are of a twofold kind. In the first place we have an absence of discerning vision over a certain part of the field of view, giving the sensation not of darkness but of blankness, and next we have certain spectral appearances replacing the former, namely, a series of iridescent points produced by intersecting zigzags in rapid motion.

All this precedes the headache which has the same bilateral character as in the former case, and is attended by nausea and sometimes vomiting, and by a degree of mental disturbance consisting in a vague sense of dread. We shall see by and by that this feature, which might otherwise have been passed over, acquires a real interest from the fact of its occurrence in other cases not only of this, but of some other neuroses. Lastly we have the curative effects, as regards the paroxysm, of vomiting and of sleep, and the absence of any known remedy besides.

I must not omit to mention that in another part of the paper before referred to, Dr. Fothergill also describes these same singular spectral appearances as the occasional forerunners of sick-headache. "After breakfast, if much toast and butter has been used, it (the attack) begins with a singular kind of glimmering in the sight; objects swiftly changing their apparent position, surrounded with *luminous angles like those of a fortification.* Giddiness then comes on with headache and sickness." It is tolerably certain that Fothergill must be here again describing what he had himself observed, and hence we may infer that his attacks were sometimes the simpler waking form of Sick-headache, and sometimes complicated by the affection of sight.

IV. We now come to a class of cases, which, although of less frequent occurrence than those to which we have hitherto referred, are by no means rare, as a reference to the table of cases will show, and are connected with them

by common characters and intermediate forms which can leave no doubt of their intimate relationship. With the same general characters as those exhibited by the forms of Megrim we have already considered, and with all or many of the same paroxysmal features, we have in addition certain symptoms which indicate a wider implication of the sensorium, affecting the general sensibility of the extremities, and especially the sense of touch in the fingers, lips, and tongue, in different degrees; sometimes impairing the faculty of expression, producing a striking form of disordered speech, and sometimes a confusion of ideas and temporary impairment of memory.

I shall take the first illustration from my case-book :—

C—— (No. 32), a young woman, seventeen years of age, came to me at the St. Marylebone Dispensary, May, 1864, complaining of headache and various dyspeptic symptoms. On inquiry I learned that from the age of nine she had suffered about every fortnight from hemicrania, the pain being situated in the right brow, gradually rising to a great pitch of intensity, and lasting the day. Her sight is never disordered throughout the paroxysm, but the *right arm becomes numb*, and in consequence so useless that she will let things drop from her hand. The headache is always accompanied by a feeling of great nausea, and sometimes by vomiting, and if this occurs her suffering is shortened.

But the most striking feature in this case remains to be noticed; the attack, when at its height, is generally attended by a remarkable sleepiness, or stupor, sometimes so great that she is very imperfectly conscious of what is passing, and does not understand what is said to her. Sometimes, in the worst seizures, this *drowsiness* is such that she is quite unable to keep awake, and sinks into a profound semi-comatose sleep; whenever this is the case she awakes worse, and the suffering is sure to be prolonged through the next day in a severe form. I think it important to add that, although described in my words, these latter points in the history were not suggested by my inquiries. We shall see hereafter that this state of drowsi-

ness has been noticed as an occasional feature of Megrim by other observers, and it has its analogies in the history of other nerve-storms.

The other feature, numbness of the upper extremity on one side, which we here meet with for the first time, will be further illustrated by subsequent cases, and we shall find subjective tactile sensations superadded, just as in the case of vision. In this form it is a tolerably common feature of the group. I infer the paralytic symptoms in this case to have been due rather to the loss of guiding sensibility than of motor power. This point I would gladly have tested had I had an opportunity.

I have still to add, and it is an important addition, that the mother of this patient had been through life the victim of similar headaches.

The second case of this class to which I would refer has been drawn by M. Lebert from his own personal experience. It appears that this distinguished pathologist, in common with many other men of high scientific and literary attainments, has been an habitual sufferer from ordinary Megrim or hemicrania such as we first described, but from time to time has experienced seizures of another type, namely, of intense sick-headache of a unilateral character with certain attendant disorders of sensibility and ideation, commonly regarded among the signs of cerebral congestion or threatenings of apoplexy. I translate his description :—

"I have myself experienced," he says, "three seizures of this kind in my life, the first at the commencement of 1845, the second in 1847, and the third towards the close of 1849. These attacks began with some incoherence of ideas, a difficulty in finding words, and a numbness in the tongue and in the last fingers of the right hand ; a feeling of general indisposition which became complicated at the expiration of an hour or two by a very acute pain above the right brow, and was soon accompanied by copious vomitings, followed immediately by the cessation of the disorder of ideas

and of the numbness, and which left no further traces the following morning than ordinary Megrim, to which I am subject."*

Here then we have a true Sick-headache of the unilateral type, without any disturbance of vision, but preceded by a remarkable disorder of ideation and failure of speech, as well as by a loss of sensibility in the tongue and fingers of the same side; and I wish to draw special attention to the fact, in connexion with my general argument for the essential unity of these various forms or degrees of disorder, that these complicated seizures occurred from time to time intercurrently or vicariously with those of ordinary simple hemicrania to which the Professor is subject. It is to be regretted that he has left us in the dark as to the existence in his case of any family disposition to the same or other nervous disorders.

In the two preceding cases there was no disorder of vision; but to show how all the phenomena may be combined in one paroxysm, I must ask attention to a third case, in which this, the most complete and formidable type of Megrim, was fully developed.

H. T. (No. 10), a tall, well-made man, thirty-three years of age, came to me among the out-patients at King's College Hospital, in 1863, complaining that he had suffered during the preceding five years from Sick- or Bilious-headaches, recurring about every six months; he had then recently experienced a severe attack, which brought him to the hospital for advice.

He told me that his mother had been subject to similar headaches during the greater part of her life, but he was not aware that any members of his family had been afflicted with epilepsy or other nervous complaints.

He knows of no exciting causes for the seizures;

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* "Traité pratique des maladies Cancéreuses," p. 778. Paris, 1851. See also "Handbuch der praktischen Medicin," vol. ii. p. 570. Tübingen, 1860. Where he says, "Ich selbst habe mehrfach solche Anfälle gehabt, und Dr. Rilliet in Genf hat mir mitgetheilt, ähnliche von Zeit zu Zeit zu haben."

they have always commenced suddenly with a "dazzling appearance" before both eyes, attended with "bright sparklings and colours;" no part of the field of view is blank, but discerning vision is so much impaired that he cannot distinguish the letters in a book. These appearances are heightened by stooping.

When this condition has lasted about a quarter of an hour, a numbness and sense of tingling (like that in a foot or hand "asleep" as we say, and "pins and needles") commence in the fingers of the right hand, and gradually extend up that arm and side until the throat is reached; the interior of the throat, the tongue and lips, seem to share in the sensation, which is now no longer confined to the right side but affects these parts bilaterally.

The speech is next implicated. I asked the patient, who was a very intelligent fellow, what difficulty he found in speaking, whether it was that his ideas were confused or that he could not pronounce his words. He said,—"neither." On my pressing him further he added—"I can't tell you why, but it is utterly impossible for me to speak. If I were to try, I should say words quite different from those I intended or which would have no meaning, but my head is clear or only a little confused, and I know quite well what I wish to say." This account of the disorder of speech is precisely like that which I have received from some other highly educated patients, for instance, Mr. S. (No. 46), and I have no doubt of its accuracy.

The whole duration of these symptoms is about three quarters of an hour, and as they subside a bilateral frontal headache sets in; it is not very severe at first, but gradually increases in intensity until it becomes intolerable, and the patient is obliged to lie down. The pain is attended by nausea but not vomiting; it is aggravated by noise, relieved to some extent by recumbency and quiet, but much more by sleep when the sufferer is fortunate enough to procure it.

Here, then, is a case which although presenting addi-

tional phenomena, and indicating a deeper or more extensive implication of the nervous centres, yet is in serial connexion with those which have gone before, and we cannot therefore hesitate to regard it also as Megrim. Altogether it is a typical case: we have the hereditary character and periodical recurrence of the seizures well marked: we have, as in Professor Lebert's case, the numbness in the fingers, the same "difficulty in finding words," the culminating headache and nausea, though not actual vomiting. But in this case we have the impairment of discerning vision and the subjective sense of dazzling with which we became familiar in the last group of cases, but which were absent in Lebert's and the preceding case. We have also a disordered sensibility of a much more pronounced character in the upper extremity, and described as a sense of tingling, as well as numbness, ascending from the fingers to the throat, tongue, and lips; we have a bilateral instead of one-sided headache, but we have less gastric disturbance, and no disorder or "incoherence" of ideas.

I have now brought forward, I believe, instances of all the principal forms which Megrim assumes. They range from the simplest hemicranial pain, transient half-vision, or sick-giddiness, to cases which present such a complex assemblage of phenomena and wide range of sensorial disturbance as those last described. We have seen the gradual transition between the different forms of seizure in different individuals, marked by the addition or interchange of single features; we have further seen in the same individual occasional indications of a similar transformation in the character of the seizures. Thus, with M. du Bois Reymond it is only the severer hemicranial attacks that are complicated with sickness; in M. Lebert's case the simpler form of hemicrania is replaced from time to time by severe attacks of one-sided numbness and tingling, with impairment of speech and thought, terminated as usual by the hemicranial pain with vomiting. It would be easy to supplement these by many additional instances of a similar kind: thus, in one of

my patients, R. S., No. 24 in the table, ordinary "bilious attacks" were replaced on several occasions by more formidable seizures with disordered speech and thought, like M. Lebert's, together with the characteristic affection of vision which was not present in his case, but without numbness and tingling. Again, in the case of Mr. A. (No. 14), who formerly suffered from the affection of sight, followed by headache and nausea, these attacks were replaced later in life by simple hemicrania. From an account of his own case published some years since by Sir George Airy, it would appear that this distinguished astronomer is a sufferer, as Dr. Parry was, from the purely visual form of megrim, but on one occasion he was surprised to find his usual attack complicated with transient impairment of speech and of memory, but without either headache or numbness.*

Nor is this all: we can point to a third class of facts in further confirmation of the close affinity of these various forms of seizure. We have seen them to be hereditary, and as a rule the same type is transmitted from parents to children, but occasionally we find two or three forms of the affection in the same family. Thus the elder Mr. Travers (No. 55) suffered from fully developed megrim, with disorders of sight, touch, and speech; his son from simple hemicrania. Sir Geo. Airy again (No. 59) from the purely visual form, and his son, Dr. Hubert Airy, as we have recently learnt, from the same affection followed by sick-headache.†

Lastly, turning our attention from the phenomena of the paroxysm to those of the general malady, we have seen the same hereditary character running through the different forms; the same kind of manifestation in transient paroxysms at intervals exhibiting more or less periodicity; the same exclusively sensory character of the disorder however simple or however complex.

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* *Philosophical Magazine*, July, 1865.

† "Philosophical Transactions," 1870. An account of Dr. Airy's case will be found in the section on the Disorders of Vision, chap. iii.

I hope I have now sufficiently justified the claim I have made to regard these various forms of disorder as constituting a well-marked natural group—whether varieties of one species or species of one genus—and for which we cannot at present, I think, employ a better name than that of Megrim.

It had been my intention to have included in the foregoing sketch of Megrim several descriptions and illustrations of the malady by other observers, but I found it impossible to do so without overloading the subject with detail. I have therefore formed a supplement of these and some other cases, which will be found at the end of the work, and I would especially direct attention to the early and minute description of "*Ophthalmic Megrim*" by M. Piorry; and to the illustrations of the *Hemiplegic* and *Aphasic* forms by Drs. Abercrombie and Parry, which are among the earliest we have in English.

CHAPTER II.

General Features of Megrim:—Influence of Sex and Age; Limitation to a certain period of Life; Hereditary Characters; Paroxysmal Form and Periodicity. Exciting Causes:—Gastric and Intestinal; Catamenial; Emotional; Exertion and Fatigue; Fasting; Sleeping and Waking; Sensorial Stimuli; Meteorological Influences. Accessory Causes.

HAVING endeavoured in the foregoing chapter to identify megrim under some of its leading modifications, we may now proceed to examine separately, and rather more in detail, the principal features of the malady as they have been already brought before us, and are further exhibited in the analysis of cases at the end of the work.

In so doing it will be convenient to draw that kind of distinction which has been sometimes made in epilepsy, between—1. The features of the disease, regarded as a persistent morbid tendency or condition of the system, manifested from time to time in nervous paroxysms; and —2. The phenomena of the paroxysms themselves. The former of these, namely the General Features of the disease, including certain Exciting and Accessory causes of the seizures, are common to the various forms of this affection and some other Neuroses; these will form the subject of the present chapter; the phenomena of the paroxysm are for the most part peculiar to megrim, and these we shall defer to the next.

General Features of the Disease.

Influence of Sex.—The first point for inquiry which the table of cases suggests to us is, as to the influence of sex

in predisposing to this malady. A notion is widely prevalent, apparently on insufficient grounds, that women have a greater constitutional proclivity to nervous affections in general than men, and it has been rather too hastily assumed that such is the case in megrim. It does seem, however, that women are slightly more prone to the malady than men.

Romberg has remarked that "a predisposition to Migräne is afforded by the female sex."* M. Labarraque observes that "women have the sad privilege of being much more subject to the malady than men," which he attributes to the greater susceptibility of the female nervous system.† M. Calmeil is of the same opinion—"Migraine," he says, "is much more frequent with women than men; and as it is often hereditary, it seems lawful to conclude that the constitution and primitive conformation of the Nervous system predispose to this kind of Neurosis."‡ M. Lebert says the same.§

I do not consider the cases I have collected sufficiently numerous, nor the circumstances of their collection such as to render any inference from them on a numerical question of this kind very trustworthy. I may, however, with this qualification, briefly refer to the table as giving a very hesitating confirmation to the general impression on the subject. The number of female cases will be seen to be 29, while the males number 24, giving an approximate ratio of 5 to 4 for the two sexes. If now we increase the number of women to 52, and the number of men to 41, by the addition of their 23 female and 17 male relatives who were similarly affected, we still find in the total of 93 cases the same ratio of 5 to 4 very closely maintained.‖

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* "Diseases of the Nervous System," p. 177 (Syd. Soc. Ed.).

† "Essai sur la Cephalalgie et la Migraine."

‡ "Dictionnaire de Médecine" (Adelon's), tom. xx. p. 5.

§ "Bei Frauen ist sie frequenter als bei Männern."—*Handbuch der Prak. Med.*, vol. ii. p. 571. 1860.

‖ I should say that the numerical results throughout this chapter were obtained from the first fifty-three cases in the Table. The seven additional cases tend still further to equalize the sexes.

The late Dr. Symonds of Bristol, whose valuable observations on Headache I shall compare throughout with my own on megrim, out of 90 more or less habitual sufferers from that complaint, counted 76 women, which would appear to establish a far higher proclivity on the female side to headache in general.* This ratio should however be accepted with great caution, for to make it trustworthy it ought to be shown that the cases were drawn from a miscellaneous body of patients in which both sexes were fairly represented. It is highly improbable that this was the case.

It does not seem that any apparently greater liability of women to megrim is to be accounted for by uterine influence, which acts merely as an occasional excitant of the seizures; for in those of my cases in which the attacks were catamenial, with one exception the malady was hereditary, and two commenced before and two much later than the first menstruation.

Dr. Symonds draws similar conclusions with regard to his cases of headache.

Period of first Commencement.—Most of the writers on megrim and sick-headache have observed how frequently the malady makes its first appearance in childhood, and how seldom it commences after the age of thirty.† Tissot particularly has drawn attention to the subject: he says that cases often begin at the age of seven and eight (period of second dentition), and even much earlier, and then are generally hereditary; while patients, who are not so predisposed, are more frequently attacked from the ages of thirteen or fourteen up to eighteen or twenty, and very few at all after the age of twenty-five.‡ Romberg has also observed that the children of parents who have suffered from the malady are frequently attacked at an early age.§ Dr.

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* "Gulstonian Lectures on Headache," *Med. Times and Gaz.*, 1858, p. 498.

† See Labarraque, "Essai," &c., p. 36. Devilliers, Art. *Migraine*, "Dict. des Sciences Méd.," vol. xxxiii. p. 395. Fothergill says, "Mostly in the early and middle periods of life."—*On Sick-Headache*, p. 597.

‡ Tissot, "Traité des Nerfs et de leurs Maladies," Bayle's edit., p. 383-4.

§ "Diseases of the Nervous System" (Syd. Soc.), p. 177.

Symonds found that about half of his cases of headache commenced in early life, and a very large proportion of the patients used the formula—"as long as they could remember.*

Turning now to our own collection, out of 49 cases of megrim in which this point was noted, taking periods of ten years, I find that 16 commenced at or before the age of ten, 11 of these used the expression "from childhood," or "as long as I can remember;" my impression is that this would be found to correspond approximately with the period of second dentition. The largest number, 19, commenced between the ages of eleven and twenty inclusive, 12 between twenty-one and thirty, only 2 after thirty, but none later than thirty-six. It thus seems that a large number of cases commence in early life, and that the numbers diminish rapidly as life advances, so that it is rare to find any one attacked for the first time after thirty.

The cases commencing in early life include a large proportion of hereditary ones; out of 33 cases commencing at or before the age of fifteen, a distinct family history of megrim is met with in 18, and of some other neurosis in 5—a much larger proportion than among cases commencing later; in several of the remaining 10 no inquiry, unfortunately, was made on the subject. These results agree very well with what Tissot has said.

The period of the second dentition, or rather, perhaps, the particular stage of evolution through which the system then passes, would seem to be mainly influential in determining the occurrence of the 16 cases which commenced before the age of ten. Of the 19 cases which commenced between the ages of eleven and twenty it is important to notice that by far the larger portion, namely 17, were included in the first half of that period, only 2 commencing after fifteen; that is, in the five years between eleven and fifteen inclusive, 17 cases com-

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* "Gulstonian Lectures on Headache." 1858. *Med. Times and Gaz.*, p. 498.

menced—a larger number than in any other period of five years—while the next five years were marked by 2 cases only. Hence it would appear that puberty has some very striking influence in determining the commencement of the malady. This accords with the observation of M. Calmeil, that "Migraine commences sometimes at the age of eight or ten years; but more commonly it sets in towards the period of puberty."* Lastly I regard the strain upon the nervous system—upon the intellectual faculties in men and the affective ones in women—which is apt to precede and attend the entrance on the more serious business of life, as favouring the development of the third most numerous assemblage of cases, namely those commencing between the ages of twenty-one and thirty. On the whole I think these three principal epochs of first commencement—second dentition, puberty, and early adult life—are pretty clearly indicated.

Duration and Natural Termination.—Most writers on megrim are agreed that even in those cases where the attacks have commenced early, and persisted in a severe form through the greater part of life, they are generally found to abate when the patient attains the age of fifty or thereabouts, and cease completely before old age. It is in fact comparatively rare to meet with old people who suffer from this malady. Sometimes the spontaneous decline takes place much earlier. In prolonged cases a maximum of severity is often attained about the age of thirty, and it is not uncommon for people of that age to seek medical advice in consequence; this will be apparent by reference to the second column of ages in the table of cases, and it has also been noticed by Labarraque.

Tissot observes on this subject:—"The affection continues in full force up to the age of fifty-five or sixty; then, generally, the paroxysms become feebler, wider apart, and almost invariably before the age of seventy the

* Art. *Migraine*, "Dict. de Méd." (par Adelon), t. xx. p. 5.

attacks have become very slight. With women the seizures often become more frequent towards the period of the suppression of the catamenia, and diminish again when the critical period has passed. The affection follows a nearly uniform course in each individual, and with all it is ordinarily less violent at the commencement, becoming more so at the end of a few years. It persists at the same intensity for a certain time, gradually declining afterwards, but with this exception it varies much in different individuals."* "Sometimes," says M. Piorry, "Migraine is cured spontaneously with advancing years, but often also the paroxysms of which it consists become more and more frequent and render existence deplorable."† This last observation is true no doubt of the worst cases in middle age, and under aggravating circumstances to be mentioned by and by, but it is quite contrary to my experience of the usual course of the malady in the decline of life.

Sometimes the premature and abrupt cessation of an habitual megrim is among the earliest indications of commencing degeneration of the brain, and particularly of the vascular structures, and so may be the forerunner of apoplectic or paralytic seizures. I have myself known this to occur, but shall reserve anything I may have to say on such cases for another place. The following passage from Tissot appears to point to a similar termination :—"If Migraine ceases with old age, it is because nervous disorders diminish spontaneously at that time of life; that the sympathies are less active; that we are more strictly sober; more particular in the character of our food; that we indulge less in excess of all kinds; otherwise migraine does not always terminate with advanced age, and sometimes if it does so disastrous consequences follow."‡

Lastly, it must be remembered that, in many of the subjects of an hereditary predisposition, the malady is latent and requires some special influence or combination of cir-

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* "Traité des Nerfs," &c., p. 383–4. † *Mémoire*, &c., p. 414, § 320.
‡ "Traité des Nerfs," &c., p. 395.

cumstances to call it forth, and then its natural progress is completely masked. Hence it is that we find the disorder not unfrequently making its first appearance among overworked students, literary men, artizans, and sempstresses, poor women exhausted from over-suckling, and others exposed to depressing influences of various kinds; and in such cases the malady often disappears again when the causes which determined it are removed. Similar conditions also sometimes occasion an increase in the frequency or severity of the seizures among habitual sufferers.

Hereditary Character.—Perhaps there is no one feature which is more constant in the history of the malady before us than its hereditary character, and none which so forcibly confirms its claim to be regarded, in the majority of instances, as an idiopathic affection, or which links it more closely to the natural family of neuroses.

Patients constantly tell me that it is "a family complaint;" "my mother and sisters suffer in just the same way," and so forth. By hereditary character then I understand a family tendency or predisposition whether manifested in a direct line between parents and children, or collaterally among brothers and sisters; I have but seldom taken account of such a predisposition among more distant relatives—uncles, aunts, or cousins—not that it is unimportant, but because it is generally difficult to obtain trustworthy information about them.

The frequent existence of an inherited tendency to the more severe forms of Headache did not escape the notice of our countryman Willis. In a chapter on headache, including megrim, he refers to a "vicious or weak constitution of the affected part" as the chief predisposing cause of the malady, and this, he adds, is "sometimes innate and hereditary, as appears from hence, that the disease is often handed down from parents to children."*

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* T. Willis, "De Cephalalgia," cap. i. p. 247, ed. 12mo, "Ex his priorem quandoque innatam et hæreditariam esse inde constat, quia morbus a parentibus sæpe ad liberos traducitur."

Sir H. Holland has made a similar observation :—"I have already noticed the strong tendency to hereditary character in disorders of the Brain and Nervous System. This is a very remarkable part of the subject, involving, as it does, every variety and degree of morbid affection, from simple headache to the worst form of epilepsy. . . . There is much that is curious in this tendency to headaches thus transmitted by descent, and often going through whole families with similar characters."*

Dr. Symonds, in the lectures to which I have already referred, states that, out of 90 more or less habitual sufferers from headache, 44 had so suffered from early life, and 40 gave explicit evidence of an hereditary predisposition received from their parents, while a few more mentioned cases among collateral relatives.†

It is however to Tissot, I believe, that we owe the first recognition of this character as belonging more particularly to the form of headache under our consideration. "Migraine," he observes, "is certainly one of those affections which is often hereditary, and then commences its attacks from the age of seven or eight, or even earlier;"‡ and this feature of the disorder has been confirmed by most writers since his time, though no attempt has been made to show the extent to which it prevails. Romberg says briefly that "a predisposition is afforded by inheritance and by early life. I have seen girls of seven or eight years of age attacked, whose mothers had been subject to this neuralgic affection;"§ and Calmeil uses the fact as an argument for the primarily nervous origin of the malady—"as it is often also hereditary it seems lawful to conclude that the constitution and primitive conformation of the nervous system predispose to this kind of neurosis."‖

Looking now to our own cases I find 26 out of 53,

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* "Medical Notes and Reflections," p. 31. 1839.
† *Med. Times and Gaz.*, 1858, p. 498.
‡ "Traité des Nerfs," &c., p. 383.
§ "Diseases of the Nervous System" (Syd. Soc.), p. 177.
‖ Art. *Migraine*, "Dict. de Méd." (par Adelon), p. 5.

or just half, where megrim was stated to be a family complaint. In all probability the proportion should be much larger, because in many recorded cases the inquiry was never made. But this statement gives us no adequate idea of the strength of inheritance even as exhibited in the table, for these 26 patients had no less than 40 near relatives sufferers from the same complaint.*

Let us take a few illustrations. The cases of A. M., Mr. B., my patients C—, and H. T., have been already fully given in the opening chapter, and are all instances of well-marked inheritance in connexion with various forms of the disorder. The table of cases will supply us with many more; thus I. M. (No. 12), in whose case the headache was preceded by transient blindness and numbness of the hands, stated that his father and family suffered in the same way. S. B. (No. 21), with whom the attack was sick-headache, and who dated her complaint from childhood, stated that her mother, brothers, and sisters suffered from similar headaches, also from childhood. Precisely the same family history was given by my patient Miss M. (No. 44), but with her the affection did not commence till puberty, and was attended by obscuration of vision and numbness of the hands, while sickness was only occasional. In Abercrombie's cases (No. 25 and 26), in which the disorder of vision, the unilateral numbness, and failure of speech occurred, two brothers and a sister all suffered alike. In the case of the elder Mr. Travers (No. 55) the megrim was of the most complete type, while his son (No. 56) suffered from simple periodical hemicrania.

I have not usually recorded cases in which, like Dr. Wollaston's, the malady was represented by simple attacks of Hemiopsia without headache, but we have already seen that Sir H. Holland has noted an instance showing that the same law of inheritance still holds.† I have

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* The seven additional cases which the Table now contains strengthen the evidence of hereditary influence.

† "Medical Notes and Reflections," pp. 20, 156. 1839.

also noticed the case of Sir George Airy, who suffers from simple visual megrim without headache, while his son, and as I infer some other members of his family, are liable to the same affection together with nausea, headache, and perhaps other symptoms. It is worthy of remark, as confirming what Tissot has said of the early manifestation of hereditary tendencies, that in five of my patients who used the expression "ever since they could remember" with regard to the commencement of their attacks, there was a remarkable family history of the complaint.

Hereditary Transformations.—But there is another aspect of the subject of inheritance which we have not yet considered. It is now generally admitted that many disorders, but especially those of the nervous stock, exhibit transformations in the course of hereditary transmission; so that a child may not suffer from the same neurosis as his parent, nor a brother from the same as his sister, but from some other kindred affection. We owe the earliest and most important development of this subject in connexion with nervous disorders to the investigations of M. Moreau (de Tours).* In estimating, therefore, the force of a family predisposition to any neurosis this must always be taken into account; and accordingly, looking again to our analysis of cases, we find evidence of Epileptic, Insane, Neuralgic, and some other nervous tendencies in at least a dozen more of the nearest relatives of the sufferers, as well as in some other more distant ones.

We have already seen in Mr. B.'s case the blind form of the malady, which he inherited from his mother, represented by severe neuralgic attacks in two sisters. F. T.'s brother was liable to paroxysms of insanity, and also of asthma, while she herself (No. 17) had suffered, ever since she could remember, from so-called "bilious attacks" during the earlier part of her life, and from seizures of a more formidable type, with hemiopsia and numbness

* "De l'Étiologie de l'Épilepsie," &c., par M. le Doct. J. Moreau (de Tours). 1852. "Mem. Acad. Imp. de Méd.," vol. xviii. p. 1. 1854.

during the last nine years. In the case of Mr. S. (No. 46) megrim in his father and brother was represented by a more serious form of the same affection in himself, with one intercurrent attack of insanity and one of epilepsy. R. W.'s mother was epileptic, while he himself (No. 27) suffered from sick-headache. In Mr. A.'s case (No. 14), who with his brother suffered from headaches with the characteristic disorder of sight, and other members of his family from other forms of the same malady, the affection was transmitted to his eldest son, first as "day-nightmare," afterwards becoming megrim very like his own; while in his second son it appeared in a single well-marked epileptic seizure on the occasion of his being frightened as a little child, and afterwards, towards the close of the second dentition, as obstinate nocturnal enuresis, with other nervous symptoms which cannot be here described. Mrs. L. (No. 57), who had been subject through life to the ordinary form of sick-headache, brought to me her little boy, who was then suffering from epileptic fits, not due to worms or other known cause. The most interesting feature of his attacks was, that they were always preceded by temporary amaurosis, reminding one of the initial blindness so common in megrim. She had also another child suffering from chorea, but this I suspect was inherited from her father, who was rheumatic.

M. Moreau has recorded two interesting cases: one (No. 53) that of an epileptic child, whose mother suffered from "violent migraines," terminating in profound stupor, very like that of my patient C— (No. 32), and her brother also was affected in the same way. The other case was that of an adult [epileptic], who, when a child, had been the victim of "night terrors," which took the form of a beast eating his hands, and afterwards suffered from convulsive attacks, becoming epileptic at twenty; his mother, from the age of eighteen, had been subject to "violent migraines."* Mrs. N. (No. 22) has been afflicted all her life with cata-

* "De l'Étiologie de l'Épilepsie," obs. iv. and ix., pp. 23, 30.

menial megrim, which she inherited from her father; one brother was a great sufferer from neuralgic tic of the face, and another was the victim of paroxysmal insanity, while a sister was for a length of time subject to a remarkable neurosis of the vagus, exhibited in paroxysms of vomiting, often recurring for several days together, as well as other nervous attacks which cannot here be specified. Her eldest son was disabled by an anomalous nervous disorder, the exact nature of which is unknown to me, from following any intellectual pursuit, and I have lately heard that another is subject to epileptic fits. Dr. K.'s sister was epileptic from childhood, while he himself (No. 15) suffered from a severe type of blind-headache. S. H. (No. 19) had a brother and sister epileptic, and her own megrim, after recurring regularly once a month for twenty-three years, was replaced by epilepsy. S. Ar. (No. 48) inherited her sick-headache from her mother, but on two occasions she herself suffered from intercurrent epileptic fits. Dr. Sieveking's patient, E. H. (No. 30), had a sister epileptic, and her own megrim was replaced after two years by epilepsy.*

I will only observe in conclusion that, although megrim thus exhibits a certain tendency to transformation in the course of hereditary transmission, and among different members of the same family, yet in the great majority of instances it is transmitted without any such change, and very often exactly the same type is preserved. Thus, if it is a blind megrim or transient hemiopsia in the father, it is often blind megrim in the son; if sick-headache in the mother it is often sick-headache in the daughter, and so on.

Paroxysmal, and Intermittent Characters of Megrim.—Megrim is one of those affections which exhibits the intermittent and paroxysmal characters in a marked degree, and in this respect again maintains a close affinity with the whole family of functional nervous disorders. It is a permanent malady, lasting, in many cases, through the

* Sieveking on "Epilepsy," p. 27.

greater part of life, but it is only manifested at more or less distant intervals, in distinct attacks or seizures of a well-defined character and of limited duration, leaving the patient, with few exceptions, in the enjoyment of his usual good health in the intervals. The particular phenomena of the seizure we shall consider in detail by and by; they are directly referrible to the nervous system, and consist for the most part, as we have already sufficiently indicated in the opening chapter, in pain and other disorders of sense, repeating themselves with much regularity on every occasion. We are only here concerned to point out that, as a whole, they exhibit that kind of accession, culmination, and subsidence which essentially belong to our notion of a *paroxysm* or *fit* of any kind, and the whole attack, in fact, may be not inaptly characterized as a "nerve-storm."

Tissot says—"Migraine is distinguished by the severity of the pain, by a kind of periodical return, by the similarity of different attacks, by its recurrence independently of those accidental causes which determine other kinds of headache. We may say generally of every seizure that its onset is spontaneous and somewhat sudden, sometimes with a slight sense of chilliness, and then the paroxysm is often more violent; the pain, however, does not set in at first in its full severity, which it does not usually attain for an hour and half, and then remains at the same intensity for some hours."*

As regards the duration of the paroxysm, M. Calmeil observes:—"The mean duration is from eight to ten hours; most patients feeling nothing of the malady the next morning."† So M. Piorry:—"Nothing is ordinarily felt of the Migraine the following morning, or at the most a slight heaviness of the head, which is quickly dissipated."‡ Tissot says—"There is no fixed time for the duration of an attack. I have seen it last from two and a half to thirty

* "Traité des Nerfs et de leurs Maladies," p. 383–4, § 2 (Bayle's ed.).

† "Dict. de Méd." (par Adelon), Art. *Migraine*, p. 5.

‡ "Mémoire sur l'une des affections," &c, § 818, p. 413, appended to "Du Procédé Opératoire," &c. Paris, 1835.

hours, or even thirty-six, and I have now under my care a patient about forty years of age who lately had a paroxysm lasting sixty-six hours." "The ordinary duration is from eight to twelve hours."*

From our own table of cases it appears that out of 35 patients who assigned a period to their sufferings, 14 named a variable number of hours less than twelve; with them "four or five," "seven or eight," "several hours," "remainder of the day," are common expressions. Nearly the same number, 13, mentioned twelve hours or "all day" as the usual duration, and 3 specified twenty-four hours. In the remaining 5 the attacks lasted more than a day, mostly two or three, with remissions and exacerbations. This is a common feature of the catamenial type of megrim in women. Leaving these last out of consideration this gives us an average duration of about 10 hours, which agrees closely with that assigned by Calmeil and Tissot. It is clear, however, that when the latter observer states there is no fixed time for the duration of an attack, he is referring to different individuals; yet even among them I should say that periods of 12 hours and about half that time, respectively, are tolerably constant, and that in the same individual, when a frequent or habitual sufferer, approximately the same duration is very closely maintained; this indeed Tissot seems to imply, for he says "the affection follows a nearly uniform course in each individual." I should add, that when the attack is very incomplete, when it consists, for example, in the affection of sight only, it will be very much shortened, and occupy no longer than the same phenomena do in the complete paroxysm.

To the same paroxysmal character belongs the occasional abrupt termination of the attack in a species of crisis. This, however, is by no means frequent; with the majority

* "Traité des Nerfs," &c., p. 386. Lebert says, "Die eigentliche Heftigkeit der Schmerzen dauert in der Regel nur wenige Stunden, meistens aber ist erst nach 8—12 Stunden der Anfall so weit vorüber, dass bei erträglichen Schmerzen Beschäftigung möglich wird. Indessen ist gewöhnlich erst nach 24 Stunden und zuweilen noch später die letzte Unbehaglichkeit des Anfalls verschwunden."—*Handbuch der Prak. Med.*, vol. ii. p. 570. Ed. 1860.

of patients the seizure subsides gradually, generally terminating at night. With a limited number, however, a very short sleep, even half an hour or less, will completely dissipate an attack; a powerful mental emotion may have the same effect, or a critical evacuation. In this way vomiting will sometimes cut short a paroxysm; this has been supposed, on the humoral and gastric theories, to depend on the discharge which it produces of some irritating matter from the stomach; we shall see by and by that a different explanation may be given. Calmeil observes: "We have already said that vomiting sometimes terminates a migraine. An abundant flow of tears occasionally does the same, or an abundant excretion of urine. Sometimes hemicrania is terminated by an abundant perspiration from the feet, hands, half of the face, or by a nose-bleeding, a spontaneous arterial hæmorrhage, or a mucous flux from the nose."*

Tissot refers to several cases in illustration of these points, and he also mentions the case of one of his patients with whom the attack never completely terminated without vomiting, and if this could not be produced the paroxysm was indefinitely prolonged, and she was not completely free from suffering throughout the ensuing interval.† I have myself known one instance in which the termination by tears sometimes occurred, and that not in an hysterical subject, but I consider such cases very rare and quite exceptional.

But even without anything of a critical character the abrupt transition from intense suffering to perfect health in this malady is very remarkable. A man of high intellectual attainments in the prime of an active life, perhaps a literary man, a barrister, a member of parliament, finds himself, with little or no warning, completely disabled, the victim of intense bodily pain, mental prostration, and perhaps hallucinations of sense or idea; the slightest light or noise, the taste, smell, or bare idea of food, the exercise of the senses or of any connected thought, are alike intolerable

* "Dict. de Méd." (par Adelon), Art. *Migraine*, p. 5.
† "Traité des Nerfs," p. 385.

or impossible, and in this state he remains the greater part of the day; and yet towards its close, perhaps after a few hours' sleep, he awakes a different being, in possession of all his faculties, and able to join an evening entertainment, to get up a brief, or take part in a debate.

Or to take another very common case: A young woman in the enjoyment of otherwise excellent health, well nourished, cheerful and active, the life perhaps of her family circle, appears in the morning, once in every two or three weeks, a perfectly altered being, with a pale inanimate face, dull lustreless eyes, and with all her usual cheerfulness departed, and so remains throughout the day in a state of chronic nausea and corresponding mental and bodily dejection to which use alone has made her resigned; and yet the following morning she will be her former self again as if nothing had occurred; and thus she may continue to live two distinct lives, as it were, perhaps for a long series of years.

Periodicity.—Megrim then is clearly a paroxysmal and intermittent affection, but is it also a periodical one? Is there any regularity in the return of the paroxysms? If we compare different cases one with another we shall find every variety in the length of the intervals, from days to months; but there can be no doubt that in the same case a very striking regularity is often observed. Thus looking to our table of cases we see at once that with many patients the seizures return every fortnight, with others every month, every two months, and so on; indeed for this reason headaches of this kind are frequently spoken of by patients or their friends as "periodical headaches." On the other hand we may notice many cases in which the intervals are uncertain and variable.

Tissot has expressed himself very decidedly on this point. After remarking that the complaint usually pursues a uniform course in the same individual, he continues: "With many women migraine recurs every month before and sometimes after the catamenia; with other women and many men it recurs at longer intervals, eight, nine, or ten times a

year. True migraines which recur oftener than three times a month or less than four times a year are rare." "Migraine is often very regular both as to the time of its return and the duration of the attack. I have often seen it return every three months, every month, or every fortnight."* He also refers to a case in which the attack returned every Monday with the greatest regularity; but it should be observed that an exact periodicity of this kind is scarcely that for which we contend, and one is tempted to suspect that the diet or engagements of the preceding day may have had something to do with it. Elsewhere, speaking of other headaches, he says: "I have never seen any which had such an exact regularity, such a perfect uniformity, such a constant duration as characterize migraine."†

Dr. Fothergill, whose preconceptions as to the origin of the disease in some accidental disorder of the digestive organs were scarcely reconcilable with the fact of a periodical recurrence, expresses himself thus on this point:— "The returns are very irregular, as must be the case, since the disease, for the most part, proceeds from accidental causes." But it is not a little remarkable that in the very next sentence he bears an apparently unconscious testimony to that very kind of approximate periodicity for which we contend:—"Some have it," he says, "every two or three days, some once in two or three weeks, others in as many months, and some seldomer."‡ Here, then, while great variations in the length of the intervals in different cases are pointed out, a degree of regularity is distinctly admitted in the same individual, which exactly accords with the general experience.

Sir Henry Holland says of periodical headache, (and he is referring particularly to a gouty variety of megrim to be considered hereafter),—"The equality of time often observed,

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* "Traité des Nerfs" (Bayle's edit.), pp. 384, 385.

† *Idem*, p. 392. Lebert says, "Anfälle der Art wiederholen sich bei den Einen selten, kaum einige im Jahr, bei Andern in jedem Monat, ein oder mehrere Male, zeitenweise sogar wöchentlich," *op. cit.* p. 571.

‡ "Works," 4to, p. 597.

even when the intervals extend to two or three weeks, or yet longer, is a very remarkable feature in these cases, and denotes a cause specific in its nature and uniform in its operation. I have known instances where intermittent headaches have occurred during the greater part of a protracted life. More frequently, however, it happens that they affect especially certain periods of life; in this, as in many other circumstances, showing a singular relation to the disordered action of the gouty constitution."* M. Piorry also notices the periodicity of megrim, but he speaks of it as exhibited by a very limited number of cases. "The return of the seizure is variable. In a great many cases it occurs when patients expose themselves to the influence of the aforesaid exciting causes, and then only. With some the affection is periodical, and returns every eight days, every month, every three months; with others there is no certainty about its returns."†

According to my experience the regular cases are more numerous than the irregular ones. Out of 43 cases in which the inquiry was made, I find a definite period of recurrence stated by 35 patients, the remaining 8 said the returns were variable or irregular. Among the regular cases fortnightly and monthly intervals predominate. Thus in 9 of the 35 cases above referred to, the attacks returned once a fortnight, and in 12 once a month; while intervals of from two to three months prevailed in 7. The remaining 7 comprise exceptionally long or short periods.

A change of intervals is sometimes observed in the same individual during the increase or decline of the malady, but even then approximately the same period is often maintained for a length of time. Tissot refers to a case of this sort: "I have seen another patient engaged in a sedentary and studious kind of life, who had also suffered from migraine from a child, the attacks occurred first at distant intervals,

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* "Medical Notes and Reflections," Chap. xxii. "On morbid actions of an intermittent kind," p. 330. Ed. 1839.

† "Mémoire sur l'une des affections," &c. "Du Procédé Opératoire," &c., p. 413. Paris, 1835.

then became more frequent, and recurred for some years every month, then every fifteen days, then every eight days, and even more frequently still."*

There can be no doubt then, I think, that in a considerable number of instances there is a *certain kind of periodicity:* when however we question the patients rather more closely we find the regularity of return is not exact, like that of ague fits, but only approximate; there are frequent variations in both directions from the stated interval, differing in degree in different cases. It is common to hear such expressions as these from patients, "If I have not had an attack for three weeks I am then certain to have one before many days;" in the same way, after an attack, they are pretty sure of being free for some time. Accidental circumstances, such as those to which M. Piorry alludes, appear in fact to have a variable influence in determining the seizures; and it is when the patient is not exposed to such disturbing causes, and the malady follows its natural course, that the periodical tendency is most distinctly apparent. The kind and degree of influence which these occasional causes exert will form the subject of our next section. I will only observe here, that their power of deranging the natural periodicity is limited; in a well-marked case they only operate near the period of spontaneous recurrence; thus, Du Bois Reymond observes of his own case—"For some time after an attack, I may expose myself with impunity to certain influences which before would infallibly have induced a seizure."†

Another feature of these headaches, closely connected with that of periodicity, is a sort of compensation which is sometimes observed between the severity of a seizure and the degree of immunity which precedes or follows it. I cannot better illustrate this point than by quoting the words of one of my patients (Miss M., No. 44). This lady, with

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* "Traité des Nerfs," &c., p. 385.

† "Eine gewisse Zeit nach dem Anfall kann ich mich ungestraft Schädlichkeiten aussetzen, die ihn mir vorher unfehlbar würden zugezogen haben."—*Arch. für Anat. u. Phys.*, p. 461. 1860.

whom the attacks, in the absence of any disturbing causes, recurred with tolerable regularity every fortnight, after observing that, when unusually delayed, she formerly hoped they were about to leave her, but was invariably disappointed by the speedy occurrence of an attack more severe than usual, added—"I have long ceased to care for longer intervals; I know that I have *a certain quantity* of suffering which I must go through, however it is broken up or divided, and I would as soon have it regularly as not."

Lastly, there are many instances of megrim in which the original or hereditary tendency is feeble and the complaint latent, and it is only perhaps for a short period of life, a year or two or less, under certain circumstances, such as those already mentioned at page 27, which produce a chronic depression or irritation of the nervous system, that the malady shows itself, to disappear again when these are removed. Now, as might be expected, there is often less regularity in the returns of the paroxysms in these cases, more particularly when they are subsiding, and a greater dependence on accidental exciting agencies.

Exciting and Accessory Causes.

It has been already remarked that in those cases where megrim shows a well-marked tendency to a regular or periodical recurrence, this periodicity may be disturbed within certain limits, and the accessions in some instances accelerated and in others retarded, by the presence or absence respectively of certain accidental circumstances or bodily states, which act as exciting or determining causes of the seizures.

Where the constitutional predisposition is present in a fully developed form and of a well-marked hereditary type, these accidental circumstances are not at all essential to its manifestation, and the seizures will occur whether they are present or not; but when this is not the case, when the predisposition is originally feeble or latent, and when it is waning or declining in force, the influence of these secondary

agencies becomes much more apparent and important, and may make all the difference to the patient between frequent suffering and comparative immunity.

There is, moreover, a great difference exhibited in different cases as regards the nature of the causes which thus determine the seizures, as well as in the degree of their influence; and in some instances at least their operation would seem to depend on an idiosyncrasy of the individual.

Among these exciting causes we may reckon three which seem to have some claim to be regarded as more widely influential than the rest, so far at least as we may judge from the accounts of patients (whose inferences are by no means always trustworthy) and the generally received opinions in the matter. These are: Gastric disorder, the Catamenial period in women, and Emotional disturbance.

"It has been," says Romberg, "a prevailing error since Tissot's time to attribute too much influence to disturbances of the digestive organs in predisposing to the malady; they and mental affections are, however, the most common exciting causes."* This, as we shall see, is very much borne out by the cases we have collected; but Romberg does but scant justice to Tissot, who, however much prejudiced in favour of an exclusively gastric theory of megrim, was a trustworthy observer, and often records facts which rather tell against that view. So here he observes—"Migraine generally attacks people at all seasons, at all times, and any hour; it is independent of those accidental causes which produce simple headaches; and when the attacks recur very regularly, the patient experiences no inconvenience in the interim." To this, however, he immediately adds this important qualification—"But with those who have delicate nerves an attack is sometimes occasioned, as simple headache, by heated rooms, cold feet, wine, smells, some kinds of food, and particularly acid ingesta."† And again—"In this way we can understand how some kinds of food, drinks,

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* "Diseases of the Nervous System" (Syd. Soc.), p. 177.

† "Traité des Nerfs," &c., p. 386.

movements, inactivity, over-exposure to the sun, passions, especially anger and vexation, have necessarily a marked influence, except in cases of such strong temperaments as are unaffected by any such accidental agencies. The changes, too, to which women are liable, both in the uterine functions and in those of the nervous system, at the menstrual period, render the recurrence of migraine at that period very natural."*

Tissot therefore himself, whatever his followers may have done, and notwithstanding some inconsistencies in his views, to be considered hereafter, clearly recognised much for which we also contend, namely, a morbid susceptibility of the nerves as well as a focus of irritation in the stomach; and he takes account of various exciting and accessory causes besides the fundamental cause of the complaint, whatever his notions of the latter may have been.

The same essential facts with regard to the nature and influence of such causes were long since set forth by old Willis in his treatise on Cephalalgia, which includes megrim. After having stated "an evil or weak constitution of the parts," "sometimes innate and hereditary," to be the chief predisposing cause of the malady, he adds—"But further, an irritation in some distant member or viscera is sometimes the occasion, and in a sense the cause of the headache."† This he afterwards illustrates by reference to cases where the attacks were determined by gastric disorder and by the catamenial period; the latter, he says, "recur monthly at the commencement or termination of the menstrual discharge." In the case of a lady which he has recorded at length, who had suffered from childhood, generally every three weeks or month for twenty years, from headache of the true megrim type, he observes that the seizures would sometimes occur spontaneously, but more often on some trivial occasion; and he afterwards mentions as accessory causes, "changes of season, atmospheric states,

* "Traité des Nerfs," &c., p. 390.

† Thos. Willis, M.D., "De anima Brutorum," &c. "Cephalalgiæ curatio," cap. i. p. 247. 12mo, Amstel., 1674.

the great aspects of the sun and moon, violent passions, and errors in diet."*

Turning now to our table of cases I find gastric, "bilious," or intestinal disorder, or some kind of food, set down as the exciting cause of megrim in 7 cases; the catamenial period is assigned as the cause of the attacks also by 7 patients, and emotion in the form of anger, vexation, or simple excitement by 6, and intellectual exertion by 5 more. Six mentioned muscular exertion or travelling, and 4 stated that their attacks always commenced in sleep or that they awoke with them. It is by no means to be inferred that in these cases the seizures only occurred in consequence of the assigned causes, but that they more or less frequently appeared to do so. Several attributed their attacks now to one of these causes and now to another, and one lady in whom they were catamenial told me she hardly knew which to blame most her stomach or womb for the suffering she experienced in her head. In 16 no mention was made of any determining causes, though it would not be safe to infer their absence, and 14 more affirmed that there were none; of these last, 6 stated that the returns observed regular periods.

It thus appears that our analysis confirms the opinions of Tissot, Romberg, and others, who have indicated gastric disorder, the catamenial function, and mental influences among the principal exciting causes of the seizures, and that to these we ought to add some forms of muscular exertion, posture, or motion, as almost as efficacious. It will be seen however, that the number of cases in which any one of these causes was assigned, even as the occasional excitant of attacks, form but a very small proportion of the whole; and

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* . . . . "Capitis doloribus, interdum sponte, ac sæpius à levi quavis occasione oriri solitis." "Olim paroxysmi non nisi occasionaliter accersiti, rarò intra viginti dies, aut mensem." "Insuper ob plures occasiones, seu causas evidentes (cujusmodi sunt anni ac aeris mutationes, solis ac lunæ aspectus magni, passiones violentæ ac errata in victu)." *Idem*, p. 282.

What Willis may mean by the "great aspects of the sun and moon" is not very clear; but exposure to a hot sun has been frequently mentioned as an exciting cause of Megrim, and the idea of the moon as determining the recurrence of periodical complaints, however absurd, is barely yet an exploded doctrine. See "Sieveking's Epilepsy," p. 42.

especially that they lend no countenance to that view which refuses to look beyond an accidental derangement of the digestive organs for the beginning and end of the complaint. Let us now proceed to examine each of the foregoing causes a little more particularly. And first with regard to

Gastric and Intestinal Disorder.—So deeply rooted with the general public is the notion that most headaches of this class are produced by this cause, and especially by the irritation which is assumed to arise from the presence of bile, either excessive in quantity or bad in quality, strengthened as this conviction is in the minds of many sufferers by the retching and consequent discharge of bile which often attend the attacks, that the greatest caution is necessary in accepting statements which such persons make on this subject, and especially the loose and conventional expressions they constantly employ in speaking of their complaints. Thus, in five or six at least of the cases of which I have preserved memoranda, the patients referred to their attacks as "bilious," or in some way connected with bile. F. T. (No. 17) distinguished her later and worse seizures from the simpler "Bilious Headaches" from which she formerly suffered. W. R. (No. 2), in describing his complaint, said—"Bilious attacks I used to call them, but they are something much worse now." R. S. (No. 24) "always fancied her attacks were bilious, and formerly took medicine with that view, but without much benefit." So also the father of Mr. S. (No. 47), and Mr. S. himself (No. 46), considered their attacks "bilious." J. M. (No. 52) said, "Bilious food, such as a quantity of butter, would bring on an attack;" and another patient, C. J. (No. 58), also mentioned "bilious food, such as pork," as an occasional cause. It is evidently most important to distinguish what is circumstantial from what is merely inferential in such statements. The question how far Bile can be regarded as the real cause of megrim will be discussed hereafter when we come to consider the various theories which have been framed to account for this malady.

The evidence, however, of skilled witnesses, who have

been themselves both patients and observers, leaves us no room to doubt that gastric or intestinal derangement is sometimes the immediate forerunner of an attack, and that certain articles of diet occasionally act as exciting causes of the seizures. Dr. Fothergill says "he has had some little experience of the complaint himself, and his opinion is that the disease proceeds from some inattention to diet, in kind or quantity or both." He gives a list of articles which he has found particularly efficacious in producing it:— "Melted butter, fat meats, spices, meat pies, hot buttered toast, and malt liquors when strong and hoppy." Afterwards he adds, "from many incontestible proofs that butter in considerable quantity is injurious, it is less used in many families. Nothing more speedily and effectually gives the Sick-headache, and sometimes within a few hours."* One gentleman, a most intelligent member of our profession, who had suffered all his life from this complaint, but otherwise enjoyed excellent health, told me that for thirty years or more he could never take the smallest quantity of wine (and he mentioned the sacramental wine as an instance), nor eat the least fragment of burnt pastry, without infallibly producing a headache. In a very typical case of megrim by Dr. Parry (No. 50), in which all the phenomena were well developed, the attacks were said to have come on "After considerable uneasiness in her stomach and bowels, and commonly after unusual costiveness."†

On the other hand, the statements of many trustworthy witnesses in this matter are of a much more qualified kind, and lend but a very hesitating support to the prevalent notions regarding the influences in question, of which the efficacy has no doubt been enormously overrated. Du Bois Reymond says of his attacks, that "in general they are preceded by constipation;" but then he also tells us that they occurred every three or four weeks with considerable regularity, and that various exciting causes would

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* "Works," 4to, pp. 597–603.
† "Unpublished Writings," vol. i. p. 465.

produce an attack, but only towards the period of natural recurrence. Dr. Parry, speaking of his own attacks of purely blind megrim, says—"They seemed evidently connected with the state of the stomach, for though they occurred without any feeling of indisposition at the time, either there or elsewhere, they generally *went off* with a movement in the stomach producing eructation."* Of one of his patients, Miss E. A. (No. 49), he says—"It appeared that without being in any degree dyspeptic, anything which disagrees with her stomach will determine an attack; also violent exercise."† Dr. K. (No. 15), "thinks his attacks have been occasionally determined, or at least accompanied, by some disorder of the bowels or departure from his customary moderation in eating and drinking;" but they also occur quite independently of such causes. Mr. S. (No. 46) says, with respect to the exciting causes of his attacks, which have been of a very formidable type, that he has known them brought on more than once by taking *too much* wine; also by anxiety about the result of an examination, and by the fatigue and exertion of travelling all night. He adds—"I know no particular article of diet which will produce this result." S. Br. (No. 20), with whom the paroxysms were of a characteristic catamenial type, nevertheless remarked that "a hearty meal would sometimes produce an attack."

Catamenial Period.—Leaving the consideration of gastric disorder, the influence of the catamenial period next requires a brief notice. Since in many instances megrim recurs at monthly intervals even with men, it might be supposed that the frequent limitation of attacks to the catamenial period in women was merely accidental; this, however, is clearly not the case. Thus my patient, Mrs. N. (No. 22), who inherited the complaint from her father, and whose family history gave other evidence of strong neurosal tendencies, became subject, after puberty, to severe attacks of megrim, recurring at the monthly period,

* "Unpublished Writings," vol. i. p. 557. † *Idem*, p. 370.

generally immediately after menstruation. She married at twenty, and had a large family; and it is remarkable that throughout her pregnancies she has been perfectly free from the complaint, which has invariably returned after delivery. Another patient, S. H. (No. 19), with whom the attacks were catamenial, stated that she had sometimes menstruated every fortnight, and then the megrim had been fortnightly also. Such cases exhibit the influence of this cause in its true light: in the first place, we see that it is merely accessory to a pre-existing constitutional tendency; but at the same time they leave us no room to doubt that it is in some way essential to the development of the paroxysms in the individual.

The precise time at which the catamenial attack occurs varies in different cases. One of our oldest English writers on megrim, and, like so many others, a sufferer himself, observes:—"In women who are subject to attacks of this malady at the catamenial period, the pain does not abate until the uterine discharge appears."* But it very often occurs in the middle or at the close of the period. The latter was the case, for the most part, with my patient, Mrs. N. Calmeil merely observes—"With females the attacks of migraine often coincide with the menstrual periods;"† and Lebert, that with women the period of the catamenia predisposes to the seizures;‡ but Tissot says, "With many women the paroxysms occur sometimes before and sometimes after the catamenia."§ Van der Linden, who has devoted a whole treatise to a history and commentary on a case of catamenial megrim, says of his patient—"She was attacked every month, generally when the menstrual flow was coming on, but sometimes when it was passing off, with a singular pain in the head, of a hemicranial kind, in the temporal region,

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* J. Fordyce, M.D., "Dissert. de Hemicrania." 1758. Obsv. xiv., "In mulieribus huic vitio obnoxiis redeunte menstrui fluxûs periodo, redintegrari solet Hemicrania, quæ non prius recedit quam catamenia effluxerint."

† "Dict. de Méd." (par Adelon), Art. *Mig.*, p. 5.

‡ "Handbuch der Prak. Med.," ii. 571. § "Traité des Nerfs," p. 384.

fixed and lancinating, sometimes in the right and sometimes in the left side."*

Another common variety is where a succession of paroxysms occur throughout the period, as in the following case :—S. Br. (No. 20), 1864, aged thirty-one, subject to sick-headaches four years. Has one brother who also suffers from sick-headaches. Her own attacks recur every month at the menstrual period, and consist of several paroxysms or exacerbations, extending over two or three days. If the pain reaches a certain climax of intensity, it is followed by vomiting, and then subsides. The last paroxysm of each monthly attack always ends thus in vomiting. There is no uterine irregularity.

Several other questions suggest themselves with respect to the nature of the influence exerted by the uterine function, of which the discussion will be better deferred to a future chapter.

Mental Emotion.—With regard to emotional conditions, we have already seen that Romberg and Tissot recognised these in general terms as among the more influential of the occasional causes of megrim, and this we shall presently find to be further confirmed by the observations of Dr. Symonds on headache. We have also had particular illustrations of this influence among the cases recorded in the opening chapter. Thus Mr. B., p. 11, included "any sudden emotion, such as fright," among the immediate causes of his attacks, and A. M., p. 6, regarded "any considerable mental excitement as the most certain forerunner of her sufferings." Mr. S. (No. 46), specified "anxiety, as for instance about college examinations." Miss M. (No. 44), stated that any serious emotional disturbance would bring on a seizure. Of a very severe attack in one of his friends, Dr. Airy writes :—"The cause

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* J. A. Van der Linden, "De Hemicrania Menstrua," p. 2. "Hæc singulis mensibus, sæpius instante mensium fluxu, interdum cessante, corripitur singulari capitis dolore, hemicrania, circa tempora, nunc in dextra, nunc in sinistra capitis parte, hærente et lancinante."

has been easily recognised in previous anxiety and mental distress, troublesome letter-writing, and the like."* Tissot says—The passions, especially anger and vexation, have this effect, and he refers to the case of a man who suffered from a violent attack of megrim whenever he got into a passion. It does not seem in fact to matter much what the character of the emotion is, provided it be strongly felt.

Exertion and Fatigue.—There are some other occasional causes of megrim which we have already indicated as scarcely less influential than gastric disorder, emotion, or the catamenial period: among these muscular exertion and fatigue stand first in order. Lifting heavy weights has been more particularly mentioned to me as an illustration by several patients; thus Miss M. said that "great exertion, as in lifting anything heavy, or a sudden effort of any kind," would bring on an attack. E. L. (No. 3) observed that "a strain, as in lifting," would provoke a seizure. Mr. B., whose case has been so often referred to, made a similar observation. Dr. Parry's patient, Miss E. A. (No. 49), besides anything which disagreed with her stomach mentioned "violent exercise" as an occasional cause of her remarkable seizures. So also R. W. (No. 27) said his headaches were not at all influenced by the nature of the food he took, though they were sometimes brought on by "violent exercise, as running." It has been suggested that in these cases the effect is due to the venous congestion which such sudden and violent efforts occasion: it may be so; in most of these cases the malady was hereditary or strongly developed and recurred spontaneously at approximately regular periods, and it is easy to believe that such a cause might determine an attack already due. The theory which would make cerebral congestion to be the fundamental cause of megrim we shall consider in the chapter on the pathology of the disease.

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* "Phil. Trans.," 1870, p. 261.

In other instances the attacks appear to follow prolonged exertion and to depend rather on the fatigue which it occasions. C. J. (No. 58) stated that "anything which upset her, such as much exertion and fatigue, as from a hard day's washing," would provoke an attack. Dr. Wollaston traced his first attack of hemiopsia to "over-fatigue," though for the next he was "unable to assign any cause whatever, or to connect it with any previous or subsequent indisposition."* Dr. Parry, whose attacks were of a similar kind, says—"Violent fatigue, more especially when accompanied by from eight to ten hours fasting, which has often happened to me, sometimes brings them on;" and he also mentions the exhaustion which followed a smart attack of diarrhœa as having produced a paroxysm.† Dr. Airy, another sufferer from this malady, states that over-exercise may bring it on.‡ So Mr. S. told me that "muscular fatigue, as from skating all day," would occasion a paroxysm, and in the passage already quoted he says that the fatigue of travelling all night would have the same effect.

Here perhaps we are right in regarding the effect of travelling as due to the fatigue attending it; in other patients it seems to operate by the jarring or vibration it occasions; one lady told me that driving over a London pavement was most effectual with her. But in a third class of cases the mode of operation appears to be similar to that of the motion of a close carriage, and a rapid succession of visual impressions, in upsetting the sensorium and producing a vertiginous state allied to sea sickness. This appears to have been the nature of the influence in A. M.'s case, which has been already given in the first chapter (*see* p. 6).

Fasting.—In the passage given above Dr. Parry refers to the fasting state as tending to induce his hemiopic attacks; the same effect has been observed by other patients.

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* "Phil. Trans.," 1824, p. 222.
† "Unpublished Writings," vol. i. p. 557. ‡ "Phil. Trans.," 1870.

Thus Du Bois Reymond says of his megrim that the seizures "most frequently followed on some occasional cause, such as prolonged abstinence."* M. Piorry again, another sufferer, observes—"Complete deprivation of food for some hours is sufficient with some people to induce the 'bizarre' lesion to which the name of hemicrania or migraine has been given."† Elsewhere he remarks—"It is generally in one of two conditions of the stomach that the malady declares itself: namely, when full of food, or when hunger is considerable," and he gives the case of a man thirty years of age who was liable to megrim "whenever he suffered any time from hunger."‡ It may be that abstinence co-operates with fatigue, as in Dr. Parry's case, exciting megrim by the exhaustion it produces; but I am rather inclined to think with M. Piorry that hunger, or the state of innervation on which the sense of hunger depends, is the real cause, operating in the same way as any other powerful impression on the sensory ganglia.

Sleeping and Waking.—One other condition is suggested by our table of cases as favouring the occurrence of the seizures in some individuals: this is the state of sleep, or rather perhaps of waking. Four of the patients whose cases are included in the table stated that they usually awoke with their complaint, but my own unrecorded experience would lead me to fix this as a much more common commencement. Fothergill, himself a sufferer, says—"Those who are affected with sick-headache most commonly describe it in this manner: that they awake early in the morning with a headache, which seldom affects the whole head, but one particular part of it—most commonly the forehead, frequently over one, sometimes over both eyes."§ Dr. Dwight, in an Essay on sick-headache, to which I shall again have occasion to refer, observes—"In the morning when the patient first awakes, he feels a pain in the head, &c."

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* "Archiv für Anat. u. Phys.," 1860, p. 461.
† "Mémoire," &c., "Du Procédé Opératoire," &c., p. 397.
‡ *Idem*, p. 400. § "Works," 4to, p. 597.

Du Bois Reymond says of his attacks that they commence in the morning on waking ;* so my patient C. J. (No. 58) stated that she "generally awoke with them." Tissot again, observes of one of his patients—"For ten or twelve years he was subject to seven or eight attacks of migraine in the year: they seized him always during sleep;"† and Labarraque remarks on this subject—"I know a lady who cannot be accidentally awakened before her customary hour without being attacked."‡ We shall presently see that the observations of Dr. Symonds supply a remarkable addition to the evidence we have on this point. It is further interesting to notice that Dr. Airy says his attacks sometimes occur in the night, and then he has had an indistinct consciousness of having experienced the visual phenomena in his sleep, mixed up with his dreams, and he awakes in the second, or headache stage. May not this be the reason why many of those who awake early in the morning with their headaches seldom experience the affection of sight?

I shall not here attempt any explanation of this influence of sleep in the case of megrim, but only observe that it is a feature common to several neurosal affections. "The transitions from sleeping to waking, and from waking to sleeping," says Dr. Marshall Hall, "are peculiarly apt to determine the accession of nervous disorders;" and he cites the instances of spasmodic croup in infants, and epilepsy in adults, as especially liable to manifest themselves in the evening and early morning sleep respectively. Spasmodic asthma and gout furnish other examples.§

Sensory Impressions.—There still remain to be noticed some exciting causes of megrim which do not make any figure in our table, but which there is reason to believe are

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* "Ich wache dann am anderen Morgen, bei gestörtem Gemeinge-fühl, mit einem leisen Schmerz in der rechten Schläfengegend auf," &c.—*Arch. f. Anat. u. Phys.*, 1860, p. 461.

† "Traité des Nerfs," &c., p. 384.

‡ "Essai sur la Cephalalgie et la Migraine," p. 25.

§ "On Diseases and Derangements of the Nervous System," p. 258.

not unfrequent occasions of attacks with some individuals. I refer to various circumstances which produce a powerful impression on, or require a prolonged exercise of, the organs of sense; such are glaring lights, loud noises, strong odours, foul air, and the like; and particularly the various combinations of these to which different classes of people are exposed in factories, workrooms, public assemblies, and in the various forms of what is called sight-seeing. Thus, my patient Miss M. (No. 44), among the causes provoking attacks in her case, instanced "the noise and excitement occasioned by a large party of people, or a public entertainment of any kind." Du Bois Reymond also mentions "a fatiguing evening entertainment" [einer ermüdenden Abendgesellschaft] as having the same effect with him.*

Some of these influences have been indicated by Tissot in a passage already quoted, but they have been much more explicitly set forth by M. Labarraque. "It is certain," he observes, "that all those causes the nature of which is such as to produce a little over-excitation, whether of the nervous centres themselves, or of the terminal nervous expansions in the organs of sense, must be regarded as sufficient, in the predisposed, to determine an accession of migraine. Thus, prolonged watching, resistance to sleep, the being awakened suddenly and sooner than usual, by denying to the brain, already fatigued by multifarious impressions, a repose which it imperatively demands, often occasion a migraine." "We all know that it is not every one who can, with impunity, do himself the pleasure of assisting at certain theatrical representations where the glory of France is daily celebrated with noise and smoke. And how many good citizens are there not, tried patriots, whom the threatening of a migraine, infallibly brought on by the unaccustomed din of drums and military music, forcibly hinders from taking part in our civic fêtes, and joining their companies on grand review days!"

"The sense of smell, so highly developed in some persons, often becomes an occasion of migraines. Nothing is more

* "Archiv für Anat. u. Phys.," 1860, p. 461.

common than to see the odours of spirits of turpentine, of lilies, of the essence of roses, of anise, of musk, of valerian, and so forth, determine violent attacks of this malady; flowers, especially those which exhale a strong odour, sweet or not, often produce the same effect."

M. Labarraque then refers to animal emanations as having a like influence with some persons, and he cites the case of "a distinguished member of the Academy, one of the most brilliant writers which medical literature possesses, and a hospital physician, who cannot take part in a post-mortem examination without being instantly seized with vomiting and an attack of migraine. The same thing happens if by any chance they omit thoroughly to ventilate the wards which are under his care before his visit. Constant endeavours, carried out with the utmost perseverance for many years, have failed to remedy this most unfortunate predisposition. On one occasion the above precautions were not taken and yet he was in no way inconvenienced: that day they had watered the wards with some slightly chlorinated water."*

M. Piorry has especially drawn attention to the influence which any circumstances tending to tax or try the eyesight have in determining migraine, and he gives two or three illustrations from his own knowledge in which this appeared to be the case. One was the case of a physician, the victim of this malady, where the attacks were ordinarily six months apart, but if he attempted to read on a full stomach he could produce an attack at any time and that almost instantly. Another instance was that of two young women who frequently sat up late at night reading, and then were repeatedly attacked next morning, as soon as the daylight struck on their eyes, with disordered vision, terminating in migraine.† Dr. Parry also records a case of hemicranial sick-headache of long standing where the paroxysms were excited by the "incidence of strong light, or the attempt to

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* "Essai sur la Céphalalgie et la Migraine," pp. 25, 27. Paris, 1837.
† "Mémoire," &c., "Du Procédé Opératoire," &c., pp. 407, 413.

read small print."* Dr. Airy says, the attack generally comes on in his case while the eyes are engaged with troublesome reading.†

We have seen in the first chapter that the disorder of sight, whenever it occurs, is the first in the series of phenomena—that is to say, that part of the sensorium concerned in sight is the point of departure for the nerve-storm; hence it need excite no surprise that in cases like those of M. Piorry and Dr. Airy, for example, where the visual phenomena are highly developed, anything which tries the sight should determine a paroxysm. Such a pathological *habit* indeed of disturbance through this channel may the sensorium acquire by its frequent repetition, that, as M. Piorry says of himself in a later paper, he can produce the phenomenon of the luminous vibratory circle at will by strongly fixing the sight or reading.‡ Quite in harmony with this is the fact mentioned by Dr. Airy, that in the case of an acquaintance of his the attacks have been occasionally brought on by looking at a striped wall-paper or a striped dress;§ and the late Sir John Herschel, a sufferer from purely visual megrim, states, in a letter to Dr. Airy, that an attack was produced in him by allowing the mind to dwell on the description of the appearances. This is very interesting, showing, as it does, that the same kind of impression on the sensorium, whether arriving through channels of sense or idea, may be followed by the same result. It does not of course follow that the 'storm' should proceed any further than the ganglia immediately concerned; whether it does so or not will depend on the stability of the equilibrium in the remainder at the time. Some further suggestions as to the interpretation of these observations will be given in connexion with the ocular theory of megrim which M. Piorry has propounded.

Meteorological Influences.—I ought not to omit to notice

* "Unpublished Writings," vol. i. p. 563.
† "Phil. Trans.," 1870, p. 259.
‡ "Comptes Rendus de l'Acad. des Sciences," Déc. 1859, p. 987.
§ "Phil. Trans.," 1870, p. 262.

that atmospheric states, changes of season or weather, have been regarded sometimes as exciting and sometimes as accessory causes of megrim. I have not myself, as far as I remember, met with any patients who have connected their sufferings in any way with these causes, but they have been frequently noticed by others. C. Lepois (No. 38) states that he was attacked "on every change of weather;" Labarraque places atmospheric conditions among the "external predisposing causes," and Tissot among the "remote causes" of the malady. The latter observes—"There are atmospheric states in which the appetite is much diminished and digestion troublesome; and often in such circumstances those who know little or nothing otherwise of migraine suffer from repeated attacks."* We shall see immediately that a large number of Dr. Symonds's patients assigned meteorological changes, and especially thunderstorms, as exciting causes of their headaches. Dr. Airy says—"Several times I have believed the attack to be favoured by bad windy weather, for the reason that different members of my family have been affected on the same day in such weather, though unaware of the synchronism till afterwards." "Sudden changes of air and living have sometimes seemed to be the exciting cause; on one occasion some years ago, on going into the country for a winter holiday, I had three or four attacks in the first two days."† So Lebert says that many are influenced by the direction of the wind; and the attacks of megrim are particularly frequent and violent in Zurich during the prevalence of south-westerly wind.‡

In concluding this subject of the exciting causes of megrim, I would again direct attention to the evidence collected by the late Dr. Symonds, as to the most frequent and influential of the occasional causes of headache when occurring as an independent affection; it appears to corre-

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* "Traité des Nerfs," &c., p. 392. † "Phil Trans.," 1870, p. 259.

‡ "Auch von der Richtung des Windes hängt manches ab; So sind in Zürich die Anfälle der Migräne bei herrschen dem Südwest-wind (Föhn) besonders häufig und heftig."—*Handbuch der Prak. Med.*, ii. 570.

spond very closely with that which has now been adduced in the case of megrim. He shows in the first place that out of 90 patients 53 assigned emotional disturbance as one of the exciting causes; 19 only laid the blame on any indiscretion in diet, and these, if they specified any at all, only mentioned some article of food which had been at times an apparent cause of the disturbance, while 62 denied that diet had any influence; 12 only affirmed any connexion between the attacks of headache and the action of the bowels, while 54 denied that any such existed. Out of 76 females, 35 referred to their "periodical health" as having been in some way connected with the attacks. Fatigue was referred to as an exciting cause by 32 out of the 90, without any question having been put on that point, and 48 mentioned atmospheric states and 25 thunder; 43 reported that the attacks set in early in the day—mostly on first waking.*

Accessory Causes.—Hitherto I have spoken only of certain influences which are sufficient with some persons to determine immediately an accession of their malady: but very many of the same agencies, and some others not included among them, also operate in another and somewhat different way. This is not by any sudden and transient impression which they make on the nervous system, upsetting its equilibrium, but by a more prolonged operation, in consequence of which its latent morbid tendencies are developed, or those already in action intensified. This they seem to effect in an indirect way by deranging nutrition, and interfering with those natural alternations of activity and repose, and that equable exercise of all the faculties of body and mind on which the functional stability of the nervous system so much depends. They are thus rather *accessory* to the original vice of that system, than provocative of the paroxysms.

Foremost among these accessory causes must be reckoned

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* "Gulstonian Lectures," 1858.—*Med. Times and Gaz.*, May 15, 1858.

exhausting circumstances of any kind. It is an axiom in nervous pathology that mobility and stability are inversely proportional; hence as the nervous system becomes enfeebled so much the more liable is it to have its equilibrium upset, and any inherent proclivity to the irregular development and discharge of nervous force promoted, by disturbing causes which would otherwise prove inoperative. M. Trousseau, speaking of exhausting circumstances, such as diarrhœa, and insufficiency of food, as a cause of convulsions in children, observes—"There is nothing in this to occasion surprise, when we reflect on the great physiological law, that in proportion as the nutritive and vegetative functions are feeble and languishing, nervous phenomena are mobile, exalted, and irregular—a law which has been admirably formulated in this simple observation of Hippocrates—*Sanguis moderator nervorum.*"*

In this way it happens that a person may go through a great part of his life without being aware of any disposition to megrim, and another may find his malady very bearable for many years, until some such circumstances arise as those to which I refer. This is illustrated by one of Tissot's cases (No. 42), where a severe form of blind megrim appears to have been first developed in a lady from the fatigue and anxiety of nursing her mother through a long illness. Many of those instances in which the complaint makes its appearance for a short time in the middle of life, and then disappears again, are probably of this kind. Thus also I find that among poor women with a predisposition to megrim, prolonged lactation, especially if associated with poor living, (which is but too often the case,) sometimes develops and always increases the frequency and severity of the seizures. This was the case with my patient, F. T. (No. 17); her megrim had taken a more serious form ever since her marriage ten years previously. When she came to me at the hospital she was much exhausted by frequent child-bearing and prolonged suckling, and this had produced

* "Clinique Médicale," par A. Trousseau, tom. ii. p. 116. 1865.

a further aggravation of her malady, which was relieved by measures adopted with this view.

The case of J. M. (No. 52) is a no less striking illustration. This patient was the victim of a well marked hereditary and periodical megrim commencing with puberty, not strictly catamenial, but remarkable, like that of Mrs. N., for being always absent during pregnancy. The attacks had invariably returned after delivery, and been unusually severe during nursing. This patient, moreover, always menstruated profusely while suckling, and it was owing to the terrible aggravation of her malady which these causes had produced that she came to me for advice. She improved considerably after weaning her infant, and taking iron and other remedies for some time. Such instances as these might be multiplied almost indefinitely.

Exhausting discharges, prolonged indigestion, disordered bowels, and whatever tends for a time to lower the standard of health, will produce an aggravation of the complaint. W. R. (No. 2) stated that his attacks were more frequent when from any cause his general health was impaired. E. C. (No. 1) made a similar remark, and was then suffering from debility and leucorrhœa.

Dressmakers, and others, compelled to work far into the night, often for weeks together, in close and confined rooms, frequently make a like complaint. This was the case with my patient R. S. (No. 24). She had suffered for fifteen years from megrim, but otherwise enjoyed good health, her attacks occurring at irregular and distant intervals; but when she came to me she had been much overworked in the way I have mentioned, and had had as many as five attacks in the previous fortnight of a formidable cerebral type.

Mental exertion, if too close or continuous, and especially if attended with anxiety, will have a like effect. Thus, among students—lads at school and young men at college—the malady is often first developed, or very much increased, by close application to books, and by those modern instruments of torture, competitive examinations, coupled with a

deficiency of out-door life. The same thing happens in later years to literary and professional men when overworked and over-anxious in business, and this, as I have already stated, I believe to be in part at least the reason why so many sufferers from this complaint seek medical advice for the first time between thirty and forty years of age. The effect of a student's life and of intellectual competition is forcibly illustrated in the case of Dr. K. (No. 15). With him these circumstances seem to have developed the first attack of his malady when at the university, and ever afterwards the returns appeared to be determined or aggravated by similar conditions. In Mr. A.'s son, too (No. 45), the early strain of school life appears to have been the cause of the "day nightmare" which preceded his megrim, and his subsequent attacks of the latter complaint were always multiplied by close application, and almost ceased with an out-door life. It was much the same, though commencing at a somewhat later period, with his father and uncle (Nos. 14 and 18). Du Bois Reymond says that his attacks were much diminished both in violence and regularity compared with what they formerly were when he was less attentive to his general health and had leisure to devote himself without interruption to severe intellectual work.*

Lastly, as we have already seen, the period of puberty, or the disturbance of the nervous system which attends it, favours the development of megrim, and the same is true of the climacteric period in women. These states of the system may perhaps be reckoned among the accessory causes of the complaint.

I regret that I have no sufficient evidence to show what effects the morbid production or imperfect elimination of certain waste products of the system, and especially urinary materials, may have in developing a tendency to megrim; but we shall see hereafter that many of the severer forms of

* "Sie haben jetzt an Heftigkeit und Regelmässigkeit sehr nachgelassen im Vergleich zu einer früheren Zeit, wo ich, bei geringer Rücksicht auf meine Gesundheit, noch musse hatte, mich unausgesetzt grossen geistigen Anstrengungen hinzugeben."—*Archiv für Anat. u. Phys.*, 1860, p. 461.

the affection are intimately connected with a gouty habit, as Sir Henry Holland long since pointed out.* The inference we feel inclined to draw, and which indeed Sir Henry draws, is that the megrim in such cases is due to an excess of uric acid in the system. It is possible, however, to take another view, and regard the gout, the uric acid, and the megrim as co-effects of a single nervous disorder; the idea is by no means a new one, and much might be said in support of it.

Throughout the preceding chapter on the general features of megrim, I have cited the corresponding observations of Dr. Symonds on Headache, with the result of showing that a very large proportion of his cases exhibit a remarkable parallelism with those of megrim; this is seen with respect to the influence of sex, the commencement in early life and decline in advancing years, the frequency of an hereditary predisposition, and lastly in the operation of various exciting causes, among which we may name emotion, the catamenial period, muscular exertion and fatigue, the waking state, and less frequently gastric or intestinal derangement, as well as in the spontaneous recurrence of attacks independently of any such occasional influences. I have already suggested that the explanation may partly be found in the fact that Dr. Symonds's cases, taken as they were from a promiscuous assemblage of patients, with whom headache of a more or less chronic and severe type was the principal cause of complaint, necessarily included a large number of unequivocal cases of megrim; but I go further, and believe that a great many recurring headaches which are not of sufficient severity, nor associated with such other symptoms as would enable us readily to identify them as megrim, nevertheless belong essentially to the same stock, and are merely feebly developed forms, or the vanishing inheritance of previous generations. In fact, excluding on the one hand those instances of merely casual and transient head-

* "Medical Notes and Reflections," p. 330. Ed. 1839.

ache, to which, as old Willis justly remarks, "there is none but is sometimes obnoxious, so that it has become a proverb as a sign of a most rare and admirable thing 'that his head did never ake,'" and excluding also cases in which headache is but a symptom of some other disease, as an eruptive fever, tubercular meningitis, anæmia, uræmia, and the like, and selecting on the other those in which it is a more or less serious and independent affection, constituting a malady *per se*,—all such cases I believe to be varieties of megrim. Hence I agree with the classification of M. Labarraque who makes *Cephalalgia Essentialis seu Idiopathica* synonymous with Migraine.

One or two inferences stand out very clearly from these observations of Dr. Symonds, namely:—1. that headache is far less frequently symptomatic of gastric or biliary disorder than is commonly supposed; 2. that in a large majority of cases it is to be traced, as he says, to a primary "neurotic susceptibility;" and 3. that, in his own words, "Headache has an importance of its own."

CHAPTER III.

Phenomena of the Paroxysm :—Natural Succession ; Unilateral and Bilateral Characters ; The Disorder of Sight ; of Tactile Sensibility and Taste ; of the Faculty of Speech ; Psychical Phenomena ; Giddiness, and Disorder of the Muscular Sense ; Headache ; Nausea and Vomiting ; Drowsiness ; Termination.

A FEW remarks may be made with regard to the phenomena of the paroxysm taken collectively before we proceed to their separate consideration. First, I may recall, what has been already shown in the opening chapter, that in the majority of cases they consist exclusively in disorders of Sense—namely, affections of sight and occasionally of hearing ; of touch, more particularly in the hands and face, and sometimes of taste ; of the muscular sense in vertigo and occasional double vision ; and lastly, in a sense of pain almost limited to the territory of the ophthalmic branch of the fifth, and of nausea, referrible to the eighth nerve. It should be further observed that this disordered sensibility is of two kinds, consisting (1) in the interruption of the transmission of impressions to the sensorium from the outer world, and (2) in the substitution or addition of subjective perceptions : such are the blindness and numbness on the one hand, the ocular spectra and tingling on the other. Secondly, ideational consciousness is occasionally disturbed, but only in a small proportion of cases ; this is felt most commonly in impairment of memory and in confusion and incoordination of ideas, very rarely in hallucination. Thirdly, motor phenomena, whether convulsive or paralytic, form no primary or essential part of the attack, are frequently altogether absent, and when present appear to be secondary and subordinate to those of feeling. The most frequent are,

vomiting, which sometimes follows the subjective sense of nausea, and impairment of articulation and manipulation, which seem to be due rather to derangement of the muscular sense and the sensori-motor associations on which all such coordinated movements depend, than on actual loss of motor power; in fact they are more ataxic than paralytic.

Natural Succession.—Another character which belongs to the phenomena of the paroxysm when regarded collectively, is the maintenance of a tolerably constant and natural order of succession. This I have endeavoured to indicate by their arrangement in consecutive columns in the table of cases. This typical order is well shown in the following case which I translate from Tissot (No. 40):—"I was consulted by an officer in the Austrian service, thirty-two years of age, whose migraine was of a well-marked nervous type. 'I have suffered from the age of nine years,' these are his words, 'from migraine which, at its commencement, seized me about every two months, sometimes oftener; I have also been more than a year without it. It begins in the eyes; when I least expect it my sight becomes suddenly disordered, but more on one side than on the other, like that of a person who has looked at the sun. This lasts about ten minutes; afterwards an arm and a leg of the same side, one time one side and one another, go to sleep. I feel a tingling as if ants were on them; I have the same feeling in the mouth and tongue, and further, during this period, I have the greatest difficulty in speaking. This lasts about half a quarter of an hour; afterwards the pains in the head commence, but only in the temples, where they persist with great severity during seven or eight hours. When I can be sick I get relief.'"*

The affection of sight then, when it occurs, is always or almost always first, next come the disorders of touch and of the muscular sense in the extremities, which are quickly followed by the impairment of speech and disordered idea-

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* "Traité des Nerfs," &c., p. 388.

tion; the headache then sets in, and as it increases nausea is gradually developed; actual vomiting is always later and may terminate the attack, but more frequently the paroxysm ends in sleep.

Unilateral and Bilateral Characters.—Megrim has been supposed to be pre-eminently a one-sided affection, but we have already shown that, if we adopt a natural rather than an artificial definition of it, this feature can no longer be regarded as constant or essential. Nevertheless a no inconsiderable proportion of cases are one-sided, and as this is a character which belongs alike to several of the phenomena it will be well to consider it here.

So far as the headache is concerned, I find by reference to the analysis of cases only 17 entered as unilateral, and 7 as imperfectly unilateral, or sometimes unilateral and sometimes bilateral, against 34 bilateral cases. I am inclined to think, however, that if more exact inquiries had been made, many of the bilateral cases would have proved to be very unequally so, and to belong rather to the former category.

As regards the affection of touch, namely, the numbness and tingling in the extremities, face, and mouth, out of 21 cases in which these phenomena were present, in 10 they were confined to one side, and in 11 both sides were involved. It is worth recalling here, that in the case of H. T., already given, p. 16, in whom these symptoms were highly developed, they were one-sided in the hand and arm, but in the mouth, tongue, and interior of the throat, they affected both sides alike.

Passing on to the visual phenomena, a moment's consideration is required before we can feel sure what corresponds with a unilateral and what with a bilateral affection of other parts. We might at first sight suppose that disordered vision in one eye would correspond with a one-sided pain or numbness, and in both eyes with a bilateral affection of other parts; but this is not so; in consequence, as we may for the present assume, of the decussation of the

optic nerves, both eyes share the disorder in almost every case, whether the other phenomena are unilateral or bilateral, and the visual field of each eye is symmetrically affected. But we find that sometimes the disorder is limited to a right and sometimes to a left half or portion of the field, constituting a form of hemiopsia, while in others it is central or involves the whole field; it is the former of these conditions, where one or other side of the visual field in each eye is affected, which is equivalent to a unilateral affection of the head or extremities, while a central or general obscuration is equivalent to a bilateral disorder. I shall have more to say in evidence and explanation of this when we come to consider the affection of sight. Now, looking to our table of cases I find, out of 37 in which vision was impaired, 12 in which a lateral half or portion of the field was obscured, in 1 only an inferior half, and in 3 more the affection was sometimes lateral and sometimes central; in the remaining 21 the obscuration was stated or inferred to be central or general. These varieties correspond with those we have noticed in the case of headache and numbness.

Our next inquiry in connexion with this subject will naturally be—Whether the cases which are unilateral or bilateral in one feature are so in all? For instance, if the headache is one-sided are the disorders of vision and touch so also? And if this prove to be the case we may then inquire further whether the corresponding or opposite sides are affected in each instance? It is to be regretted that many of the cases I have brought together have not been recorded with a view to these inquiries, and the evidence they supply is therefore often defective or uncertain; nevertheless it will be worth our while to see how far the materials before us will furnish an answer, although this may not be as complete or trustworthy as we could wish.

Now we find, by reference to the table, taking first those cases in which the headache was unilateral or more on one side than the other, that in 12 the sight was also impaired, and in 9 of these the visual field would appear to have

been affected towards one or other side; in the remaining three the impairment of vision seems to have been general, or imperfectly described. It deserves notice that in one of the nine cases (No. 45) the affection of sight was sometimes lateral and sometimes central, and then the headache was correspondingly unilateral or bilateral—a conclusive proof of the analogy and correspondence between the two orders of phenomena. In 10 cases also of unilateral headache in which the numbness and tingling were present, with two exceptions they were also one-sided.

Again, taking the cases in which the headache was bilateral: the centre or whole of the visual field was affected in 16, and a lateral portion in 5; and in 11 cases in which the numbness and tingling were present these were also bilateral in 9, unilateral in one, and imperfectly so (that is, in the extremities but not in the face) in another. In the single unilateral case it should be observed that the disorder of sight was also present and one-sided, though the headache was bilateral.

It would appear, then, that in the majority of cases where the headache is one-sided, the disorders of vision and of touch are so too, and where the headache is bilateral so are the other symptoms. But we see also that this rule is not absolute, and that there are exceptions, which perhaps would be lessened by more accurate observation, especially as regards the predominance of pain on one or other side in cases of bilateral headache.

Turning now to the latter part of our inquiry—namely, whether the various disorders of sensation in unilateral cases affect the same or opposite sides—our facts are limited and must not be taken for more than they are worth, but as far as they go they appear to confirm the statements which have been made by previous observers. Let us take, in the first place, instances of unilateral headache in which the disorder of sight was also one-sided and compare the phenomena. In S. B. (No. 21), with whom the headache was chiefly, although not exclusively, on the right side, the affection of sight was towards the right also; it was the

same precisely with Mrs. N. In Mr. A.'s son, on one occasion at least, the pain was confined to the left side, and so was the disorder of sight. M. Piorry also states (and we know that he is drawing from his own experience) that the pain occurs on the same side as the spectral appearances.* On the other hand, in the case of Dr. K. the pain was on the opposite side to the "glimmering;" so in my patient E. L. (No. 3), the headache was on the left side, and the disordered sight on the right; it was the same, on two occasions at least, with Mr. A.'s son; and Dr. Dwight states, probably from his own experience, that vision is impaired on the opposite side to the pain.†

Again, taking instances in which the headache is hemicranial and the tactile sense also impaired on one side, we find, in M. Lebert's case, the right side to be the seat of both disorders; it was the same exactly with my patient C——, p. 14. In a case by C. Lepois (No. 39), the numbness and headache were both on the left side; and it was the same, again, with Mr. A.'s son on the only occasion when the numbness was felt. On the other hand, in two of Dr. Parry's cases (Nos. 49 and 50), the headache was on the left side, and the numbness and tingling on the right; it was the same, reversing the sides, in a third case he has recorded. M. Calmeil also observes that the tingling occupies one side of the body corresponding or opposite to that of the hemicrania.‡ It is worth noting that we cannot compare the affections of sight and touch together in the same way, because in only one of the foregoing unilateral cases were both these phenomena developed; there remain, however, a few cases, such as Abercrombie's (Nos. 25 and 26), and that of the Austrian officer given above, p. 64, where the disorders of vision and touch occurred on one and the

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* "Cependant, après un temps dont la durée varie, quelques élancemens se font sentir dans l'œil et dans la tempe du côté où l'éblouissement avait eu lieu."—*Mémoire*, &c., § 813, p. 410.

† "Medical Repository," vol. ii. New York, 1800.

‡ "Dict. de Méd." (par Adelon), Art. *Migraine*, p. 4.

same side, while the seat of the headache was general or not particularized.

We arrive, then, at this rather remarkable result: that the affections of sight and touch in megrim, when unilateral, are almost, though not quite, as likely to occur on the opposite as on the same side with the headache.

Another question still remains. Is the same side always or usually attacked in the same individual? Certainly not always: our table of cases affords many instances where it was stated or implied that sometimes one side and sometimes the other was affected. Yet my impression is, that in most well-marked unilateral cases one side suffers, if not exclusively, yet far more frequently than the other, for the majority of patients indicate the right or left side as the principal seat of suffering in describing their complaint. Tissot was of the same opinion: "Most patients," he says, "have migraine always on the same side; with some it follows no rule; but I have seen a lady with whom it attacked each side alternately with the greatest regularity, and if occasionally it attacked the wrong side it was always less violent; but it then often happened that it returned the next morning on the ordinary side."* It is much the same with purely visual megrim; Wollaston's was now on the left side and now on the right; Sir George Airy finds it about an even chance which side is attacked;† with his son, on the other hand, the left side is more frequently affected than the right. There is, moreover, this very remarkable feature about Dr. Hubert Airy's case, that, in the same seizure, after the disorder has run its course in one half of the visual field, it will occasionally commence in the other, and go through the same development.‡

In conclusion we may observe that this manifestation of a unilateral, bilateral, or intermediate character, is not peculiar to megrim, but is seen in many other functional disorders of the nervous system. Thus the convulsions of epilepsy and

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* "Traité des Nerfs," p. 385. † *Phil. Magazine*, July, 1865.
‡ "Phil. Trans.," 1870, p. 260.

the twitchings of chorea frequently exhibit a more or less one-sided character, and the same may be said of hysterical paralysis and hysterical convulsions.

The Disorder of Sight.—Whenever this is present it is, as I have said, an initial symptom, the first step in the series of sensorial phenomena of which the paroxysm consists. It is a very common feature of the seizures, only second in this respect to the headache itself. Thus it was present in some degree in 37 out of the 60 cases which I have collected, or in nearly two-thirds. I may repeat that I do not attach any particular value to these figures, beyond showing that this symptom is a tolerably frequent one in the more severe forms of megrim.

I have already spoken of the twofold character of the affection of sight—first, the partial obliteration or absence of vision in a limited portion of the visual field; and secondly, the spectral appearances. The obliteration may and frequently does occur without being succeeded by the dazzling or spectra, but the converse is rare. When both occur, and this is most common, the obliteration precedes, or rather I should say commences before the dazzling.

1. With respect to the *obliteration* or partial loss of sight, this is limited at the commencement to a small portion of the visual field, which may be centric or eccentric. In the former case, by occupying that point of the field on which the sight is fixed, and which corresponds to the *macula lutea* where the sense is most acute, it directly interferes with vision and is immediately apparent to the patient, especially if he is using his eyes on any near objects at the time—for example, in reading. If, however, it commences far from the centre, where vision is obtuse and non-discriminating, it may escape notice for some time; and even when the patient's attention has been caught by its further extension, it is less clearly defined, and descriptions are correspondingly vague.*

* "Dans quelques cas," says M. Piorry, "l'éblouissement, même léger, et

As regards the appearances thus occasioned, there is a very general consent among those who have at all particularly described them; most agree that discerning vision is lost at the spot; hence Dr. Wollaston likens it to a new *punctum cæcum,* and this exactly accords with Mr. A.'s experience. Others merely describe the disappearance of certain words or letters in a page, or certain features in a person's face. We all remember Mr. Abernethy's humorous remark that he could see no more of his own name than the "knee" (*ne*) and the "thigh" (*thy*). It deserves notice that at least three patients have referred, quite independently, to the temporary loss of vision which follows a momentary gaze at the sun, as an illustration of the blindness in megrim; thus Dr. Parry says, in some cases it is "not very unlike the darkness which occurs after a person has looked at the sun."* One of my patients, Mr. S. (No. 46), observes—"The sensation was similar to that produced by looking at the sun—indeed identical both in appearance and effects." So again Tissot's patient, whose case has been given above, p. 64, says of his megrim—"It begins in the eyes. When I least expect it my sight becomes suddenly disordered, but more on one side than the other, like a person who has looked at the sun [a fixé le soleil.]"† I do not think, however, that this illustration could be pressed very far; for although, in the spectral appearances which sometimes follow, coloured fringes are occasionally seen, the blank spot itself does not present any such succession of colours as that occasioned by the sun while the retina recovers its power. Others, and these perhaps are the most

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le nuage, sont les seules lésions optiques qui précèdent la douleur, et il arrive que les troubles de la vision sont quelquefois assez légers pour que les malades n'y aient pas fait attention et ne se les rappellent qu'après les questions réitérées du médecin."—*Mémoire*, &c., § 813, p. 410.

* "Unpublished Writings of Dr. C. H. Parry," vol. i. p. 557, &c.

† Tissot, "Traité des Nerfs" (Bayle's ed.), p. 388. "Elle commence par les yeux: lorsque je m'y attends le moins, je vois tout-à-coup tout trouble, mais plus d'un côté que de l'autre, comme une personne qui a fixé le soleil."

I can now add a fourth instance. Dr. Airy uses the same simile—"At first it looked just like the spot which you see after having looked at the sun."—*Phil. Trans.*, 1870, p. 255.

numerous, describe the appearance as that of a cloud or mist, or other opaque object in the field of view.

There appears to be a good deal of variety in the degree of luminosity which the blank spot exhibits in different individuals. Thus Mr. A. (No. 14), says it is "mere blankness," as in the natural blind spot; from which I infer that the illumination is about the same as that of the field around. Mr. B. (p. 11), speaks of a portion of the field as hidden by a white object, and afterwards he calls it "blank whiteness." Here I take white to mean luminous. Dr. Wollaston says—"This blindness was not so complete as to amount to absolute blackness, but was *shaded darkness*." Dr. Parry says of his own case—"The general sight did not appear affected, but when I looked at any particular object it seemed as if something *brown*, and more or less opaque, was interposed between my eyes and it, so that I saw it indistinctly or not at all."* He always refers to it afterwards as "the cloud." M. Piorry, whose descriptions are so minute that, as M. Labarraque observes, we cannot doubt that he is describing his own sensations, observes—"It seems at first as though a cloud [nuage] made its appearance in the centre of the image depicted on the retina; by degrees the blank [terne] spot which one sees extends," &c.† It appears to me that these are all merely different modes of describing very similar phenomena—a limited area of obliteration and varying illumination or perception of light.

With others the appearances have been less defined, or they have been less accurately observed or described. Thus Abercrombie's patients (Nos. 25, 26) speak of "a blindness coming on gradually, as if a cloud passed slowly over the eye."‡ Some merely speak of a general dimness or mist: this was the case with my patient, W. R. (No. 2), in whom many of the other phenomena were exceedingly well developed and described. He tells me there is a general dim-

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* "Unpublished Writings," vol. i. p. 557.
† "Mémoire," &c., p. 409, § 812.
‡ "Diseases of the Brain and Spinal Cord," p. 420. 2nd edit., 1829.

ness and dazzling, but he has not observed one part of the field of view to be more obliterated than another. The table of cases will furnish several more illustrations. This vagueness may be partly due to the appearances being imperfectly developed, or in some cases occupying a part of the visual field further removed from the centre of vision; but more commonly I believe it may be referred to a want of training on the part of the patient in the observation and description of natural phenomena. Piorry says that when he has made drawings of the appearances, many of his patients have at once recognised them as what they have been accustomed to see.* This, however, must refer more to the spectral appearances to be presently described than to the blindness.

With regard to the situation and form of the blind area, it tends, as I have said, towards one of two types, central or lateral. In the former a limited space in the middle of the field is blank, in the latter the obliteration is to one or other side, right or left, of the axis of vision; much more rarely it occupies an upper or lower half, constituting a rare form of half-vision.

As an instance of the *lateral* variety, I may refer to Mr. S.'s narrative of his own case: "When my tutor and I were reading together I suddenly discovered that reading was impossible, as I could only see half the word." And again, "these attacks were always attended with total loss of half the vision, so that I could not see a person walking alongside of me." Dr. Wollaston's and Mr. Abernethy's were similar cases of half-vision; so were also those of F. T. (No. 17), and of Tissot's patient (No. 42). With Mr. A., on the other hand, the affection of vision was always *central;* the middle of a word or the features of a person's face would be lost, while objects around, towards which the axis of vision was not directed, were as visible as usual. It was the same with E. C. (No. 1).

* "Chez presque tous les sujets de mes observations, la forme de ces images était, à peu de chose près, la même; de sorte qu'en la dessinant, ils reconnaissent ce qu'ils avaient souvent vu."—*Mémoire*, &c., p. 409.

Some patients, again, experience, at different times, both the central and lateral forms. Thus Dr. Parry (p. 9) says of the "cloud" in his own case—"Most generally it seemed to be exactly in the middle of the object, while my sight, comprehending all round it, was as distinct and clear as usual; in consequence of which, if I wished to see anything, I was obliged to look on one side. At other times, though much more rarely, the cloud was on one side of the direct line of vision."* Dr. K. gives a similar account of his own experience—"The vision is first disordered. Sometimes without any warning or previous ill-feeling, the centre of the field of view becomes blank and invisible, all around remaining clearly defined. At other times, only the halves of objects are seen." It was the same with Mr. A.'s son. Mr. B.'s is the only case I have yet met with in which the obscuration was limited to an upper or lower half of the visual field (see p. 12).

This blindness, however, at whatever point of the field it first appears, is not stationary but progressive, gradually extending from its original focus and involving the parts around, while the sight gradually returns in those which were first affected. The course which this development takes is determined by the point of its commencement, but is almost always towards the circumference, and but seldom, so far as I know, centripetal. Thus, if the original blind spot be in the axis of vision the development is centrifugal on all sides of it, the centre of the field clearing as the circumference becomes involved; so that, as Mr. A. expressed it, the condition at this stage is as if he were looking through a tube or diaphragm, the field of vision being enormously contracted. M. Piorry is evidently describing the same kind of progress when, referring to the luminous circumference of the blind area, of which we have not yet spoken, he observes:—"At first very small, this portion of the circle expands at the same time as the

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* "Unpublished Writings," vol. i. p. 557.

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central obscuration begins to clear, and developing more and more . . . ends by vanishing when it arrives at the extremity of the field of vision."*

On the other hand when the original blind focus is to one or other side of the visual axis the expansion is towards that side exclusively, spreading over a lateral half or section of the field. This was the case with Mr. A.'s son and other patients who experienced unilateral attacks of the malady. Dr. Wollaston's would seem to have been of this latter kind—"The loss of sight," he says, "was *towards my left* . . . The complaint was of short duration, and in about a quarter of an hour might be said to be wholly gone, having receded with a gradual motion from the centre of vision obliquely upwards towards the left."†

2. Hitherto we have spoken only of the loss of objective vision, but as I said at first the disorder is twofold, and the blindness is accompanied, in many instances, by certain spectral appearances. These are developed in very different degrees in different individuals; in some they are faint and attract but little notice, in others they are so highly pronounced and sharply defined as to rivet the attention of the patient and remain vividly impressed on his mind. These appearances are not visible at the commencement of the blindness, but they are gradually developed as the blank spot expands. In their simplest form they consist in a luminous border surrounding the blind area more or less completely, and expanding and widening as it expands. In almost every case an appearance of a rapid molecular movement or oscillation is described as occurring in this luminous circle or arc; various illustrations have been employed by different observers to convey a notion of these effects; thus some speak of it vaguely as a "glimmering," or of the visual field being "all alive." Mr. A. likens it to the effect

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* "D'abord très-petite, cette portion de cercle grandit en même temps que le point central obscurci commence à s'éclaircir, et se développant de plus en plus . . . . finit par disparaître lorsqu'il arrive à l'extrémité du champ de la vision."—*Mémoire*, &c., p. 409.

† "Phil. Trans." 1824, p. 222, &c.

produced by the rapid gyrations of the small water beetles as they are seen swarming in a cluster on the surface of the water in the sunshine. Dr. K. to that produced by moving two pieces of wire gauze one before the other against the light. Where the appearances are more brilliant they are described as "coruscations," "showers of sparks," and so on. Lastly we have the addition in some instances of bright colours, as in the case of my patient H. T., p. 17, and Mr. B., p. 12. All these descriptions clearly point to very similar appearances although, no doubt, they are more developed in some cases than in others.

As regards the form of the luminous spectrum thus produced, with some there is never any well-defined outline, but in the best marked instances there is; and then we meet with a very remarkable coincidence in the accounts of it by independent observers; all agree in describing an appearance of luminous angles or zigzags. Thus Dr. Fothergill, in a passage we have already quoted, says—"It begins with a singular kind of glimmering in the sight; objects swiftly changing their apparent position, *surrounded with luminous angles like those of a fortification.*"* Dr. Parry says—"After it had continued a few minutes, the upper or lower edge (I think always the upper) appeared bounded by an edging of light of a zigzag shape, and coruscating nearly at right angles to its length . . . . When I shut both eyes, covering them with my hands so as to exclude all rays of light, the coruscation was still perceptible in the same place, and what had been an opaque cloud appeared lighter than the rest."† M. Piorry describes it thus—"Very shortly, after the lapse of one or two minutes, a luminous arc of a circle is depicted around the blank space; this is coloured with some individuals but colourless with others, disposed in zigzags, and agitated by a sort of continual oscillation . . . . Whether the eye is open or shut the hallucination persists; but it is better delineated in twilight

* "Remarks on Sick-Headache," Works, 4to, p. 597, &c.
† "Unpublished Writings," vol. i. p. 557.

or darkness than in a bright light."* My patient R. S., (No. 24) described the appearance as that of "bright zigzags;" and Mr. B. as a semicircular arc formed by two intersecting zigzag lines, the alternate points seeming to move in opposite directions and exhibiting prismatic colours. In some cases these appearances are confined to a much smaller arc of the circle or section of the field; thus, in a second notice of the phenomena by Dr. Parry, after describing the central blindness as before, he says—"After a short time a coruscation of light in a zigzag form plays rapidly backwards and forwards *at one corner* of what appears to be one eye only, but on trial is found to be common to both."†

This luminous image follows the centrifugal expansion which commenced in the blank spot; the appearances become less defined as they recede further from the axis of vision, and eventually vanish at the circumference of the field. There is so much undesigned coincidence in these accounts—the appearance of a luminous spectrum, the molecular movement, the zigzag outline—that we cannot but recognise the constancy of the phenomena and the general accuracy of the descriptions.

It is important to observe that although the succession is usually such as has been described, yet the affection of sight may be represented by the blindness alone or by the spectral appearance alone. Dr. Wollaston's would seem to have been an instance of the former kind; for although minute in his descriptions he makes no reference to a luminous spectrum of any kind, but only to "shaded darkness" in the blind area. It was the same with my patient F. T. (No. 17), who described simply a hemiopic blindness preceding the headache, and with many others.

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* "Bientôt, et après une ou deux minutes se dessine à l'entour de l'espace obscurci un arc de cercle lumineux, coloré chez quelques individus, mais pâle chez d'autres, disposé en zig-zags, agité par une sorte d'oscillation continuelle . . . Que l'œil soit ouvert ou fermé, l'hallucination continue; mais elle se dessine mieux dans un demi jour ou dans les ténèbres que dans une lumière vive."—*Mémoire*, &c., p. 409.

† "Elements of Pathology and Therapeutics," by C. H. Parry, M.D., vol. i. p. 357.

On the other hand Dr. K. states that in his case the majority of seizures have begun with the spectral appearances of glimmering and sparkling, and the earlier phenomenon of partial blindness has been absent or unobserved. But it should be noted that in this case the "glimmering" is described as commencing to the extreme right or left and thence extending over the visual field, and hence I think it very possible that the blind spot may have been present, but so far removed from the axis of vision as to have escaped notice. With regard to this commencement of the dazzling or glimmering appearance at the circumference of the visual field and its subsequent extension, following an apparently centripetal progress, I should add that I received a similar description from my patient Mr. S. He speaks of the disorder as frequently commencing with a tremulous motion in the extreme edge of the visual field, and thence extending over the half of it. This progress is comparatively rare, and the descriptions we have of it are far less precise than those of the centrifugal expansion.

I have already expressed my belief that the disorder affects the vision of both eyes symmetrically in all cases; yet patients frequently refer it to one only. This is certainly in most cases a mistake, and arises, I believe, in this way: In ordinary binocular vision we mentally combine the visual fields of both eyes and are conscious of only one, and therefore naturally attribute any derangement in the right or left half of it to the corresponding eye. So far as the blindness or loss of objective vision only is concerned, this illusion is easily dispelled by closing first one eye and then the other, and in this way I have often corrected the false impressions of patients. A blank spot in the visual field of one eye, especially if luminous and not exactly central, would be scarcely more apparent than the natural *punctum cæcum*.

This bilateral character is confirmed by the experience of both Drs. Parry and Wollaston. The former says—"The coruscation always appeared to be in one eye; but both it and the cloud existed equally whether I looked at an object

with one or both eyes open. . . . . When I raised or lowered the axes of my eyes, or squinted, the cloud and coruscation, though it moved its place, still bore the same relation to the object at which I looked."* So also Dr. Wollaston observes of a friend—"In him the blindness has been invariably to the right of the centre of vision, and from want of due consideration had been considered as temporary insensibility of the right eye; but he is now satisfied that this is not really the case, but that both eyes have been similarly affected with blindness."† M. Piorry would seem never to have freed himself from this illusion, for he says—"It is almost always on one side (meaning one eye) exclusively that this occurs;" but the reason he gives for this opinion will scarcely be considered satisfactory—"I have never seen," he continues, "any one who had experienced the sensation of double images."‡

When, however, the patient directs his attention to the positive or spectral appearances and not to the blindness, it is by no means so easy to ascertain whether these are referrible to one or both eyes: and since the phenomena are purely subjective our test of successively closing the eyes, which answers perfectly for the blindness, can no longer avail. There is, in fact, no obvious reason why a spectral appearance originating in the sensorium should be consciously *projected* in connexion with one eye rather than the other, or if in connexion with both why there should be any perception of double images. These considerations may help to clear up what remains of ambiguity or disagreement in the statements of different observers on this point; and it should be remembered that M. Piorry, in the passage just quoted, is speaking mainly with reference to the luminous spectrum.

Lastly, with regard to the duration, the whole visual

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* "Unpublished Writings," vol. i. p. 557.

† "Phil. Trans.," 1824, p. 222, &c.

‡ "C'est presque toujours d'un seul côté qu'elle (l'hallucination) a lieu; je n'ai jamais vu personne qui ait éprouvé la sensation de doubles images."—*Mémoire*, &c., p. 409.

disorder, including the blindness and spectral appearances, is very transient; the majority of patients assigning from ten to twenty minutes, occasionally half an hour, for its completion.

The foregoing account of the visual phenomena would not be complete without some reference to the *Ophthalmoscopic appearances* of the fundus of the eye. This need not occupy us long. The history of the malady already traced is enough to show that this is no mere local affection of the retina or optic nerve, but must have its origin in the sensory ganglia of the brain, and this view will be further confirmed as we proceed; we should not therefore expect that an ophthalmoscopic inspection would throw much additional light on its essential pathology. Nevertheless, as has been well remarked, the optic papilla presents the "furthest outpost of the cerebral circulation," and as such it might be expected, under certain circumstances, to furnish outward and visible indications of any serious disturbance within, so far at least as the circulation is involved; and we know that many interesting observations have been made, in this country more particularly by Dr. Hughlings Jackson, on vascular changes in the optic papilla in connexion with diseases of the brain. Moreover, several theories have been propounded with regard to the nature of megrim which would make the affection depend on an irregular distribution of blood in the brain and organs of sense. It may be well, therefore, to inquire whether the retina or optic nerve exhibit any alterations in their blood supply while the malady runs its course.

Now it does not often happen that we see our patients while actually suffering from a paroxysm of megrim, or have the opportunity or appliances at hand for making an ophthalmoscopic inspection if we do. Such an opportunity did, however, present itself to me in the case of Mr. A.'s son on one occasion. A well-marked unilateral attack was then coming on, and the blind stage had begun, the obliteration being to the left of the visual axis; the pupils were fully open, and I was enabled to make careful observations of the

state of the fundus in both eyes from that time until the headache was established. Both the retina and optic papilla presented a natural coloration and healthy appearance; the latter was well defined, if anything rather pale, but certainly exhibited neither well-marked hyperæmia nor anæmia; the retinal vessels appeared normal, the veins perhaps were rather large. I could perceive no difference in these respects in the two eyes. An unusually severe paroxysm of headache set in with much nausea, but was of a few hours' duration only. He came to me the following day when all traces of the attack had passed away; I then repeated my examination, but could detect no alteration in the appearance of the parts. These observations of course require confirmation; nor should I be surprised to find on subsequent occasions alterations in the distribution of blood in those parts which were not apparent in this instance; but they appear to me conclusive that such alterations form no essential part of the attack.

The following observation by my friend Mr. Macnamara has a similar bearing. After describing Dr. Wollaston's transient hemiopsia, he continues—"We meet with instances of this kind from time to time in practice; they generally come on with indigestion or headache, and are of little or no consequence, but may cause the patient much unnecessary alarm. On examining the eye with the ophthalmoscope no abnormal appearance can be discovered, the affection probably depending upon temporary loss of power in the nerve-fibres, or nervous matter, supplying half the retina of either eye."*

The materials for this essay had been collected and put together, very much in their present form, for several years, and I was engaged in making an abstract of them which was read at Cambridge a few weeks later, when I heard a very interesting paper, at a meeting of the Royal Society, *On a Distinct form of Transient Hemiopsia*, by Dr. H. Airy, to

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* "A Manual of the Diseases of the Eye," by C. Macnamara, 1872, p. 439.

which numerous references have already been made in the preceding pages. It appeared that the author had long suffered from one of the varieties of the malady we are considering, in which the visual phenomena were very highly developed; it was to an account of these appearances that the paper was chiefly devoted. They had evidently been most carefully observed and were very minutely described, and the descriptions illustrated by some excellent drawings of the spectral appearances. In all essential features Dr. Airy's descriptions of the phenomena corresponded with those given by various sufferers in the foregoing account, the accuracy of which they confirm; but there were many details which were new to me, and of some of these I made brief memoranda at the time.

1. The first was with regard to the degree of illumination and colour of the blank spot. Dr. Airy had depicted the appearances of a white and a coloured printed page at this period: the letters were wanting in the blind area, but the colour and illumination in each case were approximately those of the paper. Against a brightly illuminated white sky the spot appeared to be darker than the ground and of a tawny colour; on the other hand with the eyes closed and in the dark it appeared to be illuminated. This is a rather fuller description than Dr. Parry's, though very similar.

2. The description given of the centrifugal expansion of the figure differed slightly from that in the foregoing account. In Dr. Airy's case the original blind "germ" is sometimes situated in the axis of vision, or very near it, at other times at a short distance from it, and there is a corresponding difference in its subsequent progress. Since the affection with him is always strictly hemiopic and the median line is not transgressed, when the germ is most central the expansion is entirely towards one side, and the figure at once assumes a crescentic or horse-shoe shape with its concavity towards the median line; when, however, the germ originates at some distance from the centre of vision, it expands at first alike on all sides, forming a ring, and when this approaches the centre it breaks on that side and becomes a crescent as

before, and the further progress is the same. It thus appears that the blind focus may be in the axis of vision and yet the subsequent expansion be one-sided; while it may begin on one side and yet the expansion be equal on all sides until the median line is reached. The left half of the visual field is the one most frequently affected in Dr. Airy's case, much more rarely the right.

3. When the development has proceeded a certain way a second blind germ will sometimes commence near the former focus and begin a similar progress; but this always proves abortive, unless it should chance to originate in the other half of the visual field, when its development may be completed as before. I have never met with this feature among any of my patients nor in any published account.

4. The luminous character of the crescentic figure, its rapid "boiling and trembling" motion, and characteristic angular or "bastioned" outline were minutely described; and it is noteworthy, as confirming the identity of the appearances in different cases, that without any knowledge of Dr. Fothergill's account of the malady, Dr. Airy made use of the same illustration of a "fortification," and even suggested the name "*Teichopsia*" for this disorder of vision. Gorgeous chromatic edgings to the figure were also represented as sometimes present, forming, as Dr. Airy said, altogether a beautiful spectacle marred only by the anticipation of the severe headache which would follow. Figures of these various appearances, the centrifugal expansion, the "fortification pattern," and the abortive second germ, will be found in the plate at the end of this volume, for which I am indebted to the kindness of the author.

These interesting observations have since been published in the "Philosophical Transactions," and to them I would refer the reader for further particulars of Dr. Airy's case, as well as notices of several others, adding to our already large stock of autograph accounts of this affection by distinguished men of science.* Most of these being confined to descriptions

* "On a Distinct Form of Transient Hemiopsia," by Hubert Airy, M.A., M.D.—*Phil. Transact.* for 1870, p. 247. London, 1871.

of the visual phenomena are of less avail in our present inquiry than perhaps they might otherwise have been. I have already drawn attention to the fact that Dr. Airy's father and other members of his family suffer from somewhat different forms of this disorder (p. 30), and to the information thus incidentally furnished by the paper I attach much value, as confirming the views I have already expressed respecting the intimate relationship of the different forms of megrim, and the remarkably hereditary character they exhibit.

One account of the appearances contained in this paper—namely, that by the late Sir John Herschel of his own case—should be especially noticed, for it describes the development and transit of the angular image across the whole visual field, beginning on the left and ending on the right side—a somewhat unusual course, of which I have already spoken.*

I may add that the references to the descriptions of the phenomena by Drs. Fothergill and Parry in Dr. Airy's printed paper were supplied from my own. And I would also observe that the statement "the sequel of partial aphasia and loss of memory are all new features, not mentioned by any previous observer," (p. 250), referring to Sir George Airy's account, requires correction, since attention has been drawn to descriptive instances of these phenomena in the works of M. Tissot, Dr. Parry, Dr. Abercrombie, M. Lebert, and I may now add Mr. Travers.

Disorder of Common Sensation or Touch.—This is met with only in a minority of cases, and those generally of a severe kind. It was present in 21 out of the 60 cases included in the table, or in rather more than a third, but in some of these only in the severer seizures. Its normal order in the series of phenomena is after the affection of sight, which it immediately follows; but the latter may not be completed before the affection of touch commences, and

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* See also, "Familiar Lectures on Scientific Subjects," by Sir John Herschel. Lect. IX. Delivered at Leeds, Sept. 30, 1858, p. 406.

sometimes the two are developed almost simultaneously. In Mr. Travers's case (No. 55), the disorders of sight and touch were thus coincident, and they were occasionally so in that of Mr. S. My patient W. R. (No. 2), stated that with him the impairment of touch alternated in intensity with the disturbance of vision.

The situations to which the disorder is more particularly referred are the hands, and especially the extremities of the fingers, together with the parts about the mouth, the lips and tongue. The reason of this is probably because the sense of touch is so highly developed in these parts that any failure or disturbance of it is at once perceived in them. The hands and upper extremities are most frequently affected; then the face and mouth; and the lower extremities but seldom.

When fully developed it is, like the affection of sight, twofold; consisting (1) in a numbness or impairment of sensibility to external impressions, which is soon followed by (2) certain subjective sensations of tingling, thrilling, or formication. But although these two symptoms are most commonly associated, the numbness may be present without being followed by the tingling, just as the blindness may without any obvious spectral appearances. Numbness only is spoken of in Abercrombie's cases (Nos. 25 and 26), and in two recorded by Dr. Sieveking (Nos. 30 and 31), and also by my patients, J. M., S. H., and Mr. P. (Nos. 12, 19, and 28). It is not impossible, however, that the expression "numbness" may have included tingling in some of these cases. It is rare to find tingling mentioned without numbness; it was so however in a case reported by C. Lepois (No. 39), and my patient R. W. (No. 27), described his symptoms only as "sensations in his hands;" but I do not consider that either of these afford very trustworthy evidence on the subject.

Both the numbness and tingling present considerable variety both in degree and extent in different instances. F. T. (No. 17), complained that the numbness in her hands was such that she was not conscious of the contact of

objects with them. I am indebted to my friend Dr. Latham for having drawn my attention to the case of the late Mr. Benjamin Travers; it is one more of the many instances in which eminent members of our profession have been at the pains to record their own personal experience of this singular malady. We are introduced to the subject in connexion with that of ocular spectra and muscæ volitantes in his treatise on diseases of the eye. "Such appearances," he observes, "are sometimes harbingers of the intense 'bilious' headache. At the instant of their appearance the sentient extremities upon the fingers and tongue are so benumbed that objects of touch and taste convey a very indistinct impression as if some muffle were interposed. These sensations I am describing *ad vivum*, for I was formerly often the subject of this attack, which was followed by a certain degree of confusion of intellect and temporary suspension of memory, so as greatly to embarrass, if not to take away the power of intelligible expression."* We have to regret the omission of a fuller description of the visual disorder, but it is clear from the context that it was of the nature of an obscuration of a portion of the visual field as if by some interposed body, and that it formed the first symptom of the seizure. We may also infer from what precedes that the headache occurred last, was of a very intense character, and attended with bilious vomiting; in fact, in this account, we recognise all the characteristic features of megrim as we have identified it, and occurring moreover in their typical order.

In other cases not merely the sentient extremities but the whole limb seems affected. The numbness may then be compared to that which we experience in a member which has "gone to sleep," while the tingling is like the pricking and vibratory sensations which attend its awakening, familiarly described as "pins and needles." Thus it was that the Austrian officer under Tissot's care described his sensations (p. 64)—"This (the affection of

* "Diseases of the Eye," p. 175.

sight) lasts about ten minutes; then an arm and leg of the same side, one day of one side and another of the other go to sleep. I feel a sensation as though ants were running over them, and I have the same feeling in my mouth and tongue."* The tingling may in some cases amount to actual pain or suffering of some kind. M. Piorry says—"It must not be supposed that these are the only accidents by which a severe migraine may be accompanied; it sometimes happens that one side of the tongue or face, the inferior members, and still more the superior, experience a painful sense of thrilling [frémissement douloureux] which reminds one of the oscillations of the image in the eye, having the same vibratory character." "This strange sensation closely resembles that which we experience in cramps, or the painful sensation we feel at our finger ends when the ulnar nerve has been struck at the elbow."† There can be no doubt, I think, that M. Piorry is here describing what he has himself felt.

In some few cases we find the loss of sensibility accompanied by a certain loss of motor power in the same parts, in fact a degree of transient hemiplegia. Thus Miss M. (No. 44), spoke of the "uselessness" of her hands for the time; my patient C., whose case has been given in the opening chapter (p. 14), complained that her hands were "so useless as to drop things"; in two of Dr. Parry's cases we find the same expression employed; of Miss ——, (No. 50), he says—"The right hand and arm lose more or

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* "Cela dure environ une dixaine de minutes, ensuite un bras et une jambe du même côté, et un jour d'un côté et un jour de l'autre, s'endorment. Je sens des frissons, comme s'il y avait des fourmis; je sens le même chose à la bouche et à la langue."—*Traité des Nerfs* (Bayle's edit.), p. 387.

Professor Lebert uses nearly the same expressions—"Eingeschlafensein und Ameisenkriechen in einer Gesichtshälfte, auf einer seite der Zunge, in einer Gliedmasse."

† "Mais il ne faudrait pas penser que ce fussent là les seuls accidens dont une migraine excessive soit accompagnée; il arrive qu'un des côtés de la langue ou de la face, que les membres inférieurs, et surtout les supérieurs, éprouvent un frémissement douloureux qui rappelle les oscillations de l'image dans l'œil, qui en a le caractère de vibration." "Cette sensation bizarre ressemble assez bien à celle que l'on éprouve dans les crampes, ou au sentiment pénible que l'on ressent au bout des doigts lorsqu'on s'est heurté le nerf cubital au coude."—*Mémoire, &c.*, § 817, p. 412.

less, but always a great deal, of their sensibility, and in some degree the power of motion, so that she cannot hold anything in her hand."* In the other case (No. 49), which was an hysterical type of megrim, the numbness "was like in quality but greater in degree than that which occurs in what is called a sleepy hand or foot. It was accompanied with great coldness and want of muscular power in the parts affected, so that she could not hold anything in her hand. The chief of the numbness goes away with a tingling in about a quarter of an hour."† In one of Dr. Sieveking's cases, E. H. (No. 30), a similar loss of power occasionally occurred.

I have already stated my belief that the disorder in these cases is in part at least ataxic, and the result of impaired sensibility; I regret that I have not had opportunities of sufficiently testing to what extent this is so, and how far motor power is really lost. I suspect, however, that in some cases there is a real transient palsy of an inhibitory kind, the result of the nerve-storm in the sensory ganglia, and we shall see hereafter that this loss of power may occasionally prove of a less temporary kind.

Many patients describe the sensations of numbness and tingling as commencing at the extremities of the fingers and making a *gradual progress* up the arm and side of the neck until the head and face are reached, when they terminate. Thus, in my patient H. T. (p. 16), when the affection of sight has lasted about a quarter of an hour, a sense of numbness with tingling commences in the fingers of the right hand and gradually extends up the side until it reaches the throat; the interior of the throat, the tongue and lips share the sensation, which is here no longer confined to the right side, but affects these parts bilaterally. In Dr. Sieveking's case, E. G. (No. 31), the patient "felt a numbness in her right leg, ascending to the trunk, right arm, and face, with a film over her eyes, and leaving a violent headache lasting the whole day."‡ In another of his patients,

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* "Unpublished Writings," vol. i. p. 465. † *Idem*, p. 370.
‡ "On Epilepsy," p. 57.

E. H. (No. 30), "the attacks commenced in the hands and mounted up to the head."* So, again, in one of Dr. Parry's cases, an extremely typical one, the numbness was said to "ascend by degrees to the shoulder and then to the face, always, as she thinks, on the right side; immediately after which the right half of the tongue is affected in a similar way, and she loses the power of articulation."†

M. Piorry describes a slightly different progress of the 'thrilling' sensation. "Commencing," he says, "in the tip of the tongue, at one part of the face, at the ends of the fingers or toes, it mounts little by little towards the cerebro-spinal axis, successively disappearing about those parts where it was first developed. . . . . When this pain has reached the neighbourhood of the nervous centres, it ceases to be felt."‡ Lastly, in Abercrombie's cases, we have a similar but still more remarkable progress described:—"About a quarter of an hour after this (the blindness) she feels a numbness of the little finger of the right hand, beginning at the point of it and extending very gradually over the whole hand and arm, producing a complete loss of sensibility of the parts, but without any loss of the power of motion. The feeling of numbness thus extends to the right side of the head, and from this it seems to spread downwards towards the stomach. When it reaches the side of the head, she becomes oppressed and partially confused, answers questions slowly and confusedly, and her speech is considerably affected; when it reaches the stomach she sometimes vomits." The feeling of numbness then begins to subside, and as it goes off the headache sets in.§

We can hardly fail to trace in these singular phenomena the counterpart of the visual disorder which we have already studied. This correspondence has attracted the notice of

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* "On Epilepsy," p. 27. † "Unpublished Writings," vol. i. p. 465.

‡ "Commençant par la pointe de la langue, une partie de la face, le bout des doigts ou des orteils, il remonte peu à peu vers l'axe cerebro-spinal, en disparaissent successivement vers les points où d'abord il s'était développé. Quand cette douleur est parvenue vers le centre nerveux, elle cesse de se faire sentir."—*Mémoire, &c.*, § 817, p. 412.

§ "Diseases of the Brain and Spinal Cord," p. 420, 2nd edit. 1829.

several observers. Mr. Travers remarks of the numbness—"An analogy is plainly perceived between the corresponding states of the sentient and visual extremities to that of a temporary and incomplete paralysis;"* and M. Piorry says—"The thrilling sensation in the hands calls to mind the oscillatory movement of the visual image." In both we have a primary loss or impairment of the normal sensibility of the part, to be followed or not by certain sentient impressions of a subjective kind, which have, of course, their own distinctive characters determined by the original endowments of the sentient periphery to which they are referred, but of which a certain tremulous or vibratory character is common to both—the thrilling in the hands and face, the rapid molecular movement or scintillation of the visual image. But this does not complete the resemblance: in many instances we observe a similar progress, or successive affection of different parts of the sentient area; thus it is for the most part centrifugal in the field of view, it is from the extremities and outlying parts towards the cerebro-spinal axis (Piorry) in the case of touch; in both it would seem to proceed from the points of highest sensibility whether of vision or touch, to less sensitive regions: there are exceptions, but this is the rule. Lastly, we observe in both a similar manifestation of a unilateral character in some cases, and a bilateral in others—the hemiopsia and hemiplegic numbness in one set; the central obscuration and centrifugal extension over the whole visual field, and the bilateral numbness, in the other.

It is impossible not to be struck by the apparent resemblance of these phenomena—the tingling and its centripetal progress—to the so-called *aura epileptica;* Sir James Clarke has remarked upon it in a passage in which he clearly identifies the malady of which we are treating as "Nervous Dyspeptic Headache." "In some cases the attack is preceded by numbness in the extremities, by dimness of sight, or ocular spectra; in others a peculiar uneasy

* "Diseases of the Eye," p. 175.

sensation, originating in one of the extremities, ascends gradually to the head, resembling the aura epileptica."* Dr. Babington also, referring to the case of a friend where these symptoms preceded attacks of sick-headache in which the gastric disorder was strongly pronounced, observes:— "It is remarkable that 'aura' is not necessarily connected with epilepsy at all. . . . . He is much subject to headaches, dependent on a disordered state of the stomach; under which he ejects by a kind of rumination, hardly amounting to retching, large quantities of acid fluid. These attacks are often ushered in by a sensation of tingling in one arm, which mounts up from his finger ends, and gradually advances towards the face on the same side, affecting one half of the tongue, palate, and lips."†

So far as these phenomena, both in epilepsy and megrim, are due to a disturbance in the sensory ganglia of the encephalon, consciously referred to the sentient extremities of the nerves of touch, according to the well-known law of peripheral interpretation, so far no doubt there is an affinity between them, but here the resemblance ceases.‡ A variety of sensations and movements are included under the vague term "aura" in epilepsy, and these are met with only in a small percentage of cases, and form no part of the typical epileptic paroxysm; on the other hand the disordered sensibility of the extremities and other parts in megrim has a very constant character and course, comparable with those of vision; it has moreover a certain determinate place and relation to the other phenomena in the typical seizure, and lastly it is present in no inconsiderable proportion of the severer forms of the malady. Here then we have a sufficient clinical if not physiological distinction; and I may take this occasion to remark that although all the members

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* "Treatise on Climate," Introduction on *Nervous Dyspepsia*, p. 18.

† "Guy's Hosp. Reports," 1st series, vol. vi. p. 10.

‡ "*Aura Epileptica.* Sauvages is of opinion that the sensation has its origin in the brain, though it is referred to the limb, just as a man who has lost his leg still thinks he feels his toes."—*Solly on the Brain.*

"When the sense of touch is the seat of hallucination the term '*aura epileptica*' is used to describe it."—*Aitken's Med.*, ii. 312.

of the neurosal family are very nearly allied, and megrim and epilepsy perhaps as closely as any, yet the typical paroxysms in each are as distinct as any nosologist could desire.

Lastly, with regard to those cases in which the disorder of touch is one-sided, I may recall what has been already pointed out, that it is for the most part on the same side as the hemicranial pain and half blindness; but this is not constant, and as M. Calmeil observes—"In exceptionally severe seizures unpleasant sensations of tingling occupy one side of the body, corresponding or opposite to that of the hemicrania." Moreover we have seen that even when one-sided in the extremities it may become bilateral as it reaches the parts about the throat and mouth.

This will be the most convenient place to notice the derangement which has been now and then observed in connexion with the remaining Senses, although much less frequently than in those of touch and sight.

Of the disordered sensibility in general, M. Piorry observes—"The sight, hearing, taste, and smell are altered while the neuralgia runs through its stages; the least light brings on the paroxysms or aggravates them; the least noise is insupportable; the disgust for food is sometimes extreme, and the most grateful odours are with difficulty endured by the sufferers."* So painful is this *hyperæsthesia* in a certain stage of the seizure with some people that, as Tissot says of one of his patients—"he could not bear anything to touch his head, and the least light or sound, even the ticking of his watch, was insupportable."†

But *taste* and *hearing* would appear occasionally to exhibit a more specific kind of derangement similar to that of touch and sight. Thus there may be deafness with noises in the ears, and there may be loss of the faculty of tasting with the addition of subjective tastes. Tissot remarks that sometimes "there are most unpleasant noises in the ears," and he mentions the case of one of his patients with whom the

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* "Mémoire, &c.," § 814, p. 410. † "Traité des Nerfs," case ii. p 385.

ttack was always preceded by deafness, and left a numb-ness of the affected side.* I can now add that Dr. Airy's ater attacks "have been followed by a slight disturbance of hearing, in which external sounds gave rise to a momen-ary 'rumbling' in the ears."†

The impairment of taste is intimately connected with hat of touch and coincident with it. Mr. Travers states hat his sense of taste appeared benumbed like that of touch. n my patient Mr. S., when the tingling reached the mouth, ie experienced a coppery or metallic taste. This is the nly instance as far as I am aware in which the occurrence of a subjective taste has been recorded.

Disorder of Speech stands next in order in the history of he megrim paroxysm. It will facilitate our consideration of this subject if we first briefly recall the leading forms nder which disordered speech occurs in connexion with ther brain affections, whether functional or organic.

We may very shortly dismiss all such cases as depend exclusively on a paralytic condition of the muscles of the mouth and tongue concerned in speech, whether as a part of a general hemiplegic palsy from lesion of the central motor tract, or from a more localized injury of certain motor nerves, both which may occasion an uncertain amount of indistinctness in utterance. This, however, is much less than might be expected; it is well known that in 'Brain cases' the disorder of speech may be very great when the paralytic condition of the mouth and tongue is trifling; and on the other hand this paralytic condition may be highly marked and yet speech be scarcely affected. This was so for example in one of Andral's cases—"In the midst," he observes, "of all these grave lesions of motility and sensi-bility the intellect was preserved intact and there was no affection of speech."‡

Again, derangement of speech may be intimately con-

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* "Traité des Nerfs," p. 386. † "Phil. Trans., 1870," p. 261.
‡ "Clinique Médicale," vol. v. p. 325; Illustrations of Cerebral Hæmor-rhage, Case vii.

nected with mental impairment: it may be associated with confusion of ideas and failure of memory. It was at one time a very generally received opinion that loss of speech, especially in its more complete forms, was a species of loss of memory; and it is quite possible for a person to retain a good recollection of objects and events while their names or descriptions may be wanting; there is, in fact, in such cases an interruption of the fundamental association of language—namely, that of general ideas or mental conceptions of things with their conventional signs or names, constituting a loss of memory of words, or verbal "Amnesia" as it was called. Thus, one of the early signs of senile degeneration and softening of the brain may be of this kind. At first it may amount to nothing more than an exaggeration of that inability to recall a word, and especially a proper name, which happens to most of us at times, to some more than others, to the old more than the young; but from proper names it extends to all substantive forms, and the command of words becomes less and less, and is attended by general mental failure and imbecility. The temporary loss of speech which occasionally follows acute illnesses appears to be sometimes of an amnesic character.

But there is a third form which more particularly concerns us in our present inquiry, and to which the name "Aphasia" has of late been given. In the earlier part of the present century, when for a time a good deal of attention was directed to the subject, it was seen that a large number of cases of disordered speech, with no attendant paralysis, could not be explained on the memorial hypothesis. It is to a paper by Dr. Jonathan Osborne, published in the *Dublin Medical Journal* in 1833, that we owe one of the clearest and earliest statements of this distinction. Admitting some cases of failure of speech to be truly amnesic, he says there are others in which the disorder "does not consist in a want of recollection of the word to be pronounced, but in a loss of recollection of the *mode of using the vocal apparatus so as to pronounce it.*" Of course

this is no loss of recollection in the ordinary and proper sense of the term, but the expression serves to put in a forcible way the distinction between the two cases: it is really an interruption of a certain association in one order of cerebral phenomena which loss of memory is in another. In truth the faculty of speech, or that inferior part of language which consists in articulate or graphic sign-making, is a sensori-motor process comparable with various loco-motor and manipulatory acquirements; the idea in the mind calls up (if the memory serves) its corresponding word-form or sign in the sensorium, and whether this be a remembered sound, visual image, or muscular feeling, or a combination of these, it matters little for our present inquiry: this sensory impression has become inseparably wedded with a certain train of movements, and the corresponding utterance automatically follows the volitional impulse. Yet disease may effect a divorce; and just as in the malady known as locomotor ataxy the particular co-ordination is lost or deranged while motor power is still retained, so it may be with respect to speech. In amnesic impairment the idea fails to suggest the sign, in that of which we are now speaking the sign fails to determine the movement, or determines a wrong one; and this miscarriage may be of very different kinds and degrees.

First, the derangement may be such as to affect only a few of the more difficult consonant sounds and combinations, which are slurred or shirked; or there may be a higher degree of the same imperfection, as in "clipping the king's English" by a drunken man, and the very imperfect and thick articulation of many apoplectic patients. We owe to Sir Thomas Watson the observation that "some men, when drunk, lose the proper command over the muscles of the tongue and falter in speech, while they can walk very well; others reel and stagger, having lost in a greater or less degree the power of moving and governing the limbs, and of balancing themselves, who yet can speak quite fluently and plainly; and in a few cases drunken persons become delirious, who still retain the power of distinct

articulation, and of directing their steps aright."* This is an excellent illustration, exhibiting as it does an analogous incoordination, or deranged association, in connexion with different orders of nervous phenomena.

Again, the loss of speech may be total. Without any palsy of tongue or mouth, or even impairment of co-ordination in the complex operation of eating, the power of moving those parts in harmony with a speech-form may be totally lost. I was called one day to see an elderly gentleman who sometimes got into great passions on trifling provocations, and on this occasion the emotional 'storm' had completely inhibited his speech: he could not utter a syllable. When I saw him some hours afterwards, it was only with great effort that he could enunciate a few words, of which some were scarcely intelligible; yet there was no palsy. He could not help laughing at his ridiculous position, and all his actions and gestures showed him to be in perfect possession of his ideas and his reason. It was no better when he tried to write a familiar address; it was as little intelligible as his speech; yet he could move his hand, arm, and fingers freely for other actions. By degrees, after several days, the full co-ordinating power returned. Such patients mostly pass through stages of imperfect articulation in their progress to recovery, as he did, suggesting the idea that the total loss of speech in such cases is only a greater degree of the same kind of derangement which causes imperfect articulation in other instances.

Lastly, the disorder may be of quite a different kind, and take the form of a dislocation or 'fault' between the sensory image or impression and the associated movements, so that there may be a transposition or substitution of particular syllables, or entire words, while the articulation of them is distinct, and this may affect few or many of these elements. In the case of a substitution of words, those substituted may be real or unreal; in the former case, if the substitutions are numerous, the person may appear

* "Lectures on the Practice of Physic," vol. i. p. 481 (ed. 1843).

wandering or incoherent, in the latter he may be thought to speak a foreign tongue: in each instance he may be perfectly master of his ideas and his reason. The case on which Dr. Osborne's paper is based was one of the latter kind; the patient spoke a mere jargon, in which a faint semblance of words of several languages was alone perceptible, and of which Dr. Osborne has given very interesting specimens. But the point which makes this history of almost unique value is, that the patient retained the power of expressing his ideas by another code of signals—namely, written ones, by which the integrity of his memory and intelligence was established. The case was a functional one, following an *epileptoid* seizure, and recovery in time was complete.*

An excellent illustration of the use of real words, but in a sense quite different from that intended, will be found recorded by Dr. Bright in the earlier series of Guy's Hospital Reports. The attack, of which headache together with the affection of speech were almost the only symptoms, with no further mark of paralysis than a slight and apparently transient drawing of the mouth towards the left side, was regarded by Dr. Bright as of an *epileptic* character, as it appeared that the patient had once been found in "a fit." The striking feature of the case was that the peculiar disorder of speech made him appear bewildered and incoherent, whereas his actions and gestures proved him to be quite otherwise. There was only a slight difficulty of articulation. The following is a specimen of his conversation—"How do you do, sir, to-day?—*Yes, I told you so, about half-past twelve.* But how are you, sir?—*Yes, yes, I know, half-past; well, perhaps a quarter. You see ten and ten; yes, that is it.* Did you eat a good dinner, to-day?—*About that you know I said. No, that's too much—you do that too much;*" and so

* As far as my observations go, some of the most interesting cases of disordered speech are met with in connexion with *functional* nervous disorders of a paroxysmal kind, either as a transient phenomenon of the paroxysm, or a more permanent sequel of the 'storm,' whether this be a violent emotion, an attack of megrim, or a fit of epilepsy.

on without a connected idea, but perfectly conscious of his mistakes. This gentleman gradually recovered his speech in the course of a month, and some years later was living a quiet and retired life, having had no return of the malady.*

I will only add one remark of some practical importance; it is, that although we are thus able to distinguish the physiological elements of speech, and in some rare pathological cases find them separately deranged—dissected out for us as it were—yet far more frequently we meet with mixed forms of disorder combining paralytic, amnesic, and aphasic elements in various degrees.

Let us now proceed to consider the disorders of speech occurring in megrim in the light of the foregoing analysis. I may first observe that some impairment of this faculty was present in the severer seizures in 15 out of the 60 cases I have examined, or in just a quarter. It is certain that transient disorders of ideational consciousness, a sense of intellectual confusion and inability to attend or to recollect, occur in many severe attacks of megrim, and that frequently repeated and severe seizures sometimes occasion a less temporary form of the same mental impairment. Furthermore it not unfrequently happens that the former disorder is associated with an impairment or failure of speech, and it is not denied that in such cases it may contribute to that failure; at the same time it will be seen as we proceed that in a certain number of cases the affection of speech is independent of any such memorial or intellectual disturbance, and belongs rather to the aphasic than to the amnesic category, and I am much inclined to think that in these cases it is more closely connected with the hemiplegic affection than with the disordered ideation.

1. We will first consider those cases in which the concurrence of mental confusion and failure of memory with impairment of speech suggest an "amnesic" view of the latter affection. Professor Lebert says of his more severe

* "Guy's Hosp. Reports," 1st series, vol. ii. p. 306.

attacks—"These began with incoherence of ideas, a difficulty in finding words, and a numbness in the tongue and last fingers of the right side, &c." Spontaneous vomiting in his case was attended with "immediate cessation of the ideational disturbance and of the numbness."* In a second and later account he describes the seizure as attended "with impeded utterance, a difficulty in finding the right expressions or constructing a coherent sentence."† The elder Mr. Travers says the numbness in his case was "followed by a certain degree of confusion of intellect and temporary suspension of memory, so as greatly to embarrass, if not to take away the power of intelligible expression."‡ Here the impairment of speech is distinctly attributed to suspension of memory.

It was very much the same, at least as regards the association of the phenomena, in Sir George Airy's case. "In one attack on myself," he writes, "which occurred while I was conversing with an acquaintance in a railway carriage, I soon became painfully sensible that I had not the usual command of speech, that my memory failed so much that I did not know what I had said or had attempted to say, and that I might have been talking incoherently."§ In the case of W. R. (No. 2), in whom all the phenomena of the paroxysm were well developed and bilateral, "the power of articulation throughout the attack was almost lost, he could not form his words, and there was besides considerable confusion of thought."‖

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* "Accès qui débutaient par de l'incohérence dans les idées, de la difficulté de trouver les mots, et de l'engourdissement dans la langue et les derniers doigts du côté droit, malaise qui se compliquait au bout d'une heure ou deux d'une douleur sus-orbitaire droite très vive et s'accompagnait bientôt d'abondants vomissements suivis immédiatement de la cessation du trouble dans les idées et de l'engourdissement."—*Traité pratique des Mal. Canc.*, p. 778. Paris, 1851.

† . . . "Selbst mit schwerer Sprache, mit schwierigkeit die richtigen Ausdrücke zu finden oder eine zusammenhängende Phrase zu bilden."—*Handbuch der Prak. Med.*, vol. ii. p. 570.

‡ "Diseases of the Eye," p. 175. 1820.

§ "Philosoph. Magazine," July, 1865, p. 19.

‖ Similar observations appear to have been made by older writers. De Haen observes of a case of severe hemicrania with convulsive tic of the face which he cured—"Junxeratque se se ea memoriæ labes, ut noscens,

It would seem, then, that a failure of memory and confusion of ideas may in some instances cause and in others contribute to the disorder of speech in the megrim paroxysm. We must, I think, regard Professor Lebert's and Mr. Travers's cases as of this amnesic or at least ideational kind. On the other hand the case of W. R. would seem to have been of a mixed character; it is certain that there were other elements of disorder besides the memorial; his thought was confused, it is true, but there was in addition a defective power of articulation; to use his own expression, he could not "form his words." It is possible that Sir George Airy's attack may have been of a similar kind, but here the evidence is less conclusive. In one of Dr. Parry's cases (No. 50) this mixed character was well marked, and the two elements, the difficulty of articulation and the failure of memory, are separately noted; the progress of the numbness to the head is first described, "immediately after which," the account continues, "the right half of the tongue is affected in the same way, and she loses the power of articulation. At this period her intellect becomes confused and her memory at the same time for about half an hour much impaired."*

2. But it is no less certain that many instances of disordered speech occur in connexion with megrim which are quite independent of any ideational disturbance whatever, and which must be regarded as exclusively of the "aphasic" kind. This may take the form of imperfect articulation and difficulty of utterance only. Thus my patient R. S. (No. 24), with whom, excepting a vague sense of fear, there was no disturbance of the higher cerebral faculties, nevertheless experienced during her first attack and on several subsequent occasions "a difficulty in articulating." I should add that this information was given spontaneously and not

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qui accederunt, omnes, noscens omnia quæ videret, tangeretque; tamen nomina indere propria ipsis non posset, passimque per omnia balbutiret; et quamvis gallicè aut italicè interrogatus, si quid utcumque intelligibile responderet, id germanicè duntaxat, præter omnem sanè morem fuit."—*Rat. Med.*, pars 6, cap. vii. § 4, p. 222. 1760.

* "Unpublished Writings," vol. i. 465.

in reply to suggestive questions. In the case of Mr. S. (No. 46), although the affection was for the most part of a less simple kind to be presently described, it was nevertheless complicated by a difficulty of utterance. "I have further found it necessary," he says, "to speak with the greatest deliberation in order to articulate properly." At another time he compares his condition, as regards this difficulty of speaking clearly, to that of a drunken person. The Austrian officer whose case is recorded by Tissot, thus describes the termination of his attacks—"An arm and leg of the same side go to sleep; I feel tinglings as if there were ants on them; I have the same sensations in my mouth and tongue, and further yet during all this time I have great difficulty in speaking;" he makes no complaint of confusion or impairment of memory.*

The only instance of a total abolition of the power of utterance which I have met with in connexion with megrim, was in a single severe seizure in my patient Mr. S.; his case is indeed remarkable for exhibiting different forms of aphasia on different occasions, suggesting the idea that they are only different degrees of the same essential disorder. I give the account in his own words; having described the antecedent numbness and tingling of the extremities and face, and the affection of sight, he continues—"I found on getting out of the omnibus at Charing Cross, that I could not ask a question. I tried to ask what bells they were which I heard ringing (St. Martin's), but I could not get a word out; and the man thought I was mad or drunk, for he only laughed and went away. These curious symptoms did not last long, but the whole was brought to a conclusion by a most intense headache." This complete inability to utter a word occurred on this occasion only as far as he can remember, although his speech has been frequently much disordered in a manner which I shall notice immediately. It should be added that neither on this nor on the previous occasion was the attack

* "Traité des Nerfs et de leurs Maladies" (Bayle's edit.), p. 388.

attended by any confusion of thought or failure of memory.

3. Lastly, that singular form of disordered speech in which one word is substituted for another, without any corresponding impairment of understanding or memory, is also not without some sort of representative in the history of megrim. Thus H. T., whose case I have given in the opening chapter, stated that the attempt to speak was followed by "words quite different from those intended, or having no meaning, while his head remained clear or only a little confused, and he knew perfectly well what he wished to say" (p. 16). So again Mr. S., after observing that the total inability to utter a word, to which I have just referred, occurred but once, continues—"But I have experienced an inability to express that which I had distinctly conceived in my mind frequently. I have also found myself saying words which I had no intention of saying." Yet this gentleman was able to observe and reflect perfectly during the seizures, and only experienced some slight disorder of memory on very rare occasions, which does not appear to have been in any way the cause of his loss of speech.

It is to be regretted that our illustrations are not more numerous, and their details more complete; unfortunately cases are not often recorded with a view to all their pathological bearings, but for the most part solely with regard to the particular subject they are intended to illustrate; hence many of the cases of megrim on record in which speech was impaired furnish no information as to the exact nature of that impairment, and therefore contribute little to our present inquiry. On the other hand, cases are to be found described in the medical journals and other publications as instances of disordered speech, of transient hemiplegia, or passing mental disorder, not unfrequently associated with headache, which, if we had been furnished with the previous history of the individual and his family, would have proved, I suspect, in many instances unequivocal cases of megrim. Such may have been the nature of Dr. Spalding's attack to

which I shall shortly refer, and such I believe to have been that of the following case, which was published many years ago by Dr. Steel with a view to show that an amnesic theory would not account for many cases of loss of speech :—

A young gentleman, twenty-four years of age, holding a laborious situation in a Government Office, was attacked with what, according to the custom of the day, was called an "apoplectic seizure," commencing with imperfect articulation and mental confusion of a very transient character, but followed by right hemiplegia which was more lasting, but from which he quickly recovered. About seven or eight months later he had a return of the affection of speech, but nothing further. Four months later, "while engaged in his usual duties, he was again suddenly attacked with confusion of ideas and loss of the power of utterance." Dr. Steel found him "affected with general stupidity, and an inability to utter an intelligible word; there was no paralysis, he swallowed easily, and appeared to suffer from nothing but a slight headache." He was as little able to write as to speak. After a week, in which he regained much of his speech, he was again attacked, but this time with a great drowsiness and some degree of right hemiplegia, while his pulse fell to 40. The drowsiness had disappeared by the next morning, and the pulse had risen, but the hemiplegic symptoms increased and "the power of utterance was again almost extinguished." He quickly recovered from the palsy, but the loss of speech, and indeed of the whole faculty of expression remained, and these were only gradually restored. It is interesting to notice that though he could not articulate a word he could whistle an air correctly, showing that there was no impairment of another train of highly co-ordinated movements in the same parts. The stages by which he recovered his speech are very instructive, but for these and other details of the case I must refer to the original narrative.*

Here then we have, as I interpret the facts, a history of successive "nerve-storms" of varying extent and severity,

* *Dublin Journal of Med. Chem. Science*, vol. xxvi. p. 355. 1843.

disturbing ideational consciousness and leaving different degrees of aphasia and hemiplegia, sometimes very transient, at others persistent. The youth of the patient, his occupation, the repetition of the seizures, their often transient character and healthy intervals, seem to exclude the notion of hæmorrhage, embolism, or any but a functional disorder. Those attacks in which the hemiplegia or loss of speech were more persistent, I regard as instances of that more lasting inhibition of faculties which a nervous paroxysm sometimes leaves behind it, as in epileptic and hysterical paralysis, and in the aphasia which we have seen to follow another form of nerve-storm, namely, a violent emotion. Many I dare say would call the attacks epileptic in Dr. Steel's case, but they appear to me to have had more of the character of megrim. If the previous history of the patient and his family had been known to us, the question might perhaps have been set at rest.

Again in the case by Dr. Bright, which I have already given as an instance of the use of real words in a wrong sense, it is at least deserving our notice that this gentleman had always enjoyed good health, "except that he had been subject to occasional *headaches*, now and then attended by *sickness*, and several years ago suffered from distressing drowsiness;" moreover the loss of speech came on with a headache but without any fit. Indeed, the only reason there seemed to be for considering the paroxysm which inhibited his speech to have been epileptic, was that on some former occasion he had experienced some kind of fit, as to the nature of which we have no information. It would not be difficult to multiply instances of a similar kind.

There is, however, quite another side to the subject of disordered speech, and it may not be uninteresting to inquire what position our megrim cases hold with respect to it. I refer to the fact which some years since attracted a good deal of attention, and was first made known in this country in connexion with some original researches by Dr. Hughlings Jackson, that disorders of speech are almost ex-

clusively associated with disease of the left side of the brain.* The earlier observations on this subject appear to have been made in the course of *post-mortem* examinations of the brain in fatal cases of cerebral disease, and in connexion with an attempt to localize the faculty of language in a particular part of the hemispheric ganglia. Afterwards the inquiry and sources of information were widened by the simple clinical observation of all cases of hemiplegia coming under notice in which speech was impaired, and with this remarkable result —that with very few exceptions these cases were all instances in which the right side of the body, and by inference the left side of the brain, was affected.†

Hitherto the cases so examined have been mostly instances of permanent hemiplegic paralysis, the result of embolism, softening, or other structural change; but there seems no good reason why cases of a purely functional and transient disorder should not be interrogated in the same way. We have in megrim a malady of this kind, and one which in a large number of instances, as its name implies, is remarkably one-sided, and in which the faculty of speech is often most strikingly impaired; moreover it is transient and frequently recurring, allowing the clinical experiment, if we may call it so, to be repeated over and over again in the same individual. May we not then expect to find some confirmation of the "right-handed" character of speech in connexion with this purely functional disorder as well as in cases of organic disease of the brain? In reply I shall allow the facts to speak for themselves, only regretting that they are not more numerous, and regarding them merely as a nucleus for future observations.

1. In M. Lebert's case the difficulty in finding words was accompanied by a numbness in the tongue and last fingers of the *right* hand.

2. In one of Dr. Parry's cases (No. 49), the attacks were

* "Loss of Speech: its Association with Valvular Disease of the Heart, and with Hemiplegia on the Right Side." By J. Hughlings Jackson.—*Clin. Lect. and Reports* (Lond. Hosp.), vol. i. p. 389. 1864.

† *Idem*, p. 390. See also papers by Dr. Jackson, *Med. Times and Gazette*, Jan. 30 and Feb. 13, 1864.

ushered in by numbness and tingling first in the *right* hand, thence extending in quick succession to the leg, foot, arm, face, tongue, and throat, with loss of the power of articulation, and terminating in violent hemicrania of the opposite side, sleep, and vomiting.

3. In another case by the same author (No. 50), the numbness affected the *right* side, and was attended with impairment of speech and memory.

4. In my patient H. T. (No. 10), the affection of speech was very remarkable, and was preceded by numbness and tingling, commencing in the fingers of the *right* hand and thence extending to the throat and face.

5 and 6. In Dr. Abercrombie's cases, two at least (Nos. 25 and 26), and possibly a third, the numbness extended upwards from the fingers of the *right* hand, and was followed by impairment of speech.

7. In Dr. Sieveking's patient, E. G. (No. 31), the numbness is stated to have ascended from the *right* leg and arm to the trunk and face, when articulation became impaired.

8. In Mr. Travers's case (No. 55), the numbness would appear to have occupied usually *both* sides.

9. The same was the case with my patient W. R. (No. 2);

10. Also with Mr. S. (No. 46);

11. And in Dr. Sieveking's patient E. H. (No. 30).

12. In the case of the Austrian officer under Tissot's care (No. 40), the numbness affected indifferently either side, but unfortunately it is not stated which side was involved on the occasions when speech was impaired. It contributes, therefore, nothing to our inquiry.

13, 14, 15. The remaining cases, namely, those of R. S. (No. 24), Sir George Airy (No. 59), and V. der Linden's patient (No. 41), are the only instances in which speech was impaired without numbness or tingling of either side having been noted.

To sum up: out of 60 cases we meet with impairment of speech in 15. In 12 of these this impairment was preceded by numbness, with or without tingling of one or both sides, most commonly commencing in the fingers; in the

remaining 3 this feature was absent or overlooked. In 7 out of the twelve the numbness was exclusively on the *right* side, and in 4 was *bilateral*, while in the remaining case the report is defective. But it is most important to notice that in *no single instance was the left side alone affected* where there was impairment of speech. I have only to add that in 9 more cases a similar numbness was present in the right, left, or both sides, without any impairment of speech having been noted.

As far then as our cases go, they distinctly confirm the general experience with regard to the association of affections of speech with disorder of the left side of the brain or right side of the body; and they seem to establish some sort of connexion between the numbness and tingling in the side and the disorder of speech in this particular disease.

Psychical Phenomena.—We have next to consider the disturbance of the higher cerebral faculties which sometimes attends the megrim paroxysm; this may be regarded for the most part as either intellectual or emotional. The former is represented in some instances by loss or impairment of memory, and in others by confused, incoherent, or tumultuous ideation, very rarely by hallucination; the latter by general mental depression, or vague subjective feelings of anxiety and dread.

Looking to the table of cases I see that these symptoms were present in one or other form in fifteen, or just a quarter of those entered. Both belong to the earlier stages of the paroxysm, and hence for the most part precede the headache. In some few cases, where the disorder is of the emotional kind, it may be delayed or prolonged to a later stage.

1. The first, or intellectual variety, has been already pretty fully illustrated in the preceding section on the disorders of speech. Let me briefly recall the principal facts. Professor Lebert's severer seizures "began with some incoherence of ideas and difficulty in finding words;" the elder Travers describes "a certain degree of confusion of intellect, and temporary suspension of memory," following the affec-

tions of sight and touch; Sir George Airy's experience was of a similar kind;* Tissot refers in general terms to the "numbness and loss of memory which accompany violent attacks of megrim."† In one of Dr. Parry's cases (No. 49) there appears to have been a partial loss of consciousness with a sense of confusion afterwards. In another (No. 50) the disorder is thus described—"At this period (*i. e.*, following the affections of sight and touch) her intellect becomes confused, and her memory at the same time, for about half an hour, so much impaired that she cannot even remember the name of any medicine she has just taken. On account of this want of recollection at that precise period, she is unable always to tell what part of her tongue is numbed, or whether there is any local diminution of the faculty of tasting."‡

Dr. Parry had a notion that there was a sort of compensation between the different phenomena of the seizure: if the disorder of sight proved abortive he thought the higher cerebral faculties were more likely to become involved. He says—"If no such coruscation occurs, or if it very speedily ceases, severe affections of the head, as pain, confusion, vertigo, and forgetfulness of proper words, &c., succeed."§ I have heard a similar alternation described by one of my patients with respect to some of the other symptoms.

But to return to our cases: In the two instances recorded by Abercrombie, when the centripetal numbness and tingling reached the head, the patients "became oppressed and partially confused, and answered questions slowly and confusedly."‖ W. R. complained of considerable "confusion of thought" throughout the attacks, which were in all respects very typical ones; but what brought this man under my care was that the latter symptoms had of late become

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* "Philos. Magazine," 4th series, vol. xxx. p. 19.
† "Traité des Nerfs" (Bayle's edit.), p. 390.
‡ "Unpublished Writings," vol. i. p. 465.
§ "Elements of Pathol. and Therap.," vol. i. p. 357.
‖ "Diseases of the Brain, &c.," p. 420. 2nd edit.

more severe; "he had felt strange and almost wandering during the attacks, and quite unable to collect his thoughts," and he was further conscious that his general health had failed, and that "his mind had become a good deal affected" in the intervals, in consequence of the repeated seizures.

After the reading of Dr. Hubert Airy's paper, to which reference has already been made, p. 81, several gentlemen present stated that they had experienced attacks of visual disorder identical with that described by the author of the paper, and some added that they had been followed in them by some or all of the sequelæ which we have seen to characterize the typical seizure. Among the speakers was an elderly gentleman who had been through life a sufferer from similar attacks, and he proceeded to describe what he regarded as the most striking feature of his seizures: As the visual phenomena passed off his memory usually failed so much that for a time he was mentally incapacitated, and whatever he read or did during that period left no impression, compelling him to lay aside whatever he chanced to be occupied with. At the same time he experienced a singular disorder of ideation; circumstances and events which had occurred long before were brought back to him as if actually present; his consciousness appeared to be doubled, and the past and present confounded. This, as far as I remember, was the mental condition described, and it brought to my mind that singular reduplicating action of the brain which many people momentarily experience, when they seem to have been at some indefinitely remote period under circumstances precisely similar to those at the moment in question.*

The description given of these mental phenomena in different cases necessarily varies a good deal with the education and training of the sufferers; many hospital patients use such expressions as "feeling silly," "losing their senses," and the like, to describe such symptoms as these.

* This has been described by many people, among them by the late Charles Dickens. See "David Copperfield," p. 343.

The next point which deserves our attention is that just as we have seen the entire seizure in some cases of megrim represented by one set of phenomena exclusively—the blindness, the hemicrania, or the vertiginous sickness—so it may be in other instances by the psychical. Thus Tissot relates a case where attacks of habitual megrim were at length completely replaced by fits of disordered ideation—"He often suffers from a sense of confusion in his head, sometimes so serious as to cause great uneasiness, and destroy almost completely his powers and faculties for some hours. It is unquestionable," continues M. Tissot, "that if he still suffered from migraine he would not experience this confusion."* This calls to mind what we sometimes meet with in epilepsy: a gentleman of my acquaintance suffered from hereditary epilepsy in childhood and youth, which was replaced later in life by short periods of great irritability and mental incapacity, with perfectly healthy intervals.

Again, the occurrence of such phenomena may be a solitary or occasional incident in the history of an ordinary megrim. This was the character of Prof. Lebert's graver seizures which were quite exceptional, his ordinary attacks being simply hemicranial; and it was also the case with the Astronomer Royal, whose usual hemiopic attack was complicated on a single occasion by loss of memory and speech. I could very well imagine the case of a patient, who has suffered perhaps for a great part of his life from attacks of ordinary hemicrania or sick-giddiness, to which familiarity has led him to attach no great importance, being suddenly seized, perhaps after prolonged mental exertion or anxiety, with confusion of ideas and transient loss of speech, followed or not by headache; there may be nothing to connect these symptoms in his mind with his ordinary attacks, of which they may nevertheless be only an irregular form; he is naturally much alarmed, and the seizure is set down by himself, his friends, and perhaps his medical adviser, in the

* "Traité des Nerfs" (Bayle's edit.), p. 394.

conveniently inclusive category of "determinations of blood" or "threatenings of apoplexy," and treated accordingly. Or it may happen that such an attack is the first and perhaps the only manifestation of a latent hereditary tendency which has been called into activity by circumstances such as those I have indicated above. We have already seen that such a solitary or occasional awakening of a latent megrim under the strain of middle life is by no means a rare event in the history of the malady. Such, I would suggest, may be the explanation of cases like the following, which have more of the characters of irregular megrim than of any other malady with which I am acquainted.

The case I select is that of Dr. Spalding of Berlin, an eminent divine and literary character of former days. He has left us one of those autograph accounts of which we have made so much use in this essay, and of which the value can hardly be overestimated where the phenomena under consideration are those of the patient's own consciousness, and do not come within the range of ordinary observation. "I was this morning engaged," he writes, "with a great number of people, who followed each other quickly, and to each of whom I was obliged to give my attention. I was also under the necessity of writing much, but the subjects, which were various and of a trivial and uninteresting nature, had no connexion the one with the other; my attention, therefore, was constantly kept on the stretch, and was continually shifting from one subject to another. At last it became necessary that I should write a receipt for some money I had received on account of the poor. I seated myself and wrote the two first words, but in a moment found that I was incapable of proceeding, for I could not recollect the words which belonged to the ideas that were present in my mind. I strained my attention as much as possible, and tried to write one letter slowly after the others, always having an eye to the preceding one, in order to observe whether they had the usual relationship to each other; but I remarked, and said to myself at the time, that the characters I was writing were not those which I wished to

write, and yet I could not discover where the fault lay. I therefore desisted, and partly by broken words and syllables, and partly by gestures, I made the person who waited for the receipt understand he should leave me. For about half an hour there reigned a kind of tumultuary disorder in my senses, in which I was incapable of remarking anything very particular, except that one series of ideas forced themselves involuntarily on my mind. The trifling nature of these thoughts I was perfectly aware of, and was also conscious that I made several efforts to get rid of them, and supply their place by better ones, which lay at the bottom of my soul. I endeavoured, as much as lay in my power, considering the great crowd of confused images which presented themselves to my mind, to recall my principles of religion, of conscience, and of future expectation; these I found equally correct and fixed as before. There was no deception in my external senses, for I saw and knew everything around me; but I could not free myself from the strange ideas which existed in my head. I endeavoured to speak, in order to discover whether I was capable of saying anything that was connected, but although I made the greatest efforts of attention, and proceeded with the utmost caution, I perceived that I uniformly spoke other words than those intended. My soul was as little master of the organs of speech as it had been before of my hand in writing. Thank God, this state did not continue very long, for in about half an hour my head began to grow clearer, the strange and tiresome ideas became less vivid and turbulent, and I could command my own thoughts with less interruption.

"I now wished to ring for my servant, and desire him to inform my wife to come to me; but I found it still necessary to wait a little longer, to exercise myself in the right pronunciation of the few words I had to say; and the first half-hour's conversation I had with her was, on my part, preserved with a slow and anxious circumspection, until at last I gradually found myself as clear and serene as in the beginning of the day. *All that remained now was a slight*

headache. I recollected the receipt I had begun to write, and in which I knew I had blundered; and upon examining it I observed, to my great astonishment, that instead of the words 'Fifty dollars, being one half-year's rate,' which I ought to have written, the words were 'Fifty dollars, through the salvation of Bra—' with a break after it, for the word 'Bra—' was at the end of the line. I cannot recollect any perception or business which I had to transact that could, by means of an obscure influence, have produced this phenomenon."*

2. The second form of psychical disorder which sometimes attends the development of megrim is Affective or Emotional. It is not uncommon for the attack to be preceded or ushered in by symptoms of this kind. Romberg mentions irritability of temper as premonitory. Tissot records the case of a medical man who was an habitual sufferer from true migraine; he enjoyed excellent health between the paroxysms, but always became depressed and ill-humoured a day or two before.† In other instances great mental depression forms a part of the paroxysm itself. Dr. Dwight, writing, I have little doubt, from his own experience of sick-headache, says: "From the first perception of uneasiness in the stomach the spirits begin to flag. They grow more and more depressed until cheerful thoughts and feelings fly away, and the patient conceives himself the most wretched of human beings and feels as if he were never to be otherwise. What, perhaps, is a little singular is that the intellect, during the severity of the pain, is peculiarly clear, precise, and capable of making the most minute distinctions upon intricate subjects. And these operations of the mind, though very painful, are wholly beyond control; nor in these moments of depression—though reason suggests the folly of despair and the fallacy of the belief which it inspires—will the feelings assent to its suggestions."‡

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* "Inquiry into Mental Derangements, &c.," by Sir A. Crichton, vol. i. p. 287.

† "Traité des Nerfs," p. 385.

‡ "Medical Repository," vol. ii. p. 16. New York, 1800.

My patient A. M., who likewise suffered from the sick form of the malady, characterized her mental condition at this period as one of "reckless" despondency.

There is, however, a more striking form of emotional disturbance, occasionally occurring in the course of the paroxysm, to which I have referred in the opening chapter; it consists in a *vague and unaccountable sense of fear*. This was particularly described as a constant feature of their attacks in nearly the same words by two of the patients whose cases I have recorded, and that without any leading question having been put or suggestion made on the subject. R. S. (No. 24) spoke of it as a causeless "feeling of fear" attending the period of disordered vision, and Mr. B. as an "indescribable feeling of dread attending the headache, as if something were about to happen." There are some sufferers from this malady, especially its higher cerebral types, who cannot bear to think or talk of their attacks, and always refer to them with horror, which is clearly not on account of the pain they occasion; the explanation, I suspect, is to be found in the occurrence of vague psychical suffering of the kind here referred to. Dr. Airy writes—"I have seen a person terribly subject to these attacks shudder at the very name, and turn away in horror from a drawing of the ugly sight [the zigzag spectrum], quite content to bear serious illness 'if only the half blindness would keep away.'"*

This feature acquires an additional interest from the fact that a similar emotional disorder not unfrequently occurs in connexion with other nervous seizures. Sir Thomas Watson remarks—"Among the mental conditions which bespeak a tendency to apoplectic disease, I have several times noticed a strange and *vague dread*, of which the person can give no reasonable explanation; a sense of apprehension and insecurity not accounted for by the apparent state of his general powers and functions."† M. Moreau (de Tours) gives a

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* "Phil. Trans." 1870, p. 247.

† "Practice of Physic," vol. i. p. 482. Ed. 1843.

striking description of the sudden occurrence of a similar groundless fear, with all its outward manifestations and expressions, as one of the premonitory signs of epilepsy.* Dr. Reynolds records an instance of "inexpressible fear" among the prodromata of the same malady.† I have myself observed it as the precursor of a fit in a case of epilepsy recently under my care.‡ Dr. Ramskill has given some particulars of a case of incomplete epilepsy in which convulsions occurred without loss of consciousness, and in which it is mentioned that "a great fear possessed the patient."§ I shall have occasion to refer by-and-by to a case of periodical gastric neuralgia recorded by Whytt, in which the accession of the paroxysm was attended with a similar "apprehension of immediate danger."‖ Nor should we forget that a similar emotional condition is a well-recognised feature in some attacks of angina pectoris. The late Professor Trousseau says—"The awful pain which characterizes this affection generally starts from the præcordial region, and from there shoots through the chest to the throat and both arms, mostly the left arm, causing numbness of the limb in which it has been most intense, and attended with a feeling of anxiety and indescribable terror."¶ In the same sense Sir John Forbes remarks—"There seems always to be some peculiarity in the pain, whatever be its degree, unlike the pains of other parts of the body, and as if it were combined with something of a mental quality. There is a feeling and a fear of impending death, and the primary symptoms of corporeal disorder are speedily modified by the consequences of mental impressions conveyed through the nervous system."** It must not be thought, however, that this distressing symptom is at all a necessary part of the fit in megrim. On the

* "Psychologie Morbide," p. 281. † "Epilepsy," p. 90.

‡ This was in a young man, a painter, the victim of gout, lead, and albuminuria. The fits were further remarkable for being occasionally preceded by a transient amaurosis of about ten minutes duration. He ultimately became acutely maniacal and died in Colney Hatch Asylum.

§ *Med. Times and Gaz.*, July 10, 1862, p. 51.

‖ The Works of Robt. Whytt, M.D., F.R.S., 4to, p. 619.

¶ "Clinique Médicale," tom. ii. p. 64.

** "Cyclop. of Pract. Med.," vol. i. pp. 83, 84.

contrary, we know that many patients have been able to watch the development of their symptoms with little or no discomposure, and, up to a certain point, with a keen philosophical interest and almost a sense of pleasure.

Sometimes the tendency to emotional disorder of this kind—that is, to a sense of terror arising spontaneously or from imaginary or totally inadequate causes—is met with as an independent manifestation of the neurosal constitution; and when it occurs in children it is not unfrequently a forerunner, and perhaps the present representative, of some future malady of a more determinate kind. There is some reason to think that the 'fright' which is so often assigned as the cause of a first attack of chorea or epilepsy is quite as much a part of the disease as its cause. The relation of 'night-terrors' in children to epilepsy is now well understood; in this case the emotion arises in connexion with some object of their fancy and mingles with their dreams. Wild beasts very often play a part in these 'terrors.' Sometimes they occur by day. It is no uncommon thing to meet with this symptom in the children of parents who are epileptic or have other neurosal tendencies.

Just the same kind of connexion may often be traced with megrim. Cases like the following from Moreau are not uncommon:—A woman suffers from violent attacks of migraine from the age of eighteen; her child suffers from 'night-terrors,' in which he has visions of a wild beast eating his hands; as he grows up he becomes epileptic.* Dr. Beddoes long since drew attention to this connexion in the following words:—"It has sometimes been observed that particular impressions of terror remain long in early life with those who are destined to become epileptic, and that those impressions are revived in early sleep and in solitary situations. The same," he continues, "is exactly true of those who suffer from *nervous headaches* and other affections allied to epilepsy."† The same pathological affinity was also

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* "De l'étiologie de l'épilepsie," obsv. 9, p. 26, 1852.

† "Hygëia," by Thos. Beddoes, M.D., vol. iii. p. 32. 1802.

recognised by the late Dr. Marshall Hall, who thought he had found the explanation of it, as well as of many other analogous facts, in his theory of venous compression:— "These events (viz., compression of the veins of the neck and its consequences) are variously translated into apoplectic, paralytic, epileptic, syncopal, or maniacal seizures. In some instances the first stage of these seizures is hidden; in others the seizures assume the form of *oneirodynia;* in others, again, it is mere blushing, 'sick-headache,' 'sick-giddiness,' and the like. What a momentous subject for fresh inquiry!"*

This leads me to speak of some other varieties of disordered consciousness occasionally met with in connexion with megrim, and which there is every reason to believe may sometimes precede or replace the usual paroxysms; I refer to the conditions of Nightmare, Somnambulism, and Trance. These occur for the most part in children and young people, and then have much the same significance as the 'night-terrors' of a somewhat earlier age. The near affinity of these singular disorders to epilepsy and its allies was first pointed out, I believe, by Darwin, and has since been repeatedly confirmed. Dr. Prichard drew attention to their common hereditary character, mode of accession, and other points of analogy; and he relates several cases which had come under his care where the somnambulistic state was produced by day without sleep. "Both these conditions," he goes on to say, "but particularly, as I believe, the latter, are frequently connected with a disposition to epilepsy. Where they do not coexist with epilepsy they often seem to stand in the place of it, and to depend on those particular circumstances of the constitution which are the fundamental causes of epilepsy."†

Now I have observed a very similar connexion between

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* "Threatenings of Apoplexy," &c., being the "Croonian Lectures" for 1851, p. 49, ¶ 190.

† "Diseases of the Nervous System," by J. C. Prichard, M.D., Pt. i. chap. xii. p. 407.

these disorders and megrim in children and young people. The case of Mr. A.'s son, which has been referred to at length in connexion with the visual phenomena, is an instance in point; there was a strong hereditary tendency to megrim in the family (see p. 31), and when a child of about nine or ten years old he became subject to headaches recurring about once a month, but at first presenting none of the striking features of his future megrim. The chief point of interest is that during this period, on two occasions, he was visited with very remarkable seizures of the following kind: He had been somewhat overworked at school, and on returning home early with a headache, and while engaged in washing his hands, he was suddenly seized with what he afterwards described to me as "day-nightmare." He lost all conscious perception of the room and objects about him, and he felt hanging on the brink of a precipice, and other horrors which he could not remember or describe. His relatives were alarmed by hearing him cry out, and found him on the stairs in a kind of somnambulistic state, vociferating loudly. He recovered himself in about ten minutes, but remained a good deal shaken and distressed. The second attack was of much the same kind, but occurred shortly after going to bed at night. He was again found on the stairs, shouting and somnambulistic. He had no subsequent attack of so marked a character, but was sometimes found rehearsing the lessons or events of the day in his early sleep. It was shortly after these attacks had ceased to trouble him that his megrim became fully developed.

The two following instances of nightmare and somnambulism are recorded by Prichard, and although not occurring in connexion with a distinct history of megrim, yet the facts of the attack being invariably followed by a severe headache in one case, and preceded by a partial loss of sight in the other, at least suggest the affinity of the two disorders. After observing that somnambulism and incubus are similar affections Dr. Prichard continues—"A young lady, who was some time under my care, was formerly very subject to

walk during her sleep; during the succeeding day she always suffered *a severe headache,* accompanied with a sense of fatigue. She had an obscure recollection of some laborious exertion, and of very distressing sensations experienced during her sleep. She has been free from the tendency to somnambulism several years, but has since been subject to incubus. Her feelings, after a fit of incubus, are precisely similar to those she formerly experienced after somnambulism."* The other case closely resembles that of Mr. A.'s son: in both, over-application at school would seem to have been the exciting cause, and in both, attacks occurred by day. The patient was a young gentleman between thirteen and fourteen years of age, very intelligent and industrious, and anxious to improve his position in the school, but of nervous and delicate organization. His first attack occurred suddenly, but subsequently he became aware of the approach of a paroxysm, and used to say that he perceived a mist or darkness before his eyes, and was then going off. He then fell into a state of reverie, and became more or less unconscious of external impressions. During these fits he sometimes repeated his lessons, evidently fancying he was saying them to his tutor, and sometimes his imagination appeared to be otherwise engaged. These attacks were repeated many times, and mostly occurred in the afternoon. He was removed from school, and Dr. Prichard then lost sight of him.† We have to regret the absence of a family history in both these cases, and of the subsequent progress of the last.

I will conclude this subject by observing that a species of trance is an occasional incident in the development of other neurosal seizures besides epilepsy and megrim. Sir John Forbes observes of spasmodic asthma—"In some instances the patient does not immediately awake on the invasion of the paroxysm, but continues in a state of half consciousness *approaching to incubus,* aware of the approach of the disease,

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* "Diseases of the Nervous System," Pt. i. p. 403.
† *Idem,* Pt. i. p. 407-9.

yet with scarcely the power to make even the usual instinctive efforts to resist it."* And, again, in the interesting "Journal of an Asthmatic," the writer speaks of symptoms of this kind as preceding his worst attacks—"At the approach of a great fit I was subject to lose the consciousness of the circumstances in which I was placed; or from some observations made by a person present, or from some idea occurring to myself, to jump at a conclusion having no connexion with the subject, and in utter disregard of the rules of syllogism. Sometimes both these 'ravings,' if I may so call them, would occur frequently in the course of half an hour, each being instantly followed by a consciousness of its absurdity." Elsewhere he speaks of an irresistible and "horrid" drowsiness, with a succession of "trances," as preceding the attack.†

Giddiness or Vertigo.—The next feature of the paroxysm which requires our notice is giddiness or vertigo. It will be well to consider for a moment the physiological value of these terms. When a person perceives the objects about him which are ordinarily stable or fixed in a state of motion, when he *sees* the walls of his room move round, or *feels* the ground give way or the seat sink as he goes to walk or to sit down, he is said to be giddy; if he refers the movements to himself he experiences an indescribable sense of self-instability. This morbid condition of sensory consciousness commonly arises in one of two ways—first, from causes purely internal and subjective, as, for instance, a defective supply of blood to the brain in a person about to faint; secondly, from an actual or relative motion of objects similar to those apparent movements in which the disorder consists. Thus, a rapid circulation of objects before the eyes, or the retrogression of that on which we rest, as in a carriage or swing, will quickly produce this sense of giddiness with some people, and few are proof against such a combination of these as the motion of

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* "Cyclop. of Pract. Med.," vol. i. Art. "Asthma."
† *Dublin Med. Journal*, vol. xiii. 1838, pp. 27, 23.

a ship and the sight of the moving waves afford. With some susceptible persons the same morbid state of feeling is apt to arise under many other circumstances, such as looking down a great depth or over a large expanse, or even at a painted panorama, and, to speak generally, whenever the changes we are accustomed to see or feel in the relative position of objects consequent on the motions of our own bodies are either wanting or of an unusual kind. However excited, this morbid condition of the sensorium is apt to persist for a time after the causes which produced it have ceased to act.

Now, what is the nature of this disturbance, and what is the faculty disordered? At one time vertigo was regarded as an hallucination of sight. This arose from too exclusive an attention to a particular case of it—namely, that which is produced by turning quickly round, as in waltzing, and then stopping, when surrounding objects are seen to move on in the opposite direction. But, as we have already said, vertiginous sensations are not only *seen* but *felt*, so that it is impossible to regard the disorder as exclusively an affection of vision. This was long since pointed out by Erasmus Darwin: "When a person," he observes, "revolves with his *eyes closed* till he becomes vertiginous, and then stands still without opening them, he seems for a while to go forward in the same direction.* This hallucination of his ideas cannot be owing to ocular spectra, because no such can have been formed; but it must arise from a similar continuance or repetition of ideas belonging to the sense of touch instead of to the sense of vision, and should therefore be called a tangible, not a visual vertigo."† Elsewhere he uses the expression "muscular feelings" instead of touch in a similar connexion.‡ Many years later Sir C. Bell clearly distinguished the muscular

* Or, what is the same thing, the ground seems to go backward.

† "Zoonomia," vol. ii. Appendix, p. 630. 1796.

‡ Speaking of the attempts of a giddy child to recover his balance, he says—"He then loses his usual method of balancing himself by vision, and begins to stagger, and attempts to recover himself by his *muscular feelings*." —*Idem*, p. 233.

sense from that of touch, and what Darwin here foreshadowed as to "felt" vertigo and its dependence on a derangement of the muscular feelings has been distinctly enunciated by Dr. Russell Reynolds.*

But the question remains, what then is visual vertigo, and how does it differ from that which is felt? In reply I would extend Dr. Darwin's explanation, and say that the apparent motion of visual images is also "tangible" vertigo; that what is morbid—namely, the movement—is felt, not seen; and that in this, as in the former case, it is the muscular feeling and not touch which is morbidly engaged. Let me explain this rather more fully. The muscular sense, however little conscious we may be of its operation, is one which is constantly engaged in maintaining us in sentient relation with the outer world, and this in two principal ways: First, in conveying the perception of the force of gravity acting on the various parts of our bodies, and the relation of its resultant to the base on which we rest, supplying, in fact, the sentient conditions essential for those muscular operations by which the equilibrium of the body is maintained amid perpetual changes of posture; Secondly, by co-operating with vision. Few of us are probably conscious how much we really *feel* of what we say we see. Just as our sense of touch would give us but little information if we could not move our hands over the objects we examine, and so bring our muscular sense to co-operate with that of touch, so it is with vision. If we fix our sight on any object we *feel* its direction with regard to ourselves through the muscles which move or fix the eye; and when we follow the outline or motion of a body with our eyes, we are feeling it through our muscular sense as much as if we traced it with our finger, but with this advantage, that we can do so at a distance. And, again, perceptions of relative distance, size, and solidity are not strictly visual perceptions, but are derived in great part from the muscular feelings called forth

* See his highly suggestive essay "On Vertigo," and treatise "On Epilepsy," p. 59.

by the convergence of the two eyes in binocular vision, and by the movements of focal accommodation.* Now it is this *muscular element of sight*, and not its strictly visual part, which is deranged in so-called visual vertigo. Hence we conclude that both visual and general vertigo are alike hallucinations of the muscular sense, but in different territories; and this is the best definition which can be given of it.

Either of the foregoing varieties of vertigo may occur independently of the other, and are not uncommonly met with in practice; in one, surrounding objects appear to revolve in circles at right angles to the axis of the body, while there may be little or no sense of self-instability or falling away; in the other, the latter feelings predominate.† That form of giddiness which more particularly affects the general feeling of equilibrium may sometimes be corrected or relieved by the exercise of the muscular sense in another territory where it is not deranged, as by holding or even touching something with the hands. The sight, if not sharing the disorder, may serve a similar purpose; it is no uncommon thing to find the most intense feeling of giddiness produced in patients suffering from locomotor ataxia by simply closing the eyes when attempting to stand or walk, the morbid sensation disappearing again on opening them. So also, as stated by Darwin in the passage before quoted, the child who has produced a visual vertigo "loses his usual method of balancing himself by vision, begins to stagger, and attempts to recover himself by his muscular feelings."‡

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* The exceptionally large and independent supply of nerves to the small muscles of the eye alone suggests some high endowments.

† Dr. Russell Reynolds observes of giddiness as an interparoxysmal symptom in epilepsy—"The character of the vertigo, when patients have been able to describe it, has, so far as my own experience extends, been without exception 'subjective'—that is, the patient feels as if he were moving, and not as if external objects were in motion. The kind of motion which is most commonly felt to be present is that of falling or floating away to the side. I have never known an epileptic say that he felt as if spinning round or that the room appeared to him as if moving, whereas in organic disease of the brain the former is common, and in sympathetic nervous disturbance from eccentric irritation the latter is frequently observed."—"On Epilepsy," p. 58.

‡ "Zoonomia," vol. ii. p. 233.

We have already seen that the phenomena of the megrim-paroxysm are almost exclusively sensory; that the various senses are successively involved, giving rise to blindness and ocular spectra, to numbness and tingling, to subjective tastes and sounds, and to acute pain. It need not, then, surprise us to find the muscular sense also sometimes sharing the disorder, and giving rise to various degrees of vertiginous sensation. A certain sense of giddiness is, in fact, incidental to the progress of the seizure in many cases, and I see that it was particularly noticed by ten of the patients whose cases I have collected in the table. Sometimes it is accompanied with great nausea, and is increased by every attempt to rise or move, constituting a condition not unlike the first stage of sea-sickness, and, like it, may be relieved by actual vomiting. As a rule it occurs after the disorders of sight, touch, and speech, when these form a part of the seizure, and either attends or follows the development of the headache.

Dr. Dwight notices a variety of the malady in which giddiness forms a principal and *early* feature of the attack. After describing the ordinary sick form, he says—"But there is some variety in this disease which merits notice. The complaint is sometimes attended with a distressing vertigo from its commencement, which is not a usual symptom in common cases." He then refers to the characteristic affection of vision which distinguishes other cases, and concludes by saying that the former is commonly called the *giddy*, and the latter the *blind* headache.* In one of Dr. Parry's cases (No. 50), it is also stated that the vertigo occurred from the commencement of the attack, even when all the other symptoms were duly developed.† This, I believe, is unusual.

The giddiness of megrim to which I have just referred (unless, perhaps, in the last-mentioned cases, of which we have no particulars) chiefly affects the general sense of equilibrium, and is not attended with any apparent rotatory

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* "Medical Repository," vol. ii. p. 17. New York, 1800.
† "Unpublished Writings," vol. i. p. 434.

or other movements of visual images of a very striking character. There is, however, another distressing form of vertigo sometimes associated with megrim, in which these visual phenomena are highly developed and constitute a principal part of the seizure. This I have known to occur, if not in the course of the ordinary megrim paroxysm, yet intercurrently, and probably vicariously with it. In Mr. A.'s case (No. 14) I was able to obtain a trustworthy description of the symptoms. His megrim seizures usually commence with blindness, and giddiness is only exceptional and slight. On one or two occasions, however, he has suffered from short attacks of intense vertigo, which have appeared to him to replace the ordinary fit. On waking one morning, before moving or rising in bed, he was alarmed to see all objects in the room apparently revolving with extraordinary velocity from right to left in vertical circles. It was the same when he changed his posture and stood up, but then the circles were horizontal; and he was surprised to find that, notwithstanding this distressing illusion, there was much less sense of instability and staggering than usually attends a much slighter form of giddiness from which he sometimes suffers. It appeared, in fact, to be an almost exclusively visual vertigo. He returned to bed, and, lying perfectly still with closed eyes, the attack passed off in about the same time as that occupied by the blind period of his ordinary seizures.

Since writing the above account I have become acquainted with another case which tends to confirm the opinion I have just expressed on the relations of this form of vertigo to megrim. The patient, Dr. G., a highly intelligent member of our profession, now more than sixty-five years of age, communicated to me a remarkable history of his former sufferings from a series of neurosal attacks of which I will here relate so much as concerns our present purpose. He said that, from his younger days until about ten or twelve years since, he had been a great sufferer from so-called "bilious headaches" of the ordinary type; that, whether from change of residence, increasing age, or other cause, he then very

much lost his headaches, but began to experience from time to time attacks of disordered vision, with the characteristic appearance of an angular or zigzag spectrum so often and minutely described, but which was quite new to him. Singularly enough these appearances were followed by no headache or other trouble, and appeared to replace the former attacks. One day, when speaking to a friend who was standing behind him, and *turning his head* to look towards him, he was seized with such an instantaneous and violent giddiness as almost to deprive him of consciousness, yet not to such a degree as to prevent his thinking at the time that it was cerebral hæmorrhage, and feeling thankful that his will was made and other matters arranged. Since then, besides suffering from giddiness at times, he has had two similar attacks of sudden vertigo of the same severe character, and brought on in each case by circumstances singularly alike—namely, suddenly changing the direction in which he was looking, as in turning his head to look down a street in another direction from that in which he was going. These attacks of vertigo lasted some time, and the whirl of objects, even when lying down, he describes as most extraordinary.

In this case turning the head suddenly appears to have been the immediate cause of the seizure, and this on more than one occasion; and it is worthy of notice that Dr. Symonds, in the admirable lectures so often quoted, refers to a case of paroxysmal headache where the attacks were determined in the same way: "I shall have to advert hereafter to the production of sympathetic headache by the irritation of particular remote nerves. But we meet with cases which show that within the cranium there may be particularly susceptible branches, which when irritated bring on a fit of pain. A lady of my acquaintance can at any time produce a fit of headache *by turning the head to the right side.*"* Now whether, with Dr. Symonds, we trace

* "Gulstonian Lectures," 1858. *Med. Times and Gazette*, N. S. vol. xvi. p. 396.

the effects of the turning to the pressure produced directly on certain nerves, or less directly to a variation in the pressure of blood in the brain occasioned by some compression of the vessels of the neck, in neither case can we regard these conditions as more than the occasion of the seizures in a nervous system already predisposed to attacks of this kind. The utter insufficiency of the cause to produce such effects in other individuals, and in the same person at another period of his history, as well as the previous liability to the same or similar nervous seizures, are, in my opinion, conclusive on this point.

Attacks of vertigo of the foregoing kind have been very generally regarded as instances of transient congestion of the brain, but the late Professor Trousseau correctly pointed out their neurosal character. "There is still another malady," he observes, "which is perpetually honoured with the title of cerebral congestion; I refer to a form of vertigo associated with gastric disorder. This strange form of *neurosis* is marked by the following phenomena:—If the patient moves suddenly in his bed he instantly feels the bed revolving and carrying him with it in its movement; if he gets up, and especially if when up he looks into the air, the giddiness takes a worse form: objects appear to revolve around him, he staggers, sometimes he is unable to stand. At the same time he experiences an intolerable nausea, and very often vomiting. These remarkable attacks are called by the patient *coups de sang*, and this idea is shared by most medical men."* It is the intention of the

* "Il est encore une autre maladie qui sans cesse est décorée du nom de congestion cérébrale, je veux parler du vertige lié à des désordres gastriques. Cette forme bizarre de névrose est caracterisée par les phenomènes suivants: Si le malade fait dans son lit un mouvement brusque, il sent aussitôt le lit tourner et l'entraîner dans son mouvement: s'il se lève et surtout si, levé, il regarde en l'air, le vertige prend des proportions plus grandes. Les objets tournant autour de lui, il chancelle, quelquefois il est impuissant à se tenir debout. En même temps, il éprouve un mal de cœur insupportable et bien souvent des vomissements. Ces accidents singuliers sont, pour les malades, appellés des coups de sang, et disons-le, la plupart des médecins partagent cette idée."—"De la Congestion Cérébrale Apoplectiforme dans ses rapports avec l'Epilepsie," par M. le Prof. Trousseau. Note lue à l'Acad. Imp. de Méd. 15 Janv., 1861. "L'Union Médicale," Jan. 17, 1861.

paper from which this extract is taken to show that these and many similar attacks have more affinity with epilepsy than apoplexy, with syncope than cerebral congestion. For my own part I am quite of the same opinion, and believe them to be merely a modification of the ordinary megrim paroxysms; they are clearly identical with the seizures called 'sick giddiness' by Dr. Marshall Hall, which he was accustomed to compare to "the effects of a swing on the susceptible medulla oblongata," and which, as we shall see hereafter, he regarded as intimately related both to sick-headache and to epilepsy.

There is another variety of giddiness which is very common, and often very trifling, and usually regarded merely as the result of a diminished pressure of blood in the brain; I mean the giddiness which many persons experience on rising at all suddenly from a sitting posture. Now I do not deny the influence of the diminution of pressure which is thus produced, but there is, I believe, a still more important cause concerned—namely, what Dr. Hall calls a morbid 'susceptibility' of the nervous centres, or neurosal tendency. I have known this kind of giddiness prevail for a time even with young people and disappear again, and according to my experience it is particularly associated with a history of megrim or some similar nervous disorder. Dr. Wollaston has put his own experience of this affection on record, and made it the basis of an ingenious theory of sea-sickness. "At a time," he writes, "when I was much fatigued by exercise, I had occasion to run to some distance and seat myself under a low wall for shelter from a very heavy shower. In rising suddenly from this position I was attacked with such a degree of giddiness that I involuntarily dropped into my former posture, and was instantly relieved by return of blood to the head from every sensation of uneasiness. Since that time the same affection has frequently occurred to me in slighter degrees, and I have observed that it has always been under similar circumstances of rising suddenly from an inclined position after some degree of previous fatigue. Sinking down again

immediately removes the giddiness, and then by rising a second time, more gradually, the same sensation is avoided."* As I have said, I see no reason to question Dr. Wollaston's explanation of the phenomena as far as it goes, but it fails to explain why these same physical conditions of varying blood-pressure should only be followed by these effects in a few individuals, and in the same individual only at certain times. The missing factor in the causation I believe to be the neurosal disposition—a morbid facility of disturbance of the sensory ganglia.† This we know Dr. Wollaston had: we know it from the history of his hemiopic attacks, from the violent fit of neuralgic pain in the ankle occasioned by taking some indigestible food, from his last singular illness, and I believe I may add, from similar tendencies in his family.

Professor Trousseau has also directed attention to the association of precisely similar symptoms with that variety of megrim which occurs in persons who suffer from constitutional gout. "We may associate," he says, "with these periodic migraines certain cerebral symptoms of a transient character, but occurring at more or less frequent intervals, symptoms which have been correctly classed by Musgrave, Wepfer, Van Swieten, and all who have studied the question, with the phenomena produced by irregular larvaceous gout.

"These sometimes take the form of *vertigo*, as in the man of whom Boerhaave's commentator relates, that during two years he was always seized with giddiness when he attempted to stand up. In vain the ablest practitioners endeavoured to cure him. All at once he had an attack of gout, of which till then he had felt no indication, and

* "Phil. Trans." 1810, p. 1. It should be observed that Dr. Wollaston's attacks of hemiopia followed a similar state of fatigue.

† This is confirmed by the consideration of the other disorder which Dr. Wollaston explains on the same mechanical principles, namely, sea-sickness. If the susceptibilities of the nervous centres were not quite as important an element as the varying pressure of blood, we should not find such great differences in the sufferings of different people, nor should we find the disorder wear off in those accustomed to the sea, for the physical conditions must still remain the same.

from that time, he found himself free from the distressing vertigo."*

There is a minor feature of the paroxysm which may be conveniently noticed here, as it also arises, I believe, from derangement of the muscular sense: I refer to the *double vision* which is occasionally present. M. Calmeil correctly couples it with vertigo in describing the phenomena of the seizure: "Il est encore des cas où les objets semblent doubles, ou tourner sur eux-mêmes." This occurrence is probably due to false impressions received from the muscles of the eyes, and the consequent derangement of those consensual movements on which harmonious binocular vision depends, just as locomotion and articulation are impaired in the giddy or drunken, causing staggering and stammering; indeed, double vision is not an uncommon occurrence at a certain stage of intoxication. The only two instances in which I remember to have met with this symptom in megrim were in the case of my patient S. B. (No. 21), who, besides the ordinary disorder of sight, complained that she saw double, and in that of W. R. (No. 2).

The Headache.—This is perhaps the most constant of all the phenomena of the series, and that from which the affection takes its name; indeed without it a case would not ordinarily be identified as one of megrim. Yet one of my

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* "De ces migraines périodiques nous pouvons rapprocher certains accidents cérébraux survenant d'une manière passagère, mais à des intervalles plus ou moins courts, accidents qui ont été rangés à bon droit par Musgrave, Wepfer, Van Swieten, par tous ceux qui se sont occupés de la question, parmi les phénomènes produits par la goutte irrégulière larvée.

"Tantôt ce sont des *Vertiges*, comme chez cet homme dont parle le commentateur de Boerhaave, qui pendant deux ans était pris de ces accidents toutes les fois qu'il essayait de se tenir debout. Les plus habiles praticiens avaient en vain essayé de le guérir. Tout à coup il eut une attaque de goutte, dont jusque-là il n'avait ressenti aucune atteinte, et dès lors il se trouva délivré de ces pénibles vertiges."—*Clinique Médicale*, tom. iii. 336. Paris, 1865.

It is interesting to observe that this giddiness on rising appears to have been associated in Bacon's mind with Megrim, for when treating of the effects of posture he says: "Megrims and Giddiness are rather when we rise after long sitting than when we sit. The cause is for that the vapours which were gathered by sitting, by the sudden motion fly more up into the head."—*Nat. Hist.* § 734. *Works*, 4to. vol. iv. p. 388.

objects in this treatise has been to show that many cases may be correctly regarded as instances of this malady in which no headache occurs. These are chiefly cases of sick-giddiness and transient affections of sight, sometimes of memory and speech.

The characters of the headache have been already pretty fully illustrated in the opening chapter. As regards *degree*, the pain presents every variety in different individuals, and sometimes in different attacks, but in the great majority it is, for a time at least, very severe.* I have occasionally seen it exhibit that intense and agonizing character which only belongs to some forms of neuralgic seizure, and which has been characterized by such expressions as "Neuralgia Epileptiformis" and "Epilepsia Dolorifica." In other cases, where the complaint is waning or losing its hold, the pain may amount to little more than a reminiscence of former suffering.

One very constant feature of the headache is its *culminating* character. It is generally moderate when first felt, and gradually rises, sometimes very quickly, to a great pitch of intensity; this is maintained for a certain time and it then begins to decline again. Thus Tissot says in a passage already quoted—"The pain does not come on at first in all its severity, which it does not usually attain for an hour or an hour and a half, and then remains at the same intensity for some hours."† Du Bois Reymond states that he awakes with a slight pain in the right temple, which gradually extends on that side "so as to reach its height at midday; towards evening it usually subsides."‡ A very similar

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* Tissot says of one of his patients: "Il était obligé de se jeter sur un lit, de se faire extrêmement couvrir et de se tenir assis, puisque la douleur était telle que sa tête ne pouvait rien toucher; toute lumière, tout bruit, le battement même de sa montre, lui étaient insupportables," p. 385.

And Calmeil says of the pains: "Elles sont vives, poignantes, insupportables, faciles à distinguer lorsque déjà l'on en a ressenti l'atteinte."—*Dict. de Méd.*, tom. xx. p. 3.

† "La douleur ne parvient pas cependant au premier moment à toute sa force; elle n'y arrive ordinairement qu'au bout d'une heure ou d'une heure et demie, et elle reste dans cet état de violence pendant quelques heures."—"Traité des Nerfs et de leurs Maladies," p. 384.

‡ "Arch. f. Anat. u. Phys.," 1860, p. 461.

account was given by my patient C. J. (No. 58); she also awakes with headache; the pain with her occupies both sides and increases in intensity as the day advances, so that she is at length unable to hold up any longer and is compelled to lie down; towards evening it abates, and passes off completely in the night.

With some patients there would appear to be something like remissions and exacerbations; Fothergill observes, "from the time it commences to the time it ceases it is sometimes more, sometimes less tolerable."* M. Piorry says distinctly, "the pain does not always maintain the same degree of severity throughout its course; it is extreme for some minutes, then subsides, to return again with the same intensity. Nevertheless it does not cease entirely, and if it be true that exacerbations occur every ten minutes, or every quarter of an hour, it cannot be said to intermit."† In the vast majority of cases, however, it has the culminating and not the intermitting character.

The *quality* of the pain is variously described by different patients: M. Lebert uses the expressions stabbing, cutting, boring;‡ M. Piorry, stabbing or darting.§ Others describe it as throbbing; Sir J. Clarke says, "The true headache then becomes developed: the pain is intense and throbbing, affecting one side in general more than the other."‖ M. Du Bois Reymond says that in his case it throbs in unison with the temporal artery;¶ Dr. K. (No. 15), that it begins with a throbbing and aching in one of the temples. All agree that when it reaches its full development it is of a very distressing kind, and very difficult to bear. Most patients state that it is terribly aggravated by motion of any kind, and it is at this period that all sensorial impressions, especially light and noise, are so unbearable, and the sufferer is compelled to lie still, and keep his room as

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* "Works," p. 597. † "Mémoire," &c., § 813, p. 410.
‡ "Handbuch," &c., vol. ii. p. 570.
§ "Mémoire, &c.," § 813. ‖ "On Climate," p. 18.
¶ "Er steigert sich synchron mit dem Puls der Schläfenarterie."—*Arch. f. Anat. u. Phys.*, 1860, p. 461.

dark and quiet as he can.* I have, however, known instances where the pain was of that intolerable character that to keep in one position for any time was utterly beyond the power of the patient, who has been obliged to get up and move about.

With respect to *situation*, the pain is by no means always hemicranial, as the name megrim would imply. I have already pointed out that by taking this as an essential character, some of the most typical instances of the malady were formerly excluded from consideration, and our knowledge of the disorder considerably restricted. Even Tissot, who adopts the old definition, is compelled to admit that cases not unfrequently occur exhibiting all the characters of true migraine, except this one.† To judge from the cases I have tabulated, the instances of bilateral headache form a large majority—41 out of 58; but it must be remembered that some of those patients whose worst attacks are bilateral, occasionally have hemicranial seizures besides, and in many of the bilateral cases the pain is very unequal on the two sides; moreover, most of the simpler and milder forms of the complaint are hemicranial, and these are not fairly represented in the table.

Dr. Fothergill says, the pain "seldom affects the whole head, but one particular part of it, most commonly the

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* "Dabei," says Lebert, "fühlt man gewöhnlich ein Bedürfniss nach tiefster Ruhe, sowie Dunkelheit und horizontale Lage mit erhöhtem Kopf für Viele ein Bedürfniss sind."—*Handbuch*, &c., vol. ii. p. 570.

† Tissot defines Megrim thus: "La migraine est une douleur vive qui occupe seulement la moitié de la tête, et principalement le front, l'œil, et la tempe. Ce seul caractère, de n'attaquer jamais que la moitié de la tête suffirait pour la distinguer du mal de tête ordinaire." But he afterwards very considerably qualifies this statement: "Quoique ordinairement la douleur n'occupe exactement qu'un côté de la tête, il arrive, mais rarement, qu'elle attaque tous les deux, mais toujours l'un avec plus de force que l'autre." And again: "Il y a des maux de tête qui, sans avoir le caractère distinctif de la Migraine, de n'attaquer que d'un côté, paraissent cependant être la même maladie et exiger le même traitement. Leurs périodes assez réglées, la sensibilité extrême et les autres symptômes nervins, la promptitude et la violence de la douleur, les vomissements dans le plus fort de l'accès, le soulagement d'abord après, et ensuite un sommeil qui tranquillise, sont les symptômes qui font présumer que, quoique toute la tête, ou quelque autre partie de la tête que les tempes, soient affectées, on doit cependant traiter cette maladie tout comme si c'etait une migraine."—"Traité des Nerfs," pp. 383, 400.

forehead, over one frequently, sometimes over both eyes."* This I believe to be true of the great majority of cases: the pain at least begins in one spot, and even if it afterwards spreads considerably, it remains most severe in the part first attacked. Next to the brow the temple is the most common situation. Not unfrequently the eye itself or orbit is the seat of pain, as well as the brow. "As the affection of sight passes off," observes M. Piorry, "darting pains are felt in the eye and temple of the side on which the dazzling occurred; the whole globe of the eye is painful, the least pressure made on it causes a sense of pain, not differing in character from the dartings which occur spontaneously; it seems as if the eye were too full, and had been struck with a hammer. It is especially above and within (the eye) that the pain is most intense."† M. Lebert also observes that the pain is commonly felt in the fundus of the eye as well as in the territory of the frontal nerve."‡ Dr. K. states that there is with him considerable pain and tenderness in the corresponding eyeball.

In some instances the pain remains throughout the seizure confined to an extremely limited area in the brow or temple of one side, like *clavus*; it is when thus *focussed* as it were that it attains a maximum of severity. Dr. K. says of his own case that "the pain is always confined to a spot in one temple, and increases until it is so intense as to be scarcely bearable;" I have, indeed, rarely seen greater suffering than his on one occasion of this kind when I chanced to be present. Sir James Clarke has made a similar observation—"In the cases in which

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* "Works," p. 597.

† "Quelques élancemens se font sentir dans l'œil et dans la tempe du côté où l'éblouissement avait eu lieu; tout le globe oculaire est douloureux, et la moindre pression qu'on exerce sur lui détermine un sentiment pénible, dont le caractère ne diffère pas des élancemens spontanés qui surviennent; il semblerait que l'œil soit trop plein et qu'on y donne des coups de marteau. C'est spécialement en haut et en dedans que la douleur est la plus intense." —*Mémoire, &c.*, p. 410, § 813.

‡ "Bald nun fixirt sich der Schmerz; er ist stechend, schneidend, bohrend auf einer kopf-hälfte, gewohnlich in der Tiefe des Auges oder in den Stirnnerven; dabei wird die ganze befallene Partie auch auf Druck sehr schmerz-haft."—*Handbuch, &c.*, vol. ii. p. 570.

the pain has been of the most agonizing kind, it has been confined to a small spot over one eyebrow or temple."* In other cases, and I believe in the majority, it gradually extends from its original focus to the temporal and parietal regions; in some few cases (about four or five of those I have tabulated), it reaches the occiput and nape of the neck. My patient Mr. S. (No. 46) stated the pain to be situated between the eyes, at the back of the head, and nape of the neck; it was so also with E. C. (No. 1), and Miss M. (No. 44), and occasionally with one of Dr. Parry's patients (No. 50). Dr. Fothergill observes that "sometimes, and not unfrequently, the occiput is the part affected;" M. Lebert that this extension to the neck is not uncommonly observed towards the end of the attack; and Sir J. Clarke that "The upper and back part of the head is often the seat of pain, and the latter place is particularly apt to be so, when the headache is partly dependent on uterine causes." This last observation is not confirmed by the cases I have collected so far as they go.

As regards the *duration* of the headache, a very great variety is observed in different cases; and I may here refer to what has been already said (p. 33) as to the duration of the whole paroxysm, for this will be approximately that of the headache when present, the other phenomena—the impairment of sight, the hemiplegic numbness and tingling, the affection of speech and confusion of ideas—usually occupying but a small fraction of the whole time, and ordinarily only from a quarter to half an hour. As a rule, patients assign some hours—six hours, twelve hours, twenty-four hours, and very commonly "the rest of the day," or "all day," as the duration of the headache. M. Lebert puts it correctly, I think, when he says, that "the peculiar violence of the pain lasts as a rule only a few hours; mostly, however, it is not until from eight to twelve hours that the attack is so far completed that the

* "On Climate," p. 18.

pain will be bearable and occupation possible. Meanwhile it is commonly twenty-four hours, and sometimes even longer, before the last of the uneasiness disappears."* This corresponds exactly with the experience of W. R. (No. 2), who says—"Although the violence of the paroxysm abates in from two to three hours, yet it does not pass off entirely until after a night's rest, and even the next day much tenderness of the part remains."

Cases every now and then occur in which the duration of the suffering is either much less or much greater than the average here assigned. "I have seen it last," says Tissot, "from two and a half to thirty and even thirty-six hours;" and M. Piorry fixes the duration at "from several hours to two or three days." Of the shorter attacks, I may mention the case of a gentleman, who in the course of a journey from Windsor to London completely got over a seizure which had commenced with blindness and would ordinarily have lasted the rest of the day, and I have known other similar instances; it is generally by sleep that the attacks are thus shortened; occasionally by vomiting. As an instance of the longer attacks I may refer to the case of my patient C. (No. 32), who told me that in her worst fits, attended by stupor, the headache was often prolonged through the next day in a severe form. In most of the cases where the headache extends beyond a day, exacerbations and remissions occur.

Nausea and Vomiting.—A certain degree of nausea is a tolerably constant feature of megrim. In some cases it is slight, in others it reaches a high degree of intensity, and is followed by vomiting.

Out of the 60 cases I have analysed, 23 stated that their attacks were generally or always attended with vomiting or violent retching; 9 complained only of occasional vomiting; 16 suffered for the most part from nausea alone, but of these 7 stated that they also occasionally vomited.

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* *Handbuch der Prak. Med.*, vol. ii. p. 570.

M. Piorry and Dr. Dwight have described in nearly the same terms the sense of disgust for food with which the attack sometimes begins, and the latter traces its further development into nausea and vomiting. "From the beginning there is a total loss of appetite; an aversion to every flavour, even to those which are at other times the most grateful. . . . From an aversion to food the stomach feels an uneasiness which is indescribable, but speedily rises to a greater or less degree of nausea. In some instances it soon becomes sufficiently strenuous to excite a voluntary retching to vomit. . . . In other instances the nausea becomes very distressing, but does not produce a retching. In these cases the disease generally continues much longer, and is perhaps none the less painful."*

The normal period of the sickness is, however, not until after the headache has commenced, and frequently not until it has lasted some time. Romberg says, "When the attack has reached its climax and *is approaching its termination,* nausea and vomiting come on, and thus a quantity of mucus and bilious matter is got rid of."† M. Piorry observes that, in the simpler forms, the attack is limited to the disorder of vision and the headache; but very frequently the stomach participates: "Some time *after the dazzling and the invasion of the pain,* eructation commences, and gas escapes from the stomach, then nausea is felt and vomiting follows."‡ In M. Lebert's case, again, in which there was no visual disorder, the order of symptoms in the severer seizures was—hemiplegic numbness, incoherence of ideas and difficulty in finding words, followed in an hour or two by very intense hemicrania; free vomitings *set in soon after,* and were immediately followed by the cessation of the previous symptoms.§

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* "Medical Repository," vol. ii. p. 16. New York, 1800.
† "A Manual of Nervous Diseases," vol. i. p. 176 (Syd. Soc.).
‡ "Mémoire, &c." *Du procédé operatoire,* § 816, p. 410.
§ "Maladies Cancéreuses, p. 778.

Many seizures, as M. Piorry says above, which begin with disordered vision never proceed further than the headache, and occasionally not so far, as in Wollaston's, Parry's, and Sir George Airy's cases, which were represented exclusively by the visual disorder; in such cases nausea and vomiting are mostly wanting. There are other cases which commence only with the later phenomena of the series; such are typical sick-headache, and what Dr. Marshall Hall called sick-giddiness, where the headache is wanting; in these, nausea and vomiting are early and principal features. It is to cases like these that Dr. Dwight's account is more particularly applicable.

When actual vomiting occurs it sometimes terminates the seizure. The question may then arise how far it simply marks the natural completion of the attack, and how far it may be considered curative. It cannot be denied, I think, that it sometimes cuts short the paroxysm, as for example in Lebert's case; and in other instances it may afford relief. In fifteen of the cases I have analysed vomiting was terminal, and several of the patients regarded it as distinctly curative. Tissot says—"After the headache vomiting frequently sets in, which is attended with relief; the pain diminishes, and the patient sometimes falls into a tranquil sleep for some hours, and awakes, feeling quite well." One of his patients never got any relief until she had vomited, which she endeavoured to promote in various ways.* Another observed—"When I can be sick I get relief;" and this seems to be the general experience of a certain proportion of sufferers.

How, it may be asked, does vomiting afford relief? The answer commonly given is:—By promoting the evacuation of some visceral irritant—undigested food or bile. This, indeed, was the doctrine of Fothergill and others, but it

* "Traité des Nerfs," p. 384, 388 (Bayle's ed.) "Cette malade n'etait jamais soulagée qu'après avoir vomi, et elle aidait le vomissement par la thériaque. Quand il était abondant, elle était à merveille après: s'il n'était pas suffisant, elle ne se remettait pas parfaitement jusqu'à une autre attaque," p. 385.

seems to have been mainly conjectural and to rest on no good foundation, and further inquiry has failed to confirm it. We shall have occasion to return to this subject by-and-by when discussing the bilious and gastric theories of megrim; I will only here observe, that in a great many cases the stomach is empty and nothing is discharged at first but a little mucus, and afterwards bile, which at length regurgitates into the stomach from the mere efforts of retching, and would do so in a perfectly healthy person under similar circumstances. M. Piorry justly observes—"These vomitings in no way depend on the presence of food, for they sometimes set in when the stomach is completely empty, and it is then they are most fatiguing to the patient."* Even Tissot, a principal supporter of the gastric theory, admits "that if the vomitings are violent the bile flows back from the duodenum; but this," he continues, "is often a proof of the violence of the malady, and not its cause."† Similar views of the nature of the vomiting in sick-headache were expressed by the late Dr. Elliotson and will be found in his lectures.‡ The vomiting, in fact, is distinctly cerebral vomiting, as much so as that of sea-sickness or meningitis, and the nature of its operation in relieving the patient appears to be this, that it substitutes one form of nervous paroxysm for another; it is an instance of that kind of replacement which we shall see hereafter to be of frequent occurrence in the history of neuroses.§

Vomiting, however, is by no means always curative.

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* "Memoire," &c., § 816. † "Traité des Nerfs," (Bayle's ed.), p. 388.

‡ *Lond. Med. Gaz.*, vol. ii., 1833, p. 403.

§ The cerebral nature of the vomiting in headaches of this class was distinctly pointed out two centuries ago by our countryman Willis. He says: "Propter eandem inter stomachum et caput communicationem reciprocam, nauseæ et vomitus prout modo innuimus, cephalalgiæ non raro superveniunt; scilicet membranis a materia morbifica (non secus ac a plaga aut vulnere illato assolet) in corrugationes dolorificas incitatis, noxamque nervorum ductu, ad ventriculum, ex se insontem transferentibus, vomendi nixus interdum inanis oritur, nihilo quod rejiciatur intra ventriculum superstite; quandoque tamen ab immani viscerum inter vomendum succussione, humor felleus aut pancreaticus, nempe alter tantum, aut utrique simul in duodenum explosi, et vomitu rejecti, pro materia cephalalgica perperam sumuntur."—*De cephalalgia*, cap. i. p. 259.

Lepois distinguished in his own case between that sort of vomiting which was merely convulsive, and a feature of the paroxysm, from that which was terminal and attended with relief.* One of Tissot's patients stated "that vomiting had never occurred to him except when the pain had been very intense, and it had never been productive of any relief."† I have myself been frequently consulted by a lady very subject to megrim, with whom vomiting occasionally occurs as an early symptom, and then the attack is sure to be unusually tedious and severe, lasting into the following day. M. Labarraque makes a similar observation:—"The vomiting may occur at the commencement, during the progress, or at the end of the paroxysm. When it sets in towards the end it is generally attended with a marked abatement of suffering. This, however, is not always the case: not unfrequently after a first fit of vomiting the pain returns with greater violence than ever until another fit occurs, and sometimes this is repeated five or six times, and even more, at variable intervals. But, as a general rule, the less delayed and more complete the vomiting, the more rapid the termination of the attack."‡

In cases of typical "sick-headache," as I have said above, nausea and vomiting form a principal part of the seizure, and are prolonged throughout the attack. The nausea is continuous, and vomiting or fits of empty retching occur from time to time; there is much prostration, pallor, and tendency to collapse, and the whole condition of the sufferer is very like that of sea-sickness. Sometimes the vomiting is followed by temporary relief; in

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* "C. Pison avait bien observé sur lui-même la différence des vomissements convulsifs aux vomissements utiles."—Tissot, "Traité des Nerfs," p. 384.

† "Les vomissements n'ont jamais été chez lui qu'une suite de la douleur excessive et ne le soulageaient pas."—"Traité des Nerfs," p. 384.

‡ "Les vomissements peuvent avoir lieu au début, pendant la durée du paroxysme, ou à la fin. Quand ils se montrent à la fin, ils s'accompagnent ordinairement d'un soulagement marqué. Il n'en est pas toujours ainsi: souvent, après un premier vomissement, la douleur se réveille plus forte que jamais, jusqu'à ce qu'il en survienne un autre, et quelquefois cela se répète cinq, six fois, et même plus encore, à des intervalles différents. Mais, en général, l'accès se termine d'autant plus promptement que les vomissements se font moins attendre et sont plus complets."—*Essai, &c.*, p. 33.

other cases the headache is aggravated by straining and retching.

It is remarkable how close the parallel is with the condition of sea-sickness in some of these cases; for example in that of A. M., page 6. With her it was a family complaint, and the same sick type was maintained in her mother and sisters. The motion of travelling, which is sufficient with some persons to produce the sea-sick condition, would infallibly bring on an attack, just as straining the eyes is particularly apt to do in those who suffer from the visual form of the malady. She described, moreover, a singular mental state as attending the seizures, exactly like that which is felt by some persons when sea-sick; in fact, the following description by Dr. Staunton of his own sufferings from sea-sickness is almost equally applicable to her case and many like it :—"He felt at first a sickness in his stomach, followed by retching, when he threw up whatever he had taken into it; then green, and afterwards yellow bile; to which succeeded a thick, mucilaginous, insipid fluid, which he considered to be the gastric juice; and lastly, grumous blood. . . . . His mind grew indifferent to all things, either past or future, and even to his existence. Regret and hope were equally extinct within his breast. His head felt light and sore, and as if its sutures were separated from each other. It likewise ached; and he had alternate sensations of violent heat and chilling cold. . . . . The bare mention of food, solid or liquid, was loathsome to him."*

In the case of "sick-giddiness," a variety of megrim where the headache is absent, to which reference has already been made in the section on vertigo, the resemblance is still more striking. Dr. Marshall Hall not only saw this, but also pointed out how intimately related both forms of seizure are to the whole family of paroxysmal nervous affections of which epilepsy is the type: "I have been particularly struck," he writes, "with the frequency of the association of sickness with these seizures (minor epilepsy).

* Staunton's "Account of Lord Macartney's Embassy to China," vol. i. pp. 145, 146.

The designation "sick-headache" is familiar to us all; but sometimes it is not headache but giddiness, or a momentary unconsciousness which accompanies the sickness." And again, "The seizure is not always one affecting the intellect, or the muscular system; sometimes, on the contrary, there are pallor and faintishness, if not actual syncope, and nausea, if not vomiting. This form of seizure—I purposely avoid the term epilepsy—arises from the same causes as the others to which I have adverted. They belong to a *class* of affections which, however various or varied in other respects, combine the symptoms of faintness or sickishness." Dr. Hall further recognised a morbid susceptibility of the medulla oblongata as the point of departure for all such seizures;—"The term epilepsy," he continues, "if not discarded, may be applied more extensively than is usually done to designate certain cases of sickness and syncope greatly allied to the less formidable epilepsy. 'Sick-headache,' sickness, faintishness, vertigo, sickness the effect of disgust, are not dissimilar from minor epilepsy—the *petit mal* of French writers. The effect on the susceptible medulla of a swing, of sea-sickness, belong to the same *class* of morbid affections."*

Drowsiness.—One other feature of the paroxysm remains to be noticed, namely, that of drowsiness or stupor. Although of less frequent occurrence than those already described, this symptom is one of considerable interest as having its representative in the history of other neurosal seizures, and forming one more of the many links which bind together this remarkable family of disorders.

It is important to distinguish this drowsiness from the comparatively natural and grateful sleep which, in a large proportion of cases, terminates, and sometimes shortens, the paroxysm. It is, on the contrary, of a most uncomfortable and oppressive character, sometimes verging on coma. Thus

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* *Lancet*, 1849, vol. i. pp. 506, 507, 688. "Of a distinct class of Paroxysmal Nervous Affections," by Dr. Marshall Hall.

my patient C. (No. 32) described it, in her own case, as a sleepiness or stupor so great that while it lasts she is only imperfectly conscious, and does not heed when spoken to. Sometimes, in her worst seizures, she is quite unable to keep herself awake and sinks into a profound (semi-comatose) sleep. Whenever this happens she awakes worse, and the malady is prolonged. I would here repeat the remark I formerly made that this description was not suggested by the questions put her, but originated with herself; it corresponds very closely with the account given by Tissot of the same kind of stupor as contrasted with the usual terminal sleep; he says—"We have already referred to one case where the attacks terminated in sleep, and the instances are numerous in which this termination occurs; but it also sometimes happens that sleep is but a symptom of the paroxysm: the more the patients sleep the worse they are, and it is only when they are thoroughly awake that the malady begins to pass off."* In a case of severe megrim recorded by Sir C. Scudamore, where the disorder appears to have had a gouty origin or gouty affinities, a similar fact is noted—"On the day of the headache, the patient was completely overpowered with torpor, and the most extreme oppression of sleep."† In other instances this drowsiness occurs towards the end of the attack, and then is less readily distinguished from the terminal sleep in which it merges. This was probably so in an instance recorded by Moreau where the attacks are said to have terminated in "profound stupor."‡ C. Lepois's case appears to have been of a similar kind: he says that for more than fourteen years he suffered from very regular returns of severe megrim, and that the attacks never abated until after free vomiting, generally of watery and

* "On a déjà vu un malade chez qui l'accès se terminait par le sommeil, et il y en a plusieurs chez qu'il se termine de même; mais il arrive aussi quelquefois que le sommeil est un symptôme convulsif; plus ces malades dorment, plus ils sont malades: ce n'est que quand ils sont très éveillés que le mal commence à diminuer."—"Traité des Nerfs," p. 386.

† "On Gout," p. 369.

‡ "Etiologie de l'Epilepsie," 1854.

sometimes of bilious material, followed by a profound sleep (sopor). After leaving Paris, and particularly after travelling in Italy, these headaches so much abated as to cause him very little annoyance, but it is remarkable that he still continued to suffer periodically from attacks of vomiting and drowsiness.* In one of Dr. Parry's cases (No. 50), it is stated that an unusual tendency to sleep remained for some days after the attack.

As I have already said, this feature of the paroxysm is not peculiar to megrim, and forms an occasional incident in the history of other neurosal seizures. A very similar drowsiness sometimes attends the progress of asthma; in this case it is generally an initial symptom and precedes the actual dyspnœa, but it is occasionally prolonged to a later stage. Sir John Floyer, who records his own experience of this complaint, observes—"There appears a great dulness and fulness of the head, with a slight headache and great sleepiness towards evening, before the fit."† So, also, Dr. Salter—"The patient will feel himself very drowsy and sleepy, will be unable to hold his head up or keep his eyes open, and that without having undergone any particular fatigue or done anything that could account for it. . . . . I find this precursory drowsiness to be the commonest of all the premonitory symptoms of asthma. It is the commencement of that particular nervous condition of which the succeeding respiratory phenomena are but the more complete development; in fact it must be looked upon as an integral part of the paroxysm."‡ The author of the "Journal of an Asthmatic" thus describes one of his attacks:—"Symptoms of an approaching fit began to appear at 4 P.M. The principal were fulness in the head, dulness and heaviness of the eyes, and *disagreeable drowsiness*. The drowsiness increased so much that I spent a great part of the evening in a succession of 'trances,' as

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* C. Piso, "De morbis cap. intern.," cap. i. obsv. xi. p. 23.
† "A Treatise of the Asthma," p. 7.
‡ "On Asthma," p. 62.

I call them. This horrid drowsiness generally prevents one from being sensible of the approach of a fit till it has commenced." On another occasion he says that, notwithstanding some strong coffee, the drowsiness gradually increased for two hours, when he fell asleep for an hour. When he awoke the spasmodic action increased. "This," he adds, "is always the consequence of sleeping in a fit."* In other instances the drowsiness is a later feature of the paroxysm. One of Dr. Salter's patients says—"From my seventeenth to twenty-sixth year the fits became marked and aggravated by a tendency to *coma*, which was often, during the latter part of the fit, so obstinate that my attendants had trouble in keeping me awake."†

A very similar drowsiness sometimes precedes the paroxysms of ague. "This is often so sudden," observes Dr. Macculloch, "that a patient will fall asleep even in the act of conversation or may find the greatest difficulty or pain in preventing it. It offers an exact analogy to the more perfect apoplectic (comatose?) state which is so often the first attack of the fever of Italy. Sometimes it is temporary, terminating in half an hour, a quarter, or even within a minute; but while irresistible, those who have experienced it describe it as more resembling what they should conceive to be the effect of a narcotic poison than natural sleep. In other modes it lasts for many hours; the patient being unable to rouse himself into a properly waking or active state, while at the same time he cannot procure even a minute's real sleep: the bare attempt defeating his object. All those who have suffered this symptom from the chronic fever of Italy describe it as extremely distressing, and as one of the most vexatious parts of their disease; and I need scarcely point out to medical readers that while it may rank under the *Quotidiana Soporosa* of Sauvages, they may find abundant mention of it in medical writers, at least in cases

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* *Dub. Jour. of Med. and Chem. Sc.*, vol. xiii. p. 23 and 28. 1838.
† "On Asthma," p. 312.

of severe or masked fever, though it is so often overlooked or mistaken in our own country."*

Lastly, we have in the post-epileptic sleep a phenomenon of a similar kind. When the convulsions are over and consciousness returning, the patient, says Dr. Reynolds, "may gradually recover, or he may pass into a more or less profound stupor, constituting the after stage or profound sleep."† We cannot regard this condition as a mere effect of the fit, for it may be absent and is by no means proportioned to the severity of the seizure; in fact it must be regarded as a part of the paroxysm, and sometimes it constitutes a principal part, giving rise to a form of "pseudo-apoplexy" described by the late Dr. Todd.

Termination.—A few words are required on the various ways in which the paroxysms terminate, and with them we must bring this review of the phenomena to a close. Some of these have been already noticed.

The most frequent termination by far is in *sleep.* This is not the lethargic condition which sometimes attends the development of the seizure, and of which we have already spoken, but natural and refreshing sleep. It does not usually set in until the paroxysm has run much of its course and headache only remains, and frequently not until night; but if by darkness, silence, and recumbency it can be obtained earlier, the headache may sometimes be much abbreviated. All the writers on megrim notice this mode of termination. Romberg says—"The attack is generally closed by a profound and refreshing sleep;"‡ and Tissot that "after vomiting the pain diminishes and the patient sometimes falls into a tranquil sleep for some hours, and awakes feeling quite well."§ Afterwards, referring to a case where the paroxysms always ended in sleep without vomiting, he remarks that this is a very common termination.‖

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* "An Essay on Remittent and Intermittent Diseases," by John Macculloch, M.D., F.R.S. 1828. Pp. 74, 75.

† "On Epilepsy," pp. 90, 104.

‡ "A Manual of Nervous Diseases" (Syd. Soc. ed.), p. 176.

§ "Traité des Nerfs" (Bayle's edit.), p. 384. ‖ Idem, p. 386.

In seventeen of the cases I have tabulated the patients stated that their attacks terminated in sleep or a night's sleep; several said they were shortened by sleep. In two, the unnatural drowsiness or stupor of the paroxysm seems to have passed into a natural sleep.

This terminal sleep, as it commonly occurs towards the close of the paroxysm, I regard as the natural consequence of that exhaustion of the sensorium which results from the morbid state of activity through which it has passed, and as similar to that which follows long sight-seeing or other exhaustive occupation of the senses. Among Sir Henry Holland's many suggestive reflections I find the following: "Pain is among the causes which tend directly to exhaust the nerve force; and, when violent, often very suddenly and remarkably. The collapse which follows any acute bodily suffering, even though of short duration, is well known both to physicians and surgeons. The instances are familiar of sleep ensuing instantly on the remission of such suffering; as in sequel to severe operations, or in the intervals between labour pains, or in the remission of acute inflammation or spasms."*

Sometimes, however, as we have before observed, sleep is not only terminal but *curative;* and the same influences which under ordinary circumstances serve to induce sleep will here tend to tranquillize the sensorium and shorten the attack. Du Bois Reymond, speaking from personal experience, says—"Schlaf kürzt häufig den Anfall bedeutend ab;" and Lebert, another sufferer—"Schlaf kann den Anfall sehr abkürzen." This sleep need not necessarily be long; with some persons a remarkably short period, less than half an hour, may be sufficient to dissipate an attack. A remarkable instance of this came to my knowledge in the case of Mr. A.'s son (No. 45). On one occasion he was attacked when about fifteen miles from home, on an expedition of pleasure, with the usual initial blindness; the headache followed and promised to be a severe one, but, taking the

* "Med. Notes and Reflec.," p. 278.

first train to town and stretching himself full length on the seat, he fell asleep, and by the time he reached home the attack was dispersed. A similar experience has been related to me by other patients: one man in particular, a gardener who had a family tendency to these headaches, I well remember telling me that if he could leave his work at the commencement, and by lying down under the shade of a tree procure half an hour's sleep, he would awake well. M. Piorry states that in some rare cases the attack may be cut short in this way after the development of the blindness and before the headache has commenced.*

In speaking of drowsiness as an occasional feature of the megrim paroxysm, I drew attention to a similar occurrence in connexion with other neurosal seizures, particularly asthma, and it is interesting to observe that the same distinction has also been made in this case between the morbid drowsiness of the seizures and the natural sleep which terminates them. Thus, in an autograph history in Dr. Salter's work, the patient thus describes the termination of his attacks:—"At last came the turn. Generally it appeared in the gradual subsidence of the more violent symptoms, a greater facility of keeping warmth in my legs, a moistening of the skin, and a gentle slumber—quite a different thing this from the *comatose* slumber, which was horrid nightmare. My attendant could distinguish between them, and I myself still kept conscious enough to feel the difference."†

The termination by *vomiting* is scarcely less frequent than that by sleep, which it sometimes immediately precedes. I have already said that fifteen patients referred to in the table described their attacks as terminating in this way; two or three of them mentioned sleep besides. It is not at all uncommon to hear persons complain that if they cannot be sick their attacks are prolonged and hang about for a day or more. Actual vomiting seems in fact sometimes to

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* "Dans quelques cas, bien rares sans doute, lorsqu'on se livre au sommeil dès la première invasion, la névralgie oculaire se borne aux éblouissements."—"Mémoire," &c. p. 417, § 825.

† "On Asthma," p. 361 (1868).

relieve the cerebral disturbance, just as it does at sea, where it is well known that many suffer more when they vomit less; hence many patients are glad to promote it in megrim by artificial means.* I shall return to the consideration of the physiological act of vomiting and its relation to the cerebral disorder in the chapter on pathology.

A third mode of termination, and a less satisfactory one, is the *gradual subsidence* of the pain without sleep or any form of crisis. I find only seven patients who described their attacks as terminating in this way, but it doubtless occurred with many of those who gave no particular information on the subject.

I have already stated (page 35) that other evacuations besides vomiting appear to be sometimes critical, and perhaps may contribute to shorten the attack. Such are tears, nose-bleeding, diuresis, and profuse perspiration, all of which have been observed to occur at the close of the paroxysms. In Mrs. N. (No 22) the attacks terminated in a copious secretion of tears, and Tissot refers to a similar case.† It is worth observing that M. Moreau has recorded a case of epilepsy in a male adult where the fits were sometimes cut short in a similar way.‡ With regard to perspiration, Tissot says:—"I once saw a lady who had been subject to migraine for many years, and with whom it was always terminated by extremely copious perspirations from the forearms and hands; at length at a certain age she used to have perspirations regularly every morning, which set her entirely free from the malady."§ Profuse secretion of urine is mentioned by several writers—Whytt, Calmeil,

* Tissot gives a curious instance: "Quoiqu'en général la douleur soit si vive que les malades ont besoin du plus absolu repos, j'ai vu deux personnes qui souffrent plus longtemps si elles ne peuvent pas monter en voiture, parceque, si elles restent dans l'inaction, elles ne vomissent point; au lieu que la voiture abrège l'accès chez l'une en la faisant vomir, chez l'autre sans opérer d'évacuation."—"Traité des Nerfs," &c. p. 386.

† "On trouve dans un bon recueil d'observations l'histoire d'une dame dont les accès se terminaient par un lamoiement abondant de l'œil madade." Idem, p. 386.

‡ "De l'Etiologie de l'Epilepsie." *Mém. Acad. Imp. de Méd.*, vol. xviii. 1854, obsv. 44, p. 35.

§ "Traité des Nerfs," &c. p. 386.

Labarraque, and others—as sometimes terminal.* In Van der Linden's case (No. 41) the patient suffered from attacks of polyuria five or six times a year, which may perhaps have been vicarious; they lasted a day, during which she passed ten times at least as much water as she drank. These incidents cannot fail to recall the diuresis of hysteria and other neurosal paroxysms. In asthma this occurrence is mostly initial: "The associated and precursory symptoms of an asthmatic attack," observes Dr. Salter, "are such as point to its nervous character. The quantity of limpid water passed in the early part of the paroxysm, white as pump water, like the nervous water passed in the students' 'funking room,' or like the urine of hysteria, or that of nervous headache; . . . . all these are just such symptoms as we meet with in various diseases of the nervous system, such, for example, as hysteria and epilepsy." "The abundant secretion generally comes on soon after the asthma commences, but I have known it come on so early that the patient was awakened from his sleep by the distension of his bladder, when the difficulty of his breathing was only just commencing. It generally lasts for the first three or four hours and then ceases altogether."† Lastly, Professor Trousseau relates a case of angina pectoris attended by similar symptoms, in which the paroxysm was prolonged if circumstances delayed the evacuation of the bladder; and he remarks on the analogy exhibited in this respect with a fit of asthma.‡

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* "Souvent à la fin des accès, on observe que l'urine est limpide et plus abondante que de coutume."—*Labarraque*, "Essai," &c., p. 35.

† "On Asthma," pp. 29 and 69 (1868).

‡ "Mais l'accès se prolongeait si le malade ne satisfaisait immédiatement à un besoin d'uriner invincible, et avait-il quatre accès en une heure, il était forcé d'uriner quatre fois." "Ces besoins d'uriner très-fréquents et presque irrésistibles qui s'observent également dans certains accès d'asthme, constituent pour moi l'analogie que je crois trouver, dans ce cas, entre l'asthme et l'angine de poitrine."—"Clinique Médicale," tom. ii. p. 443.

CHAPTER IV.

Affinities of Megrim with other Neuroses. Common Characters of the Group; illustrated in Epilepsy, Asthma, Laryngismus, Pertussis, Chorea, Tic Douloureux, Angina Pectoris, Gastralgia, Paroxysmal Insanity, and the like. Exciting Causes of the Seizures; their similarity in various Neuroses. Neurosal Equivalency and Transformations. Metamorphic and Vicarious Relations of Megrim.

MY intention in the present chapter is to set forth, to the best of my ability, the intimate relations of megrim with the whole family of neurosal disorders of which Epilepsy is the type, including Epilepsy, Epileptic Vertigo, Spasmodic Croup, Spasmodic Asthma, Angina Pectoris, Gastralgia, Tic-douloureux, Intermittent and Paroxysmal Insanity, with many others which I might name. For this purpose I shall endeavour—First, to draw from various sources and exhibit in a connected way the common characters of some leading members of the group, including the influence of various exciting causes of the seizures, with a view to show how closely megrim conforms in these respects to the family type. In doing this I shall follow a similar order to that which I have observed in tracing the general features of megrim in the second chapter, and leave the reader to complete the parallel, which will thus be rendered sufficiently obvious.

Secondly, I shall point out a still more intimate relationship between the various members of the group in the occasional replacement of one form of paroxysm by another in the same individual, as well as in the occurrence of intermediate and transitional forms; and here again we shall find in the case of megrim a strict conformity to the common type and the maintenance of metamorphic relations

with various neurosal seizures—epileptoid, neuralgic, and psychical. To begin with the common characters:—

Common Characters of Neurosal Affections.

I. In the first place, we recognise in all maladies of this class a persistent disorder or morbid tendency of the nervous system, or of some one of its physiological divisions, not associated with any primary or constant structural lesion of that system sufficiently gross to be made obvious to our senses, and not generally or necessarily permanent or incurable; in other words, we have to do with a group of *functional disorders*. But although these affections are more or less persistent—some varieties lasting the greater part of life, others only for a limited term—yet the principal phenomena which characterize them are discontinuous and intermittent, and consist in paroxysms of irregular and uncoordinated nervous action, recurring at intervals which vary greatly with the particular malady under consideration. Hence a distinction has conveniently been made between the malady itself and its paroxysmal manifestations. Speaking of epilepsy, the type of the series, the late Dr. Todd observes: "We must not forget that, in forming a theory of the pathology of epilepsy, we have to explain, not a continuous state of disturbed sensation and motion, but a *malady*, the grand feature of which is the periodical recurrence of the paroxysms, the patient being wholly or almost restored to his normal state in the intervals."* When we say that the paroxysms consist in uncoordinated nervous action, this is to be understood solely with reference to the coordination of health, for a tolerably constant and regular succession is observed among the pathological phenomena which constitute each variety of paroxysm.

II. Secondly, the predisposition of the nervous system, or some of its parts, to these irregular modes of activity

* *Lon. Med. Gaz.*, 1849, vol. viii. p. 820.

appears to be, in a large proportion of cases, *innate and hereditary*, descending from parents to children, or grandparents to grandchildren; at other times it makes itself apparent among collateral relatives, and there is no class of maladies in which the influence of inheritance is so strongly marked. On this subject Sir Henry Holland has justly observed: "Every physician will recognise the general tendency to hereditary character in disorders of the brain and nervous system." "This is a very remarkable part of the subject, involving, as it does, every variety and degree of morbid affection, from simple headache to the worst forms of epilepsy. It is further a topic of deep interest as including the various conditions of hereditary insanity."*

Let us take some particular instances in illustration. The same author observes of *Asthma*—"Spasmodic asthma sometimes shows an hereditary character. I have known the complaint to occur in four successive generations, and often so numerously in the same family as to make it certain that a common cause was concerned."† This hereditary character of asthma was long since noticed by Sir John Floyer, whose treatise on that malady has formed the basis of many which have since appeared. Of his own case he says—"As my asthma was not hereditary from my ancestors, so, I thank God, neither of my two sons are inclined to it." But he gives instances in which inheritance was well-marked: thus, the grandfather of one of his patients was subject to the same complaint and several of his brothers and sisters, "so that it was a disease in the family, but yet missed a generation."‡ Dr. Salter says: "Of 35 cases in which I have noted this circumstance, I find distinct traces of inheritance in 14; in 21 not so. The kind of inheritance differs very much; sometimes it is direct, sometimes lateral. I have observed one curious fact which suggests an interesting general pathological question: it is, that several brothers

* "Medical Notes and Reflections" (ed. 1839), p. 31.

† Idem, p. 31. So M. Georget states that "asthma, like other *nervous maladies*, is often hereditary."—"Phys. du Syst. Nerv.," vol. ii. p. 416.

‡ "Treatise of the Asthma," pp. 20, 129. 1698.

and sisters in a family may be asthmatic without the parents having been so."*

Angina pectoris supplies another instance of a remarkably hereditary neurosis, as was first pointed out by Dr. R. Hamilton, who has left us a very circumstantial history of a case where many members of the same family were victims of this malady. "One thing," he remarks, "worthy of notice in these cases is, that the disease seems to be on some occasions hereditary. This is a hint which no author, as far as my memory serves, ever threw out before. But whether it be allowed by the learned to be an hereditary complaint or not, this is surely one remarkable instance of its descent from a parent to his children, and may serve at least to remind us, when we meet with the disease, to make strict inquiries into those diseases that were most general in the patient's family."† This has since been confirmed by many observations. The case of Dr. Arnold, of Rugby, who inherited the malady from his father, has become familiar to most of us from the narrative given in Dr. Latham's lectures ‡ More recently Dr. Anstie has pointed out "the extraordinary frequency—one might almost say universality—with which anginal patients will be found descended from a race strongly marked by tendencies to the more severe neuroses."§

The hereditary character of *Insanity* is so notorious that it is scarcely necessary to refer to authorities, but I may observe that Esquirol gives a family proclivity as by far the most influential cause or constant antecedent of the disease. "Of all maladies," he observes, "mental alienation is the most eminently hereditary. Although noted only in 337 out of 1375 insane persons, I am persuaded that this predisposing cause is much more frequent than this represents."‖ Dr. John Cheyne, in his essay on "Partial Derangements of

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* "On Asthma," p. 109. † "Edin. Med. Comment." vol. ix. p. 307.

‡ "On Diseases of the Heart," vol. ii. p. 373. 1846.

§ "Report of the Meeting of the Brit. Med. Assoc. at Oxford, 1868." *Lancet*, vol. ii. p. 229.

‖ "Maladies Mentales," vol. ii. p. 683. 1838.

the Mind," states that this hereditary tendency is particularly manifested in periodical or intermittent mania. "Insanity," he observes, "is so prevalent in some families that we have known 2, 3, or 4 children of the same parents suffering under the disorder. In the family of a brother and two sisters there were 10 cases of insanity—5 in one family, 2 in another, and 3 in a third—out of 20 members! When insanity is inherited the disorder is generally periodic, the lucid intervals being often of long duration. The fits of insanity when they recur, even at the distance of many years, often closely resemble each other—the same faculties are disturbed, the same hallucination returns."*

The evidence of inheritance in the case of *Epilepsy* is generally admitted. M. Delasiauve fixes the proportion of hereditary cases at nine per cent. from his own experience; Dr. Sieveking found epilepsy prevail among the relatives of his patients in 13·4 per cent. of the cases.† The proportion will be greatly increased if we admit the existence of allied nervous disorders in the family as evidence of inheritance. Dr. R. Reynolds, from an inquiry into 88 cases, found a family proclivity to nervous diseases in 31 per cent., including antecedent and collateral relatives. He concludes that "an hereditary tendency to epilepsy is much more common than it is generally represented to be by recent writers."‡

Of *Infantile Convulsions*, a malady in many respects quite distinct from epilepsy, Professor Trousseau states that,

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* "Partial Derangements of the Mind," p. 84.

† "On Epilepsy," p. 112. 1861.

‡ "On Epilepsy," pp. 47, 52. Since the above was written, Dr. Reynolds has slightly qualified this statement. He says: "Hereditary taint has been found to exist in rather less than one third of those cases which have fallen under my care, and have been carefully examined on this point. It is not intended by this statement to affirm that true epilepsy has existed in the parents of one third of the cases, but that some disease of the nervous system, more or less closely allied to that under consideration, has been present in either the parents, the grandparents, the aunts, uncles, brothers, or sisters; that there has been a family proclivity to nervous disorders, in one case showing itself by idiotcy, in another by mania, in a third by convulsions, and so forth. I have found 12 per cent. of epileptics giving a distinct history of epilepsy in other members of their families; a number which is very near to that stated by Dr. Sieveking, and not far removed from that given by M. Delasiauve."—"Syst. of Med." vol. ii. p. 253. 1868.

"circumstances apparently the most trivial may bring on infantile convulsions in individuals predisposed to them; there are children who are convulsed with as much facility as others pass into a dreamy or delirious state; and this predisposition is chiefly hereditary."*

It is the same with *Chorea*. The author last quoted observes that in this complaint "an hereditary predisposition is unquestionable; and even if judicious statistics had not proved it, it might be asked why St. Vitus's dance should not be subject to the same law as all nervous diseases, in which hereditary predisposition holds such an important place." "On tracing back the history of individuals affected with chorea, you will find that either their direct or collateral ancestors have suffered from various neuroses, such as hysteria, epilepsy, or eclampsia."† Dr. Radcliffe has made a similar observation: "Out of 48 cases in which I have inquired into the family history, I find 27 cases in which father or mother or brother or sister had been, or was, the subject of one or other of these disorders—paralysis, epilepsy, apoplexy, hysteria, or insanity."‡

These last observations remind us that, as in megrim so in other members of the neurosal family, there is another way in which an hereditary disposition may be manifested besides the direct transmission of the same affection from parent to child: the occasional *metamorphosis* of an inherited neurosis is, in fact, a character which belongs to the whole group; hence in a family of brothers and sisters we may meet with a variety of such affections. This tendency of some diseases to transformation in the course of hereditary transmission was long since pointed out by writers on the subject of pathological inheritance,§ and in the case of

* "Clinique Médicale," tom. ii. p. 119. Paris, 1865. † Idem, p. 167.

‡ "Reynolds's Syst. of Med." art. "Chorea," vol. ii. p. 123. These observations on the fundamental connexion of chorea with the stock of nervous disorders I consider of especial interest, now that there is a strong and, as I think, misleading tendency to look for the origin of chorea and some other neuroses in accidental conditions external to the nervous system itself.

§ See more particularly, Piorry—"De l'Hérédité dans les Maladies" (Paris, 1840)—in which the subject is considered with regard to syphilis, scrophula, cancer, and the like.

nervous disorders was particularly noticed by Prichard. He says—"A predisposition to epilepsy will sometimes appear in some individuals of a family, whilst their nearest relatives are affected by other maladies of the same class."* But we owe to Dr. J. Moreau (de Tours) some of the most valuable observations which have been made on this subject in recent times, and his treatises on epilepsy and morbid psychology abound with interesting illustrations. "This pathological fact," he says, "presents itself in a much stronger light, and, as it were, surrounded with evidence, if we study it in disorders exclusively affecting the nervous system. In considering the question of hereditary predisposition we have been careful not to confine ourselves to an hereditary tendency such as is generally understood by that expression—namely, a transmission pure and simple of a similar malady from parents to children; on the contrary, we have particularly taken into account that kind of inheritance which implies the transformation of maladies. There are none, or exceedingly few, cases of epilepsy which may not be traced back to an hereditary predisposition when thus understood."† The treatise itself from which this statement is taken contains a large body of evidence in support of it.

So, again, with regard to mental alienation, the same author observes:—"The conditions of inheritance occupy the foremost rank; they embrace, in fact, all, or almost all, the pathology of intellectual derangement; they furnish, as it were, the key to all forms of madness, by disclosing the existence of a neuropathic diathesis, which constitutes, to use the picturesque expression of M. Marchal de Calvi, 'one of those great pathological currents which permeate and decimate certain families.' From the profound study of hereditary conditions, of their part in the production of neuroses in general and of insanity in particular, it follows that this latter malady, like every chronic affection, is strictly a general disease, *totius*

* "A Treatise on Diseases of the Nervous System," pt. i. p. 96. 1822.

† "De l'Etiologie de l'Epilepsie, &c."—"Mém. Acad. Imp. de Méd.," vol. xviii. 1854, § 18, 19.

substantiæ, before it is a local one, before the hereditary predisposition, awakened by a host of accidental causes, physical and moral, concentrates its action on a system of determinate organs.

"There are few of my works in which I have not taken occasion to recall this truth; and scarcely a day passes that I have not some proof of this morbid disposition, of which the evolutionary potency, in certain cases, strikes one with painful surprise. In how many families do we not see this neuropathic condition, while preserving its intrinsic unity, manifest itself under a thousand different forms—under the forms of hysteria, of epilepsy, of partial convulsions, of chorea, of general and partial insanity, of lesions of the nervous centres, of the general sensibility, &c.?"*

My present purpose will not allow me to pursue this subject further, and for additional illustrations I must refer the reader to the original works.† I shall only notice in conclusion a single family history recorded by my friend the late Dr. H. H. Salter in connexion with asthma. The patient, himself a medical man, made this statement—"My great-grandfather on the mother's side and my aunt on the father's had asthma. One of my brothers suffers from it. My father suffered for many years from general neuralgia, ending in paralysis. One of my brothers when a young man had attacks of spasmodic dysphagia or spasm of the pharynx, another has had epileptic fits, and several of the family have been sleep-walkers."‡ Such histories might be multiplied indefinitely.

III. A third feature common to many members of the neurosal group is a tendency to make their first appearance at certain ages, and frequently to show *an approximate*

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* "Traité pratique de la Folie Névropathique." Introduction, p. ix. Paris, 1869.

† See more particularly, Moreau's "Etiologie de l'Epilepsie" and his "Psychologie Morbide" (Paris, 1859); the passage already quoted from the treatise of Dr. R. Reynolds ("Syst. of Med." vol. ii. p. 253, 1868), and other standard works on epilepsy; M. Morel's "Maladies Mentales," and the works of Guislain, Griesinger, Dr. H. Maudsley, and other alienists.

‡ "On Asthma," case ii., Appendix, p. 288.

limitation to a determinate period of life varying greatly with the nature of the particular neurosis.* Thus Infantile Convulsions, and Spasmodic Croup or laryngismus stridulus, are almost confined to the first years of life and the period of the first dentition. Sydenham, who was the first to describe particularly the malady which is now known as Chorea, states that it commonly makes its first appearance in children between their tenth and fourteenth years, who have not reached puberty;† subsequent observations have shown that these limits require to be somewhat extended, but in the vast majority of cases the malady is confined to the former period of life.‡ Hooping-cough is a paroxysmal nervous affection almost exclusively of early life. I have, indeed, known several instances in which persons very far advanced in years have suffered from this singular malady, but such cases are quite exceptional, and if people do not have pertussis as children they generally escape altogether. I do not think the immunity of adults sufficiently explained by the communicability of the complaint and the supposition that they have had it as children or not been exposed to infection. The old people referred to above had all brought up large families, and must often have been so exposed.

So, again, of Epilepsy, Dr. R. Reynolds observes "that the development, or at all events the period, of puberty is, in regard of age, the most powerful predisposing condition." Out of 172 cases 19 commenced before the age of 10; 106 between 10 and 20; 45 between 20 and 45 years of age, and only 2 after 45. Hereditary cases are com-

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* See on this subject Dr. Anstie's treatise on Neuralgia, "Reynolds's System of Medicine," vol. ii. p. 722.

† Sydenham, "Schedula Monitoria," sec. 19.

‡ The late Professor Trousseau says: "Although you will see every year a certain number of cases of this complaint in my wards, where patients over sixteen years of age are alone admitted, such cases are rare when compared with those you will meet with in hospitals appropriated to children. I shall only tell you what you know already when I say that St. Vitus's dance is a complaint of second dentition (de la second enfance) and puberty, and it is generally between the ages of six and fifteen years that it is most frequent. It is only quite exceptionally that it affects children before they change their first teeth."—"Clinique Médicale," tom. ii. p. 164.

monly developed before and non-hereditary after 15 years of age. "The striking point to be noticed is the great frequency with which epilepsy commences between 10 and 20—that is, a period of life embracing the second dentition and the establishment of puberty;" and I would add this period of special liability may be further restricted, for by far the larger number of the group showed their first symptoms between the ages of 13 and 17.*

Sir J. Forbes states that true Spasmodic Asthma is "most common in middle life, being rare in infancy and childhood and seldom making its first appearance in old age."† In other words it is a neurosis whose natural development is from youth to middle age. "The cases of asthma," says Dr. Salter, "that come on in youth and early manhood are generally specimens of the pure spasmodic form." Where, however, the constitutional predisposition is very strong it occasionally appears much earlier. "I have long known," continues the last author, "that early infancy is accessible to asthma, and that many of the best-marked and purest spasmodic cases start from that early date; but until I examined many cases I was not aware so large a proportion, nearly one in five, occurred within the first year of life."‡

There are other neuroses which have their period of natural development only in adult life. This is the case with Insanity. "This disease," writes Dr. H. Maudsley, "is rare before puberty. . . . it is far more frequent between the ages of sixteen and twenty-five, but it is most frequent of all during the period of full mental and bodily development—from twenty-five to forty-five." "The internal revolution which takes place in women at the climacteric period leads to many outbreaks of insanity in them between forty and fifty."§

Again of Angina Pectoris, Dr. Heberden, who first des-

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* "On Epilepsy," p. 126, and "Syst. of Med." vol. ii. p. 254 (ed. 1868).
† "Cyclopædia of Pract. Med." art. "Asthma," vol. i. p. 185.
‡ "On Asthma," p. 107.
§ "Reynolds's System of Medicine," vol. ii. p. 12.

cribed it, says:—"I have seen nearly 100 people under this disorder, of which number there have been 3 women, and 1 boy twelve years old. All the rest were men near or past the fiftieth year of their age."* This statement is confirmed by Sir John Forbes, who says:—"The disease occurs in both sexes and at all ages above that of mere childhood, but it is much more common in particular periods of life . . . . especially affecting persons advanced in life."† Professor Trousseau makes a similar observation.‡

I do not think we need look very far to find a reason for these limitations. Van Swieten observes that, from the analogy of the ovum and the inherent qualities of development therein long dormant, we may readily conceive how a pathological tendency may be similarly latent in the individual until a particular period of evolution, or in the family for a generation or more. "In the embryo, while it is contained in its mother's belly, there are the rudiments of *teeth,* which remain in the bottom of the sockets for seven years and upwards, and then they are suddenly enlarged and pushed out; nay, several persons have had new teeth at a very advanced age. *Puberty* appears in both sexes at a certain time of life, and produces a surprising change in the body; but the rudiment of this change was present in the first formation of the person, although it is late before it bursts into action. Thus, therefore, such a *morbid* quality might be impressed upon the human embryo as may not break out till a certain time after birth."§ Again, the familiar division of the life of man into seven ages is not so purely conventional as might be supposed; physiologists also recognise closely corresponding periods of development after birth: Infancy, corresponding to the period of the

* "Crediderim me vidisse non pauciores quam centum hoc morbo ægrotantes; in quibus numeravi tres fœminas, et unum puerum duodecennem, qui aliquid simile hujus affectus experti fuerant. Cæteri omnes fuerunt viri, qui vel prope accederant ad annum quinquagesimum vel eum excesserant."—"Commentarii," p. 311.

† "Cyclopædia of Pract. Med." Art. "Angina Pectoris."

‡ "Clinique Médicale," tom. ii. p. 445.

§ V. Swieten, "Comment. on Boerhaave," vol. x. p. 353 (Eng. Ed.)

first dentition; "Childhood, ranging through the greater part of the second dentition; Youth, characterized by that increased evolution which altogether constitutes puberty. Adolescence, distinguished by the entire consolidation of the osseous skeleton when full stature is attained."* Then comes the lengthened period which we call the Prime of Life; but it is to be observed that this prime is not reached by all the faculties at the same time; mere nutritive or vegetative force begins to decline when the higher animal or relative life is still in perfection, and a maximum of muscular power and bodily vigour is attained before the highest intellectual development is reached. Lastly, we arrive at the period of Decline, and here, too, the same kind of distinction must be made as regards the order of declension in the different faculties.

Now these various stages are intimately associated with certain phases of functional evolution in the nervous system, as will appear from the following considerations: First of all, the time of birth is marked by the acquisition of many new faculties—for example, the conservative instinct of crying, the appetites for air and food, and the consensual movements by which they are satisfied; and although these serve for the most part the purposes of a purely vegetative existence, they are really functions of the cerebro-spinal system pressed into that service. Secondly, in the education of the senses in childhood and in the acquisition of the sensori-motor actions of manipulation, locomotion, and speech, in the play of the imagination and of the elementary passions, which form the foundation, as it were, of the outer or relative life, we witness the completion of another stage of this nervous development. A third is readily traced in the extraordinary evolution of the emotional and moral part of our nature, which is approximately coincident with the period of puberty and intimately connected with the relations of the sexes, and which gives a force and a character to our actions which they never had

* "Human Physiology," by Dr. Carpenter, p. 967.

before. Lastly, we have the replacement of these by the passions of ambition and acquisition in men, of parental affection and solicitude in women, while the intellect has been gradually gaining strength and the emotional part become more and more subordinated to the direction and control of the reason.

Now it is not difficult to see in these different stages of life, and in the progressive evolution of those nervous endowments with which they are so intimately connected, the reason why certain nervous disorders should chiefly prevail at particular epochs: why spasmodic croup, infantile convulsions, and some other neuroses make their appearance in infancy; chorea, stammering, somnambulism, and night-terrors in childhood; epilepsy and hysteria from puberty to adolescence; mental alienation and angina pectoris in middle life. It is mainly that certain pathological tendencies in the nervous system have their natural evolution coincidently with that of the normal endowments to which they are physiologically related. In the varying force of these internal tendencies, and in the concurrence or otherwise of favouring circumstances, we may probably find an explanation of whatever is irregular or exceptional in individual cases.

IV. The *Influence of Sex* is often strikingly apparent in the class of affections of which we are treating. Some neuroses are much more frequently met with in males, others in females. Thus Chorea predominates in females. Dr. Heberden says that in his experience one fourth only of the patients who had the disease were males, and three-fourths females. Dr. Elliotson observes—"I made a calculation from my own experience of this disease, during six years at St. Thomas's Hospital, and I found the proportion about the same as had been observed by Dr. Heberden. Twenty-two females had the disease and but eight males. This is the opposite of what occurs in Epilepsy: you find a greater proportion of persons that have Epilepsy are males."* Dr. Radcliffe says—"After 9, females become

* *Lond. Med. Gazette*, vol. vii. p. 486. 1831.

more liable to chorea than males in the ratio of 5 to 2."* Professor Trousseau gives the ratio of 3 to 1 in favour of girls, and a still higher one for cases occurring after puberty.† Asthma, on the other hand, predominates in males. Sir John Forbes says—"Asthma affects both sexes, but it is more frequent in the male than in the female." Joseph Franks states the proportion as observed in his own practice to be 6 males to 1 female, but Sir John considers this too high.‡ According to Dr. Salter's large experience of this complaint, "men are more subject to Asthma than women in the proportion of 2 to 1."§ Professor Georget, after stating that Asthma is less common in children and women than men, remarks that this is to some extent compensated by hooping-cough and epilepsy in the one case, and hysteria in the other.‖ Hysteria is, in fact, a multiform neurosis which is almost confined to the female sex. Gout, which has many claims to belong to the same neurosal stock, is comparatively rare in women. Cases of Angina pectoris occur much more numerously among men than women : Sir J. Forbes, out of 88 cases, found 8 only were females, and he refers to Jahn, Hosack, and Laennec in confirmation of this observation.¶ I have myself had one fatal case of well-marked Angina pectoris in a woman under my care, but it was in this and some other respects an exceptional case.

V. Turning now to the phenomena of the seizures themselves, we shall find that they also exhibit many striking points of affinity in the different neuroses. In the first place, there is the *paroxysmal character*, that is, the manifestation of the disorder from time to time in fits of morbid nervous action, often rising gradually to a certain pitch of intensity and then subsiding, with intervals of health or comparative health between, which vary greatly in length with the nature of the malady. These paroxysms may con-

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* "Reynolds's Syst. of Med.," vol. ii. Art. "Chorea."
† "Clinique Médicale," tom. ii. p. 166.
‡ "Cyclop. of Pract. Med.," vol. i. p. 185. § "On Asthma," p. 149 (1868).
‖ "Phys. du Syst. Nerv.," vol. ii. p. 416.
¶ "Cycl. Pract. Med.," vol. i. p. 83. See also Heberden above, p. 161.

sist in convulsive movements of the whole frame, as in the clonic spasms of infantile convulsions and of the second stage of the complete epileptic fit; or in tonic spasm of the respiratory or some still more limited group of muscles, as in the first stage of epilepsy, in asthma, and laryngismus stridulus; at other times in pain of the most intolerable and agonizing kind, either referrible to the ramifications of some sentient nerve, as in Tic-douloureux, Sciatica, and Lumbago; or radiating from some visceral plexus, as in Angina pectoris, Gastralgia, and Colick; or, lastly, in hallucinations of the senses, a delirium of ideas, or causeless and violent emotion with wild and noisy ravings. But all exhibit, more or less, the same transient, culminating, or explosive character, suggesting the notion of some irregular accumulation and discharge of nervous force or Nerve-storm. This character is implied in the name ἐπιλημψια, *a seizure*, by which one of the most typical members of the group is known, and the terms epileptoid and epileptiform have been pretty freely used of late years to indicate any form of nervous disorder having the above characters; and if they have been somewhat too loosely and widely applied, their ready adoption is a distinct recognition of a real pathological affinity, and of the need of some such term to express it.*

The late Professor Trousseau, under the title "Epileptiform Neuralgia" has drawn some very vivid portraits of such seizures: "An individual experiences all at once a frightful pain in the region of the heart; this pain spreads through the chest, in the two arms (by preference the left), with an anxiety, an indescribable terror, and with a sense of numbness in the limb where the pain has been most acute. This is denominated Angina pectoris; I call it a species of epilepsy: it is an *epileptiform neuralgia*.

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* Dr. R. Reynolds severely criticises this use of the words "epileptoid" and "epileptiform." ("Syst. of Med.," vol. ii. p. 251. 1868.) Perhaps it is rather far-fetched to speak of nocturnal enuresis as epilepsy of the bladder, and transient amaurosis as epilepsy of the retina; still, a considerable accession to our pathological knowledge is embodied in this use of these terms, and if not free from objection they are at least convenient

"Another patient, who is experiencing at the time no pain, who loudly attests the entire absence of suffering, is all at once seized with a horrible agony while consulting you; he puts his hand to his face, which he presses with all his might; he locks his head between his hands while uttering stifled groans. This scene lasts ten or fifteen seconds at the most, and is completed without convulsions. The patient resumes his interrupted account until you see him seized by a fresh paroxysm. How shall we designate this facial neuralgia, characterized by sudden and rapid seizures? I have named it *epileptiform neuralgia;* my professional brethren will judge whether I am right in doing so."*

Other forms of seizure, such as the paroxysms of Asthma, Gastralgia, and Colick, if more prolonged and less explosive, nevertheless exhibit the recurrent and culminating characters in a marked degree. Thus Trousseau says—"A fit of asthma has a course resembling that of a paroxysm of fever—that is to say, it begins somewhat slowly (occasionally, it is true, very suddenly); it *rises by degrees to its culminating point, like every neurosal affection;* it then declines again in the same way, becoming gradually less, and leaving the person in perfect health for a longer or shorter period until the return of a fresh attack."†

Insanity, too, in the form which more especially concerns us, frequently exhibits characters which render it no exception to this rule, as the quotation from Esquirol on the following page will show. Transient paroxysms of insanity of the most violent kind frequently follow epilepsy and sometimes replace it. But such "Mania Transitoria" is by no means always connected with epilepsy: Dr. Maudsley says—"The *course* of mania is not often regularly progressive: there are generally remissions, and sometimes complete intermissions, or even so-called lucid intervals.

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* "De la Neuralgie Epileptiforme." Par A. Trousseau, Prof. de Clinique Médicale à la Faculté de Médecine de Paris, &c.—*Archives Gén. de Méd.*, vol. i. 1853, p. 33.

† "Clinique Médicale," tom. ii. p. 387.

The duration of an attack of mania may be for hours or months. There can be no question of the occasional occurrence of a short maniacal fury, a *Furor Transitorius,* lasting a few hours or days, usually associated with vivid hallucinations, and comparable to a fit of epilepsy."*

VI. The next feature common to the paroxysms of several neuroses is their *periodical return;* not an exact periodicity, it is true, but a rough approximation to regular recurrence, as if the result of a gradually accumulating tension. The interval will vary greatly with the nature of the malady and with the individual case, and in some cases and some neuroses this variation is more apparent than in others. Sir Henry Holland observes of this periodicity, so characteristic of functional nervous disorders—"Epilepsy may be taken as a remarkable example to this effect: in which disorder the principle of intermission and repetition is often distinctly maintained, with intervals exceedingly protracted between, tending sometimes to a regular period, though more frequently irregular, and liable to variation from causes of temporary excitement.

"Hooping-cough furnishes, also, a curious example of intermittent spasmodic actions, tending to like intervals, and these often of considerable length. When no casual irritation is present to provoke the fit, and more especially, perhaps, when the disorder is declining, it is remarkable how regular the times of seizure occasionally become, retaining the periodical character even to the last."†

It is the same in some forms of Insanity; the name "lunacy" itself implies this periodical return or exacerbation, which was formerly attributed to lunar influences.‡ Thus Esquirol observes: "Intermittent mania, with accessions sometimes regular, sometimes irregular, is very common; it may be considered as constituting a third of any large

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* "Reynolds's Syst. of Med." Art. "Insanity," vol. ii. 1868.

† "Medical Notes and Reflections," pp. 284, 5.

‡ "There are numerous instances," says Darwin, "of the effects of lunations upon the periods of Insanity, whence the name Lunatic has been given to those affected with this disease."—"Zoon," vol. ii. p. 464.

assemblage of maniacal cases. As in intermittent fevers, intermittent mania assumes the quotidian, tertian, or quartan type, the paroxysms returning every eight days, every month, every three months, twice a year, every year, or every two, three, or four years."* Dr. Maudsley says of intermittent forms of mania—"The attacks may return at regular or irregular intervals, and thus constitute a *periodic* or recurrent mania; or attacks of melancholia may alternate with them and give rise to what the French have described as *folie circulaire* or *folie à double forme*."†

A natural periodicity in the returns of Angina pectoris was long since pointed out by Dr. William Butter, as the result of his own observations of that disease. "It is," he says, "a periodical disease, when not disturbed by adventitious circumstances, such as motion or emotion."‡ Professor Trousseau makes a similar observation:—"In the majority of cases several paroxysms follow one another at more or less distant intervals—years, months, or weeks. We have already seen that the paroxysms may return periodically. In the interval the patient apparently enjoys perfect health."§

In Epilepsy, again, M. Delasiauve and Dr. Reynolds agree that an exact periodicity is rare, but an approximate periodicity is very common. The interval is variously stated by different authors. In half of Reynolds's cases it was under three weeks. The most frequent interval appears to range between a fortnight and a month, and the next most frequent between a week and a fortnight. "It appears, therefore, that although a regular periodicity is rarely observed in epilepsy, and is entirely absent in some cases, yet that in the majority of cases there is an approximation to periodicity."‖ As we have said, it is just this approxi-

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* "Maladies Mentales," vol. ii. p. 168.

† "Reynolds's Syst. of Med.," vol. ii. p. 216. 1868.

‡ "Treatise on the Disease commonly called Angina Pectoris," p. 28. London, 1791.

§ "Clinique Médicale," tom. ii. p. 448.

‖ "On Epilepsy," by J. R. Reynolds, M.D., p. 149. Sauvages defines epilepsy as—"Morbus clonicus universalis chronicus et *periodicus*, cum sen-

mate periodicity which is characteristic of these neurosal affections.

Dr. Hyde Salter, after referring to some forms of spurious periodicity in disease, arising from the periodical return of the cause, continues—"But there is one group of diseases whose rhythmical recurrence cannot be explained on either of these suppositions, whose periodicity has no relation either to the diurnal interval or the renewal of the cause, but which must be intrinsically periodic; such are Epilepsy and Asthma." "This last kind of periodicity, and this alone, it is that points at all to the *nervous* nature of a disease." "Asthma is typically periodic. Though there is a period for each case, there is no particular period for the disease in general. . . . . In the majority of cases if asthmatics are asked how often their attacks occur, they will mention some definite period, although their specification may not be precise, or may be accompanied with the qualification that it varies a little—*about* every ten days or a fortnight, or *about* every two months." "The periodicity of asthma implies its nervous character."*

VII. Intimately connected with this periodicity is a kind of *compensation* observable in many neuroses, a longer interval being followed by a more severe seizure, or an unusually severe seizure by a longer exemption. On this subject Sir Henry Holland remarks—"There is clearly in these cases of lengthened periodicity some relation between the time of exemption and the violence of the succeeding attack, equally in conformity with the same general view of the cause"—namely, the idea of accumulation and discharge. "In a well-marked case of Tic-douloureux now under my care, if the attack is severe it removes wholly for a time the extreme susceptibility of the parts; if slight, the interval is

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suum feriatione in paroxysmo et ante-actorum oblivione." ("Nos. Meth.," i. 578.) There can be no doubt that the occasional coincidence of the returns of a periodical epilepsy with the phases of the moon led to the belief, once very prevalent, that the fits were determined by lunar influence.

* "On Asthma," pp. 29 and 97.

proportionally lessened; affording a ratio of considerable exactness between the acuteness of the spasms and the consequent degree of relief. An analogous fact has very frequently occurred to my observation in other cases of neuralgic pains—namely, that where the nights have been passed with greatest suffering the following days have been comparatively exempt; a relation often distinct enough to engage the attention of the patient himself."*

The same circumstance is frequently observed in connexion with the attacks of Asthma. Sir John Floyer, who was a sufferer from this disease and kept a calendar of his fits, observed that the longer and more severe the paroxysms the greater the intervals.† It is the same in Epilepsy: sometimes a change of circumstances, as is well known, will break the *habit* of the disease and put off the seizures for a time, but then it often happens that the first fit which occurs afterwards is more severe than usual, or several occur in succession.

Another fact, similarly related to the periodicity of the returns, is the impunity with which a patient may expose himself to various exciting causes immediately after a seizure. It will be remembered that the case of M. Du Bois-Reymond has afforded us a remarkable instance of this in megrim; it is the same in asthma and other neuroses. "Soon after an attack," observes Dr. Salter, "the asthmatic may do what he likes with impunity—take cold, eat a heavy supper, anything. But as the time for an attack comes round, woe be to him unless he exercises the most scrupulous care; any indiscretion, any irregularity, and the asthma is on him.

"This is closely analogous to what we see in Epilepsy. After the attack the epileptic is a free man; but when the time for the fit draws nigh it is necessary to guard him from many sources of disturbance, and the most scrupulous care will not suffice to delay the fit many days. In both cases

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* "Medical Notes and Reflections," p. 283 (p. 326 ed. 1839.)
† "A Treatise of the Asthma," p. 16.

there appears to be an accumulation of some occult cause which at the fit discharges itself."*

Exciting Causes of Neurosal Seizures.

Another part of their history in which many neuroses exhibit a striking affinity one with another is in the variety and similarity of the influences which operate as exciting or accessory causes of the seizures. It constantly happens that a malady of this class is, as it were, latent, until some disturbing cause is brought into play, which is sufficient to upset the unstable equilibrium of the nervous system, and determine the storm which may have been silently threatening. It has been generally observed that such influences are inoperative unless it be somewhere near the period of natural recurrence.

1. We have already seen that considerable *muscular exertion,* whether of a prolonged or straining kind, will determine the occurrence of megrim with many patients; the same effect is sometimes seen in the case of other nervous paroxysms. Thus Esquirol says of Epilepsy—"Anything which drives the blood to the head, such as violent exertion, may provoke the seizures."† Dr. Radcliffe observes in reference to the same malady—"Of the causes which bring on the individual attacks I should be disposed to mention undue muscular exercise as one of the most frequent. At any rate I have notes of several cases in which the fits diminished in number or remained in abeyance altogether so long as the patient was careful to avoid any fatigue, and where a fit was almost sure to follow any carelessness in this respect."‡ Dr. Reynolds remarks—"I have sometimes known, as Dr. Radcliffe says, the particular attacks brought on by fatigue, but only in one instance was the commencement of the affection set down to this cause."§ Elsewhere he refers to the production of a fit by "a violent effort, such as straining to raise a heavy weight," as an

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* "On Asthma," p. 125 (ed. 1868). † "Mal. Ment.," tom. i. p. 299.
‡ "Epileptic and other Convulsive Affections," p. 141 (2nd ed. 1858).
§ "Epilepsy," p. 137.

instance of the passage of a healthy action into a morbid one.* Tissot also mentions prolonged or violent exertion among the causes of epilepsy.†

Of the exciting causes of the seizures in Angina pectoris, "bodily exertion," Dr. Latham says, "is the most frequent and the most certain. In the vast majority of the cases upon record the first paroxysm has arisen while the man was making some strenuous effort: he was lifting a weight or he was walking up hill." He then gives a remarkable illustration of this influence, showing further that the amount of exertion needed to produce an attack tends to become less and less until in some cases the most trifling cause is sufficient, or the paroxysms ultimately occur without any exciting cause at all.‡ Professor Trousseau, referring to the same subject, observes—"Sometimes it is not even necessary that these efforts or these muscular movements should be very violent, for we have already seen in the case of the Commissary of whom I spoke in the beginning of my lecture, that merely signing his name a great many times in his office was sufficient to bring on the pain."§ In fact, as Sir John Forbes has truly remarked, "in some unhappy individuals, almost any general bodily movement, such as the act of turning in bed, or walking across the room, or coughing, sneezing, or relieving the bowels, or even thinking intensely, will occasion a seizure."‖

Bodily exertion is also mentioned by Asthmatics among the numerous exciting causes of their attacks. Among the many autograph accounts we have of this malady, there is one in Dr. Salter's treatise where the patient says—"I have always suffered from the effects of bodily exercise, especially in childhood; but even at my present age I cannot run a considerable distance, or jump a child, without the occurrence of some asthma." Dr. Salter himself has frequently observed this influence of over-exertion in bringing on an

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* "Epilepsy," p. 52. † "Traité de l'Épilepsie," p. 157.
‡ "Lectures on Clinical Medicine," vol. ii. pp. 408, 412.
§ "Clinique Médicale," tom. ii. p. 445.
‖ "Cyclop. of Pract. Med." vol. i. p. 84.

attack of asthma, as, for example, from a game at cricket; but he mentions this curious circumstance in connexion with it, that the effect has not been instantaneous, but delayed some hours—in fact, until the customary hour of seizure in the night or early morning. "In some cases over-exercise will bring on an attack; in many cases that have come under my care this has been so; but although the asthma was in these pretty sure to follow such over-exertion, it never came on immediately, never till the next morning; the exertion might be followed at the time by a little shortness of breath, not much exceeding that of a healthy person, which would speedily and entirely disappear, and the patient would pass the rest of the day and go to bed in perfect health; but as surely as possible he would be awoke the next morning at the usual time with his asthma. . . . . Now here we have an exciting cause," continues Dr. Salter, "actually and inevitably bringing on an attack, but powerless to do so, its effect suspended, as it were, and laid dormant, until the characteristic time had come round. Nothing could show, as I think, more clearly than this, both the tenacity with which the disease sticks to its favourite time of occurrence and its essentially nervous nature. For through what but through the nervous system could such exciting causes maintain their influence suspended, and finally produce their effects after so long an interval, during which the respiratory and circulatory systems had been in a normal and tranquil condition?"* Lastly, in a form of Gastralgia, which will be described hereafter, Dr. Graves observed the same exciting influence of muscular exertion—"A walk long enough to fatigue the patient considerably never failed to bring on an attack."†

2. *Gastric or Intestinal Irritation,* whether caused by worms, fæcal accumulations, or undigested food, is one of the more widely influential of these common exciting causes of neurosal seizures. This is seen in Infantile Convulsions and

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* "On Asthma," pp. 66, 67.

† *Dublin Journal of Med. and Chem. Science,* vol. i. p. 299. 1832.

in Epilepsy. Children especially are liable to have "fits" brought on from these causes, and every one has known or heard of cases in which epilepsy has been cured by the expulsion of worms; but to make such causes operative, the convulsive neurosis must, of course, be present, though it may be latent. Professor Paget, of Cambridge, has expressed an opinion "that in many cases of epilepsy the immediate exciting cause of the fits is in the stomach, and that in some a cure can be effected by correcting the gastric disorder," and he gives at least one instance in which this plan of treatment was most successfully carried out; but he justly adds, "in very many cases we have to take into account an epileptic diathesis either congenital or acquired, in consequence of which the fits will recur, notwithstanding all our care in correcting the local exciting cause."* Tissot says—"The most common seat of the disorder in sympathetic epilepsy is the stomach. If what I have already said be remembered, that the stomach is one of the viscera which has the greatest supply of nerves, and derives them from the vagus and sympathetic, which have so great an influence over the whole machine, it will be readily understood how gastric irritation may occasion epilepsy."† Here I think that, as in the case of megrim, Tissot has over-estimated the gastric influence, and Dr. Reynolds states the case more correctly when he says—"Although an individual who is already epileptic may often reproduce his attacks by an indigestible meal, a distinct tracing of true epilepsy at its commencement to this cause is, so far as my observation extends, rare."‡

"In Angina pectoris," as Dr. Latham teaches us, "whatever be the form of the heart's disorganization upon which it essentially depends, if life be long spared, experience gradually grows upon the patient and the physician of more and more conditions conducive to the paroxysm. Sooner or later the one feels, and the other knows, that it may be

* *Lancet*, April 11 and 18, 1868.
† "Traité de l'Épilepsie," Bayle's ed., p. 278.
‡ "On Epilepsy," p. 135.

excited by the state of the stomach." "Mere dyspepsia has, in some rare instances, been the sole apparent cause conducing to the paroxysm; and extreme care in meats and drinks has postponed it so successfully and for so long a time as to induce a persuasion that the whole malady was nothing more than an intense sympathy of the heart with a disordered stomach. The late Dr. Richard Pinchard told me that his uncle, who had suffered unquestionable angina pectoris, made out distinctly that each attack was induced by disorder of the stomach. Hence it became the business of his life to take care of this organ, having before his eyes the frightful penalty he might pay for neglecting it. And he succeeded so well that for years and years he did not suffer a single paroxysm. . . . . But at length he was found dead in his library."*

Professor Trousseau says—"With some persons the first attacks of this malady have made their appearance immediately after some excess in eating or drinking; with many the paroxysms are never so violent as after a meal, even when this has been frugal, and whether it has been followed by exercise or repose."† And Sir J. Forbes observes, with reference to this disease, that any of the ordinary causes "being applied immediately after a meal, acts with much greater certainty and force; and sometimes the mere presence of a full meal in the stomach seems sufficient to excite a paroxysm."‡ This recalls the precisely similar experience of M. Piorry in the case of megrim: when the stomach was full, and only then, any use of the eyes would bring on an attack.

"One of the peculiarities of Asthma," Dr. Salter writes, "is that it may be induced by stimuli applied to remote parts; in these cases the nervous circuit is much longer and the phenomena of reflection clearer and more conspicuous. Take, for example, that most common of all the varieties of Asthma which we may call *peptic Asthma*, in

* "Lectures on Clin. Med.," vol. ii. pp. 414–416.
† "Clinique Médicale," tom. ii. pp. 445, 446.
‡ "Cyclop. of Pract. Med.," vol. i. p. 84.

which the induction or prevention of attacks is entirely controllable by the state of the digestive organs." "The frequency with which attacks of asthma may be traced to errors in diet—a debauch, a late dinner, a heavy supper—is well known. In many asthmatics the most scrupulous care is necessary in all that relates to food, and a late dinner or heavy supper will at any time bring on an attack."*

In the same way a Neuralgic paroxysm in some remote part may be excited by a casual gastric irritation in any one predisposed to such attacks. The case of Dr. Wollaston is familiar to most of us: he had eaten an ice cream, and shortly afterwards was attacked by a violent pain in his ankle; he vomited the contents of his stomach and was immediately relieved of his pain.† As I have elsewhere pointed out, he had a strong neurosal predisposition.

3. The establishment of *Puberty*, the recurrence of the *Catamenial period* in women, and the *Puerperal state*, whether we look upon them as occasions of ovarian or uterine "irritation," as is commonly done, or take that somewhat broader view of their influence which will be indicated hereafter, are kindred conditions which play a very important part in the history of various neuroses, either as the occasion of their first manifestation or subsequent recurrence. Of the influence of puberty we have already had instances when speaking of the periods of first commencement; we have still to consider the conditions of menstruation and delivery as exciting causes of nervous seizures.

To begin with Epilepsy. Catamenial epilepsy is a familiar variety of the complaint, of which so many notices and illustrations will be found in most of the treatises on the subject, that it will be scarcely necessary to do more than refer to them. Dr. Prichard's chapter on "Uterine Epilepsy" is a complete exposition of this feature in the clinical history of that disease, and Dr. Sieveking's treatise contains many valuable observations on the same point. Not many years

* "On Asthma," pp. 40, 219 (ed. 1860).
† "Lectures on Local Nervous Affections," by Sir B. C. Brodie, p. 11.

since, Sir Charles Locock gave his testimony to the prevalence of this variety of the malady in introducing the use of bromide of potassium as a remedy. He stated that many such cases came under his care, in which the attacks observed a regular return in connexion with the catamenial function, and, except under circumstances of great mental excitement, only occurred at those periods.* On this point I would more particularly direct attention to the admirable collection of epileptic cases by MM. Bouchet and Cazauvieilh, which incidentally exhibit this frequent connexion of the seizures with the catamenial period. I counted a dozen or more in which this circumstance was particularly noted, and the evidence is all the more trustworthy since the cases were collected mainly to illustrate quite another point—namely, the relations of epilepsy and insanity. These writers observe, on reviewing their cases: "All the world knows the powerful influence, physiological and pathological, which menstruation exercises on the encephalon both in health and disease; it was therefore important to inquire if in two maladies which more particularly affect that organ (viz., epilepsy and mental alienation), this connexion could be observed." The materials they have collected they justly regard as supplying an affirmative answer.†

Insanity, again, is another neurosis which in some of its forms exhibits a tendency to recurrence or exacerbation at the catamenial period. This has been noticed above in the passage we have quoted from Bouchet and Cazauvieilh. Esquirol observes of intermittent mania: "With some women the paroxysm manifests itself at each menstrual period, at each pregnancy, or at each confinement. There are some women who become maniacal every time they

* *Med. Times and Gaz.*, May, 1857, p. 525.

† "Arch. Gén. de Méd.," 1825-6, vols. ix. and x. pp. 515 and 37.

Dr. Reynolds thinks that a monthly interval is as common in men as women, and that in the latter there is no exact coincidence with the catamenial period, and hence he would seem to suggest that there is no connexion between them ("On Epilepsy," p. 149). Yet he admits elsewhere (p. 332) that it is "common enough to meet with women whose fits are more numerous during or just before the catamenial discharge." This last is precisely the sort of connexion observed in most catamenial cases, and the kind of influence for which we contend.

suckle or wean."* Elsewhere he says of the exciting causes of maniacal attacks: "Among women of all classes, the menstrual function, either when it has been established with difficulty or has become suppressed, or lastly, at its cessation at the critical period, is one of the most frequent causes of mania. . . . . The cause most to be dreaded after the state of menstruation is childbirth and suckling."† I quite agree, however, with M. Morel, who, while freely admitting that "menstruation, pregnancy, childbirth, and the painful evolution of puberty may be determining causes of insanity," nevertheless considers "that a distinction should be drawn between these physiological causes and the cause of the disease properly so called," namely, the presence of an antecedent neurosal tendency or predisposition.‡

Dr. Salter thus refers to the influence of the catamenial period in determining Asthmatic paroxysms; a monthly interval he considers pretty constantly indicative of a uterine origin—"I have never seen or heard of any cases of it well and regularly marked except in women, and in cases of what appeared to be clearly hysterical asthma. But of hysterical asthma, it is, as might be expected, the characteristic interval; and I should always, in a monthly asthma in a woman, look out for a uterine cause."§ Sir John Forbes in his treatise on asthma refers to such a case, in which the paroxysms always returned at the menstrual period during seven years.‖

But other neurosal affections also manifest a similar catamenial sympathy, although less frequently than those already mentioned. Thus some varieties of Neuralgia (besides such as are distinctly ovarian, and the different forms of neuralgic dysmenorrhœa) occasionally exhibit this character. M. Neucourt, in his valuable treatise on this subject, says the paroxysms of true facial neuralgia, as well as of cervico-occipital neuralgia, are sometimes determined by the

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* "Maladies Mentales," vol. ii. p. 169. † Idem, vol. ii. p. 381.

‡ "Traité des Maladies Mentales," par le Dr. B. A. Morel. Paris, 1860, p. 113.

§ "On Asthma," p. 93 (1st ed.). ‖ "Cyclop. of Pract. Med.," vol. i. p. 185.

menstrual period, and he gives several instances.* Dr. C. H. Parry relates a case of "true spasmodic Hiccup, exceeding in violence any disorder of the same kind he had before seen, and recurring for several years, more particularly about the periods of menstruation."† It is almost needless to add how constantly Hysterical attacks form a part of the catamenial illness; yet scarcely any one, I imagine, could now be found who regards hysteria as in any sense a uterine affection, or differing essentially in its nature from other neuroses.

I have already shown that the effect of *pregnancy* is sometimes to interrupt for the time the recurrence of an habitual megrim, and this was also Heberden's experience.‡ The same influence has been occasionally observed in other affections of the same class; Dr. Prichard relates a case of Epilepsy in which the fits returned at the monthly periods, but were arrested during pregnancy and suckling.§ Tissot relates the following:—"A woman was subject to violent attacks of epilepsy; as long as she was in the family way she only suffered from very slight seizures, but directly she was delivered the fits reappeared with the same intensity as before." M. Fabre records another instance—"A young woman, twenty-six years of age, had been attacked when twelve years old, in consequence of a severe fright, with epilepsy, and remained always subject to it afterwards. The appearance of the catamenia brought no amelioration and no increase of the malady. In the course of 1833 she became pregnant for the first time, and the attacks disappeared entirely; but at the end of two months of her pregnancy, a fall occasioned uterine contractions, hæmorrhage followed, and abortion was the result. The accouchement was scarcely over when the epileptic seizures reappeared, and continued to recur until about the end of February, 1836; when she again became enceinte. As in the first

* "Arch. Gén. de Méd.," tom. iii. (5me sér.), p. 214.

† "Mem. of Med. Soc. of Lond.," vol. iii. p. 88.

‡ "Fœminis gravidis pepercit, quas semper alias vexabat, hemicrania."—*Comment.*, cap. xvii., p. 85.

§ "Diseases of the Nerv. Syst.," Pt. i. p. 163.

pregnancy the attacks again disappeared."* Insanity also has been occasionally interrupted in a similar way: thus "Guislain and Griesinger mention a case respectively in which insanity disappeared during pregnancy, the patient at that time only being rational."† So also Dr. Conolly says of Clavus hystericus, a neurosal affection having many of the characters of megrim—"We have known it disappear entirely during pregnancy, and again become troublesome a few months after delivery."‡

4. But the local cause need not be visceral; a focus of irritation may be formed in any organ of special sense, or at any part of the sentient periphery. The instance of "teething" as an exciting cause of Spasmodic Croup and Infantile Convulsions is familiar to every one, and if we err it will probably be rather in over than under estimating this influence. Later in life carious teeth become frequent excitants of facial Neuralgia, and occasionally of more formidable nervous seizures."§ Some time since I had under my care a case of Epilepsy in a little boy, where the focus of irritation appeared to be a diffused nævus behind the angle of the lower jaw. In another, it was the strain of accommodation required to overcome a certain amount of hypermetropia in attempting to read small print: I shall have occasion to refer to this again. In a remarkable case of Asthma communicated by Dr. Chowne to Dr. Salter, the application of cold to the instep immediately produced the asthmatic condition; this was the case, for example, if by accident any cold water fell upon his instep: here great pains were taken to verify the facts.‖

Again, we have seen that in the case of megrim attacks are frequently brought on, and almost always aggravated,

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* "Bibliothèque du Médecin-Praticien," tom. ix. p. 606.

† Reynolds's "Syst. of Med.," Art. "Insanity," by H. Maudsley, vol. ii. p. 16.

‡ "Cyclop. of Pract. Med." vol. ii. p. 559.

§ See a remarkable instance of transient hemiplegia alternating with headache from this cause in Darwin's "Zoonomia," and other instances noticed by Dr. Symonds. "Gulst. Lect.," 1858, *Med. Times and Gaz.*, i. 421.

‖ "On Asthma," p. 41. (1868.)

by prolonged or powerful impressions on the organs of sense, whether by sights, sounds, or smells, and allayed by the exclusion of such stimuli—by darkness and quiet. The same effect of light, and the same relief from its exclusion, have been observed by Laennec in some forms of nervous dyspnœa and true Asthma, as well as in visceral neuralgias of the abdomen. "In such cases it is evident that the effects can only depend on the stimulation communicated to or subtracted from the brain by light; and consequently that disorder of the nervous influence simply, without any organic lesion, may give rise to dyspnœa as well as other nervous affections."* Afterwards he observes of the occasional causes of asthma, that "they are almost always of a kind to give rise to an immediate and evident disturbance of the nervous influence—of this kind are strong mental emotion; the influence of light and dark; certain odours, such as those of tuberose, heliotrope, stored apples, &c., changes of atmospheric electricity, and other less appreciable conditions of the atmosphere."†

Sir John Floyer, who was himself a sufferer from asthma, mentions strong odours as exciting the attacks: "Not only fœtid and offensive smells, but those also which are strong-scented and sweet." He also particularizes the "fœtid smell of a candle put out."‡ Laennec, also, in the foregoing passage, mentions odours among the occasional causes of asthma, and he also gives the history of an asthmatic, who, if his night-lamp went out, invariably experienced an attack.§ So, also, Dr. Parry observes of one of his cases: "In Lady C. an asthmatic paroxysm is excited by the smoke of sealing-wax."‖

Closely corresponding with what has been just said as to the influence of light and darkness on megrim and asthma, is the fact communicated to me by the late Dr. R. B. Todd, that he once cured a bad case of spasmodic wry-neck, which

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* "On Diseases of the Chest." Trans. by Sir J. Forbes (2nd ed.), p. 405.
† Idem, p. 413. ‡ "Treatise of the Asthma," pp. 73, 76.
§ "Diseases of the Chest," by Forbes, p. 413.
‖ "Unpublished Writings," vol. ii. p. 34.

had resisted treatment, by confining his patient, a lady, in a dark room; and he mentioned at the same time a similar instance which had occurred in the practice of Dr. Elliotson. The essentially neurosal character of spasmodic wry-neck is confirmed by a case of Sir Benjamin Brodie's, where this singular affection alternated in the same individual with attacks of insanity.* I shall have occasion to refer to this again.

5. The conditions of *sleeping and waking*, and more particularly the *transition* from the one to the other, as Dr. M. Hall has pointed out, are singularly influential in determining the occurrence of many neurosal paroxysms. Spasmodic Croup often awakes children from their first night-sleep. Epilepsy, as is well known, shows the same tendency with some patients: "The attacks," says Sir Thomas Watson, "are very apt to come on during the night: in the commencement of the disease they frequently are *confined* to the night; they are said to occur chiefly at the moment when the patient is sinking into sleep."† In the same way the night terrors of children, the "Oneirodynia" of Cullen and Marshall Hall, sleep-walking, nightmare, and sudden shocks through the whole frame, in all of which epileptic affinities have long been recognised, mostly occur soon after falling asleep.‡ But as in megrim so in epilepsy, "many persons habitually disposed to the malady are attacked, not on

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* "Lectures on Local Nervous Affections" (1839), p. 8.

† "Practice of Physic," vol. i. p. 635 (1871).

‡ Whytt regarded Nightmare as allied to epilepsy and produced by gastric irritation. "If epileptic fits often proceed from the stomach, why may not the Incubus which has been considered by Galen as a nocturnal or slighter epilepsy, have its seat in that part?" "The incubus generally seizes one in his first sleep, but seldom towards morning."

He thus describes his own sufferings from this disorder: "When my stomach has been out of order and troubled with wind, I have often perceived a slighter *incubus* seize me before I was fully asleep, the uneasiness of which would make me get up suddenly. As soon as I was quite awake I was generally sensible that I had been affected with a weight and uneasiness, attended with faintness and some sort of oppression or suffocation about my breast. . . . While I sat up in bed, or lay awake, I felt nothing of these symptoms, except perhaps some degree of uneasiness about my stomach; but when I was just about to fall asleep they began to return again. In this way I have often gone on for two hours or more in the beginning of the night."—*Works*, 4to, pp. 626-628.

Dr. Prichard, in his chapter *On the Intimate Connexion of Nervous*

sleeping, but immediately *on waking in the morning* from a sound sleep. Cullen admits that he finds a difficulty in explaining this curious fact;" and Dr. Good, from whose work I am quoting, suggests "that during sound sleep there is always taking place a considerable accumulation of sensorial power, and there may at times be an excess of it" —an explosive accumulation, in fact.* This, however, would not explain the former cases where the fit occurs on sinking into sleep, and to account for these an exaltation of the excito-motory function has been supposed to follow the withdrawal of the control of the higher centres. Neither explanation is quite satisfactory, but at present we are only concerned with the fact that both sleeping and waking favour the occurrence of many neurosal seizures.

A similar influence is often observed in Neuralgic affections; Sir B. Brodie gives several instances of this in his lectures on local nervous disorders; and in a case of Gastrodynia recorded by Dr. Graves, to which we have already referred, the writer observes: "Most usually the attacks commence several hours after he has been asleep, and awake him at one, two, or three o'clock in the morning. This latter circumstance confirms the conclusion that the disease is neuralgic."†

Of the Asthmatic paroxysm, Sir John Floyer says—The fit usually begins "on first waking about one or two of the clock in the night."‡ Dr. Salter considers the period of the attack in asthma among the most constant features, "which is almost always in the early morning. In nineteen cases out of twenty the dyspnœa first declares itself on the patient waking in the morning; or rather it wakes him from

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Diseases, says of sleep-walking: "Dr. Darwin was, I believe, the first who advanced the idea that somnambulism is nearly related to epilepsy; and although the suggestion seems to have been little better than conjecture,—yet it appears to point out to us the true state of the case. This is evident from some facts and observations which will be adduced in the succeeding pages." Incubus he also regards as allied both to somnambulism and epilepsy.—*Diseases of the Nervous System*, pp. 64 and 399.

* "Study of Medicine," vol. iii. pp. 541–542.

† *Dub. Jour. of Med. and Chem. Science*, vol. i. 1832, p. 299.

‡ "A Treatise of the Asthma," p. 8.

his sleep when he has had but half a night's rest." "How essentially characteristic of the disease this occurrence of the attack in the early morning is—how inherently a part of it—is shown by the fact that, in the great majority of cases, at this time alone will the attacks come on, at whatever time in the twenty-four hours the exciting cause may be applied."* Trousseau, himself a sufferer from hereditary asthma, says: "My fits used to return about three o'clock in the morning. I was then invariably awakened by a sense of oppression, and heard my clock strike three." He gives other illustrations of this occurrence in the early morning, generally about one or two o'clock.† Dr. Salter, however, records a remarkable instance of this malady where sleep, as in the case of megrim, appeared to dissipate the paroxysm. For this purpose the patient was accustomed to inhale chloroform, which only relieved her when it produced sleep, and this it did only near her usual sleeping time. "This curious fact," says Dr. Salter, "is consistent with another fact in this lady's case, and probably depends upon it—that she never has asthma when she is asleep, and that if she has asthma and can in any way get to sleep, her asthma is sure to cease: so, on the other hand, she is never awoke by asthma, like other asthmatics, but wakes free, her morning asthma appearing *immediately after* she is awake, and the time that it comes on depending entirely upon the time she wakes."‡

In the case of Angina pectoris, Dr. Heberden observed in some patients a tendency of the paroxysms "to come on at night, just after the first sleep, at which time," as he says, "the incubus, convulsive asthmas, numbnesses, epilepsy, hypochondriac languors, and other ills justly attributed to the disturbed functions of the nerves, are peculiarly apt either to return or to be aggravated."§ Sir J. Forbes

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* "On Asthma" (1st ed.), pp. 63, 66.
† "Clinique Médicale," tom. ii. p. 375.
‡ "On Asthma" (2nd ed.), p. 228.
§ "Some Account of a Disorder of the Breast;" "Medical Trans. of College of Physicians," vol. ii. p. 65. Read July 21, 1768.

endorses this in his treatise on the same affection: "In certain cases the attacks occur most frequently at night, on the patient awaking from sleep, as is so frequently the case with paroxysms of asthma."* So we find in Dr. Black's case of angina pectoris, that the patient became subject to night paroxysms of a very severe kind. M. Trousseau also records the case of a gentleman, where the paroxysms recurred about 1 A.M., several occurring in succession. "Now," asks the Professor, "do not these nocturnal attacks remind you of fits of asthma, at least as regards the evolution of the phenomena?"†

6. I shall next refer to states of *passion* and *mental emotion* as exciting causes of the seizures in very many neuroses. Maisonneuve relates 19 cases in which "fright" was assigned as an exciting cause of Epilepsy; and out of 67 cases of the same malady observed by Leuret, the first symptoms of the disease showed themselves after a fright in 35.‡ Dr. Reynolds says—"Among my own cases terror has been the occasion of epileptic seizures; but more frequently they have followed continued anxiety and prolonged rather than intense alarm."§ Trousseau states that—"Among the occasional causes of epilepsy the influence of fear can be denied by no one; every physician has noticed it; for my own part I have been able on more than one occasion to verify the fact which I admit, guarding myself at the same time against exaggerating its frequency, or believing it as common as patients or their friends represent it."‖ In the same way, where the convulsive tendency is strongly developed, especially in children, a fit of passion may be quite sufficient to determine a recurrence of the attack. The last named author relates that "a ricketty child was one day brought to him at the Necker Hospital subject to epileptiform convulsions, which for the last few months had recurred several times a day under the least fit of anger."¶

* "Cyclop. of Pract. Med.," vol. i. p. 84.

† "Clinque Médicale," tom. ii. p. 442; see also Fothergill, "Med. Obs. and Inq.," vol. v.

‡ "Arch. Gén. de Méd.," 1843. § "Epilepsy," p. 135.

‖ "Clin. Méd.," tom. ii. p. 51. ¶ Idem, p. 127.

In Angina pectoris again, "the influence which the passionate affections of the mind have over the return of the paroxysms," to use Heberden's words, who first identified the disease, is very remarkable, and he assigns this as one of the reasons which led him to regard the malady as belonging to the spasmodic group of disorders.* In one of the cases of this affection recorded by Jurine, among other exciting causes it is stated that "a more or less severe attack was sure to supervene if the patient gave way to a fit of anger, which was only too common with him, so that it was no very rare thing to see four or five seizures produced in the course of the day."† John Hunter's case affords another illustration of the same influence; and he appears ultimately to have died suddenly in consequence of a paroxysm brought on by an annoying communication made to him under circumstances which induced him strongly to repress his feelings. As Dr. Latham truly says—"A man may resolve never to move from his chair, but cannot resolve never to be angry. Thus many a subject of angina pectoris, who, by skilfully measuring and limiting the movements of his body by what he can bear, has been able to abate the frequency and severity of the paroxysms, and so to prolong his life for years, has in an unhappy moment been surprised into anger and died at once. And so I believe that in angina pectoris death has followed mental excitement more frequently than bodily excitement. The latter may indeed be the more potential cause of the paroxysm, but the former it is more difficult to guard against."‡

The effect of mental emotion in inducing an attack of Asthma as well as some other nervous affections was long ago noticed by Robert Whytt. "As hysteric fits and spasmodic cholics are often occasioned by violent affections of the mind, so," he says, "I have known sudden fear

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* "Med. Transac.," vol. ii. p. 64; and "Comment.," p. 312: "Tum, perturbatione animi augetur."

† "Mémoire sur l'Angine de Poitrine," p. 242. Paris, 1815.

‡ "Lectures on Clin. Med.," vol. ii. p. 413.

bring on an asthmatic paroxysm in a woman who was subject to frequent attacks of the disease."* Laennec also mentions "strong mental emotion" among the exciting causes of the asthmatic paroxysm, and he adds—"Many persons of a delicate and mobile constitution cannot sustain a lively emotion, whether from physical or moral causes, without being immediately seized with intense dyspnœa; and, indeed, this is the only form which the nervous attack assumes in many women."† Dr. Th. Thompson informed Dr. Salter of a case in which severe asthma was on two occasions brought on in a gentleman by sudden fear—the fear of having, as he imagined, administered accidentally an overdose of belladonna to his wife. Dr. Salter mentions also the case of an asthmatic boy who required to be frequently reminded by his parents not to over excite himself as, if he did, he would be sure to have asthma; and of another who found in his complaint a convenient immunity from correction; "Don't scold me," he would say, if he had incurred his father's displeasure, "or I shall have the asthma;" and so he would.‡ The former of these cases calls to my mind one of epilepsy related by Sir Thomas Watson in his lectures, where the patient was "a young girl in whom the occurrence of very high spirits was always premonitory of the paroxysms. When this extreme vivacity was moderated by those about her the threatened fit was sometimes averted."§

It will occur to every one that fright is the most commonly assigned exciting cause of Chorea, and although the popular estimate of its influence is probably greatly exaggerated, yet Dr. Hughes, who took the pains to inquire carefully into a large number of cases, saw no reason to doubt its real influence in a great many instances, and Dr. Babington held the same opinion.‖ Moreover, as is

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* "Works," 4to, p. 603. 1768.

† "Diseases of the Chest," p. 404 and 413. ‡ "On Asthma," p. 26.

§ "Practice of Physic," i. 665.

‖ "Cases of Chorea," by H. M. Hughes, M.D.; *Guy's Hosp. Reps.*, 2nd ser., vol. iv. p. 374.

well known, the least emotion will at any time serve to aggravate the malady, and bring on a severe paroxysm of convulsive movements. It was this aspect of chorea, no doubt, which principally led Dr. Marshall Hall to regard it as a disorder of the "centre of emotion." I may observe that the influence of fear more particularly, as an exciting cause of neurosal attacks in children, whether epileptic or choreic, need not surprise us, as it is one of the most frequent and serious emotions to which children are liable.

I cannot leave this subject of emotion as a cause of various nervous affections without observing that it may be in part a symptom as well as a cause. One effect of the neurosal disposition itself is in some cases greatly to exaggerate the tendency to particular emotions. A child, for instance, with a tendency to epilepsy or chorea may be more easily moved and experience a much more violent emotion from a given cause of fright than another, and a man with a tendency to angina pectoris may be much more irritable and passionate than another. This indeed may be carried so far that the emotional phenomena may be developed subjectively without any outward occasion, as in the "night terrors" of children, and the "causeless fear" of epileptics.

7. We have seen that the condition of *fasting or hunger*, independently of any considerable exhaustion from prolonged abstinence, has been recognised in a few instances as an exciting cause of megrim by sufferers from that affection (see page 50). In one of Jurine's patients the most formidable attacks of Angina pectoris were traced to this cause, and the paroxysms continued to recur with great frequency unless he immediately took some food.* Dr. Radcliffe says of epilepsy: "After muscular fatigue, I would lay most stress on abstinence as an exciting cause. Epileptics, so far as my experience goes, bear abstinence ill, and I have often been surprised at the rapid way in which they become faint if

* Trousseau's "Clinique Médicale," tom. ii. p. 450.

they are kept waiting beyond the time of their accustomed meal."*

8. Lastly, there are some healthy persons of highly nervous organization and great sensitiveness, who find their whole moral character and disposition very sensibly affected by *atmospheric changes* for which no intelligible explanation can be assigned; it need therefore excite no surprise, however inexplicable, that similar conditions should have a disturbing effect on a nervous system already prone to morbid activity in some of its functions; and such appears in fact to be the case. It will be remembered that similar influences have been very frequently mentioned as exciting causes of megrim, and that in a large portion of Dr. Symond's cases of headache, the patients assigned "thunder" as a cause. "Of atmospheric conditions, it is probable that several are capable of exciting an attack of Nervous Headache; but there are two conditions well known in their relation to the production of this pain—namely, the atmosphere which precedes and accompanies

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* Van Swieten also reckons *Hunger* among the exciting causes of epileptic fits (*Com. ap. Boerhaave*, § 1075); and it is not a little interesting to find the same influence noted by Galen seventeen hundred years ago. In an admirable description of a case of gastric epilepsy, which has many interesting features, he states that, among other causes, whenever the patient, who was a schoolmaster, fasted too long, he was seized with a fit. Galen accordingly advised that he should anticipate the occurrence by taking some bread at a certain hour. This was done and warded off the fits, which in course of time were cured; yet he afterwards remained subject to a very transient convulsion if his business obliged him to fast longer than usual.

Galen's words are:—*Νεανίσκος τις ἠλίσκετο τῷ τῆς ἐπιληψίας πάθει γραμματικὸς, ἡ νίκα μάλιστα σφοδροτερον ἐδιδασκεν, ἢ ἐφρόντισεν, ἢ ἐπιπλέον ἠσίτησεν, ἢ ἐθυμωθη. τούτῳ τό στόμα τῆς κοιλίας ὑπενοησα πασχειν, εὐαίσθητον ὑπάρχον, ἐφ' ᾧ κατὰ συμπάθειαν τὸν ἐγκέφαλον ὅλον τὸ σῶμα κραδαίνειν σπασμωδῶς. ἐκελευσα τοιγαροῦν εὐπεψιας μόνης αὐτὸν ἀκριβοῦς προνοεῖσθαι, τρίτης δ' ὥρας ἢ τετάρτης ἄρτον ἐπιμελῶς ἐσκευασμένον προσφέρεσθαι. . . . . ὡς δὲ τοῦτ' αὐτῷ πραττοντι συνέβαινε μηδεν πάσχειν, ἀκριβῆ τε γνῶσιν εἶχον ὧν ἐστοχαζόμην ἔμπροσθεν . . . . ἔτεσιν οὗτος ὁ ἀνὴρ οἷς ἐπεβίω πλέοσι τῶν εἴκοσι, ὑγιαίνων ἀμέμπτως διετέλεσεν. εἰ δε που σπανίως ὑπὸ περιστάσεως πραγμάτων ἄσιτος ἠναγκάσθη διατεθῆναι, συνέβαινεν ἁλισκεσθαι βραχύτατοις αὐτον σπασμοῖς.—De loc. affect.*, lib. v. cap. vi.

Does not this recall the very similar experience of Tissot in a case of megrim?—"Je connais un autre homme qui s'en est guéri en soupant, et en tenant toujours du pain dans sa poche, pour prendre dès qu'il sentait quelque rongement d'estomac."—"Traité des Nerfs," p. 386.

thunder, and that which precedes a fall of snow."* So Fothergill and Trousseau mention "atmospheric changes" among the determining causes of the paroxysms in Angina pectoris ;† and one of Jurine's patients stated that "thunder," which he used to hear with a certain pleasure, now occasioned him great distress.‡

Laennec also states "changes of the atmospheric electricity and the less appreciable conditions of the atmosphere" to be exciting causes of Asthma ;§ and Salter says : "I have notes of as many, I should think, as six cases in which the connexion between *thunder* and asthma was well marked."‖ Elsewhere he mentions "some inappreciable quality of the air as one of the commonest exciting causes of asthma. In some cases change of air is the great thing. This is often felt at first going to a place, and only at first. In another set of cases changes of weather without change of place seem sufficient to excite asthma ; even change of wind. In some of my cases the special winds are mentioned ; in one it will be E., in another S.E., in another any high wind, in another any cold wind."¶ In one of his autograph cases the patient observes : "Another primary cause of asthma with me is change of air. That this produces my asthma I know from the fact, that attacks have often occurred for the first few days or weeks after arriving at a place, where, during a former residence, and subsequently when the effect of the change has passed off, I was as free from all trace of the complaint as I have ever been."**

This recalls Dr. Airy's experience, who suffered several attacks of his blind megrim on first going into the country (see page 56) ; and I am acquainted with a lady in whom the same thing occurs. It may well be that there are subtle agencies at work in such instances, of which a morbidly sensitive nervous system, of the kind now referred to, is the only test we at present possess, and this would seem to be

* *Med. Times*, 1858, vol. i. p. 396 ; "Gulstonian Lectures."
† "Med. Obs. and Inq.," vol. v. ;—"Clin. Méd.," tom. ii. p. 445.
‡ "Mémoire sur l'Angine de Poitrine," p. 242. Paris, 1815.
§ "On Diseases of the Chest," by Forbes, p. 413.
‖ "On Asthma," p. 96 (ed. 1868). ¶ Id. p. 138. ** Id. p. 380.

confirmed by those singular instances of "cat syncope" described by some authors,* and of "cat asthma" and other analogous cases by Dr. Salter, which, if they were not well authenticated, it would be difficult to believe.

I now venture to think that any one who has had the patience to follow me through the preceding part of this chapter, and who will be at the further pains to compare the common characters of the neurosal family, which I have there endeavoured to establish, with the general features of megrim set forth in the second chapter, can hardly fail to see how strictly megrim itself conforms to the family type. We have, in the broad, the same functional character; similar determinate relations with respect to ages and sexes; the same frequency of hereditary transmission and hereditary metamorphosis; the strictly paroxysmal and culminating character of the seizures in most instances; their intermission, with intervals of health, and often an approximately periodical or regular return; and, lastly, precisely the same variety of influences operating as exciting or occasional causes of the seizures. I may further remind the reader that, in discussing the special phenomena of the paroxysm in the preceding chapter, I took occasion to point out, as opportunity offered, that even here the analogy with other neuroses is often apparent, several of the phenomena occurring in other forms of nervous seizure as well as in megrim; such are the sense of fear, the drowsiness, and the diuresis. Another class of facts remain which exhibit this affinity in a yet stronger light, and these we must now consider.

Neurosal Equivalency and Transformations.

We have already shown that the metamorphosis of a neurosis in the course of hereditary transmission is of frequent occurrence, but a similar transformation is occasionally met with *in the same individual,* one form of seizure being replaced temporarily or permanently by another. This is, no doubt, exceptional, but still it occurs sufficiently often to

* See Kaau Boerhaave, "Impet. faciens," § 409.

exclude the notion of a mere accidental succession, while the operation of the same principle may be traced through the whole range of nervous disorders from the lowest to the highest—from a simple respiratory neurosis like sneezing or hiccup to the more formidable types of epilepsy and mania.

In a well-known treatise by the celebrated Dr. Cheyne, I find the following passage, which shows how conscious he was, as a student of nervous disorders, of that close affinity between them to which we refer. "All nervous distemper whatsoever," he writes, "from yawning and stretching up to a mortal fit of an apoplexy, seems to me to be but one continued disorder, or the several steps or degrees of it."* Much more recently, Dr. Prichard described and illustrated the convertibility and alternation of such affections at some length as a result of his own observations. "It would appear," he says, "that many of the disorders of the nervous system are more nearly connected with respect to their causes and the morbid conditions in which they consist, than most of the disorders that are classed together in other departments of nosology. This remark will be illustrated by observing the mutual relations of some of these disorders, their successions, and their conversions into each other."† In fact he regarded apoplectiform neuroses, or inorganic apoplexies as they were called, epilepsy, mania, vertigo, chorea, transient amaurosis, somnambulism, and the like, as closely allied and interchangeable morbid conditions. Dr. Parry, again, to whose writings we have had occasion so frequently to refer, observes that such transformations are common enough, and a variety of instances which at different times came under his notice will be found in his works.‡ He finds the explanation of this connexion in his theory of these diseases, regarding them all alike as the result of a "determination of blood" in different degrees and to different parts of the brain.

The late Dr. Marshall Hall took a similar view of the

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* "The English Malady," chap. iii. p. 14 (1733).

† "Diseases of the Nervous System," Pt. i. pp. 58 and 66 (1822).

‡ "Elements of Path. and Therap.," vol. i. p. 307; also "Unpublished Writings," *passim*.

near affinity and convertibility of such paroxysmal nervous affections, and in the Croonian Lectures for 1851 he makes use of the observed facts to support his favourite mechanical theory of venous compression. "Every fact," he observes, "leads to the inevitable conclusion that the apoplectic, paralytic, epileptic, and maniacal affections are all allied intimately together." . . . . "The same remarks relate to puerperal cases: convulsions, apoplexy, paralysis, mania, are so linked together that they may not only occur singly, but in various successions before, during, or after parturition. The difference is, in reality, but the difference of vein compressed."*

Take, again, the following extract from the writings of another living authority. Dr. Brown-Séquard says—"Other affections very often have the same characteristic features as epilepsy as regards their production. If I had time I could relate a very large number of facts to prove that, much more frequently than might be imagined by most of my hearers, the various forms of insanity, of vertigo, of hallucinations, and of illusions, and also ecstasies, catalepsy, hysteria, chorea, hydrophobia, tetanus, local cramps, and even the general paralysis connected with insanity, may be due to irritation starting from a centripetal nerve, and frequently slightly felt, or even unfelt."† Here, again, we have the same fundamental affinity exhibited in connexion with a doctrine of peripheral irritation and vaso-motor reflection, which we shall hereafter discuss.

My object in giving the foregoing extracts has been to show that, notwithstanding much diversity in the interpretation of the facts, the existence of an intimate relationship between the various forms of nervous disorder, and their occasional convertibility, have been very generally recognised by successive generations of pathologists who have made those disorders their study. I shall hereafter give my

* "Croonian Lectures for 1851." Lect. ii. p. 46, §§ 184, 185.

† "Lectures on the Physiol. and Pathol. of the Central Nervous Syst.," delivered in the Coll. of Surgs. Engl., May 1858. Philadelphia, 1860; p. 185.

reasons for believing that the explanation of this connexion is to be found in the original constitution of the central nervous system, and in the different endowments and functional connexion of its parts, rather than in any accidental circumstances of peripheral irritation or varying blood-supply. Whatever share the latter may have in the production of the phenomena, they can only be regarded as secondary and subordinate causes.

But let us proceed to some particular illustrations of neurosal metamorphosis. "There is much and powerful evidence," writes Dr. Sieveking, "to show that Epilepsy belongs to a group of affections which are closely allied to one another, and hence exhibit many transitional forms which have given rise to confusion in the minds of medical men. The eclampsia of early childhood, laryngismus or spasm of the glottis, may be especially mentioned as belonging to the same category as epilepsy;"* and he proceeds to give instances of the succession of infantile convulsions, spasmodic croup, and epilepsy in the same individuals. It may be said, perhaps, that such cases are merely instances of the same disease in different degrees of development, and not of conversion. They are, no doubt, a manifestation of the same neurosal tendency under forms corresponding to the particular periods of bodily evolution, but they are not the same disease, and probably differ as much as other neuroses—epilepsy and asthma, for instance, which no one confounds.

A somewhat similar distinction should, I think, be drawn between the so-called minor and major epilepsy: it is a mistake to confound these under one name, unless we make that name far more comprehensive; for though intimately connected and exhibiting transitional forms, they yet differ quite as much as some other neurosal affections having distinct designations: they are, like them, I believe, different localizations of the same pathological tendency of the nervous system. In support of this I would recall the fact, first

* "On Epilepsy," p. 213. London, 1861.

pointed out by Esquirol, and generally admitted since, that transient epileptic vertigo is more damaging to the intellectual faculties than the far more violent and formidable fits of major epilepsy ;* and that the observed connexion between the two is not of that kind or constancy which we should expect it to be on the supposition that the one is only an incomplete form of the other. Hence it is at least a question whether it might not be more correct to consider the two disorders as distinct, and to regard the fact of their association or succession in the same individual as an instance of that metamorphosis of neuroses of which we are speaking, and which holds good in different degrees for all the members of the neurosal family, reaching its maximum in those which have an hysterical basis. M. Trousseau in one of his lectures, referring to a case of so-called partial epilepsy, where the patient, having been at first regularly epileptic, afterwards suffered only from epileptic vertigo, and occasionally from convulsions limited to the face without vertigo, observes—"Before going further, let me direct your attention to this *transformation* of epilepsy—an occurrence long since pointed out by medical men who have given their attention to the subject, by Calmeil among others. I would have you observe, however, that these pathologists have especially indicated the transformation of the *petit mal* into the *grand mal,* whilst in the case of the young man before us the reverse of this has occurred, the severer convulsive affection having preceded the vertiginous form."†

But to proceed to another illustration. Epilepsy and Asthma are occasionally observed to be interchangeable affections. Dr. Salter has recorded the following remarkable instance. "The patient was a man about fifty years of age, subject to epilepsy. His fits had certain well known pre-

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* "Les vertiges ont une influence plus active, plus énergique sur le cerveau que ce qu'on appelle le grand mal, ou l'accès complet."—"Traité des Maladies Ment.," tom. i. p. 288. See also Foville, "Dict. de Méd. et de Chir.," Art. "Epilepsy;" and Morel, "Études Cliniques," tom. i. p. 320.

† "Clinique Médicale," tom. ii. p. 38.

monitory symptoms and occurred with tolerable regularity, I think about once a fortnight. On one occasion his medical attendant was sent for in haste and found him suffering from violent asthma; the account given by his friends was, that at the usual time at which he had expected the fit he had experienced the accustomed premonitory symptoms, but instead of these being followed as usual by the convulsions, this violent dyspnœa had come on. Within a few hours the dyspnœa went off, and left him as well as usual. At the expiration of the accustomed interval after this attack, the ordinary premonitory symptoms and the usual epileptic fit occurred. On several occasions this was repeated, the epileptic seizure being as it were supplanted by the asthmatic."* After citing this instance Dr. Sieveking observes—"While these sheets are passing through the press a closely analogous case occurring in an elderly lady has been under my care."†

Of Chorea, another affection belonging to the motor group, Dr. Radcliffe says—"How far the occurrence of chorea implies a tendency to other disorders of the nervous system, especially to Epilepsy, is a question which has not hitherto been fully entertained, and I cannot supply an answer from actual statistics. But this I may say—that I have *frequently* met with epileptic patients who were choreic at one period of their life, and that the impression left on my mind from what I have seen is, that the chances of chorea being followed sooner or later by some other disease of the nervous system are too much made light of."‡ Sometimes chorea is replaced by a form of Insanity: after remarking on the general immunity of children from the latter neurosis, Dr. Maudsley adds—"But we do meet some-

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* "On Asthma," p. 44. † "On Epilepsy," p. 218.

‡ Reynolds's "Syst. of Med.," vol. ii. p. 125 (1st ed.), Art. "Chorea," by C. B. Radcliffe, M.D.

Dr. Handfield Jones has recorded a case of incomplete epilepsy in a child which gave place to chorea:—"The convulsive attacks were evidently of epileptic character, and yet differed much from true epilepsy, especially in the retention of consciousness. The transmutation of the malady into chorea is a point of much interest, marking the affinity which exists between the several neuroses."—"On Functional Nervous Disorders," p. 292.

times in older children with a general acute mania, occurring usually in connexion with chorea or epilepsy, and presenting the symptoms, if I may so express it, of a mental chorea or an epilepsy of the mind; but without the spasmodic or convulsive movements of those diseases. . . . . Besides the imbecility and occasional violent delirium attending chorea, there are other cases in which, without choreic disorder of movements, there is a *choreic mania;* it is an active delirium of ideas which is the counterpart of the usual delirium of movements, and its automatic character and its marked incoherence are striking enough to an ordinary observer."*

Hooping-cough is another malady which not unfrequently exhibits a like tendency to metamorphosis in the character of its paroxysms. Thus, many years ago, I attended a family of children affected with this disorder, and in two members of the family, after suffering a short time in the usual way, the characteristic seizures were replaced by violent paroxysms of sneezing, which continued to recur until the end of the complaint; and I have recently observed precisely the same substitution in another case. Dr. Gairdner has also recorded a singular instance in which this convulsive cough appears to have been replaced in an adult by attacks of prolonged spasm of the glottis not unlike spasmodic croup. "The patient was a gentleman, thirty-five years of age, of good general health. While hooping-cough was prevalent in his family, he was himself attacked by the malady in its usual form. After it had lasted some weeks the fits of cough were replaced by the following remarkable seizures: He was attacked with difficulty of breathing, attended by a sense of constriction about the upper part of the trachea, so sudden and violent as to cause the greatest alarm. The duration was about a quarter of an hour; when the suffocation passed off, a distressing sensation still remained at the chest. After the first, these seizures recurred generally, but not always, at night; at first they were every two days, but then became less fre-

* "Gulstonian Lectures" for 1870, by Henry Maudsley, M.D., pp. 68-9.

quent, and after about two months the interval was a week or ten days, then longer, but it was not until the fourth month from their commencement that they ceased altogether."* This case calls to mind those instances of "Laryngeal Epilepsy" which are occasionally met with in adults, and closely resemble the spasmodic croup of infants. I shall have occasion to notice some instances of this by-and-by. I will only add that the transition from a paroxysm of hooping-cough to one of epilepsy or asthma is sufficiently easy, and pertussis has not unfrequently been the exciting cause of the latter affections. Dr. Reynolds mentions an instance of "the passage of an attack of pertussis into a complete convulsion with loss of consciousness,"† and Dr. Salter refers to the same complaint as a frequent point of departure for asthma.

Turning now to some forms of painful neurosis—Neuralgias, in fact—we find much the same interchangeable character maintained as in the spasmodic forms. "Those who have watched the varying phenomena of neuroses with care," says Dr. Sieveking, "will often have observed cases of metastasis, which are no less surprising than instructive. I speak not merely of the pains occurring in hysterical females, that pass rapidly from one part to another, but of definite affections of one class or set of nerves subsiding on the approach of a similar or different affection in the range of another set of nerves. A short time ago I attended a lady, previously subject to intense pharyngeal neuralgia, for an intercostal neuralgia simulating pleurisy. The former malady had entirely disappeared on the occurrence of the latter. In the course of my career I have seen many cases which appeared to me to support the same view, and the above case may bear an interpretation of the same kind."‡

Sir B. Brodie, in his treatise on local nervous affections, records a striking instance:—"A gentleman laboured under a most severe pain referred to the left side of the

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* "Ed. Med. and Surg. Jour.," vol. xliii. p. 257. † "On Epilepsy," p. 52.
‡ "On Epilepsy," p. 218 (2nd ed.), 1861.

face, to which those whom he consulted gave the name of Tic Douloureux. While under the influence of the pain he was suddenly seized with a pain in the calf of the left leg, having precisely the same character with that he experienced before in the face. When the pain in the leg attacked him that in the face did not subside altogether, but it abated so much that he suffered little or no inconvenience from it. At the end of a few days, as the pain left the leg, it returned with its usual severity in the face."*

M. F. Neucourt in his treatise on neuralgia records numerous instances of a similar kind, to which he appends these general remarks :—"One cannot but be struck, in cases of Facial Neuralgia, by observing that the affection is often preceded, accompanied, or followed by violent pains in the stomach (gastralgia) or in the side (pleurodynia), neck, loins, &c., and this succession of painful phenomena in different parts occurs too frequently to be regarded as a mere coincidence."† And again, when summing up the results of his observations on neuralgia of the scalp—"As to its relation with pain in other parts of the body, I have found it alternate three times with gastralgia, once with true facial neuralgia, once with intercostal, lumbar, and uterine neuralgia, and once with palpitations."‡ Numerous illustrations of these alternations will be found in the work.§

In other cases these same neuralgic affections are found to alternate with convulsive ones. Dr. Copland long since pointed out that—"Epilepsy and convulsive or spasmodic affections are often the external manifestations of the same lesion which occasions Neuralgia—the one alternating with, or to a certain extent accompanying the other. Indeed the same local lesion which produces intense pain may, in a different grade, or as it extends to the nerves of motion, occasion spasm or convulsion." And again he says—"A considerable practical knowledge of neuralgic affections has

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* "Lectures on Local Nervous Affections," p. 8.
† "Arch. Gén. de Méd.," sér. 5, tom. ii. p. 413.
‡ "Arch. Gén. de Méd.," sér. 5, vol. iii. p. 202. § Idem, p. 210.

convinced me that some severe visceral disease, or an apoplectic, epileptic, or paralytic seizure not unfrequently supervenes on the suppression of a neuralgic affection."* Dr. Tweedie has made a similar observation—"We have known an inveterate Asthma which had existed for years superseded by Tic douloureux."†

A similar transformation or replacement has been sometimes observed in connexion with Angina pectoris. Dr. Anstie has recorded a case of that malady in a gentleman who had previously been a sufferer for twenty years from attacks of spasmodic asthma and facial neuralgia.‡ Lately Professor Trousseau has shown that the same most painful and distressing neurosis may replace epilepsy. "There is," he says, "one predisposing cause of angina pectoris, very indisputable in my opinion, which, however, I have not seen noticed by any one, but which I have already pointed out to you: this cause is *epilepsy*. In certain cases, and perhaps in a considerable number, to judge by my own experience, angina pectoris is one expression of this formidable and cruel malady—it is a modification of its vertiginous form; it is, in two words, an epileptiform neuralgia. It has the same abrupt invasion, rapid progress, and sudden cessation, and, as I have already told you, it is not very uncommon for patients who have formerly suffered from paroxysms of angina pectoris to be afterwards attacked with true epileptic fits, just as, in other instances, angina pectoris may have been preceded at a former period by well-marked epileptiform seizures. Such a case has again recently occurred in my practice:—A man, forty-five years of age, who was subject to epileptic attacks, had experienced during the last six months certain phenomena of which he gave me the following account. After exercise of a somewhat violent kind, running quickly, he suddenly experienced a painful sense of oppression; during the last

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* "Dictionary of Medicine," Art. "Neuralgia," vol. ii. pp. 887 and 889.

† "System of Practical Medicine," p. 5.

‡ "Report of Proceed. of Clin. Soc. of Lond.," *Brit. Med. Journ.*, Feb. 26, 1870.

month these symptoms had recurred spontaneously three times a day, even when he was at rest, and had assumed a very intense character. They consisted at that time in violent pains, occupying at first the front of the chest on the right side, like a sort of breastplate; then, after the lapse of a minute, they radiated into the corresponding arm, which became numb, very painful, and of higher temperature than the left one. This attack lasted nearly a quarter of an hour, and then ceased entirely. At the outset there was an abundant secretion of intestinal gas. In other respects this person's health was perfect: his appetite good, all the digestive processes regular, ... and I could detect no symptom and no sign of organic lesion, either of the lungs or circulatory apparatus."*

Spasmodic Colick, or Gastralgia, is another variety of neuralgic affection in connexion with which a similar metamorphosis not unfrequently occurs. Dr. Salter records a case of true asthma where the patient had suffered from childhood, and the malady was a family complaint. The paroxysms exhibited some interesting features, such as being excited occasionally by laughter, and attended by a profuse secretion of urine like pump-water. For twelve years the attacks had been regularly periodic, when, on the patient's coming to London, they ceased; but the point of especial interest is, that from the time the asthma disappeared he became liable to occasional violent fits of spasmodic colick.†

The strict conformity of this sort of colick or gastralgia to the neurosal type, although often regarded merely as a form of dyspepsia, is well established, and was long since pointed out by Dr. Graves. "In some cases," he says, "its neuralgic nature is sufficiently evident, for the attack of pain is often suddenly produced by something affecting the nervous system—as anxiety, alarm, anger, &c.; and its commencement in such cases appears at times totally unconnected with any previous derangement in the act of digestion.

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* "Clinique Médicale," tom. ii. p. 444 (2me ed.), 1865.
† "On Asthma," p. 299, and "Appendix," p. 357.

In the case of a medical man of eminence who lately consulted me, the pain is for the most part induced by the causes just enumerated; is sudden in its appearance, and when it subsides leaves no trace behind. This is the more remarkable as the pain he suffers is excruciating. The duration is generally from four to five hours. Though the chief exciting cause is any violent impression on the nervous system, yet certain articles of diet which disagree with the stomach also produce pain." Fatigue is mentioned as another cause. "Most usually the attacks commence several hours after he has been asleep, and awake him at one, two, or three o'clock. This latter circumstance confirms the conclusion that the disease is neuralgic."*

Valleix relates the following case in support of the same view:—"A young man, subject to attacks of facial neuralgia, was seized, towards the close of January, 1841, with darting pains in the right temple, which soon spread towards the opposite side. One evening, while his face was red, cold compresses were applied to the forehead: in the course of five minutes the pain in the head had abated, and at the expiration of three or four minutes more, entirely disappeared. At the same time a sense of oppression was felt in the epigastrium; then, suddenly, agonizing pains set in in the same region, accompanied with a sense of suffocation, painful efforts to vomit, and the escape of gas from time to time from the mouth. These critical symptoms lasted an hour or two. It is important to add that some months before he had experienced an identically similar attack."†

Lastly, some forms of Mental Derangement not unfrequently arise from a similar neurosal transformation. I have already referred to this occurrence in connexion with chorea, but it is much more common in the history of epilepsy. It is a well-known fact that an epileptic fit is frequently followed by an attack of violent, though transient, mania, and few now imagine that this is an effect of any cerebral congestion which the fit may occasion; but

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* "Dublin Journ. of Med. and Chem. Science," vol. i. p. 298.
† "Traité des Névralgies," p. 703. Paris, 1841.

quite apart from this, very similar insane paroxysms may alternate with, replace, or be replaced by epileptic seizures. "In some cases," says Professor Trousseau, "these cerebral phenomena seem to be the only manifestation of epilepsy. This chapter in the history of epilepsy has within the last few years been the subject of special study, and has given rise to numerous memoirs, among which I shall mention that of M. Jules Falret."* Some recent observations by Dr. Maudsley have an exactly similar bearing. "Sometimes," he says, "an outbreak of mania precedes or takes the place of an epileptic attack; and it may happen that a painful form of moral derangement with periodical exacerbations—a masked epilepsy—precedes for months the appearance of genuine epileptic convulsions."† And again—"In children, as in adults, a brief attack of violent mania, a genuine *mania transitoria*, may precede, or follow, or take the place of an epileptic fit; in the latter case being a masked epilepsy. Children of three or four years of age are sometimes seized with attacks of violent shrieking, desperate stubbornness, or furious rage, when they bite, tear, kick, and do all the destruction they can; these seizures, which are a sort of vicarious epilepsy, come on periodically, and may either pass in the course of a few months into regular epilepsy, or may alternate with it."‡

Sir B. Brodie, in the lectures to which I have before referred, records some remarkable instances of the alternation of other nervous disorders with insanity. "A lady," he writes, "became affected with a spasmodic affection of the sterno-cleido-mastoid muscle, producing what is commonly called a Spasmodic Wry-neck. This symptom continued unabated for a year, and then suddenly left her, but as the spasm in the muscle ceased, she fell into a state of mental depression amounting to insanity; and in this she continued

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* "Clin. Méd.," tom. ii. p. 67. "Dans ces circonstances," says M. Falret, "le délire épileptique se substitue en quelque sorte aux convulsions épileptiques, et n'est, pour ainsi dire, qu'une autre manifestation de la même maladie, sous une forme différente."—*Arch. Gén. de Méd.*, 5me Sér. tom. xvi. 1860. p. 679, etc.

† Reynolds's "Syst. of Med.," Art. "Insanity," vol. ii. p. 15.

‡ "Gulstonian Lectures for 1870," p. 69.

during the whole of the second year. At the end of this period she recovered of the disordered condition of her mind, and the spasm of the muscle returned, continuing from that period up to the time of my being consulted three or four years afterwards." "I was consulted," he adds, "by another lady, in whom a neuralgic affection of the spine alternated with insanity."*

I shall conclude these remarks in the words of a distinguished French alienist, M. Morel (de St. Yon) :—"J'ajouterai même, pour mieux faire comprendre ma pensée, que toutes les folies à base hysterique, épileptique, et hypochondriaque, ne sont, dans mon idée, que des névroses transformées."†

Metamorphic and Vicarious Relations of Megrim.

Turning once again to the history of Megrim itself, we shall find it exhibiting precisely the same kind of transformations as those we have now traced in connexion with other neuroses, affording an additional illustration of its general conformity to the laws of neurosal phenomena, and the most conclusive evidence of its intimate relations with several members of the group in the circumstance of mutual replacement.

Tissot was strongly impressed with the proneness of megrim to occasional metamorphosis. "Many observers," he says, "have established it as a fact that the derangements of migraine are almost as dangerous as those of gout, and are almost always followed by accidents of a more or less troublesome kind."‡ Of these he proceeds to give several illustrations; and in attempting to account for the phenomena, he rejects the doctrine of a humoral *metastasis* which had formerly prevailed, and in place of the transfer of a morbid material from one part to another, he supposes a transfer of a morbid activity from one set of nerves to another.§ Excepting that our modern views of nervous

* "Lectures on Local Nervous Affections," p. 8. (1839.)
† "Maladies Mentales," p. 125. (1860.)
‡ "Traité des Nerfs," p. 392. § Idem, pp. 394–5.

"sympathy" are somewhat broader than those which Tissot held, I do not know that even now we can offer an explanation either much better or materially different from that which he taught; but we can appeal to many facts recorded since his time, and we can show, as we have endeavoured to do in the previous section, that this transfer of morbid activity from one division of the nervous system to another in the case of megrim, is but a particular illustration of a general law which is observed to hold for all members of the neurosal family. I may add that most of the French writers since Tissot's time have confirmed his observations on the metamorphoses of megrim.

To begin with Epilepsy. This is, doubtless, the particular neurosis which exhibits the closest connexion with megrim, both in the occasional replacement of the one affection by the other, and also in the occurrence of cases of a character intermediate between the two. Let me refer to some illustrations of each. The case of Sarah H—— (No. 19) is quite in point. She was thirty-seven years of age, a woman of nervous and hysterical temperament, who came to King's College Hospital suffering from epileptic fits. It appeared that she had a brother and sister epileptic, but neither her father nor mother were so. When about twelve years old she began to suffer from "sick-headaches" of a regular type. The attacks had a distinctly catamenial character, recurring for the most part at monthly intervals with the uterine discharge, and consisting, as is so often the case with catamenial neuroses, of a succession of paroxysms, or of remissions and exacerbations, for two or three days, ending in vomiting with relief. She has sometimes experienced other forms of disturbed sensibility, such as dim vision during the paroxysm, and numbness of the fingers before it. She has found unusual exertion occasionally act as an exciting cause of the headache. Purgatives have been the only remedies tried for the pain, but she never found the attack shortened nor the pain materially relieved by them. She continued to suffer in this way until two years ago—that is, for a period of about twenty-three years; the head-

aches then ceased, but have been replaced ever since by true epileptic seizures having the same catamenial character. It is interesting to notice that at present the epileptic attacks recur every fortnight, and so also do the catamenia. The last two fits have been preceded by a drowsy stupor of twenty-four hours' duration, in which she has been unable to answer questions readily, but this has quite cleared off with occurrence of the fit.

The case of my patient, Sarah Ar—— (No. 48), affords another instance. With a well-marked hereditary tendency to the complaint, she had suffered from periodical sick-headaches from the age of fourteen; at twenty-nine she had two intercurrent epileptic seizures.

This relation of the malady to epilepsy was long since pointed out by Dr. Parry. "This kind of headache," he observes, "usually called 'sick-headache,' so well described by Dr. Fothergill, not uncommonly occurs as a vicarious affection with epilepsy. . . . . I have known epilepsy occur indiscriminately with sick-headache, disappear as that was cured, and return again several years afterwards, as from the imprudence of the patient the sick-headache also returned."*

Dr. Marshall Hall, again, in his lectures on functional nervous disorders of paroxysmal character, including seizures of apoplectic, paralytic, epileptoid, maniacal, and other types, which he regards as constituting a natural group of diseases intimately related one to another, makes a similar observation:—"Nothing is so common—nothing is viewed as of such trifling import—as the seizure termed 'sick-headache.' Yet I have known sick-headache issue in paroxysmal attacks of a very serious nature both apoplectic and epileptic. . . . . How often would due attention to sick-headache and similar warning affections ward off the more formidable attacks of apoplexy or epilepsy—yes, and of mania!" Elsewhere he refers on several occasions to "sick-headache" as a "type" of the class of paroxysmal

* "Elements of Pathology," pp. 244, 249.

nervous affections which he endeavours to establish.* In illustration I may cite the following case recorded by him, where sick-headache appears to have merged into unilateral epilepsy with transient hemiplegia:—"Jane D. has been under my care for the last fourteen years. For many years she was severely attacked with bilious sick-headaches of an agonizing character. The attack was always accompanied by severe bilious vomiting." When this state of things had continued some time—"During an attack of vomiting and headache, she was seized with a mixed character of fit (apoplectic epilepsy), which more particularly attacked the left arm and leg, and the left side of the face, the tongue being wounded. The fit passed off, and was succeeded by a profound sleep. I have now seen her so attacked twenty-eight times. She has diminished power of the left hand and arm after each attack."†

Hitherto we have spoken only of the "sick" variety of the malady in relation to epilepsy; but the severer forms of hemicrania, and especially the blind, numbing, and aphasic seizures described by Piorry, Lebert, and others, show the same affinity and occasional transitions. Tissot himself gives the following instance of this connexion between Epilepsy and severe hemicrania:—"Sometimes," he says, "epilepsy succeeds other maladies; at other times it gives place itself to some different affection. I have seen quite recently a patient in whom this course of epilepsy was very striking: his illness had begun at the age of fifteen with violent attacks of Migraine; he soon began to experience in addition what he called giddiness or swimming in the head; this was really epileptic, for the patient would suddenly

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* "Lects. on the Neck as a Medical Region," *Lancet*, 1849, vol. ii. pp. 67 and 68; and "Synopsis of Diastaltic Nervous System," 1850.

There can be no doubt, I think, that in thus attempting to form a distinct *Class of Paroxysmal disorders*, Dr. Hall saw and followed up many of those indications of a true natural affinity which we have been engaged in considering in the previous section, but he regarded all such facts solely from one point of view—namely, that of his own ingenious but purely imaginary theory of "Trachelismus" and "Laryngismus," which we shall examine hereafter.

† "The Threatenings of Apoplexy and Paralysis, &c.," § 156, p. 39, being the "Croonian Lectures" for 1851.

experience a confusion in the head and momentary loss of consciousness with a very slight convulsion. The affection afterwards became more violent and of longer duration, and he had for two years well marked epileptic seizures."*

Dr. Sieveking has dwelt much on the transitional character exhibited by some forms of nervous seizure, and the difficulty there may sometimes be in determining to what group a particular affection belongs. Of this he gives the following illustration :—E. H., aged thirty-two, the wife of a coachmaker, consulted him in 1856; she was of a florid complexion and well made, and had not herself ever had fits, but two of her sisters were epileptic. The catamenia were regular and normal. The urine contained neither sugar nor albumen. For two years she had suffered from attacks of the following kind, which occurred at intervals of from two to six weeks. There was temporary loss of sight, with numbness and occasional loss of power in the arms, and loss of speech. These attacks commenced in the hands and mounted up to the head, lasted about fifteen minutes, and were followed by headache of a severe character extending over two or three days. "This case," continues Dr. Sieveking, "acquires additional interest from the fact that on inquiry I now find (1861) that the patient, whom I had entirely lost sight of two years ago, was seized with complete epilepsy, and has since been subject to it in an aggravated form."† Here we have, in a well marked form, all the more characteristic phenomena of the severest type of megrim, occurring for some years in recurrent paroxysms, in a patient the subject of a strong family tendency to epilepsy, and finally the replacement of these seizures by epilepsy itself.

After showing the frequency with which headache is met with as a mere consequence of epileptic seizures, Dr. Sieveking remarks on the far higher import of headache in those comparatively rare cases in which it precedes or forms a principal part of the seizure. He then adds—"In the

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* "Traité des Nerfs," "Epilepsie" (Bayle's ed.), p. 361.
† "On Epilepsy," p. 27 (2nd ed.), 1861.

same way as epilepsy is very commonly associated with cephalalgia, so also do we frequently meet with individuals who are not subject to epilepsy subject to headache; but in whom the concomitant symptoms of giddiness and temporary and partial loss of power, remind the physician of their possible relation to epilepsy, or of the approach of the latter disease." He then suggests a new term, *cephalalgia epileptiformis*, for such headaches, and gives as an illustration the following case :—

E. G., a widow, aged 37, of robust appearance and florid complexion, has always enjoyed good health, except that she has been subject to headaches. A year before consulting Dr. Sieveking she felt a numbness in her right leg, ascending to the trunk, right arm, and face, with a film over her eyes, and leaving a violent headache, lasting the whole day. The numbness passed off in two hours. These attacks returned about once a month; they "took away her senses," but not to such an extent as to prevent her being conscious of what was passing around; articulation became impaired, and the patient complained of being very nervous.*

There is no history of epilepsy in connexion with this case, and we can have no difficulty in recognising it as a well-marked instance of that severer form of megrim so well described by Piorry, Lebert, Travers, and Abercrombie; and while agreeing with Dr. Sieveking in acknowledging a true affinity between such cases and epilepsy, and the occasional replacement of one form of seizure by the other, we nevertheless regard such occurrences as quite exceptional, and as instances only of that occasional metamorphosis of neuroses which we are now considering, and to which he has himself directed our attention. In confirmation of this I may observe that Dr. Sieveking has only met with headaches of this type, and with these attendant symptoms, in two *per cent.* of a large number of cases of epilepsy passing under his observation; on the other hand, if such phenomena are exceptional in the history of epilepsy, we have seen

* "On Epilepsy," 2nd ed. p. 57.

that seizures of an identical character are sufficiently common as an independent affection; and besides their recognition as a variety of megrim by Tissot, Piorry, Lebert, and Romberg, we have shown, by a connected series of cases in our opening chapter, that they are inseparably allied with, and indeed mere varieties of, the more ordinary forms of that singular disorder.

The following extract from Dr. Prichard's work shows that the relation of such attacks to epileptic seizures was suspected by himself as well as others.—"There is another disease, unaccompanied by convulsions, which I suppose to be allied in a certain manner to epilepsy; or rather to that affection which I have termed Leipothymia. It consists in a sudden attack of dimness in the sight, attended with stupor and often with vertigo, which comes on at uncertain intervals, and after continuing for a short time leaves the patient labouring under a severe headache with drowsiness. This disorder is produced, as I believe, by the same causes which give occasion to epileptic attacks; existing perhaps in a lower degree, and acting on a constitution less susceptible of the morbid action on which this disease depends. But of this I shall say nothing further at present."*

The relations of megrim are indeed much more intimate with so-called "minor" epilepsy or epileptic vertigo than with the "major" affection, for the phenomena of megrim are exclusively or almost exclusively sensorial, while those of true epilepsy are convulsive; it is here therefore that we meet with *transitional forms*, of which I shall now give a few illustrations. Take, for instance, the following case by Dr. Parry:—Miss E. S. had been subject when young to frequent headaches and peculiar sensations in her head which she found it difficult to describe. There was "a very transient loss of consciousness *followed by headache and vomiting*, after which she felt well. She cannot recollect how frequent these attacks were; but as she grew older they became stronger, and the subsequent vomiting, which

* "Treatise on Diseases of the Nervous System," pt. i. p. 385.

she looked upon as a critical relief, ceased." This young lady had an epileptic brother, and after many years her own attacks gave place to true epilepsy. "The first clearly defined epileptic fit appears to have taken place when she was in her twentieth year. She dropped down, was strongly convulsed for several minutes, and remained for several hours after in a state of stupor. After the first seizure the fits returned at various intervals; sometimes three weeks, at others as many months elapsed between the attacks." At the time of her consulting Dr. Parry her mental capacity and memory were most materially impaired. However, under treatment by zinc, local depletion and aperients, she completely recovered, becoming entirely free from the seizures in the course of two years.*

Mr. Solly has recorded a case of epilepsy of a very similar kind, where if the pain in the forehead, which was a premonitory symptom, "*increased to a real headache, so as to end in sleep or vomiting,* the approaching fit was generally averted for three or four days at least, and sometimes for a longer period."†

The case of one of my patients, Susan A., not included in the table, is also very similar:—She was about eighteen years of age, and came to me at the hospital, April 2, 1863, complaining of "Headaches" of a peculiar kind, from which she had then been suffering a year and a half. She described them as sometimes preceded by the following symptoms: she feels generally unwell and depressed; experiences a sense of stuffing or oppression in the præcordial region. She then becomes momentarily confused and speechless; it does not appear that consciousness is actually lost, as she remembers what is said at the time. Sometimes there are no premonitory sensations, but the attack comes on abruptly. Her sister told me that if walking with her she would suddenly appear lost and speechless for a few seconds. She has no control over the attacks. These symptoms are now *invariably followed by a*

* "Unpublished Writings," vol. i. p. 434. † "On the Brain," p. 588.

severe frontal headache, terminating in a heavy sleep of three or four hours' duration. The attacks occur at uncertain periods, but generally in groups of two or three with short intervals; occasionally two occur in one day, morning and evening, and then the sleep has been delayed until after the second. At one time the headache was absent but the sleep occurred as usual. While she was under my care (for about a year) I frequently had individual seizures described to me, and the features appeared to be very constantly those I have given above.

There was no history of megrim in her family, but a sister, two years older than herself, was epileptic as a child, but at the age of twenty-one had had no fits for some years. It appeared to me that although the ovarian functions were regular the fits or headaches had a tendency to group themselves about the catamenial period, leaving the middle of the month comparatively free. On tabulating the attacks for a year I found this idea confirmed. This catamenial influence would not have been apparent from a short observation of the case.

I have dwelt thus at length on the epileptic affinities of megrim because they are the most important, but similar vicarious relations are maintained between megrim and some other neuroses, as, for example, Asthma. The following instance is from Tissot—"I was consulted," he says, "by a lady from Lyons about fifty years of age, who having suffered for many years from regular attacks of megrim, suddenly lost them, and from that time has been subject to a genuine spasmodic Asthma, of which the paroxysms are very violent, and of which I shall speak again when treating of that malady."* Similar cases have been recorded by other observers.† Dr. Heberden, who has given an interesting

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* "Traité des Nerfs" (Bayle), p. 393.

† Willis gives the following:—"Novi alium virum generosum scorbuto inveterato laborantem, qui tussi omni carens, modo *cephalalgia*, cum insigni *vertigine* per plures dies laborat: dein alio tempore, ab iis pathematis immunis, *asthmatis* paroxysmo valde atroci corripitur; atque affectus modo hujus, modo istius, crebros insultus, præsertim circa insignes aëris alterationes, et majores anni tropas, patitur."—"De Morbis Convulsivis," cap. xii. p. 218, ed. 12mo, Amstel.

account of megrim, says that it sometimes ceases on the coming on of an asthma.*

In describing the visual phenomena of megrim I had occasion to notice at some length the case of Mr. A.'s son; Mr. A.'s own history is no less interesting, and I shall introduce it here because it affords a striking instance of Gastralgia of the true neurosal type of which I have already spoken (see p. 201), and of its replacement by megrim, as well as of another intercurrent form of nervous seizure. I have already described the remarkable extent to which megrim and some other functional nervous disorders were hereditary in this gentleman's family and need not therefore repeat the account. Mr. A. is himself a medical man, and the following description of his case is given in his own words :—" When about sixteen years old and at school in the country, enjoying otherwise excellent health, I began to suffer from periodical attacks of severe pain in the stomach of the following kind : The seizure would commence at any hour and I was never able to discover any cause for it, it was preceded by no dyspeptic symptoms or disordered bowels, and was quite uninfluenced by food, which was always of the plainest and most wholesome kind. The pain began with a deep, ill-defined uneasiness in the epigastrium, gradually becoming a dull but at first very bearable pain. This steadily increased in severity during the next two or three hours until it reached a certain pitch of intensity, and then declined. When at its height the pain was very intolerable, sickening, and I should say peculiarly visceral in character, of the quality produced by a blow on the epigastrium, or testicle, and had no griping character whatever. It was always accompanied by chilliness, cold extremities, a remarkably slow pulse and a sense of nausea, but never vomiting. When the pain began to decline there was generally a feeling of movement in the bowels and occasionally some development of flatus and perhaps a slight febrile reaction. The paroxysm left very considerable tenderness of the affected

* Comment. cap. xvii. p. 85. "Item asthmate superveniente cessavit."

region, which took a day or two to clear off, but there was no tenderness at the time. The ordinary stimulant antispasmodics were of no value, and a full dose of opium prescribed on one occasion by a physician in town, appeared rather to aggravate the suffering. Most relief, and sometimes a shortening of the attack, were obtained from hot turpentine fomentations and a full dose of hot brandy and water, if adopted at a sufficiently early stage.

"These attacks continued to torment me for two years or more, recurring sometimes as frequently as once a month and sometimes at longer intervals. One curious circumstance I ought to mention; it is that during the whole of the period I remained subject to these attacks my pulse never recovered its normal rate in the intervals, but ranged from fifty to sixty, considerably below its former and its present rate, two-and-twenty years later.

"It was at this time, when about eighteen, that I moved to college, and notwithstanding the change of circumstances I was still visited for upwards of a year by my old enemy. One morning, in chapel, I was startled to find that I could see only a portion of the reader's face, and it was the same with any other object at which I looked—the central part of the field of vision was obliterated, so that to see any point I was obliged to look to one or other side of it; but there was no sense of darkness. It was, I may say, exactly as though I had acquired a new *punctum cæcum* in the axis of vision of each eye. This blindness gradually spread over a larger area, while the sight returned in the centre. The conditions of vision were then most remarkable; the field of view was very greatly contracted, very much as though I were looking through a tube; it gradually widened however, and as this went on I became conscious of spectral objects like sparks or bright beads in incessant motion in the circumference of the field. The motion was very rapid and difficult to describe, but it always reminded me of the effect produced by the rapid gyrations of the lesser water beetles as I have seen them in patches on rivers and ponds in the bright sunshine.

"These appearances were followed in about a quarter of an hour, very much as in my son's case, by an intense frontal headache, occupying both sides, quickly rising to a great pitch of intensity, with much nausea, occasional retching, but never vomiting. The suffering was lessened by perfect quiet and by lying down, and terminated in sleep. I was as well as usual the next day. I continued to suffer from similar attacks at uncertain intervals of several months for some years, but from their commencement I *lost completely my stomach disorder.* I could never trace the headaches, any more than the gastric pain, to any indiscretion in diet or other cause, and after seven or eight years they also ceased to trouble me. After a long interval of freedom —four or five years—I had again some return of the headaches, which I could trace to overwork and anxiety with want of sufficient exercise. On two or three occasions they had precisely the same character as before, but were disposed to be more one-sided. I still continue to suffer occasionally, but for some years now I have had no loss of sight, but simply hemicrania, the pain having the same course and character as of old, but rather less severe and exclusively one-sided."

This is by no means the only instance in which such an alternation of megrim and Gastralgia has been observed. Dr. Dwight, in the paper on Sick-headache to which I have several times referred, after endorsing Fothergill's view of "an accumulation of acrid bile" as the cause of the malady, proceeds to describe a form of "colick" which he believes to depend on the same cause as the headache, and for the following reasons:—"1. From the two disorders affecting persons of the same temperament—namely, the bilious. 2. From their both observing similar periodical returns. 3. From the circumstance of persons who, in the course of their lives, have been subject to both complaints for years, having uniformly experienced an exemption from one during the reign of the other, alternately; and 4. From the efficiency of the same remedies in the cure of both."

In a postscript, Dr. Dwight adds, that since his paper was

written he has met with an additional instance confirming the foregoing view. "This was the case of a woman, who (without any knowledge of his opinions) informed him that for several years she had been subject to frequent returns of the 'Sick-headache,' but without ever experiencing an attack of the colick until within the last three years. Since then the attacks of colick have been numerous, but the headache has wholly disappeared."*

I may observe that the slow pulse noticed by Mr. A. in connexion with his gastralgia was long since observed by Robert Whytt in a similar case: "A youth of fifteen, of a strong make, and seemingly healthy constitution, had for some time been subject, once in six or eight weeks, to a

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* "Amer. Med. Repos." vol. ii. p. 16. 1800. Cases of this kind appear to have attracted the notice of medical men in all ages. The following extract is from Willis: "Leguleius quidam callidus, et vafer, quinquagenarius a multis annis *cephalalgia periodica* cum sensuum stupore, et capitis gravitate insigni molestari solitus, circa mediam æstatem prædictis affectibus valde laborans, a remediis topicis applicatis de repente levamen percepit; attamen paulo postea *colica* immani tunc primò corripiebatur; cujus insultus cum tanta ferocia eum incessit, ut viribus subito fatiscentibus, crebra animi deliquia cum sudore frigido subiret; qui tamen paroxysmus, intra 24 horas, sine flatuum eruptione, aut ventris solutione, sensim evanuit. Deinceps vero huic morbo obnoxius accessiones ejus frequentes passus est; quas omnes (uti sedulò advertebam) plerumque capitis dolor cum vertigine et stupore præcedebat, hinc ut dolores colicos brevi postea insecuturos præsagire soleret. In quodam paroxysmo, qui per duodecim dies cum insigni ferocia perstitit, ipsemet ægrotans observavit, et mihi retulit, sese affectu circa abdomen urgente, nihil molestiæ in capite persensisse, passione autem colica remittente, illico vertiginem cum cephalalgia rediisse; ex qua reciproca symptomatum istorum a capite in ventrem, ac vice versa metastasi, arguere licebit eandem materiam morbificam in nervosis ductibus scatentem, modo inferius delapsam passionem colicam, modo superius restagnantem pathemata istæc cephalica intulisse. Huc referri debent, quæ Carolus Piso de seipso affectibus cephalicis, et doloribus colicis vicissim, et cum mutua dependentia affici solito, accuratissime observavit, § 4, c. 2, p. 355."—"De An. Brut.," cap. xv., *De colica*, p. 550, edit. 12mo, Amstel.

The whole circumstances of this case are singularly like those of the one we have already given, from Valleix, of the replacement of facial neuralgia by gastric pain (see p. 202). Several points in the case of C. Lepois, to which Willis here refers, have been already noticed: on this alternation he says: "Nam cum per annos quatuordecim vixissem obnoxius anticæ Hemicraniæ . . . . . tum cessanti Hemicraniæ summas capitis partes affligenti dolores abdominis, iique ut ante vomitu aqueorum prorsus humorum per illum fervorem e capite in ventriculum depluentium comitati, successêre, et revera convulsorii, siquidem intestina mihi omnia una cum cæteris partibus peritoneo colligatis tam manifeste sursum retrorsumque revelluntur, ut dubitandi de naturâ eorum causam non habeam."—"*De morb. Vent.* p. 355."

violent pain in his belly, with an apprehension of immediate danger. During the time he was troubled with these cholic pains, his pulse commonly beat only fifty times in a minute, resuming its natural quickness (eighty) on recovering from the complaint by treatment."*

I now resume Mr. A.'s case, for the narrative so far does not complete the history of neurosal metamorphosis in this remarkable instance. When thirty-seven or thirty-eight years of age, rather before the time when the above account was written, this gentleman became liable to night attacks not unlike the spasmodic croup of children—a species of "laryngeal epilepsy." After having been asleep an hour or so, and generally between one and two o'clock in the morning, he would suddenly awake to consciousness in the act of jumping out of bed, tearing open his collar-band and struggling violently for breath with loud stridulous breathing; after a few moments of this, which appeared to him a prolonged and intolerable agony, the throat spasm would relax, a few convulsive heaving inspirations follow, and respiration again become free. These attacks have occurred at very irregular intervals, sometimes several months apart, but generally two or three together on neighbouring or successive nights. His wife, who is instantly awakened by the noise, was at first a good deal alarmed; the struggling of a strong man for breath under a sense of imminent suffocation, the noise produced by the air forcibly drawn through the closed glottis, his utter inability to speak, and the instinctive rushing to doors and windows for breath, form no doubt a sufficiently distressing scene. She tells me that he always has a much more severe seizure if he goes to bed unprepared. This is equivalent to saying that the first and therefore unexpected attack of a series is always much the worst, for there is no previous warning. Mr. A. has now been liable to these seizures for some two or three years, and experince has taught him that

* "On Nervous Disorders," by R. Whytt, M.D., F.R.S., p. 302, 1765; and "Works," 4to, p. 619.

by going to bed nauseated with ipecacuan, and with the consciousness that he must not sleep soundly, he can insure himself against a *severe* return of the spasm the following night. Nevertheless, after at all a severe fit he is afraid to return to bed, and remains sitting up until daylight.

There are other instances of this sort of "laryngeal epilepsy" in adults on record. Sir John Forbes gives the following one in his Treatise on Asthma :—"An old lady, a friend of the writer, has all her life been liable to attacks of this kind, which seize her instantaneously, after long intervals, and during their continuance entirely prevent inspiration and thus threaten immediate death. After a few seconds the paroxysm subsides without leaving a trace behind it."* Dr. Marshall Hall gives the case of an old gentleman of gouty habit, who, after sustaining "a severe affliction in the loss of his son, became liable to awake in the night with a suffocative feeling in the throat, making a peculiar noise. In the day, too, he was subject to giddiness, with a slight cloudy appearance before the eyes, and a sense of tightness about the throat. He had, at the time the report was made, frequent headaches, giddiness and dimness of sight."† The same author records another case in which similar laryngeal spasms were the precursors of hemiplegia and apoplexy.‡

But megrim may alternate with other forms of visceral neuralgia besides the gastric, and just as I have known attacks of Angina pectoris superseded by atrocious paroxysms of Tic douloureux, so the suppression of an habitual megrim is sometimes followed by all the distressing symptoms of the former complaint. The physician whose case has been partly given at page 125, besides the occasional occurrence of the visual and vertiginous forms of megrim which appeared to replace his habitual "bilious" headaches, became liable, about the same period of life, to attacks which he

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* "Cyclop. of Pract. Med.," art. *Asthma.*

† "The Threatenings of Apoplexy and Paralysis"—the Croonian Lectures for 1851. pp. 59, 60.

‡ Idem, p. 49.

has no doubt, and I have no doubt, to have been genuine Angina pectoris. The first was brought on by walking briskly up hill in a part of the country where steep ascents abound: he was suddenly seized with the most violent breast-pang which he thinks can possibly be conceived, with a complete fixation, as it seemed, of the chest, so that by no effort of will could he take another breath; he fell to the ground but did not lose consciousness, and his agony, while the paroxysm lasted, was attended with that sense of dying which has been described as characteristic of the malady. He has continued to suffer from similar attacks at uncertain intervals since that time, but they have gradually declined in severity since the first, and he has now been for some time free. On several occasions they have occurred after first falling off to sleep at night. It should be added that during the period in which the seizures chiefly prevailed, the rate of his pulse was very considerably and permanently reduced, without, if I remember rightly, any disturbance of rhythm. It has now recovered its customary rate. There is some reason to suspect a gouty basis for the remarkable succession of neurosal seizures in this gentleman's case. Although he has never had gout himself, his father and his son have both suffered from it, and some of his own finger-joints show slight signs of nodular enlargement. It is worthy of notice that in the very typical and purely neurosal, but fatal case of Angina Pectoris recorded by Dr. Fothergill, the malady had been preceded by paroxysms of intense giddiness somewhat similar to those from which this gentleman suffered.*

I have not met with any other instance of so well-marked a character and so much to our purpose as the foregoing, but the following note by the American editor of Lobstein's Treatise on the Sympathetic nerve deserves attention:—"I have," he writes, "in several instances seen females about the middle period of life who had from puberty been continually subject to paroxysms of sick-headache, from which relief

* "Med. Observ. and Inquiries," vol. v.

was generally sought by vomiting and sometimes by catharsis, followed by subsequent doses of opium. As these sufferers advanced in life the paroxysms were much less frequent, and in one case diminished entirely: but when the functional derangement of the chylo-poietic viscera which formerly had produced headache, took place, the symptoms irradiating upwards through the sympathetic and par vagum nerves, produced such excessive functional distress in the heart and lungs as to necessitate a resort to the usual medicines for relief before the head was affected. There was great palpitation of the heart, and embarrassment of the circulation, and most suffocative asthmatic respiration, with pain along the spine (on pressure) and sometimes in the arm and shoulder—in short a case analogous to Angina pectoris."* I shall only add that Dr. Heberden, who in his commentaries has particularly described both Angina pectoris and megrim, observes of the former malady—"Instances are not wanting where the paroxysms have exhibited a periodical return; or where attacks now of this complaint and now of headache have afflicted the patient by turns."†

In our account of the phenomena of megrim we have already shown that a certain amount of psychical disorder not unfrequently forms a part of the severer attacks in some individuals. In some exceptional instances I believe the whole paroxysm may be represented by one of transient Insanity, or the malady itself may be replaced by a temporary mental derangement—in other words the neurosal disposition may show itself now under one of these forms and now another. We have already seen that Dr. Marshall Hall has expressed a similar opinion, see p. 206.

The following particulars of his history were kindly communicated to me by the patient, a gentleman who for a short time was under my care. Many details of his case,

* Lobstein, J. F. "A Treatise on the Structure, Functions, and Diseases of the Human Sympathetic Nerve"; transld. by J. Pancoast.—Philadelph. 1831.

† "Non defuerunt exempla, ubi certum habuerunt circuitum; aut ubi invicem modo hi, modo capitis dolores vexarunt."—"Comment.," cap. 70, p. 308.

which was one of severe hereditary megrim, have been already given in illustration of the different phenomena of the typical paroxysm—viz., the half-blindness, tingling, and aphasia; those I now supply have reference to his family history and the intercurrence of temporary insanity in his case, as well as of rheumatic or pseudo-rheumatic arthritis, the connexion of which with megrim we hope to examine on another occasion.

Mr. S. (No. 46), a clergyman, aged twenty-seven, a tall well-developed man, consulted me on account of headaches from which he had suffered more or less frequently from about the age of fourteen. His family history claims especial notice. His paternal grandfather lived until past eighty, but did not die in possession of all his mental faculties, although his grandson can give no particulars of his condition. His father was troubled with so-called "bilious-headaches" at distant intervals.—"I have seen him lose his sight partially," writes my informant, "in the same way as I used to do." About a year and a half before his last illness he was attacked with what was called "a paralytic stroke," although his limbs do not appear to have been affected. This deprived him of speech at the time, and he never afterwards completely recovered the faculty: "He made curious transformations of words, and by his confusion of one word with another made mistakes which under other circumstances would have appeared ludicrous. I never knew of his getting through a sentence without thick utterance, or hesitation or transposition of parts of words." This aphasic condition extended to reading and writing; his memory appeared defective, but he showed great intelligence about some things. He was at times very irritable, but generally his spirits were excellent, and he enjoyed good health and strength and a good appetite, and eventually died of an attack of bronchitis. One of Mr. S.'s brothers has experienced Hemicranial seizures of identically the same character as his own, a description of which will be found in a previous chapter (see pp. 73, 93, 101-2).

As far as the account already given of Mr. S.'s case ex-

tends we have a very typical and very instructive history of megrim, but there is more to be told with which we are less familiar. It was in 1858 when at Oxford that on going over the *University Press* with some friends he felt an attack of his old malady coming on—"Whether it was the twisting of the wheels that set me off," he observes, "I don't know. On going to a chemist's shop to get something, and while waiting there, I fell down in a 'fit,' but was soon brought to. I fell down like a log, or as if I had been shot. I remember also on this occasion entering another shop and going on in such a way that they thought I had been drinking. Even my own friends thought I was drunk that evening." He remained unwell and under medical care on this occasion for five or six days; the treatment consisted chiefly in the exclusion of all sources of excitement. This attack was evidently analogous to one of post-epileptic delirium.

The next serious illness was in April, 1860, when he had left Oxford, and appears to have been "brought on by over anxiety and close drudgery in reading for ordination." He was attacked precisely as on the last occasion, but this seizure was immediately followed by what was supposed to be rheumatic fever of the usual articular type; there was no cardiac complication. During convalescence he was removed to London, and while on his way to town he was seized with an attack of Insanity which was not completely dissipated for some months, and for which he was placed under the care of a well-known physician in town. He thus describes his feelings at the time—"On the journey it was plain that all was not right, and the curious part of it was that *I knew it myself.* All the hallucinations, fancies, odd actions, dislikes, suspicions, indeed everything about it, are almost indelibly fixed on my mind. One idea was that I had ceased to be responsible for my actions, not unlike Townley. But it would be useless my going into all that again."

He remained under medical care until November, when he was quite restored. The old headaches now returned, but with less severity and frequency than before, and without

the more formidable accompaniments of loss of speech or disordered memory, and he has since been able to undertake the duties of his profession without intermission.

Moreau gives the following instance of "Neuropathic Insanity" in connexion with a history of megrim, with which I must bring this already too long chapter to a close :—

"Margaret B——, aged forty-six, a cook. Admitted July 26th, 1866. One of her brothers suffered from nervous seizures. She knows nothing for certain as to the health of the other members of her family.

"Her childhood was exempt from serious illness of any kind, but very early in life she became subject to Migraine. At the age of twenty-two she first entered service in the capacity of cook. Excepting her migraine paroxysms, which had become habitual, she continued to enjoy the best of health until the age of forty-six.

"Two months before her admission into the Salpêtrière, without having undergone any change of circumstances or of health, she suddenly felt transformed as it were into another being: 'she found herself changed from head to foot, she was no longer the same.' Her head boils (to use her own expression), her ears are full of noises and voices confused and unintelligible; she is frightened at everything; and though never much given to piety, she now turns her thoughts to God and prays him not to abandon her.

"This condition, which the patient described to us with much self-possession, is succeeded at times by a veritable stupor, attended by a refusal of food, and broken utterances, clearly revealing her ideas of suicide.

"*Remarks.*—The character of the derangement, the manner of its commencement, abruptly and without apparent cause physical or moral, are sufficient to give to Mrs. B.'s malady the distinctive characters of a transformed hereditary neurosis."*

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* "Traité pratique de la Folie Névro-pathique," par J. Moreau (de Tours), p. 152. Paris, 1869.

CHAPTER V.

Pathology of Megrim and Allied Disorders. Doctrine of Biliousness; Bilious Headache. Doctrine of Sympathy, and of the Eccentric Origin of Neuroses; Gastric Megrim; Uterine Megrim; Ophthalmic Megrim; Modern Reflex and Inhibitory Theories. Vascular Theories; Determinations of Blood to the Head; Congestion of the Brain; Recent Vaso-motor Hypotheses. Theory of Nerve-Storms.

The subject of the present chapter has an interest and importance beyond that of the malady to which it more immediately refers, for the pathology of megrim is in the main the pathology of the whole group of disorders to which it belongs; and in discussing it we shall be practically discussing a much wider subject—namely, the pathology of neuroses in general, apart from which that of megrim itself would be but imperfectly understood. My intention then is to exhibit as well as I am able the gradual progress of opinion as to the nature and cause of neurosal phenomena up to the present time, with an especial reference to the malady before us; and I think it will thus appear that, while a few are purely imaginary, many of the views which have at different times prevailed and still prevail are not so much antagonistic as partial and incomplete representations of the facts with which they deal, and that our knowledge of the whole subject will gain by their connected consideration in something like historical order.

Doctrine of Biliousness.—Bilious Headache.

This is the oldest and still the most popular view of the nature of Megrim. The few remarks I have to make upon it are certainly not suggested by its scientific value or im-

portance; my object is rather to point out the remote origin and probable value of a doctrine which, if for the most part abandoned by scientific men, still holds its ground with the general public, and still exerts a very important practical influence as regards the measures adopted for their relief by perhaps nine out of ten of the sufferers from megrim.

The doctrine of *Biliousness*—the idea that many disorders are due to the presence of bile in excess, either in the system at large or accumulated in particular localities—prevailed, as I have said, from a very early period, but the affections attributed to this cause were by no means exclusively or generally those which are marked by the presence of jaundice, or other obvious error in the quantity or distribution of the biliary matters. To this day a host of ills are referred to the vague and ill-defined condition to which the name of "biliousness" is given, and among these megrim takes the first rank. Let a man only complain from time to time of a transient disorder of sight followed by a severe headache, or of giddiness followed by retching and the discharge of his stomach, and he is sure to be told by sympathizing friends that he is "bilious" and wants "a dose." No very definite notions it is true are attached to these expressions by those who use them, and I have often amused myself by asking patients who have confidently assured me of their "biliousness" or that "the bile was flying about them," what they meant by it, but of course without eliciting much in reply.

The real meaning of all this is to be found, I believe, in the past history of medicine. As in so many other instances, what was once the teaching of the philosopher is preserved to us only in a fragmentary form in popular language and traditions. It needs almost an apology to repeat that for many ages the whole superstructure of medical philosophy was based on the doctrine of the "four Cardinal Humours of man's body," the blood, yellow bile, black bile, and phlegm, and the "four Elementary Qualities," hot and cold, moist and dry. The just distribution and admixture of the

former (κρασις) was the source of health, while any departure from this condition (δυσκρασις) was a cause of disease, of which the particular character was determined by the humour which happened to be in excess, or its accumulation in a particular locality. So with the elementary qualities: if present in just proportions they gave rise to a healthy "temperament," whereas the excess or defect of one or more was the cause of a "distemper." These two principles were harmonized and combined by attributing to the four humours the four elementary qualities, and many particular developments were given to them with which we are not now concerned. My object is only to point out that the popular theory of megrim and the whole doctrine of "biliousness" are the legitimate descendants of this primitive philosophy.

We may cite Alexander Trallianus as a fair exponent of the ancient teaching with reference to such maladies as that before us. Thus, in a section on *Cephalalgia* he first treats Περὶ τῆς ἐπὶ χολώδει χυμῷ κεφαλαλγίας—"Concerning headache arising from bilious humour"—which begins thus:—"If therefore headache frequently arises on account of a superfluity of bilious humour, the cure of it must be effected by means of remedies which purge and draw away the bilious humour."* He then proceeds to enlarge on the method of doing this: how the faulty humour is to be dealt with so that it may be drawn from the system and ultimately evacuated according to the principles of the humoral therapeutics, first, if diffused; secondly, if accumulated in the coats of the stomach or other locality.

The same view is taken of a more severe form of headache termed *Cephalæa.* We find directions for the cure "if the pain is begotten of the bile"—Ἐὰν ὑπὸ χολῆς γένηται ἡ ὀδύνη; first, "if hot and bilious humours are already formed"—εἰ δὲ θερμόι εἰσιν οἱ χυμοὶ καὶ χολώδεις; and then further

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* Εἰ μὲν οὖν ἕνεκα τοῦ πλεονάζειν τὸν χολώδη χυμὸν γίνεται πολλάκις ἡ κεφαλαλγία, ποιεῖν ταύτης τὴν θεραπείαν διὰ τῶν καθαιρόντων καὶ ὑποκλέπτειν δυναμένων τον χολώδη χυμόν. Αλεξ. Τραλ. Βιβ. Α. Edit. Lutetiæ. 1548. fol., p. 8.

on the case is considered "in which the humours are thick and not yet hot"—ἐφ' ὧν δὲ παχεῖς εἰσι καὶ μὴ πάνυ θερμοὶ, and where "discutients" must therefore first be used.*

Again, I find a section "On *Megrim* occasioned by a bilious humor"— Περὶ τῆς διὰ χολώδη χυμὸν γινομένης ἡμικρανίας, for which "aloes and scammony and other drugs which purge off bile without heating much" are recommended.† In a previous section, "headache arising from a hot distemper of the liver" had been treated of,—περὶ τῆς διὰ θερμὴν δυσκρασίαν του ἥπατος γινομένης κεφαλαλγίας.‡ Much more to the same effect might be added.

Headache, however, and especially megrim, was sometimes referred to "cold humours" as well as hot, to black bile as well as yellow bile, to the spleen as well as the liver, and hence it came to be regarded as one expression of the malady known as Hypochondriasis, which was supposed to be due to "Atra bilis" or "Melancholia." "Headaches," says old Willis, "are wont to be imputed no less to the *spleen* than the stomach; and indeed it is a common observation that in hypochondriacal subjects when a pain, inflation, rumbling, or other disturbance arises in the left side from the distempered spleen, that a headache frequently succeeds as if excited by it."§

Pope, in his description of the Cave of Spleen has perpetuated the same idea:

> "There screen'd in shades from day's detested glare,
> Spleen sighs for ever on her pensive bed,
> Pain at her side, and *megrim* at her head."

When, however, abandoning the regions of mere hypothesis,

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* *Idem.* ια. p. 12.

† *Idem.* ιβ. p. 14. Ἐι δὲ διὰ χολώδη χυμὸν γένοῖτο ἡ ὀδύνη, * * * καὶ τελευταῖον κάθαρσις ἡ διὰ τῆς πικρᾶς καὶ τοῦ δακρυδίου, καὶ των ἄλλων ὅσα χολὴν οἶδε καθαίρειν, ἐκτὸς πάνυ θερμαίνειν.

‡ *Idem*, p. 7.

§ *De cephalalgia*, cap. i.:—"Dolores capitis *lieni*, haud minus quam ventriculo imputari solent, et quidem passim observare est in hypochondriacis, isti etiam morbo obnoxiis, cum in sinistro latere dolor, inflatio, borborygmus, aut alia quævis, velut *lienis* affecti perturbatio, contingit, *cephalalgiam* quasi exinde suscitatam mox crebro succedere." Works, 4to, 1680, Geneva, vol. ii. p. 155.

men began to test these ancient doctrines by anatomical inquiry, that of black-bile soon lost ground. Just a century ago Robert Whytt wrote: "Although not a few of the moderns, following the opinions of the ancient physicians, have supposed the hypochondriac disease to be owing to an *atra-biliary* humour produced in the stomach, liver, or spleen, yet in many hypochondriac patients *there is no such humour;* and where it is observed, it is only a symptom or consequence of the disease, but not its original cause."* Sir George Baker, who wrote about the same period, after observing that the ancients supposed the excess of yellow bile to flow into the gall-bladder, and of the black bile into the spleen as its receptacle, thence to become the source of many disorders, complains that his contemporaries, and more particularly Boerhaave, retained the terms Black bile and Atra-biliary humour out of an ill-placed veneration for antiquity, and vainly endeavoured to reconcile the ancient speculations with modern philosophy. "A few years since," he adds, "I was consulted by a gentleman who had taken many medicines with a view to dissolve the atra-bilis, which was supposed to appear as well in what he vomited as what he voided by stool. After death this atra-bilis was found to be no other than blood from an ulcer at the beginning of the duodenum."†

But although the atra-biliary doctrine gradually sunk into oblivion when once it had been shown that no such humour existed either in the spleen or elsewhere, this has not been the case with the yellow-biliary theory, for yellow bile has a real existence, although the doctrine of "biliousness" has no better, and indeed exactly the same foundation as that of "melancholia;" we have buried the last but the former still survives.

We have already referred in the second chapter (see page 44) to numerous instances where the patients attributed their megrim to "bile," "biliousness," or "bilious food,"

* "Treatise on Nervous Diseases," by Robert Whytt, M.D., F.R.S. 1765, p. 242.

† "Trans. of Coll. of Phys.," vol. i. p. 398. 1767.

without any assignable reason, as it appeared, except the prevailing custom. The case of J. M. (No. 52), is as good an illustration as any. She came to me on account of "Bilious headaches," as she said; they had all the usual characters of megrim, lasted all day with much nausea, and ultimately vomiting, and passed off at night. Beyond the sickness and the statement that she had found "bilious food, such as a quantity of butter, bring on an attack," there was nothing, even on her own showing, to support the theory. On the other hand, there was very much against it: the headaches were hereditary, her sister suffered as she did, and both were first attacked at the period of puberty; though not catamenial they returned every two or three weeks; she had had ten children, and during every pregnancy remained free from these attacks. Now, all these points appear to me irreconcileable with the bilious theory, while they correspond exactly with the characters of other well-established neuroses.

Dr. Symonds, so far as I know, is one of the very few who have taken any considerable pains to inquire into this subject. He observes: "There is a headache often called in popular language 'the bilious-headache,' which, were we to take the word of the laity for it, is a very common occurrence; but I need not say that 'bilious' with the laity applies to any form of disorder characterized by anorexia and nausea." . . . "Patients themselves are apt to assert that their headaches are 'all from the stomach,' or 'bile,' or 'liver;' and their conviction has a twofold origin—one, in the sickness or other gastric disorder, or in the intestinal symptoms which accompany these attacks; the other, in the relief which seems to ensue on the operation of medicines directed to the alimentary tube, as we have already hinted. But the sickness is oftener an effect than a cause, or even a concurrent, and the relief from purgative medicines admits (if true in fact) of an obvious explanation irrespective of the supposed disorder of the digestive organs."*

* "Gulstonian Lectures, 1858, on Headache."—*Med. Times and Gaz.*, vol. i. 1858, p. 420.

Two centuries ago, Sydenham himself protested against the inference which it is thus sought to draw from some supposed "vitiation" of the bile discharged in the evacuations, whether by the stomach or bowels, in the case of so-called bilious headaches and bilious colics: "Neither," he says, "from the fact that the matters which in this disorder (bilious colic) are rejected by the mouth or stool are of a greenish colour, can it be safely inferred that the disease is a humoral one, or that the excruciating pain is due to the acrid quality of any humour irritating the parts within which it is confined; and which we accordingly take for the source of the malady and think to eradicate by vomits and purges. For it is a well-established fact that the sickness which is experienced on first going to sea draws out from the stomach a similar green coloured refuse, even in the case of perfectly healthy persons, who half an hour before had none of this so-called 'leeky bile' about them."* Cullen has a similar observation: "As all vehement and often repeated vomiting generally brings up bile, I consider that colic which from the throwing up of the bile alone has been called 'bilious colic,' as entirely spasmodic."† This is certainly not less true in the case of headache.

In framing the questions, therefore, which he put to his patients on this subject, Dr. Symonds used a very just caution—"To have asked my catechumens whether their headaches had anything to do with bile or bilious disturbance, would have, I well knew, called forth a chorus of Yes. But as I should have been none the wiser, I thought it better to limit the question to the accumulation of bile manifested by the skin." Of the 90 patients thus interrogated, 65 answered in the negative; 14 gave a doubtful or qualified 'yes,' and 11, no reply.‡ This is very much the result which might have been expected; and as, with the great majority of patients, according to my experience, any sallowness of complexion is attributed to bile, it is highly

* "Dissertatio Epistolaris," *de Affect. Hyster.*, § 83.
† "Nosology," *Colica Idiopath.*," p. 122. Footnote.
‡ "Gulstonian Lectures, 1858."—*Med. Times and Gaz.*, vol. i. p. 498, etc.

probable that scarce one of those who gave a qualified assent to the inquiry were really jaundiced.

It is not a little remarkable that, after contributing so materially to the overthrow of the popular doctrine, Dr. Symonds should himself have admitted the occasional occurrence of a true bilious headache, though on what ground is not very clear. "The only real cases," he observes, "of this affection are those in which, from duodenal obstruction, or a more copious secretion than the duodenum can dispose of, bile regurgitates into the stomach, or accumulates in the blood; in the one case producing an acute headache, generally on one side of the brow; in the other, giving rise to a dull headache, with more or less disturbance of the special senses in the form of suffusio dimidians, or of tinnitus aurium, and often with vertigo. A bilious diarrhœa attending or following the headache gives it a still more unequivocal character. But for one such case, I believe there are twenty in which the so-called bilious headache is *nervous*, with sympathetic disturbance of the stomach."* We shall return to the consideration of the first, or sympathetic bilious headache, to which Dr. Symonds refers, in the next section.

It is at all times difficult to establish a negative, and I shall not further attempt it in the present case; I am satisfied to have shown the real foundation on which the bilious doctrine rests, while the history of Megrim, as it has been traced in the previous chapters, points to another and very different origin for the malady—namely, the neurosal constitution. I must not, however, omit to state that jaundice does occasionally follow an attack of megrim, and is then generally of a very transient character. This was sometimes the case, I am well assured, with two of my patients, F. P. (No. 9), and I. M. (No. 12), although I was never fortunate enough to witness it; the latter remarked that the tendency to jaundice, like the tendency to headache, was hereditary in his family.

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* "Gulstonian Lectures, 1858."—*Med. Times and Gaz.*, vol. i. p. 420.

The same occurrence has been noticed by other observers. Labarraque says—"Sometimes the bile is secreted in greater abundance than usual, and a case has been recorded where the patient became jaundiced every time he was attacked with migraine. This condition lasted a certain time and then disappeared, sometimes after a light repast, sometimes after a profound sleep of some hours."*

I fail, however, to see in this very exceptional circumstance any corroboration of the bilious theory; the jaundice immediately *follows* the attack, and is evidently an effect and not a cause of the paroxysm. Labarraque correctly introduces it when speaking of the critical evacuations which sometimes attend or terminate the seizures, such as a copious flow of tears, or an abundant discharge of limpid urine. It evidently belongs to the same class of phenomena, and is only another instance of the control exerted by the nervous system over the secretions in general. Moreover, we meet from time to time with instances in which exactly the same effects are produced by other nervous paroxysms. Thus it is a well established fact that a powerful emotion may give rise to a temporary jaundice; Dr. G. Budd has drawn attention to instances of its occurrence after prolonged anxiety, and it has been occasionally produced by violent fits of anger. Some excellent illustrations and observations on this and other varieties of nervous jaundice will be found in a paper by Dr. Marsh in the Dublin Hospital Reports.

Other cases are on record, in which a similar transient jaundice has followed epileptic seizures. Dr. Todd, in his clinical lectures on Epileptic Coma and Hemiplegia, observes —"A very striking case is related by Dr. Stokes, in which the patient was liable to these pseudo-apoplectic paroxysms or epileptic fits, as I would call them, which came on generally at night or during sleep. The patient came out of each of these

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* "La bile est sécrétée en plus grande abondance que de coutume, et on cite un cas où un malade était pris de jaunisse toutes les fois qu'il avait la migraine. Cet accident durait un certain temps, puis disparaissait, soit après un léger repas, soit après un profond sommeil de quelques heures."—*Essai, etc.*, p. 34.

attacks perfectly paralysed on the left side, and also jaundiced. Both the hemiplegia and the jaundice would subside in a very short time; the former within a few hours after the attack, and on the following day scarcely a trace of jaundice could be seen. I would suggest," continues Dr. Todd, "that the jaundice in this case was a paralytic symptom, due to a temporary paralysis of the biliary ducts —analogous to the instances of jaundice from strong mental emotion or shock to the nervous system."*

Doctrine of Sympathy, and of the Eccentric Origin of Neuroses.

We must now pass on to the consideration of those theories of Megrim and some allied disorders, which, while recognising the essentially nervous character of the phenomena, suppose them to originate, not in any primary defect or morbid disposition of the nervous system itself, but from some accidental source of irritation in the nervous periphery. As a familiar illustration of this principle we might cite the case of teething as a supposed cause of nervous seizures in children; but in order to appreciate it at all fairly in its application to megrim and neuroses generally, we must follow it rapidly from its origin in the ancient doctrine of sympathy, to its latest development in the modern reflex and inhibitory theories.

Three principal varieties of Sympathetic or Eccentric megrim have been more particularly described by writers on the subject—namely, Gastric, Uterine, and Ophthalmic—and it will be convenient to distribute what I have to say under these heads.

Gastric Megrim.—The general fact, that a source of disturbance, whether felt or unfelt, in one part or organ of the

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* "Clinical Lectures—Nervous System," p. 311, 2nd ed. 1856. Esquirol notices epileptic jaundice, but says, "La jaunisse, qui se manifeste avant ou après l'accès, se dissipe lentement; le malade se plaint d'une douleur à la region du foie, et vomit des matières jaunes. Hippocrate a signalé la bile comme cause de l'épilepsie."—*Mal. Ment.* i. p. 299.

body may be a cause of suffering or derangement in another more or less remote from it, attracted the attention of pathological observers from a very early period, and was recognised under the names of *συμπάθεια* by the Greeks, and *Consensus* by the Latins. The particular instance of this sympathy which more especially excited the admiration of our forefathers was the remarkable communion between the belly and the head—the "mirum inter caput et viscera commercium." Galen not only dwells upon the phenomena at length, but even goes so far as to attribute them, in this particular case, to the instrumentality of the nerves connecting the two. "For the head," he says, "communicates to the bowels and the bowels to the head their respective disorders, on account of the magnitude of the nerves which reach from the brain to the stomach, by which also an excess of sensibility over that of other portions of the body belongs to this limited region. And on this account, also, vomitings of bile follow on those injuries of the head which extend to the meninges."*

The doctrine that megrim thus arises by "consensus" from gastric or intestinal irritation is, next to the humoral, the oldest view of the malady we have, and is still very generally accepted. At first it was combined with the humoral hypothesis; bile was still regarded as the essential cause of the complaint: and while in some cases, as we have already seen, the humour was supposed to be diffused through the system or collected in the head itself, in others it was thought to be accumulated in the walls or cavity of the stomach, and to affect the head by sympathy. Thus Alexander Trallianus, in addition to the passages already quoted on Hemicrania from Bile, has a section "*On Hemicrania arising from Sympathy.* If megrim arises from sympathy with the stomach, either that organ itself being

* "Ἥ τε γὰρ κοιλία τῇ κεφαλῇ καὶ ἡ κεφαλὴ τῇ κοιλίᾳ μεταδίδωσι τῶν παθημάτων, διὰ τὸ μέγεθος τῶν ἐξ ἐγκεφάλου καθηκόντων νεύρων εἰς τὸ στόμα τῆς γαστρὸς, ὑφ' ὧν καὶ τό περιττὸν τῆς αἰσθήσεως ὑπὲρ τἆλλα μέρη τοῦ σώματος ὑπάρχει τῷ μορίῳ τῶδε. καὶ διὰ τοῦτο τοῖς κατὰ τὴν κεφαλὴν κατάγμασιν, ὅσα πρὸς τὰς μήνιγγας ἐξικνεῖται, χολεμεσίαι παρακολουθοῦσι." *Galen's Works* by Kuehn. Vol. viii. p. 179.

weak as to digestion or containing within it a bilious or phlegm-like material, and these humours moreover are not properly concocted: consider further whether it proceeds from a cold or hot distemper; if from a cold, warming remedies must be provided: if from a hot, cold and tempering ones."* Galen is even more explicit:—"How constantly do we see the head attacked with pain when yellow bile is contained in the stomach; as also the pain forthwith ceasing when the bile has been vomited." This principle of sympathy was moreover extended by Galen to the explanation of other neurosal affections besides headaches: "The best physicians are agreed," he says, "that these are not the only maladies in which the head is affected from the belly, but that the same thing occurs in epilepsy itself."†

It was very much in this form that the bilious theory continued to hold its ground even after the humoral pathology had been generally abandoned. At a comparatively recent period Dr. Fothergill, who as we have seen was himself a sufferer from sick-headache, lent the whole weight of his authority in support of this teaching.—"This disease," he states, "is very frequently treated as a nervous distemper, as an ague in the head, as a spasm (which indeed it appears to be), and perhaps considered as pertaining to other diseases. The manner and time of its attack [this refers to the fact of many sufferers waking with it] is after digestion is performed, and the chyle admitted into the blood, and the bile has acquired its full activity, undiluted by fresh supplies of liquid; the stomach and duodenum empty, and the nerves exposed to irritation; and, indeed,

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* Περὶ τῆς κατὰ συμπάθειαν γινομένης ἡμικρανίας. Εἰ δὲ κατὰ συμπάθειαν τοῦ στομάχου γένοιτο, ἢ ἀσθενοῦντος αὐτοῦ κατὰ τὴν πέψιν, ἢ περιέχοντος ὕλην ἐν ἑαυτῷ χολώδη, ἢ φλεγματώδη, καὶ μὴ πέπτονται καλῶς, σκόπει πάλιν πότερον διὰ θερμὴν δυσκρασίαν ἢ ψυχράν· εἰ μὲν οὖν διὰ ψυχρὰν δυσκρασίαν, ἀναγκαῖόν ἐστι διὰ των θερμαινόντων ποιεῖσθαι πρόνοιαν. Εἰ δὲ διὰ θερμὴν, διὰ των ψυχόντων καὶ ἐπικρατουντων [*var.* ἐπικεραινόντων].—Αλεξ Τραλ. Ββ. Α ιβ. Ed. Lutetiæ, fol. 1548. p. 13.

† Καὶ μὴν καὶ συνεχέστατα θεώμεθα τὴν κεφαλὴν ὀδυνωμένην ἐπὶ τῇ ξανθῇ χολῇ κατὰ τὴν γαστέρα περιεχομένῃ, καθάπερ γε καὶ παραχρῆμα γινομένην ἀνώδυνον, ἐμεθείσης τῆς χολῆς. . . . . συμπεφώνηται δὲ τοῖς ἀρίστοις ἰατροῖς, οὐ ταῦτα μόνον ἀπὸ τῆς γαστρὸς τῇ κεφαλῇ συμπίπτειν, ἀλλὰ καὶ τὴν ἐπιληψίαν. *Galen's Works* by Kuehn. Vol. viii. p. 189.

from numerous circumstances it is most clear that the headache proceeds from the stomach, not the reverse, as is the opinion of many who have been sufferers from it." He then goes on to observe that he has been much struck with the influence of certain articles of diet in producing the malady. There are some things, he says, in a passage already quoted, which, in very small quantities, seldom fail to produce the sick-headache in some constitutions. Such especially are melted butter, fat, spices, rich dishes, malt liquors, and so on. He attributes their operation to their influence on the generation or quality of the bile. "Bile, if very acid, will prove a stimulus sufficiently strong in many cases to excite sick-headache in a violent degree. There are habits in which the bile, if exceeding in point of activity, either from its bitter or its acid quality, will act as a purgative," and then the patients escape its ill effects on the head. "From these considerations it is evident that as the quality of the bile in a great measure depends on the quality of the food, regard being had at the same time to quantity; and that the disease we are treating of appears to arise from this cause, it is necessary to point out, as experience may direct, what kinds of aliment are most likely to add to the disease." Butter he held in special aversion—"Nothing more speedily and effectually gives the sick-headache, and sometimes within a few hours." On the same view he recommends for the relief of the paroxysm an emetic or cathartic, and for the treatment in the intervals mild laxatives and stomachic bitters: "Where acid bile abounds, the bitter and absorbent laxatives; where the bitter, salines generally are useful."*

We owe, however, to Tissot the most explicit statement of the gastric theory with respect to megrim which has appeared in modern times, and as his treatise on the malady is at the same time among the most complete we possess, and his views have exercised a similar influence in forming the popular opinion of the continent with those of Fothergill

* *Works*, 4to, pp. 597–603.

among English people, I shall translate them here—"The reasons," he observes, "which go to prove that the stomach is the prime cause of migraine and that the affection is almost always a sympathetic one, are—The repeated observations of those who have suffered from migraines, and of the medical men who have witnessed them. All patients remark that their stomachs are not as comfortable as usual on the approach of an attack; that if they are careful over them the attacks are not so frequent; that if they take anything which deranges the stomach the attacks are more frequent and severe.

"Persons who suffer from migraine and stomach derangement feel the migraine diminish in proportion as the stomach recovers itself. . . . . Almost invariably, on the instant the stomach discharges its contents, the pains cease, and we have seen patients prevent the attacks by gentle emetics or purgatives repeated from time to time." Tissot cites many authorities in support of his assertions, and then continues: "After these observations we can no longer doubt that by far the greater number of migraines are the consequence of some irritating agent in the stomach, which acts on the nerves distributed to the anterior and lateral parts of the head, and which appears especially to affect the ramifications of the supra-orbital branch of the fifth pair." "It is then most probable that a focus of irritation is formed by little and little in the stomach, and that when it has reached a certain point, the irritation is sufficient to give rise to acute pains in all the ramifications of the supra-orbital nerve. This phenomenon of one part suffering for another is doubtless very astonishing; but it belongs to the class of sympathetic phenomena which I have endeavoured already to explain.

"We have seen patients with whom pains produce, by irritating different nerves, disorders of sight, deafness, cutaneous eruptions, pains in all parts of the surface, oppressions, coughs, &c., without the stomach appearing to suffer. Migraines are an affection of the same kind; they differ in their symptoms, but not at all in their primary

cause. All the symptoms of extreme sensibility to all impressions, those of a convulsive tendency, and even convulsions themselves, vomitings, numbness, loss of memory, which accompany a violent, or are the result of repeated attacks, are readily explained by this law—that the irritation of a nerve readily communicates itself to all the others, and more especially to those with which it is particularly connected, and that nerves which are often irritated become functionally impaired. If by one consequence of the *laws of consensus,* the state of the stomach may cause all the branches of the supra-orbital nerve to suffer, an extreme degree of irritation of this nerve may, by virtue of the same laws, determine vomiting; and this vomiting becomes the remedy which thus, by an admirable arrangement, springs from the malady itself; the very violence of the pain extinguishes its cause."*

It would be easy to cite many other authors in support of the same view, but it would add nothing to its weight. On the other hand there have never been wanting those who have ably contested both the bilious and gastric theories, and regarded the malady as primarily a disease of the nervous system itself, and the disorder of the stomach or

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* I supply the original of the last extract :—"Il est donc vraisemblable qu'il se forme peu à peu un foyer d'irritation dans l'estomac, et que, quand il est parvenu à un certain point, l'irritation est assez forte pour donner de vives douleurs à toutes les ramifications du nerf sus-orbitaire. Ce phénomène d'une partie qui souffre pour une autre est fort étonnant sans doute; mais il rentre dans la classe des phénomènes sympathiques que j'ai cherché à expliquer plus haut. On a vu des malades à qui des douleurs occasionnaient, en irritant différents nerfs, des dérangements dans la vue, des surdités, des éruptions cutanées, des douleurs dans toute la peau, des oppressions, des toux, etc., sans que l'estomac parût souffrir. Les migraines sont une maladie du même genre; elles diffèrent par les symptômes, mais non point par la cause première. Tous les symptômes d'extrême sensibilité à toutes les impressions, ceux de convulsibilité, les convulsions mêmes, les vomissements, l'engourdissement, la perte de mémoire, qui accompagnent un violent accès, ou sont la suite d'accès souvent répétés, s'expliquent très-aisément par cette loi, que l'irritation d'un nerf se communique aisément à tous les autres, et surtout à ceux avec lesquels il a des connexions plus particulières, et que les nerfs souvent irrités s'affaiblissent. Si, par une suite des lois du *consensus,* l'état de l'estomac fait souffrir tous les rameaux du sus-orbitaire, l'extrême irritation de ce nerf peut, par une suite de ces mêmes lois, déterminer le vomissement; et ce vomissement devient le remède qui, par un cercle admirable, naît du mal même; la violence de la douleur fait finir sa cause."—*Traité des Nerfs,* p. 390.

bowels, if present at all, either as an effect or at most only as an accessory and very subordinate cause. Tissot has certainly mis-stated the facts when he says that patients almost invariably complain of discomfort in the stomach *preceding* the attacks, and that they can prevent their occurrence by care in their diet. We have a remarkable testimony to the contrary effect from successive generations of pathologists who have been themselves sufferers from the complaint. C. Lepois, one of the earliest of these, who has left us an excellent account of his own megrim as well as of many other cases, observes :—"Since the headache invariably precedes the abdominal pains and spasms, as I have experienced in my own case and that of others, and as will appear from the following narrative, it may be hence inferred that the head suffers idiopathically but the stomach and bowels by sympathy with the head."* Dr. John Fordyce, whose own sufferings made him an interested and faithful observer, says :—"Though some have supposed that the affection is exclusively excited by disorder of the upper abdominal viscera, which appear to sympathize in a remarkable way with the head ; yet I am inclined to think that it is generally an *idiopathic* affection, as systematic writers say ; for very frequently there is no antecedent nausea, nor flatulency, nor pain in the region of those viscera, nor any unusual confinement of the bowels."† So again Dr. Parry says of the headache "usually called Sick-headache, so well described by Dr. Fothergill ; this malady is generally conceived to originate from some derangement of the functions either of the liver or of the alimentary canal. The state of

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* "Quoniam porro convulsivos illos abdominis et hypochondriorum dolores capitis dolor prævertit semper, ut in me, aliisque sum expertus, et patebit in historia sequenti, obiter hinc elici potest caput per *ἰδιοπάθειαν* laborare, intestina autem, ventriculumque per *συμπάθειαν* capitis."—"*Obs. et consilia.*" *De morb. cap. int.* p. 90.

† "Etsi existimârunt nonnulli morbum hunc e præcordiis subditisve partibus solum-modo excitari, quibus cum capite arctissima quædam intercedit sympathia ; ego tamen illum plerumque idiopathicum (ut qui systemata condunt, loqui amant) potius esse autumarem ; quoniam sæpissime nulla ventriculi nausea, nec flatus, nec hypochondriorum dolor, nec alvi durities insueta præcedant."—*De Hemicrania*, § xviii. p. 85. 1758.

the stomach is however the effect and not the cause of the malady of the head which it never precedes; just as sickness and vomiting are the consequence and not the cause of the affection of the head produced by a blow on the cranium."* Lastly M. Labarraque passes a just criticism on M. Tissot's exclusive view, without denying the co-operation of gastric disorder in some cases:—"Not that we mean to assert that migraine never owns a gastric cause; certainly not: . . . . but when Tissot, who refers in his work to a number of similar observations, has been so struck with this circumstance that he admits no other origin for migraine, this is an opinion to which we cannot assent, in spite of the authority of a great name; for it is certain that among his numerous observations many cases are to be found where the gastric affection was consecutive to the migraine on one or more occasions: and in several others it is impossible to ascertain which of the two affections was consecutive to the other."† The result of my own observations on this matter has been already recorded in the previous history of the malady; in a large number of cases the seizures begin suddenly with disordered vision while the person is feeling as well or better than usual; the gastric disturbance may be entirely absent, and if present its normal order is last in the series of phenomena.

With regard, again, to Tissot's second point, the influence of diet in producing megrim, and of dyspepsia in general as a cause of headache, there is a great deal of evidence which is directly opposed to it, and, I may add, to the views which very generally prevail on this subject. In a previous chapter

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* "*Elements of Pathology*," vol. i. p. 244.

† "Ce n'est pas que nous voulions nier que, dans aucun cas, la migraine ne reconnaisse pour cause une lésion de l'estomac; non assurément. . . . . Mais que Tissot, qui parle dans ses œuvres d'une foule d'observations analogues, en ait été tellement frappé, qu'il n'admette pas d'autre cause comme point de départ de la migraine, c'est une opinion à laquelle nous ne saurions nous rendre, malgré l'autorité d'un grand nom; car il est bien certain que, dans le nombre de ces observations, il s'est trouvé plusieurs cas dans lesquels l'affection gastrique a été consécutive à une ou plusieurs migraines; et dans plusieurs autres, il est impossible de savoir laquelle des deux affections a été consécutive à l'autre."—*Essai, etc.*, p. 24.

I have indeed recorded a number of instances in which certain articles of diet appeared to contribute among other causes to the recurrence of the seizures (see p. 44), but on the other hand I have found many sufferers from megrim, probably a majority, who, notwithstanding the force of a long tradition, unhesitatingly deny the influence for better or worse of any dietary. But I can refer to better evidence than my own on this point: Dr. Symonds, in summing up the result of his observations on the dependence of headache upon dyspeptic states, already recorded at p. 57, concludes thus:—"The evidence is, to say the least, ambiguous and unsatisfactory. But if any decided inference is to be drawn from it, we must conclude rather against the existence of such a connexion in many of these cases, and we do not advance beyond the fact, that when there is the disposition to cephalalgia the digestive organs may afford occasion of excitement to that disposition."* I may also notice the results of an analysis of 100 cases of headache by Dr. Sieveking as having a similar bearing; out of all these, dyspepsia is assigned as the cause of only 8.†

In further confirmation of this view, the converse experience may also be cited: during many years' practice as an out-patient hospital and dispensary physician, where dyspeptic disorders and derangements of the bowels form no inconsiderable proportion of the cases which present themselves, I have been much surprised to find how comparatively rarely *well-marked* headache occurs as a symptom of such complaints. Dr. Parry has made a similar remark. "It may," he says, "without hazard be asserted that dyspepsia is so far from being usually a cause of headache, and other affections which pass under the name of nervous, that they rarely accompany one another."‡ The same fact has not escaped the acute observation of Willis, who cites it in precisely the same connexion. After recording a very typical case of sick-

* "Gulstonian Lectures," 1858.—*Med. Times and Gaz.*, May 15, 1858.
† *Assoc. Med. Journ.*, Nov. 9 and 16, 1855.
‡ "Elements of Pathology," vol. i. p. 244.

headache, hereditary and periodical, and terminating in bilious vomiting, he observes in support of its centric origin —"An injury to the head, as from a blow, wound, or fall, is generally followed by vomiting; whereas headache rarely or never follows mere sickness, heartburn, or other disturbance of the stomach, unless some disorder of the blood intervene."*

One way in which traditional error in such matters is propagated is, I am convinced, in many cases, by our faulty methods of interrogation. On the one hand, we are too apt to accept in the hurry of routine the inferences of patients for statements of fact; and on the other, we often wring from them conformity to our views by pressing them with leading questions or anticipating what they have to say. I remember being particularly struck with a passage from the writings of the late Sir James Clark on the subject of megrim. After accurately describing a typical seizure with blindness, aura, hemicranial pain and sickness, as a variety of dyspepsia, he concludes—"This class of headaches is common in delicate nervous persons, particularly females, when its immediate dependence on dyspepsia is often overlooked, but very generally the connexion is discovered upon minute inquiry into the circumstances of the case."† Now there are very few patients of the above class who might not be made to own to dyspeptic symptoms under "a minute inquiry" of this kind, but this would by no means justify the inference which it is sought to draw from it.

There are other circumstances in the history of megrim, as we have traced it in our earlier chapters, which suggest considerations fundamentally opposed not only to the gastric but to other forms of the sympathetic theory. It has been

* "Hujus rationem ut reddere suscipiam, imprimis constat, vomitionem capiti læso, nempe post plagam, vulnus, aut casum ab alto succedere; attamen vomitui, cardialgiæ, aut stomacho alias laboranti, dolor capitis, nisi intercedat sanguinis effervescentia, raro aut minime supervenit. Quamobrem in prædicto laborantis casu, cum plane liqueret, cerebri meninginas ad cephalalgias prædispositas fuisse."—"De An. Brut.," *Ceph. Cur.*, cap. ii. case viii. pp. 289-290. 12mo, Amstel. 1674.

† "The Sanative Influence of Climate," by Sir James Clark, 3rd ed. p. 18, 1841.

a principal object in this treatise to show the intimate relations of the malady it describes with the whole family of neurosal affections; and the facts of this relationship, and more particularly the transformations which we sometimes witness both in the family and in the individual, seem to indicate the neurosal constitution as too well-established a factor to be overlooked in any theory of its causation. The hereditary character alone, which is fully admitted even by Tissot himself, is hard to reconcile with his view. We know well that functional diseases of the nervous system are pre-eminently hereditary, but we have yet to learn how gastric or intestinal irritation from unwholesome food or disordered secretions can be a legacy from our parents.

Again, the tendency to a periodical recurrence which is so frequently observed in megrim, and the immunity secured to a patient for a certain time after a seizure, are quite in harmony with its nervous origin, but very difficult to explain on any hypothesis which assumes an accidental irritation to be the fundamental cause of the complaint.

I shall only notice one other point: it is, that even in cases where gastric or other local disorder is assigned as the cause of the paroxysms, so many other influences are allowed to have a like effect, that even on this ground we are compelled to look further than the stomach, and even deeper into the original constitution of the nervous system than any peculiarity of gastric innervation, for the essential cause of the malady. Thus, to take the single instance of emotion; this is admitted to be scarcely less efficacious than unwholesome food, yet who would now contend that its influence is to be referred to its effect on the viscera, or indeed to any but a central operation?*

On all these grounds we are led to adopt without hesi-

* On the older view, which attributed both passions and diseases to particular humours, such an operation of emotion was doubtless reconcilable with a gastric theory, and Bianchi tells of a man who, whenever he got into a passion, suffered from a violent megrim, which was terminated by bilious vomiting at the end of some hours. But though we still speak of a *choleric* person, the most ardent believers in biliousness would not accept the term in its literal sense.

tation the only view of the subject which appears consistent with the facts, and which can reconcile the discordant opinions which have so generally prevailed. It is, that so far as concerns the derangement of the stomach *attending the seizure*, and which is chiefly indicated by nausea and vomiting, this must be regarded as a feature of the paroxysm, as an effect of the nervous disturbance, and not at all as its cause; and while the occasional influence of an *antecedent* gastric or intestinal irritation or a particular diet in producing an attack is not denied, it is impossible to look upon these with Fothergill and Tissot as the principal cause of the malady. This must on the contrary be considered as a morbid tendency, rooted in the nervous system itself, and the gastric disorder as one among many occasional or determining causes of the seizures.*

But if any are disposed still to contend for a gastric or other local origin of megrim, on the ground that a distinction may be made between centric and eccentric cases, with reference not to the presence or absence of an extraneous source of irritation, but of a morbid activity respectively of the central and peripheric portions of the nervous apparatus concerned—not having regard so much to Fothergill's "acid bile" or "vitiated secretions" as to a

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* Dr. Symonds arrives at a conclusion which, as far as regards the general question, does not differ materially from this; but he makes a somewhat different application of it, which holds good, no doubt, for particular instances. Referring more particularly to that form of sympathetic headache, which arises in some persons from ice in the stomach, he says:—"In these cases of sympathetic headache, which are not disorders of extension, it seems to me that we cannot avoid the conclusion, that while there is a *special proclivity in the nerves of the brain to ache*, the sensibility is greater in relation to some impressions than to others. Thus, a person who could bear a prolonged fit of hard study, or a sudden shock to the feelings, or a strong light, or a loud noise, might suffer an intolerable headache from the irritation of a bad tooth, or from sitting in a draught of cold air. It is not wonderful that in such cases the remote irritation, when discovered, should be especially blamed; but we must still remember that the injury could not have been inflicted by the distant evil, had there not been a readiness in the cerebral nerves to be affronted by this particular impression. Yet it is fortunate for the subject that the susceptibility should respond to a single source of irritation, because the detection of the latter may sometimes be followed by the removal or prevention of the pain."—*Med. Times and Gaz.*, 1858, vol. i. p. 420. Unfortunately, as we have said, the source is seldom thus single in megrim.

morbid irritability of the gastric nerves—we can only say there is great difficulty in admitting the distinction; for it is probable that both centre and periphery share the morbid disposition, and co-operate in every nervous paroxysm like that of megrim, whichever be the point of departure; and on the whole the conclusion of M. Calmeil appears nearest the truth :—"En définitive, il paraît rationnel de conclure que généralement la migraine se rattache à une lésion double et simultanée du système nerveux central et périphérique, et que la cause matérielle prédomine tantôt à l'intérieur tantôt à l'extérieur de la cavité crânienne; bien entendu que le désordre peut affecter divers points du cerveau, différentes branches des conducteurs nerveux."*

In tracing the transition from the older principle of sympathy to the modern doctrine of the eccentric origin of nervous disorders to be presently considered, I have been much struck by the readiness with which a peripheral irritation has been at various times accepted as a sufficient explanation not only of megrim but of almost every form of neurosal seizure, apparently with little consideration of the possible mode of operation, or how so simple and uniform a cause could give rise to such varied phenomena as have been attributed to it. Passing over many varieties both of painful and convulsive affection, in connexion with which the principle in question has become too thoroughly naturalized in our minds to be fairly appraised, I cannot select a better illustration than the following :—It will be remembered that many years ago the late Dr. Bright and others endeavoured to explain the well-known association of chorea and other nervous affections with acute rheumatism, by regarding them as the effect of the cardiac complications which we now know to be such common incidents in the history of that malady. Dr. Bright's idea was that the pericardial inflammation acted as a visceral irritant, affecting the nervous centres through the phrenic nerve, much in the same way as worms in the

* "Dict. de Méd." en 30 vols. Tom. xx. p. 6.

bowels are believed to cause epilepsy. His paper contained instances of the occurrence not only of chorea, but of trismus, epilepsy, dysphagia, hysteria, and so forth, in connexion with cardiac inflammation by no means exclusively of rheumatic origin.* Dr. Babington adopted the same view, and illustrated it by additional examples.† A few years later Dr. Burrows, in his well-known work on the cerebral circulation, re-asserted and further extended the argument, regarding the vagus and not the phrenic as chiefly concerned in the production of the phenomena; he thus concludes his observations:—"From this collection of cases which I have analyzed and retailed in the present section, we learn that all those groups of symptoms (mania, coma and apoplectiform phenomena, epilepsy, trismus, aggravated choreic and hysterical symptoms) which indicate the most formidable diseases of the brain and spinal cord, may arise from the irritation of the nerves of the heart without any structural change in the nervous centres themselves. It would thus appear, to employ the words of Andral, 'that in consequence of individual susceptibilities, there is no organ the lesion of which may not determine the most varied nervous symptoms, producing as it were sympathetically those different morbid conditions, the seat of which we consider to be the nervous centres and their dependencies.'"‡

Here the significance of Andral's words, "in consequence of individual susceptibilities," seems to have been scarcely appreciated; the neurosal predisposition implied in them we now know to be conferred by, or intimately connected with the rheumatic constitution. The researches of Dr. Begbie and M. Sée have taught us that

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* *Lumleian Lectures*, 1836. "Cases of Spasmodic Disease accompanying Affections of the Pericardium."—*Med. Chir. Trans.*, vol. xxii. 1839.

† *Guy's Hospital Reports*, 1st Series, vol. vi. p. 411, 1841.

‡ I have here translated the passage which stands thus in the original:—"Qu'en raison des susceptibilités individuelles, il n'est point d'organe dont la lésion ne puisse déterminer les symptômes nerveux les plus variés, de manière à produire sympathiquement les différens états morbides dont on place le siège dans les centres nerveux et leurs dépendances."—*Disorders of the Cerebral Circulation*, by G. Burrows, M.D. 1846, p. 207.

chorea, and other nervous disorders, have an hereditary connexion with constitutional rheumatism, which is quite independent of cardiac complications; thus, a father may suffer from rheumatic fever, his child from chorea without rheumatism.* This I believe is merely a particular instance of a general tendency on the part of arthritic complaints to assume a neurosal development, or of neuroses to assume an arthritic one, in certain individuals of a family. A cardiac theory of chorea is now again in fashion, but it is no longer the nerves but the circulation which is regarded as the medium of communication between the heart and the brain, and embolism is assumed (far too generally I think) to be the cause of the nervous phenomena.

The danger of hasty inferences as to the sufficiency of mere visceral irritation to explain even far simpler forms of nervous disorder, is further illustrated by the remarkable history of Dr. Wollaston. He was accustomed to relate the following story of himself:—He had eaten some ice-cream after dinner one day, and his stomach did not seem to be capable of digesting it. Some time afterwards, when he had left the dinner-table for the drawing-room, he found himself rendered lame by a violent pain in one ankle. Suddenly he became sick, the ice-cream was vomited, and instantaneous relief of the pain followed its ejection from the stomach.† This story has been often quoted in proof of the sufficiency of gastric irritation to explain the occurrence of pains in distant parts, and if we knew nothing more of Dr. Wollaston's history, it would be difficult to resist the inference; but it has been well observed by Dr. Latham, that "a single entire case often furnishes the key to many *fragments* of cases," and we happen to know that Dr. Wollaston had a nervous system singularly prone to such neurosal attacks; we have already seen that he was a sufferer from blind megrim, and also from transient attacks of cerebral giddi-

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* *Monthly Journ. of Med. Sc.*, new ser., vol. i. p. 740, 1847; and *Mem. de l'Acad. Roy. de Méd.*, Jan. 15, 1850.

† "Lectures on Local Nervous Affections," by Sir B. C. Brodie, p. 11, 1839.

ness, which gave occasion to two interesting papers by himself, in the "Philosophical Transactions," one on half-blindness, and the other on sea-sickness, and we know further, that he ultimately died of a remarkable form of cerebral disorganization, in which his reasoning and reflecting powers were for a length of time most singularly retained. To these facts, and only in a very subordinate way to the effect of the ice-cream, we must look for an explanation of the phenomena which followed its ingestion.

Uterine Megrim. Next to the gastric, that form of sympathetic megrim which is supposed to arise in many women from ovarian or uterine irritation, is the most important. We have already seen that in a certain proportion of cases, the patients themselves attribute their attacks to some uterine cause, and that at all events the paroxysms with them are prone to recur at or about the catamenial period. This was the case with seven of the patients referred to in my table. Dr. Symonds' analysis of cases of headache, shows a large preponderance in women, and of these about half referred to their "monthly health," as in some way connected with the attacks. We have also seen that in most of the treatises on megrim, namely, those of Tissot, Calmeil, Labarraque, Fordyce, and Fothergill, this catamenial variety of the malady is distinctly described, while Van der Linden has devoted an entire treatise to a history and commentary on a case of "Hemicrania Menstrua."* Sir James Clark, too, who, as we have seen, identifies true megrim as a variety of dyspepsia, nevertheless mentions uterine irritation as a cause of similar seizures.

Moreover it is no unusual circumstance for megrim, in common with other neurosal affections, to be interrupted completely during pregnancy, and renewed again some time after delivery, occasionally with unusual severity; and this lends additional support to the general impression that

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* J. A. Van der Linden, *De Hemicrania Menstrua: Historia et Consilium.*

there is some real connexion between the attacks and the catamenial function. This was the case with my patient, Mrs. N.; her megrim was a monthly one, and was invariably interrupted during a number of consecutive pregnancies, always returning, however, with the return of the catamenia. We have already shown (see p. 179), that this interruption is also of frequent occurrence in the case of "uterine" epilepsy, and it has been sometimes observed in insanity.

There can then be little room to doubt the fact of a uterine influence in the case of megrim, so far as it is implied in a distinct connexion of the attacks with the catamenial function; and the same may be said of a great many other neurosal affections, as epilepsy, paroxysmal insanity, asthma, and various forms of neuralgia, in all of which we have already traced a more or less frequent dependence on the same cause. The only question then appears to be, how we are to interpret the facts; what is the character of the influence exerted, and to what extent is it the cause of the malady?

We may feel pretty confident that whatever be the nature of this influence in one form of neurosis, it will be essentially similar in all, since, as we have seen in the previous chapter, they maintain throughout the closest parallelism. Are we then to suppose, as has been very generally done, that the condition of uterine or ovarian excitement, when the menstrual function is naturally performed, and still more when exaggerated by circumstances of suffering and disorder, becomes a source of *local irritation*, and produces the malady just as in other cases gastric and intestinal disorders from bile or undigested food have been held to do?* Or, on the other hand, that the malady has an independent basis in the nervous system itself, and that the uterine influence, whatever it be, merely brings into

* Tissot, pushing the gastric theory to extremes, says:—"The megrim which occurs regularly at the catamenial period (before or after), depends on a consensus between the stomach and uterus."—*Œuvres Complètes*, par Hallé. vol. xi. p. 136.

activity a latent tendency, or determines the occurrence of the paroxysms?

Now most of the considerations which have been already adduced in opposition to the former view in the case of gastric megrim are equally applicable here, and it is scarcely necessary to repeat them. Take, for example, the hereditary disposition, which is as common in this, as in other varieties of the malady. I have known ordinary megrim in the father assume the most typical uterine character in the daughter, and it seems to me impossible to reconcile such facts with the doctrine of an eccentric origin in some local disorder. Again, how are we to explain why the same kind of local irritation shall excite megrim or clavus in one patient, and epileptic seizure in another, and a maniacal one in a third? The only satisfactory answer which can be given to such inquiries is the admission of some latent tendency to one or other form of derangement in the constitution of the nervous system itself.

But there are other considerations which should not be lost sight of in the particular case before us, and which tend to throw considerable doubt on the correctness of the conventional expressions which attribute this uterine influence to "irritation" at all. Catamenial neuroses are by no means necessarily or generally connected with any *derangement* of the uterine functions; there may be no irregularity, no morbid discharge, no dysmenorrhœa, no consciousness in fact of any disorder. This was the case with my patients Mrs. N., Sarah B., Sarah H., with whom the attacks of megrim recurred at the menstrual periods. The same circumstance is frequently observed in cases of catamenial Epilepsy and Insanity: if we turn to one of the best collections of epileptic cases on record, those of MM. Bouchet and Cazauvieilh, we shall find many in which the paroxysms were catamenial but in which the uterine functions were regularly performed.* Dr. Sieveking observes — "Even

* De l'épilepsie considérée dans ses rapports avec l'aliénation mentale. *Arch. Gén. de Méd.*, 1825–6, vols. ix. and x.; see especially Observations 3, 5, 72, 95, 99.

where no marked abnormity is to be detected in the character of the menstrual flow, we still, in women, often find a definite periodic character imparted to the epileptic seizures which precede or follow the catamenia. It is impossible to see any number of epileptic females and not to recognise the existence of some relation between their disease and the sexual organs. It is more difficult to determine the exact nature of the relation; whether it is simply indicative of a common debilitating cause, or whether it is to be regarded as the direct excitant." And of those cases which are accompanied by some uterine irregularity he adds—"Unfortunately when we succeed in curing the latter, the epilepsy still persists."* So Dr. Prichard remarks of hysterical or catamenial Insanity — "Many women who experience no interruption to the regular periodical return of the catamenia, display a degree of excitement and irritation in the system at the period of menstruation. . . . This often assumes a character resembling that of hysteria, and is attended with fits of crying and laughing; in other instances maniacal impressions take hold of the mind. . . . . These symptoms often disappear with the temporary circumstances which had given rise to them, but they are important as marking the tendency of the constitution and are sometimes harbingers of a more permanent disorder."†

Nor can it be said that the local plethora which is assumed to precede the discharge is a source of irritation in such cases, for the attacks sometimes precede and sometimes follow the hæmorrhage. As Tissot says:—"With many women, the migraine recurs before and sometimes

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* "On Epilepsy," p. 133.

† "A Treatise on Diseases of the Nervous System," by J. C. Prichard, M D., Sect. V. "*Of Mental Affections connected with States of the Uterine Functions*," p. 194.

So MM. Bouchet and Cazauvieilh observe: — "Tout le monde connait la grande influence physiologique et pathologique qu'exerce la menstruation sur l'encéphale sain et malade. Il était donc important de savoir si dans deux maladies qui affectent spécialement cet organe (l'épilepsie et l'aliénation mentale), le rapprochement pouvait se faire." To this they supply an affirmative answer.—*Arch. Gén. de Méd.*, vol. x. p. 37.

after the catamenia, and that every month.* So Van der Linden states of his patient—"She was attacked every month, generally when the menstrual flow was coming on, but sometimes when it was passing off."† Nor is it uncommon to find several attacks occurring in succession about the catamenial period, the disorder in this respect resembling catamenial epilepsy in which this type is very usual.

Lastly I would ask, how many uterine irregularities and known sources of irritation exist, and are followed by no nervous seizures whatever, for every single instance to the contrary? And do not considerations like these suggest that the influence in question is only one and that perhaps a minor element in the causation, while it is at least doubtful how far the idea of a local irritation at all corresponds with the actual conditions?

The other view of the nature of this uterine influence—namely that which regards the malady as having in all cases an independent organization in the nervous system itself, or in some limited nervous circle more particularly concerned in each neurosis, and which looks upon the return of the catamenial period merely as an accessory or determining cause of the seizures—this view is not open to the objections we have now recited, and is indeed the one we have adopted throughout this treatise, and have already applied to those instances of megrim which have the best claim to be considered as of gastric origin. Dr. Symonds came to very nearly the same conclusion from the examination of a large number of patients who connected their headaches in some way with their monthly health; his conviction was "that the menstrual function only acted as an exciting cause on an antecedent constitutional or neurotic susceptibility."‡

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* "*Traité des Nerfs*," p. 384.

† "Hæc, singulis mensibus, sæpius instante mensium fluxu, interdum cessante, corripitur."—J. A. Van der Linden, *De Hemic. Menst.*, p. 2.

‡ "Gulstonian Lectures," 1858. *Med. Times and Gaz.*, May 15, 1858. In another place he says:—"As far as my observation has gone, it is rare for headache to be produced by faults in the uterine function, unless there have been other agencies which have rendered the nerves of the brain irritable," p. 420.

One question still remains:—Admitting as we do a distinct catamenial influence though of a subordinate kind, and rejecting the notion of mere local irritation, what alternative explanation can be offered? There can be little doubt, I think, that the catamenial period—the period of ovarian and sexual activity in the human female—is intimately associated with, if not dependent on, a periodically recurrent activity of the nervous system. The return of the corresponding period in many of the lower animals—the pairing and rutting seasons—is marked not only by an increased development and functional activity in the organs of generation, but by other remarkable modifications of local nutrition in remote parts, more especially in the cutaneous system and its appendages, in the plumage, for example, of birds and the antlers of deer. There is, moreover, a very general excitement and increased functional activity throughout the system, and even the disposition, habits, and instincts of animals are altered or singularly intensified; animals become fierce which before were not so; instincts offensive and defensive as well as weapons are provided on the part of many males, those of construction and maternal provision on the part of females; other dormant faculties too come into play which tend to insure the meeting and communion of the sexes—such are the song and cry of some, the peculiar odours of others. It is very difficult to account for these phenomena unless we suppose the nervous system to be mainly instrumental in their production; for to the higher endowments of that system many of them are directly referrible, while the characters of intermittent activity and functional periodicity belong in an especial if not exclusive manner to the same system; and to it must also be referred that control and co-ordination of local nutrition in distant parts, through vaso-motor or trophic nerves, in subordination to the general design and economy of the whole, of which the phenomena in question afford so remarkable an illustration.

Now the catamenial period in the human female has

fundamental affinities with that of sexual activity in the lower animals, but the nervous phenomena are modified in conformity with the higher grade of psychical life, so that sentient and organic impulses become affiliated with ideational and emotional ones. "Among the causes of mental disturbance," writes Dr. Maudsley, "which it would be difficult to pronounce other than moral, but which are really due to physical conditions, are those incident to the great mental revolution produced by the development of the sexual system at puberty; when there occurs, as Goethe aptly expresses it, 'an awakening of sensual impulses which clothe themselves in mental forms, of mental necessities which clothe themselves in sensual images.'"* What is here said of the first establishment of the sexual functions holds good also in a minor degree for each recurring period of sexual activity; to repeat the words of MM. Bouchet and Cazauvieilh—"Tout le monde connait la grande influence physiologique qu'exerce la menstruation sur l'encéphale sain et malade."

It is then rather to this wide-spread periodical excitation of the nervous system, and not to any mere uterine irritation, or cerebral or general plethora pending the discharge, that I trace the manifestation of certain morbid tendencies on the part of that system, whether in the form of hysteria, megrim, epilepsy, or insanity, at those particular periods.

Ophthalmic Megrim.—In our account of the gastric theory we pointed out that the fact of a "sympathy" in suffering between distant parts had been taught as the result of direct observation at a very early period in the history of medicine, but we said little as to the channel through which this sympathetic communication was supposed to be carried on. The passage indeed already quoted from Galen shows that, in the very important instance of the stomach and head, the *nerves* which were seen to connect the two were regarded

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* "Reynolds's System of Medicine," vol. ii. p. 12, Art. *Insanity*, by Hy. Maudsley, M.D.

by him as instrumental in the production of the phenomena, but we do not find any uniform explanation of this, or indeed of any other kind suggested. "Galen," says Robert Whytt, "treats particularly of those diseases which arise from sympathy or consent; but he was so far from having any notion that sympathetic affections were owing to the nerves, that he ascribes those headaches which do not proceed from any fault of the head, to vapours ascending from the stomach or uterus. . . . . Riolan, who flourished before the middle of the 17th century, has not, with all his learning, made any improvement in the doctrine of sympathy; and his contemporary Riverius, ascribes sympathetic diseases to five causes — viz., the connexion, situation, vicinity, or similarity of the parts, or to their having the same kind of office."* Although Whytt in this passage does not do justice to Galen, he shows us what the teaching was at the period of the revival of anatomical studies. When however Willis, in his famous work on the Anatomy of the brain and the nerves, had distinguished the "Great Intercostal" from the 8th pair with which it had been previously confounded, and when the numerous ganglionic communications and so-called anastomoses between the cranial and spinal nerves, to which it so largely contributes, had been pointed out by himself and succeeding anatomists, it was thought that the key to all sympathetic phenomena, whether healthy or morbid, had been found in this anatomical connexion of the parts, and the "great intercostal" became afterwards known as the "great sympathetic."

This doctrine of the peculiar office of the sympathetic system has now for the most part been abandoned; moreover an anastomosis of nerves is no longer admitted, and most of the phenomena which were once explained by sympathy are now referred to the reflex faculty of the cerebro-spinal system itself; in a modified form however it still survives in some theories of megrim. This disorder has, in fact,

* Works, 4to, p. 504, note.

been frequently regarded as one of the cerebral *nerves;* not of their central origin and connexion in the brain itself, but of their subsequent course and numerous communications outside the cranium, more particularly those of the 5th, and organs of special sense, with the sympathetic and 8th, and so with the thoracic and abdominal viscera. Tissot's gastric theory, to which we have already referred, was apparently based on this view of the extra-cranial communications between the nerves of the stomach and those of the head; and M. Labarraque, though ably opposing the exclusively gastric origin for which Tissot contends, appears to have adopted a very similar view of the seat of the malady, for he regards it as consisting essentially in a morbid disposition of the cranial nerves, which may be brought into play by a source of irritation at various points —the stomach, the eye, or the frontal sinuses—through their sympathetic connexions.* Comparatively lately, in his lectures on headache, Dr. Symonds suggested "a transmission of the disorder from ganglion to ganglion" as an alternative view with that of "a radiation in the sensorial centres." He considers the ganglia in the immediate neighbourhood of the organs of special sense, in which the fibres of the 5th and sympathetic unite, and the nerves in connexion with them, to be the principal seat of disorder in megrim; and he regards the morbid action as diffused from one ganglion to another,—"from the ophthalmic

* "Peut-on d'après ce qui précède, établir quelle est la nature de la maladie? Si l'on se rappelle ce que nous avons dit sur les causes et sur les symptômes de la migraine, il est facile de voir que nous la considérons comme une affection toujours identique dans sa nature intime, comme un trouble dans l'innervation d'un ou plusieurs organes étroitement liés les uns aux autres, comme une névrose enfin, c'est à dire, comme une maladie dont le siége évident, à en juger par les symptômes, réside dans quelque partie du système nerveux, sans altération visible primitive de ce système. Mais quelle est la partie du système nerveux qui est la première assez modifiée dans sa manière d'être, pour réagir ainsi sur les autres?" He then shows that the stomach cannot be this exclusive seat, and continues:—"En outre, ces altérations des voies digestives ne sont pas, comme le croyait Tissot, toujours et nécessairement des gastrites. . . . . bien au contraire, nous n'y voyons le plus souvent qu'une névrose de cet organe, laquelle réagit, *en remontant le système nerveux ganglionnaire, sur certaines parties de la cinquième paire cérébrale.* . . . . En résumé, la migraine est une névrose du système nerveux de la tête, dans laquelle on peut établir plusieurs variétés."—*Essai, &c.*, p. 37–39.

to the spheno-palatine, the otic, the gasserian, and the cephalic."*

My present intention is to notice rather more fully only one view of this kind—namely, the *Ophthalmic Theory*, chiefly because it has been put forward by an eminent French pathologist, M. Piorry, who was the first to describe particularly the visual phenomena. He considers the malady, or at least one of its varieties, to be developed sympathetically from irritation of the optic nerve occasioned by straining the eyes, whether from prolonged use on small objects or from excessive or defective illumination. We have already had occasion to refer in several places to the life-like description of the seizures which M. Piorry has drawn, we are now only concerned with the explanation he gives of the phenomena. Having before observed that persons of weak sight, those employed in ill-lighted rooms, those who read and write much, working people who lead a sedentary life and have their attention constantly fixed on objects badly lighted, or of very small size (such as literary men, clerks, needlewomen, and compositors), are the principal sufferers; and after noticing the contraction of the pupil and redness of the lids observed in some cases, like that which follows irritation of the eyes from long watching and close study, he continues—"After the preceding facts, the idea which

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* *Gulstonian Lectures on Headache*, 1858. "Med. Times and Gaz.," vol. xvi. 1858, pp. 419, 496. In another passage, referring to the headache produced by ice in the stomach, he asks:—"Is the impression which has been made on the gastric nerves by a lump of ice allowed to pass over the encephalic cells related with those nerves without being converted into a sensation, while on reaching the cells related with the sensory fibres of the first branch of the fifth nerve it causes a state which is felt in this nerve as neuralgia? Is this the probable route, or is there not another equally probable? If we admit that impressions are exchanged between different ganglia, may we not conjecture that the impression made by the ice on the gastric nerves instead of running along the nearest *rami communicantes* to the spinal ganglia and thence up the sensory tracts to the sensorium, or if you please by the more direct course of the vagus; instead of either of these courses, I say, may we not conjecture that the impression takes its route up the chain of sympathetic ganglia, making no disturbance till it reaches the ophthalmic ganglion, which being in a susceptible state undergoes a certain change, which change, on being imparted to its sensory nerves, excites a sensation of pain referred to the parts over which the sensory nerves of that ganglion are distributed?" p. 420.

I have formed of the migraine I have described is this. An exciting cause acts on the retina and the iris; the nervous condition is modified; a morbid action is set up which is manifested by oscillations, the vibratory movements of which I have spoken; these spread themselves from the smaller circumference of the iris towards the greater; hence the appearance of a gradually expanding luminous circle. To what other organ than the iris could the rounded form of the image be referred? So long as the disorder is limited to that part there is no pain; later on the morbid action extends to the fifth pair, the influence of which on vision since the researches of M. Magendie can no longer be disregarded; then the pain becomes keenly felt. If the mischief is limited to these nervous ramifications there is no vomiting; but if, by *anastomotic communications,* the great sympathetic and eighth pair share in the suffering, nausea, and the ejection of the contents of the stomach occur. Lastly, if it happens that the nerves of the tongue, of the face, and of the limbs, are likewise the seat of the affection of which the eye was the starting-point, those parts become the seat of vibrations which are felt as oscillatory sensations."*

M. Piorry then proceeds to relate the following cases, which appear to him to lend support to his ophthalmic theory; they have been already briefly noticed:—"A phy-

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* "D'après tous les faits précédens, l'idée que je me forme de la migraine que je décris, est la suivante: Une cause excitante agit sur la rétine et l'iris; l'action nerveuse est modifiée; il se déclare une sorte de travail manifesté par les oscillations, les vibrations dont j'ai parlé; celles-ci se portent de la petite circonférence de l'iris vers la grande; de là ce cercle lumineux, qui s'agrandit de plus en plus. A quel autre organe que l'iris pourrait-on rapporter la forme arrondie de l'image? Tant que le mal est borné là, il n'y a pas de douleur; plus tard, le travail pathologique s'étend à la cinquième paire, dont l'influence sur la vision, depuis les travaux de M. Magendie, ne peut plus être méconnue; alors les douleurs se déclarent avec énergie. Si la lésion se borne à ces branches nerveuses, il n'y a pas de vomissement; mais si, par les communications anastomostiques, le grand sympathique et la huitième paire participent à cette souffrance, les nausées et l'expulsion des matières contenues dans l'estomac ont lieu; enfin, s'il arrive que les nerfs de la langue, de la face et des membres soient aussi le siége de l'affection dont l'œil a été le point de départ, surviennent dans ces parties les vibrations, les oscillations dont on éprouve la sensation."—*Mémoire, etc.* "*Du procédé opératoire à suivre, etc.,*" § 822, p. 415.

sician frequently experienced attacks of this affection when giving a medical lecture at two o'clock. He was accustomed to lunch at one o'clock, and then to proceed to the lecture-room, where he made use of notes written in a very small hand. He discontinued his lecture for eight days, and during that period he had no migraine. On the ninth day he again proceeded to read from his notes: the migraine reappeared. He remained a month without resuming this occupation, and for a month he was free from the malady, which returned the day he recommenced as before. Since then he has repeated the experiment over and over again; it was always sufficient to read a few lines at the moment of stomach digestion to determine the neurosis which is the subject of this memoir."* He afterwards observes that "it is in two conditions of the stomach, either when full or empty, that the least exertion of sight is sufficient to determine an attack of this ophthalmic neuralgia in those who are subject to it."

The second case he relates is that of "two young women who often sat up late at night reading, and who were attacked next morning, so soon as the daylight struck on their eyes, which had been previously fatigued, with obscurity of vision, followed by migraine." We regard this instance with M. Labarraque as far less conclusive than the last; for, as he justly observes, "we are not informed what may have been the nature of those engrossing readings; and if it is established that fatiguing the eyes can determine accessions of migraine, it is no less certain, we think, that the malady may also depend on over-excitement of the brain, for which the prolonged reading of one of those productions of a distracting literature, against which there is a wholesome reaction in the present day, would very well account."†

In explaining his views of the nature of megrim in the above memoir, M. Piorry has stated very distinctly his opinion, that the particular form of the malady which is characterized by the remarkable disorder of vision so often described, is

* *Mémoire, etc.*, pp. 407, 408. † *Essai, etc.*, p. 27.

essentially a "neuralgia of the eye,"* an "ophthalmic neuralgia,"† and that the primary seat of disorder, or its point of departure, is the iris. He even goes so far as to suppose that the shape and centrifugal expansion of the spectral appearance are referrible to the form of the iris, which he seems to suggest is itself in some way the object of vision, though how this could be it is somewhat difficult to conceive.‡ It is not a little remarkable that the late Mr. Travers, whose description of aphasic and hemiplegic megrim in his own person has been already given, also states that one of his patients under somewhat similar circumstances accurately described to him an appearance he had witnessed, which he, Mr. Travers, had no difficulty in identifying as the *zona minor iridis*.§ I repeat that it appears quite incomprehensible how his own iris could, under any circumstances, become an object of vision to the patient; but the consideration is no longer of any moment, since no one who has compared M. Piorry's with the other descriptions we have given of the visual phenomena in megrim will have any difficulty in recognising the same appearances in all, and their purely subjective and spectral character will scarcely be questioned.

Assuming the iris to be the starting-point of the disorder, M. Piorry proceeds to describe its subsequent extension and the successive implication of various nerves. On this M. Labarraque observes—"M. Piorry concludes that the different phenomena of migraine can always be explained by the physiological relations which exist between the nerves of the iris and those of the fifth and eighth pairs. M. Andral thinks this is often the case, but that

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* *Mémoire, etc.*, p. 413.

† Idem, pp. 414, 407. In a later treatise (*Clin. Méd. de la Pitié*) he suggests the name *Iralgia*. "La maladie pourrait être appelée *iralgie*, nom plus convenable que celui beaucoup plus long que je lui avais d'abord donné (*monophthalmalgie*)."

‡ He repeats the same idea in the *Clin. Méd. de la Pitié*:—"La forme de l'image ne permet guère de douter que les nerfs iriens ne soient le siége de la maladie," p. 306.

§ "Diseases of the Eye," by B. Travers. 1820. Sect. on Muscæ and Ocular Spectra.

there are no grounds for concluding that it is always so. We entirely agree," he continues, "with the opinion of the learned professor; we believe that the migraine of M. Piorry, which he designates *monophthalmalgie*, has a real existence and is not, as was formerly supposed, a deviation or anomaly of true migraine."* M. Piorry, however, has been careful to guard himself against misinterpretation on this point; he professes to describe and explain but one form of migraine, and he fully admits that other parts besides the eye, the nerves of the stomach for example, may be the primary focus of disorder in other varieties of the malady: "We must believe," he says, "that the iris or the nerves of the eye are not the only points of departure for migraine. Both analogy and certain facts mentioned by authors lead me to think that the same lesion may have its source in all the other organs of sense."†

For our own part, we have endeavoured to show that the different varieties of megrim are essentially one and the same disease, and that the particular form of seizure which is attended by the disorder of sight so well described by M. Piorry, is not a distinct affection requiring a special irritation of the retina or iris for its production, but is connected by transitional forms with all the other varieties of the malady, their differences depending on the extent to which the sensory ganglia of the brain are involved in the disorder; the local irritation, whether ophthalmic or gastric, not being essential to any particular form, and merely acting as the exciting cause of the seizures.

Again, as regards the sufficiency of the "anastomotic communications" between the different nerves to explain the various phenomena, M. Piorry has very much qualified

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* *Essai, etc.*, p. 39. "Il conclut que la migraine peut toujours s'expliquer par les rapports physiologiques qui existent entre les nerfs de l'iris et ceux de la cinquième paire et de la huitième. M. Andral pense que souvent il en est ainsi, mais que l'on n'est pas fondé à soutenir que cela arrive toujours; nous nous rangeons tout à fait de l'avis du savant professeur; nous croyons que la migraine de M. Piorry, qu'il appelle *monophthalmalgie*, existe bien réellement, et n'est pas, comme on le croyait avant lui, une déviation, une anomalie de la véritable migraine."

† *Mémoire, etc.*, pp. 422 and 406.

his previous statements by the following passage on the same subject in another part of his work. "I do not think," he says, "that the seat of the malady, essentially neuralgic, is ordinarily in the brain; I believe I can show that the eye is its most frequent point of departure; but it is certain that a series of consecutive symptoms manifest themselves which announce that the encephalon and its dependencies suffer. Excruciating pain in one organ of sense, and extending towards the cranium; hallucinations of sight, which is disturbed; consecutive vomitings; sometimes a kind of painful vibration which spreads through one-half of the body, and which mounts up from the fingers or toes towards the trunk: such are the principal symptoms which occur, and which do not allow us to disregard the implication of the nervous system."* It seems to have occurred to him on further reflection that nothing but a disorder of their central connexions could explain the successive implication of so many nerves, so remote in their distribution, as those concerned in the typical megrim paroxysm.

Lastly, M. Piorry maintains, with very good reason, that his view of migraine, as taking its rise from an irritation of the iris, is quite in harmony with the generally accepted doctrine, which traces various forms of neuralgia and other nervous seizures to peripheral irritation; for example, sciatica, toothache, tetanus, hysteria. "And epilepsy itself," he asks, "has it not often a point of departure in the aura epileptica? might not this point of departure be the eye in some cases?"† In a much more recent paper (*Comptes Rendus*, 1859) M. Piorry has resumed this subject, and refers to numerous confirmatory observations he has made since his views on megrim were first put forth. The drift of these is to show that any excessive stimulation of the eye may occasion not only megrim but other nervous paroxysms, as hysteria and epilepsy; in fact, to use his own words, the entire group of "accidents symptomatiques

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* *Mémoire, etc. Du procédé opératoire, etc.*, § 795, p. 399.
† Idem, § 837—839, p. 424.

réunis sous les dénominations d'épilepsie et d'hystérie." He refers more particularly to some cases of epilepsy where the attacks were produced by looking at the sun.* "It is manifest," he continues, "that from 1828 I have established the influence of vision, or the sight of highly luminous bodies, on the production of a *vibratory circle* observed in ophthalmic migraine; on the manifestation of epilepsy and even of catalepsy. I have even established that hysteria takes the epileptic character only in those cases where the disease reaches the retina." He concludes by observing that he can produce the appearance of a luminous circle,

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* *See Mémoire sur la Nature de plusieurs Névroses.* "Clinique Médicale de la Pitié," 1835, p. 295, etc. In this treatise M. Piorry contends for the origin of all neuroses in some peripheral affection of the nerves. He describes a case of Migraine exactly like his own, and he also refers to a memoir by M. Pelletan on the same subject which I have been unable to meet with in London. The author, as in so many other instances, appears to have been a sufferer himself, and confirms M. Piorry's account of the visual and other phenomena. "M. Jules Pelletan, to whom we are indebted for a very excellent treatise on Migraine . . . . has recognised in his own case, and in that of several other patients, exactly the same occurrences as those I have pointed out, and has traced the same succession of nervous phenomena as those recorded in the preceding case. In that instance, as in so many others, there is an excitation of the nerve fibres of the eye or iris; it would seem that afterwards the nervous centres are affected [there was a degree of stupor], then that there is an extension of the disorder, either to the eighth pair or to the sympathetic, and a secondary influence on the viscera."

M. Piorry goes on to say that the influence of light in the production of Asthma and other nervous disorders, pointed out by Laennec in a passage I had cited before I met with this reference to it (see p. 181), will admit of a similar explanation.

The cases of Epilepsy to which he refers are, one from Maisonneuve (also mentioned by Esquirol), where a child became epileptic from looking at the sun; the other is as follows:—"A man, about forty years of age, robust, with weak sight, admitted in the course of last autumn into St. Joseph's ward of *La Pitié*. He was just recovering from an epileptic fit, and at the time of his admission some symptoms of cerebral congestion still remained. . . . . This is the information we obtained from him: Looking at a bright light, and being dazzled, were the only circumstances which determined the invasion of the malady. When these causes were absent he never had an attack; but he was sure to have one immediately he looked at the sun, or a very bright object, or even when he fixed his sight very attentively on any object for some length of time. He could, he said, produce his epilepsy at will: he had only to expose himself to the influences he assigned as the cause of it." "Comparing the preceding facts," continues M. Piorry, "with the case of Iralgia (migraine) and the phenomena of the same kind observed by M. Pelletan and myself, we become aware of a close analogy between them, and that if one of them, as we think we have proved in the case of Iralgia, is a neuralgia, there is good reason to think that the same is the case with the others," pp. 306, 322. He even goes so far as to suggest

which he long since described as the initial phenomenon of migraine, both by fixing his sight intently on some object and by reading.*

To sum up; if we modify M. Piorry's views so far as to consider the disorder he describes as not differing essentially from other forms of megrim, and the visual appearances as strictly spectral and subjective; if moreover we consider the central connexions of the nerves in the brain, and not their subsequent 'anastomoses,' to be the medium of communication between them and the cause of their successive implication; and lastly, if we regard the use of the eyes as one among many occasional causes of the seizures, and not the exclusive cause of the 'ophthalmic' variety; there will then remain little to which exception can be taken. There is certainly no reason why the local impression, whatever it be, which favours the occurrence of a paroxysm should not have its seat in the eye as well as in the stomach.

This last point, however, deserves a little further consideration. M. Piorry shows, and in this he is confirmed by others, that the use of the eyes under certain circumstances will occasion megrim and even more formidable nervous seizures; but what is the nature of this influence, and how does it operate? M. Piorry supposes that the retina or iris or both being over-stimulated become the seat of 'irritation.' It may be so sometimes. There is, however, another and more probable explanation which may be given, at least in many instances. It is now far better understood than it was when M. Piorry wrote, that certain disorders of

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that the difference between his migraine and epilepsy is that in the latter the disorder is propagated by the short course of the optic nerve to the brain, and in the former it follows the sympathetic nerves:—"Le peu longueur du nerf optique expliquerait ce fait, et l'iralgie pourrait bien être la névralgie des nerfs ganglionnaires, tandis que l'épilepsie serait celle de nerf optique," p. 326.

* "Il résulte manifestement de ces dates et de ces travaux: Que depuis 1828 j'ai établi l'influence de la vision ou de la vue des corps très-lumineux, sur la production du *cercle vibrant* observé dans la migraine ophthalmique; sur la manifestation de *l'épilepsie* et même de la *catalepsie*. J'ai même établi que *l'hystérie* prenait le caractère épileptique seulement dans les cas où le mal parvenait à la rétine."—*Comptes Rendus de l'Acad. Roy. des Sciences.* Dec. 1859, p. 987.

accommodation and refraction in the eyes may be the unsuspected cause of much nervous suffering and disorder. Hypermetropia especially is constantly overlooked in early life, the patient correcting the optical defect by a continuous effort of accommodation. But the persistent spasm of the accommodatory apparatus which is thus produced becomes sooner or later the occasion of severe neuralgic paroxysms, giddiness, and sometimes other nervous seizures, and this is especially apt to occur if the general health fails or the eyes have been more than usually taxed.

The accommodation of the eyes for distinct and harmonious vision is a very nice piece of consensual mechanism, involving the co-operation of many cerebral nerves, intimately connected with those parts of the brain to which the phenomena of megrim and other neurosal paroxysms are more directly referrible; but besides this it has been often observed that the attempt to accomplish a nicely adjusted act, or difficult piece of motor co-ordination of quite another kind, has been followed in persons of nervous constitution by a serious disturbance of the sensorium. This did not escape the acute observation of Dr. M. Hall: "I have known," he says, "the attempt to untie a very small knot induce a feeling of sickness;" and I may add that in a gentleman of my acquaintance a similar effort has on several occasions produced a sensation in the chest of the most intolerable kind—a spurious angina pectoris—which compelled him to desist. We all know the distressing spasms into which some unfortunate stammerers are thrown by their efforts to articulate. The giddiness which is instantly produced in some persons by looking through a stereoscope or glasses which do not suit their sight, is a fact still more nearly related to that to which we refer.

Some time since I was consulted about a young gentleman in whom a fit, apparently of an epileptic character, had been occasioned by an effort to read small print, and a renewal of the attack was afterwards threatened whenever he repeated the attempt or applied himself much to read-

ing. Here there was evidently some degree of hypermetropia, the effect of which had been heightened by debility and the asthenopic condition into which he had fallen; to this I directed my treatment, desiring him at the same time to obtain suitable glasses. Not having heard of any return of the seizures I am willing to believe in a favourable result.

The key to many such cases of megrim as M. Piorry has recorded will be found, I believe, in such conditions of vision as those to which I refer. The last illustration he has given of "ophthalmic migraine" lends additional confirmation to this explanation, though in this instance the visual defect was myopia, and the symptoms were not strictly those of megrim:—"Dr. D—— had long used concave No. 10 glasses; they suited him perfectly, but when travelling in Russia the glasses were broken, and he was obliged to replace them on the spot by other concave glasses of unknown strength, probably approximating No. 10, since they suited his sight, but really differing as we shall see. It was about five or six months after that Dr. D—— wished to obtain new glasses at Paris (*chez* Lerebours): he naturally selected No. 10 as those which suited him best, and the trial he made on the instant seemed to justify his choice. Some days after, wishing to use his glasses, he began to experience, at the end of an hour or two, a sense of weight and a very painful constriction in his eyes; the sight was clear, but rather painful to sustain; in the evening Dr. D—— removed his glasses to go to bed; the headache remained and appeared to increase; artificial light was difficult to bear; in darkness a kind of luminous aureola seemed to appear and disappear from time to time; at the same time an oppressive pain was felt in the region of the frontal sinuses. All night there was intense and general headache, and loss of sleep. The following morning a slight sense of dazzling remained, and he found it impossible to devote himself to study. Dr. D—— resumed his ordinary glasses, and from that time the headache declined. About fifteen days afterwards Dr. D—— repeated the experiment, to

convince himself of the reality of the cause; the same symptoms recurred during the day and night; the next day they gradually disappeared."*

Modern Reflex and Inhibitory Doctrines.—I should leave the foregoing sketch of the doctrine of sympathy and of the eccentric origin of various neuroses very incomplete, were I to omit to notice the modern theories which at present replace the older views; their consideration, moreover, will serve as a fitting introduction to the different forms of vascular hypothesis with which they are more or less closely connected, and which will form the subject of the next section.

Nearly a century ago the insufficiency of the 'sympathetic' connexion of nerves to account for the various phenomena attributed to it, both healthy and morbid, was pointed out by Robert Whytt; he maintained the independence and continuity of nerve fibres throughout their course, and ably argued that the "sensorium commune," or that portion of the brain and spinal cord from which the nerves originate, is the only channel of communication between them; but he attempted no further explanation of the phenomena than that of referring them to the unconscious operation of a sentient principle therein residing.†

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* *Mémoire, etc.*, p. 408.

† "Although it may appear," he says, "that all real consent between the different parts of the body is owing to the nerves, yet it will be found very hard to account particularly for the various instances of sympathy, either in a sound or morbid state. The prevailing opinion has been that these sympathies are owing to the communications between the nerves, and particularly to the connexions which the intercostals [sympathetic] have with the fifth, sixth, and eighth pairs, and with almost all those which proceed from the spinal marrow. Upon this principle it has been thought easy to trace the various sympathies, not only between the several parts of the abdomen, but also between them and the head, neck, thorax, and extremities. But however plausible this theory may appear at first view, and how readily soever it may seem to explain many remarkable instances of consent, yet a more strict examination will show it to be liable to insuperable difficulties." After giving his reasons he continues—"If therefore the various instances of sympathy cannot be accounted for from any connexion or anastomosis of nerves in their way from the brain to the several organs; and if there are many remarkable instances of consent between parts whose nerves have no connexion at all; it follows, that all sympathy must be referred to the brain itself and spinal marrow, the source of all the nerves."—Works, 4to, p. 504—510, sec. 14, 15.

His illustrations, however, are highly interesting and instructive. About the same time Prochaska, who had been led to take a similar view of the "sensorium commune" and its functions, first introduced the idea of *Reflection* in connexion with nervous actions of this kind: he speaks of an impression transmitted by sentient nerves and reflected by the sensorium in combined and adapted movements.*

Both these authors offered their respective views in place of the sympathetic doctrine then current, and in explanation of the various phenomena, healthy and morbid, which had hitherto been explained on that principle. I need not dwell on the great development which was given to this idea of reflection about forty years since by the researches of Dr. M. Hall; his doctrine of the "true spinal" or "diastaltic" system, with its series of "incident-excitor" and "reflex-motor" nerves, gave a precision to the principle which it never had before, while he applied it with much ingenuity and happiness of illustration to the explanation of the principal automatic and conservative actions of the economy, as well as of many convulsive and spasmodic disorders; the latter were readily seen to be the direct result of the perversion of the "true spinal" function, while the share taken in their production by any form of peripheral

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* One passage from Prochaska on this subject is of so much importance in connexion with our present inquiry that I supply it here—"The external impressions which are made on the sensorial nerves are very quickly transmitted along the whole length of the nerves, as far as their origin; and having arrived there, they are reflected according to a certain law, and pass on to certain corresponding motor nerves, through which being again very quickly transmitted to muscles, they excite certain definite motions. This part, in which as in a centre, the sensorial nerves as well as the motor nerves, meet and communicate, and in which the impressions made on the sensorial nerves are reflected on the motor nerves, is designated by a term, now adopted by most physiologists, the *sensorium commune*. . . . . The reflection of sensorial into motor impressions, which takes place in the sensorium commune, is not performed according to mere physical laws, where the angle of reflection is equal to the angle of incidence, and where the reaction is equal to the action; but that reflection follows according to certain laws, writ, as it were, by Nature on the medullary pulp of the sensorium, which laws we are able to know from their effects only, and in nowise to find out by our reason."—Chap. iv. Sec. i. p. 429 (Sydenham Society's Transln.) Prochaska's sensorium commune included the medulla oblongata, the crura cerebri and cerebelli, and part of the thalami optici, with the whole of the medulla spinalis.

irritation was in perfect harmony with the notion of incident-excitor nerves.*

It will be observed, however, that neither the views of Prochaska nor of Dr. M. Hall were directly applicable to the explanation of any but *convulsive or motor* disorders, and fell short in this respect of the vaguer but more comprehensive doctrine of sympathy, which was still in part retained. In order to make his system available for the explanation of other pathological phenomena, involving the derangement of sensory or ideational consciousness in any of its forms, Dr. Hall was obliged to make these the secondary effects of muscular spasm, which he supposed to operate by compressing the veins of the neck, and producing various degrees of cerebral congestion. "I repeat," he writes, in one of his latest lectures, "that disorder or disease of the spinal system can only affect the encephalon through the nerves and muscles of the neck."† We shall return to the consideration of this ingenious but very imaginative hypothesis when discussing the vascular and congestive theories in the next section, to which it more properly belongs.

I pass on to notice a further development which has been recently given to the principle of eccentric or peripheral irritation and central reflection in order to account for the phenomena of almost every form of functional nervous disorder, and which is more particularly associated with the name and researches of Dr. Brown-Séquard. According to this view an irritation of any centripetal or afferent nerve

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* As early as 1836 Dr. Hall wrote—"The first remark I would make is a very comprehensive one. I believe that the whole order of spasmodic and convulsive diseases belongs to this the excito-motory division of the nervous system—and that they cannot be understood without a previous accurate knowledge of this system."

"Another remark is equally important. All these diseases have their source in one of three parts of the excito-motor system: The first series have their origin in the spinal marrow itself, the axis or centre of the system; I shall designate these cases by the term *centric;* the second series have their source in the excitor nerves, consequently at a distance from the centre; I shall denominate them the *eccentric.* A third series occurs, like the spasmodic tic of the seventh pair, in the course of the motor nerve."—*Lectures on the Nerv. Syst. and its Diseases*, 1836, p. 38.

† *Synopsis of the Diastaltic Nervous System*, 1850 (Preface).

may produce a morbid impression on the centre to which it belongs, and be thence reflected or transmitted to other nerves, or centres, according to its particular connexions; and thus give rise to pain or spasm, to anæsthesia or palsy, to various local disorders of nutrition and secretion, or to deranged ideation and mental phenomena, according to the particular nerves and centres involved in this chain of morbid activity. Such at least appears to be the interpretation we must give to passages like the following: "I shall not insist," observes the distinguished physiologist I have named, "upon the demonstration of the influence that an irritation of almost every centripetal nerve may have on the production of nervous affections, which show that a change in the nutrition of the nervous centres has taken place. In one of the lectures I have still to deliver I will show, by an *immense* number of recorded cases, that insanity in its various forms, epilepsy, chorea, catalepsy, extasis, hydrophobia, hysteria, and all the varieties of nervous complaints, may be the result of a simple, and often slightly felt, irritation of some centripetal nerve. I will also then prove, or at least endeavour to prove, that it is by a reflex action of the cerebro-spinal axis on itself, through the nerves going to its bloodvessels, that this irritation acts to alter the nutrition of this nervous centre." "As regards the influence of the irritation of centripetal nerves on the nutrition of the senses, I will refer to what I have already said of amaurosis, adding only that the influence by which worms acting on the bowels cause the paralysis of the retina is just the same as that by which a neuralgia acts in causing the same effect. Deafness has also been caused by an irritation of the nerves of the bowels, as it has been in two cases of facial neuralgia."*

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* *Lectures on the Physiology and Pathology of the Central Nervous System*, by C. E. Brown-Séquard, M.D., F.R.S., Philadelphia, 1860, p. 166-67. These passages on the effects of the irritation of a centripetal nerve in the production of every form of neurosis may well be compared with that we have already given from the work of Dr. Burrows, p. 246, and with M. Piorry's views, p. 263 (note).

Here indeed we seem to recognise a principle rivalling in its comprehensiveness, and in the variety of phenomena to which it is applicable, the older doctrine of sympathy itself. In comparing it with the forms of reflex and eccentric theory hitherto noticed, we find an entirely new element introduced—namely, the operation of vaso-motor nerves on a contractile system of vessels pervading even the nervous centres; and what Dr. Marshall Hall accomplished in neurosal pathology by his coarse hypothesis of muscular spasms, and the compression of jugular and vertebral veins, is here achieved with far more completeness and ease by a refined and delicate mechanism comprised in the organization of the nervous system itself. But we must not forget that after all there is necessarily much which is conjectural in this view, and that it is no less exclusively motorial and purely mechanical than that of Dr. Hall.

In another aspect, too, this theory is new: it readily explains not only pain and convulsion, but anæsthesia and palsy; not only an exaltation or perversion, but also a temporary arrest or 'inhibition' of function. According to the view we have just recited—namely, that of Dr. Brown-Séquard, this arrest or depression of function is produced in the following way: A centripetal nerve is irritated, the irritation is conveyed to the centre and thence reflected along vaso-motor nerves which control the distribution of blood, and consequently the functional activity of the particular part or centre to which the faculty in question belongs. In the words of Dr. Brown-Séquard—"It is by a reflex action of the cerebro-spinal axis on itself, through the nerves going to its blood-vessels, that the irritation acts to alter the nutrition of the nervous centre."

There are, however, some who, while admitting the influence of a centripetal irritation in producing a temporary arrest of function, dispense with the intervention of the vascular system as a necessary step in the causation, and we find ourselves confronted by a fresh hypothesis. There has lately grown up in the minds of many physiologists a disposition to recognise the existence of a new order of nerves,

or new order of nervous influences, whose office it is to arrest or diminish action. The name of "Hemmungs Nerven System"—checking, 'braking,' or inhibitory system—has been given to it by its German inventors. This is no mere conjecture, and the doctrine of such an influence is founded indeed upon a tolerably wide experimental basis; but the question is one of considerable difficulty, the conditions of a successful and trustworthy experiment are not easy to satisfy, and when satisfied there remains much room for difference of interpretation as regards the results. Besides minor differences, there are two distinctly antagonistic views held by those who agree in the main as to the phenomena: First, that of Pflüger, who may be regarded as the founder of the Inhibitory Theory, and who maintains the existence of a distinct set of nerves or nerve-fibres having an inhibitory function; and secondly, that of Moleschott and others on the Continent, and of Lister among ourselves, who contest this, and hold that the same nerve may exert an exciting or inhibitory influence according to the nature of the impression it conveys, whether weak or strong, stimulating or exhausting. Mr. Lister's view was first suggested to him by the consideration of the familiar phenomena of the circulation in the web of a frog's foot—namely, that while a slight stimulus causes the vessels to contract, a strong one produces dilatation.

The investigations hitherto have been chiefly made with reference to the control exerted by cerebro-spinal nerves on the ganglionic visceral centres, and so on the movements of the bowels, those of the heart and vascular system, and on the secreting functions of certain glands; but there are grounds for thinking that the operation of this inhibitory principle, whatever its nature, is not confined to the visceral nervous system and the organic functions, but may also be observed in connexion with those of the cerebro-spinal centres and the phenomena of animal life: that an impression made on an afferent nerve may directly depress the function of the centre in which it is implanted, by virtue of its inhibitory endowment or the strength or character of the

impression it conveys, or that a similar inhibitory influence may be reflected from one centre to another.*

It is no part of my present purpose to attempt to decide on the respective merits of these different views, in which there is still so much of a conjectural and conflicting character; I have referred to them chiefly because certain phenomena of the nature of paralysis or arrest of function, of a more or less transient kind, are met with from time to time in connexion with neurosal seizures; such are the temporary paralyses occasionally observed to occur in the course of neuralgic affections. We have already had occasion to notice a form of transient hemiplegia which now and then attends the deranged sensation in the extremities in certain cases of megrim, and it is possible that this may be of an inhibitory character. There may also be an inhibitory element in some of the forms of impaired speech; and we shall have occasion to refer by-and-by to a remarkable slowing of the heart and relaxation of arteries which sometimes attend the paroxysms, and which appear to belong to the same order of phenomena.

In conclusion I would observe that, as both the reflex theory of Dr. Hall and the modern vaso-motor doctrine require the intervention of the vascular system, and make an irregular distribution of blood in the nervous apparatus the immediate cause of neurosal phenomena, the application which has been made of these principles to the explanation of the symptoms of megrim, will be best considered in the following section.

Vascular Theories of Nervous Disorders.

The doctrine of a Plethora of Blood as a cause of disease is as old as that of Bile, and rests on exactly the same foundation. As one of the cardinal humours, an excess of blood like an excess of bile, whether diffused through the

* See on this subject Dr. C. Handfield Jones's paper on *Inhibitory Influences*, in the "British Med. Journ.," Feb. 5, 1859; and his work "On Functional Nervous Affections," 1870.

system or accumulated in a particular locality, was believed to occasion distemper and require evacuation. In this crude form the doctrine indeed has been long unknown, but shaped to conform with the knowledge and teaching of different times, it long survived the humoral theory from which it sprung. No one now talks of general plethora, and very few think of general blood-letting, but many of us are old enough to recollect when both the principle and practice were living realities. But if the doctrine of general plethora is completely abandoned, that of local plethora is still allowed; and while opinions differ as to the share which such a condition may have in the production of morbid phenomena, and the manner in which it is itself produced, the occurrence of a relative excess or deficiency of blood in this or that part or organ, is a fact which admits of no dispute; indeed it would be almost as hard to deny the flushing or congestion of the brain as that of the face.

It need not then surprise us that successive generations of pathologists have found in this condition of fulness of blood or cerebral plethora a convenient and comprehensive explanation of many head-affections, including the graver forms of megrim. Quite recently Professor Lebert has attributed the temporary failure of memory and difficulty of speech which occasionally attend his own attacks of hemicrania to a limited and transient "congestion of the brain."—"Wahrscheinlich findet eine umschriebene Gehirn congestion statt, welche jedoch bei vollkommener Ruhe schnell und spurlos vorübergeht."*

There are three principal forms which the doctrine of morbid distribution of blood in the brain, as a cause of functional nervous disorders, has assumed in modern times, and which I have here included under the general title of Vascular Theories; they are—1. Active or Arterial Hyperæmia; 2. Mechanical, or Venous Congestion; 3. Irregularities of distribution from spasm or relaxation of the smaller or capillary vessels. Each of these I propose to

* "Handbuch der Prak. Med." Bd. ii. p. 570.

illustrate by reference to the actual teaching of some representative men who have adopted and applied them, with more or less ingenuity and success, to the explanation and treatment of such affections as megrim and its allies.

Arterial Hyperæmia, or "Determination of Blood to the Head."—As regards the first of these views, it is not long since it formed an established part of the orthodox creed, and even now we are scarcely strange to such expressions as "active congestion," "determinations of blood to the head," "coups de sang," and the like. Not to go farther back, the writings of Dr. C. H. Parry will afford us a striking illustration of the extent to which this doctrine was pushed, at the end of the last and beginning of the present century, by a certain school of pathologists. With a peculiarly suitable field for the study of functional nervous disorders, such as Bath in its flourishing days afforded, Dr. Parry's attention was especially directed to the subject, and we are already indebted to his original observations for several interesting extracts descriptive of megrim in the previous chapters. He appears to have applied the principle of "determinations of blood" to the whole group of such disorders, including not only epilepsy, pseudo-apoplexy, and paroxysmal insanity, but also such minor seizures as local pains and spasms, painful and convulsive affections of the respiratory and digestive systems, transient disorders of sense and thought, and all the unnamed varieties of hysterical complaints; and he endeavoured to support these views by many ingenious experiments. In a review of his works which appeared in the "Edinburgh Medical Journal" shortly after his death, the writer states—"It was not new or unusual to ascribe apoplexy, palsy, epilepsy, or even water-on-the-brain, to unusual fulness and vascular tension; nor even was there anything extraordinary in perceiving something of this kind in insanity, and the varying shades of mental derangement . . . But it was certainly new to ascribe all instances of dazzling of the eyes or corruscations; giddiness; ringing in the ears; the

sensation of blank spots before the eyes; sick headaches; tremors; that sinking and lowness which occur in dyspeptic persons; even the nervous temperament strictly so called, or extreme mobility of the muscular system; and hysterics—to unusual 'determination,' or rather inordinate fulness of the vessels of the brain."*

Dr. Parry's views on this subject were first distinctly stated by him in a paper which appeared in the "Memoirs of the Medical Society of London."† This paper opens with a description of one of those anomalous and protean forms of nervous affection extending over a lengthened period, in which a great variety of paroxysms, convulsive, delirious, and lethargic, succeeded and replaced one another. It was his study of this case, he tells us, which more particularly forced on his mind the important share taken by local determinations of blood in the production of such phenomena, and which he learnt at last completely to control, by compressing the carotid with his thumb. "I do not remember," he says, "having experienced a philosophical pleasure in any degree comparable to that which this experiment afforded me. No sooner was the pressure made than the austerity of the countenance disappeared, and the patient was restored to the perfect use of her senses and power of reasoning. At the same time the headache and the undue sensibility with regard to light and sound, which had always taken place in the intervals of the paroxysms, were altogether wanting, and the patient declared that she was in every respect free from complaint."

"After having fully satisfied myself as to the effects of this pressure, I gradually removed my hand. The frown in an instant returned on the countenance, and every mark of delirium immediately succeeded. In the course of many subsequent months I was able to repeat this experiment

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* "Ed. Med. and Surg. Journ.," vol. xxv. 1826, p. 366.

† "On the Effects of Compression of the Arteries in various Diseases, and particularly in those of the Head: with Hints towards a new Mode of treating Nervous Disorders," by Caleb Hillier Parry, M.D., C.M.S. (Bath). Read Jan. 19, 1789. "Mems. of Med. Soc. of Lond.," vol. iii. p. 77, 1792.

many hundreds of times, and to exhibit it to the attendants with the utmost certainty of success."*

Dr. Parry then goes on to describe the further prosecution of his experiments in the case of other nervous affections, including the one in which we are more particularly interested :—" Since the period of this discovery, now more than a year and a half, I have made the experiment in a great variety of instances with the following success. It nearly or totally removes *Hemicrania* of the side on which the compression is made ; the headache which is called 'nervous,' that also which is entitled 'bilious,' and which evidently arises from a disorder in the alimentary canal ; vertigo ; noises in the head ; sense of heat in the same part, and the mental agitation of nervous patients." And again : " It quieted the symptoms in two cases of chronic mania which had subsisted several weeks. It immediately removed the maniacal symptoms in a recent case of a young female patient, and hysterical convulsions in that of another who had been several days ill." He goes on to relate his further success in a case of severe Epilepsy of two years' standing. " I had long wished in vain for an opportunity of seeing him in a fit. . . . when one afternoon he called on me and told me that he had had that morning five fits, in most or all of which he had lost his senses. While he was speaking I observed an appearance about his face as though a paroxysm were approaching. His eyes began to assume a vacant stare and convulsions were commencing about the throat. . . . . I immediately made strong pressure on the right artery. The convulsions ceased, and the fit proceeded no further. He had one fit more that afternoon. I instructed him as to the nature and method of the operation, and he assures me that when he has had sufficient warning he has frequently been able to prevent the epileptic paroxysm."† Dr. Parry was equally successful in arresting nervous rigors and other paroxysmal seizures by the same means, and he remained unshaken in these views through the rest of his

* "Mem. of Med. Soc. of Lond.," vol. iii. pp. 86, 87. † Idem, pp. 89, 90, 91.

professional life. They were reiterated in his "Elements of Pathology and Therapeutics," and subsequently in his Posthumous Works, with the addition of much valuable clinical material, which, apart from the thread of theory binding the facts together, will well repay perusal.

Several considerations appeared to him to favour the views he had formed. In the first place his experience had rendered him dissatisfied with the doctrine of sympathy and eccentric irritation, the alternative view which then prevailed. Thus, when referring to the malady which is the subject of this essay, he says:—"Of headaches arising from excessive *determination of blood* to the branches of the internal carotid, I would here particularly specify that which is usually called *Sick-headache* so well described by Dr. Fothergill. This malady is generally conceived to originate from some derangement of the functions either of the liver or of the alimentary canal." He then goes on to say in a passage already quoted—"The state of the stomach is the effect and not the cause of the malady of the head which it never precedes: just as sickness and vomiting are the consequence and not the cause of the affection of the head produced by a blow on the cranium. Accordingly sick-headache may be cured or relieved by spontaneous bleeding from the nose or other similar remedies applied to the head; but it is not alleviated by purgatives, and is always aggravated by stimulants which relieve dyspepsia."* And again:—"These two maladies, headache and gastric disorder, are often totally independent of each other; so that various determinations of blood to the head called 'nervous' occur in thousands of instances in which all the phenomena constituting the digestive functions are perceived to be in their just degree and order; and on the other hand various disorders of the stomach, as that accompanying Sick-headache, are either the immediate effects of the disease of the head, or else efforts of the constitution to relieve general fulness or excessive determination of blood to various

* "Elements of Pathology and Therapeutics," vol. i. p. 244.

parts."* Elsewhere he says in the same sense—"It is as absurd to say that nervous affections attended by vomiting depend on disorders of the stomach, as to say that hysteria depends on disorder of the kidneys, because of the profuse micturition which attends it."†

I may observe in passing, that in what Dr. Parry says above of the aggravation of megrim by stimulants, he is not quite consistent, for he elsewhere advocates the use of stimulants under similar circumstances as tending to favour and *equalize* the circulation and so overcome any local determination; and this is the explanation which is usually given by most of those who, while they hold to a hyperæmic theory of megrim, cannot deny the rapid dispersion of an attack which occasionally follows a glass or two of wine or other stimulants. "In Miss F.," writes the same author, "a little eating and wine immediately take off convulsions of the face, sleeplessness, and very often pain of the head. Mr. C. says that it also makes the pulse slower. Great relief was in every respect obtained by *Ol. Succin. Rect.*, of which she took by degrees 114 drops twice a day in milk. How does this act? Surely by extending the determination, which did exist in the head, to the whole habit, and thus diminishing the former."

He finds additional support for his theory from a circumstance in the history of nervous disorders on which we have dwelt at considerable length in the preceding chapter—namely, the transitional forms they often exhibit and the occasional replacement of one by another. Of this he gives many examples, to some of which we have already referred. "I have known," he says, "epilepsy occur indiscriminately with sick-headache; disappear as that was cured, and return several years afterwards as from the imprudence of the patient the sick-headache also returned."‡ Dr. Parry suggests, and I think correctly, that such a con-

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* "Elements of Path. and Therap.," vol. i. p. 340.

† "Unpublished Writings," vol. i. p. 396.

‡ "Elements of Path. and Therap.," vol. i. 249. Other examples will be found at pp. 250, 297, 303, 306, 307, and elsewhere.

nexion can only be explained by reference to a somewhat different localization of a common source or principle of disorder in the nervous centres, and this he finds in the variation of the focus or extent of blood-determination. He thus sums up the argument from some extreme instances of such metamorphosis:—"In what are called *Nervous Complaints* we sometimes see a patient one minute delirious, and as to the performance of other functions, as respiration, &c., well; the next minute labouring under some convulsive affection of the organs of respiration, as the larynx, &c.; then some violent pain or cramp in the muscles of the belly; then affected with a giddiness; then headache; then a sickness, occasionally amounting to vomiting; while in each of these states all the other symptoms are wanting. The pulse, however, shall be too quick or the face shall be flushed. Does this change of symptoms only arise from a morbid change in the parts themselves, or ultimately from the influence of the cause on different parts of the brain, and through them on the parts severally affected?"* He leaves the reader to supply the answer which he thinks cannot be doubtful.

At this point, however, Dr. Parry finds himself face to face with a difficulty which has confronted all who have preceded or followed him on the same road. How does the state of things he supposes arise? What determines the determination of blood? In his first paper he attributes the "determination" mainly to increased action of the heart. "I have extended my inquiries," he writes, "to a great variety of other cases, and conclude that too violent or too quick an action of the heart is the common cause of the nervous and bilious headache, the nervous agitation of spirits, want of sleep, uneasy dreams, giddiness, sudden maniacal fits, hysteria, epilepsy, and all kinds of convulsions."† But while stating hyperaction of the heart to be a common cause, he does not intend to imply that it is the

* "Unpublished Writings," vol. i. p. 329.
† "Memoirs of the Med. Soc. of Lond.," vol. iii. p. 92, 1792.

only cause of such local determinations, and is careful to say that they may arise independently, just as in the case of normal menstruation.* Indeed the impossibility of accounting for such limited forms of hyperæmia of the brain as he has supposed to occur, simply by excessive action of the central organ of the circulation, must have been perfectly obvious to Dr. Parry himself, and he does not solve the difficulty by referring to the case of menstruation, which is merely explaining one paradox by another. Here then this theory of determinations of blood breaks down, or to say the least is incomplete.

Dr. Parry finds a third point of support for his theory in a class of facts which he designates as "salutary reactions." In illustration he refers to the cutting-short of various head-attacks by shivering and other involuntary movements, such as laughing, sighing, sneezing, vomiting, and the like, as well as by voluntary exercise; also by eruptions and copious secretion, as in the relief which follows tears. After giving many instances he concludes thus:—"It seems to me, that in all these cases, one purpose of these several motions is to drive forward the blood in the veins, and thus to promote a free and equable circulation of that fluid throughout the system. . . . Under impressions of sorrow, suspense, &c., not only is the patient relieved by tears (which unload certain branches of the carotid artery), but considerable mental ease is obtained by that species of deep inspiration called sighing; by which the right auricle and therefore the jugular veins and the whole venous system of the brain are in an unusual degree emptied of blood."† It is singular that Dr. Parry should not have seen that these phenomena belong to the very class of facts to which he has himself directed attention—namely, a certain capacity of substitution or replacement one by another, which is so remarkable a feature of the whole family of

* We shall see by-and-by how closely Dr. Parry has been unconsciously followed by Dr. Möllendorff, both in the experiment of compressing the carotid, and in this illustration of menstruation, in his recent revival of the determination theory in connexion with the operation of vaso-motor nerves.

† "Elements of Path. and Therap.," vol. i. pp. 335, 336.

paroxysmal nervous affections. In fact a rigor, a violent retching, a fit of convulsive laughter, or flood of tears, are equivalent though minor forms of nervous seizure, displacing that which before existed; not mechanically, by equalizing the circulation or evacuating the stomach, but dynamically, by substituting a vicarious mode of relief to nervous tension. We shall return to this subject hereafter.

I have referred thus at length to Dr. Parry's teaching because it presents us with one of the most thorough-going and, in some respects, ingenious expressions I have yet met with of the older doctrine of "determinations of blood," with especial reference to functional nervous disorders, including the one in which we are more particularly interested. It should be observed that the local hyperæmia of this hypothesis has no relation to inflammatory hyperæmia: Dr. Parry's expressions are "fulness," "determination," "increased impulse" or "momentum" of blood.*

In a modified form this doctrine has been maintained by some of our ablest pathological writers down to a very recent period. Dr. Alison writing in 1843 observes:—"It is important briefly to enumerate the principal disordered states in which *morbid determinations of blood* certainly occur, and in great measure determine their extent, intensity, and injurious results. Thus very various derangements of the functions of the nervous system, headaches, giddiness, transient imperfections of sense or of memory, fits of epilepsy, of hysteria, or other spasms, even of mania, in those predisposed to these diseases, some cases of transient paralytic affections, and many of apoplexies, appear to result from *simply increased afflux of blood to the Brain*, without rupture of its vessels, disorganization of its texture, or even increased effusion of its serous fluid."†

We shall see hereafter how this doctrine has been modified of late years by the introduction of the principle of arterial contractility and co-ordination.

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* "Elements of Path. and Therap.," vol. i. pp. 288-297.
† "Pathology," p. 554.

Venous Hyperæmia, or Passive Congestion of the Brain.—We must pass on to consider the second form of vascular theory—namely, that of venous congestion of the brain. I do not think a better idea of this doctrine and its application to the subject before us can be obtained than from the teaching of the late Dr. Marshall Hall, who adopted it as a fundamental part of his highly ingenious but very imaginative theory of functional nervous disorders. An extensive clinical acquaintance with affections of this class had led Dr. Hall, as it had Dr. Parry before him, to recognise an intimate natural affinity between various members of the group, which was traced in certain common characters, in the merging of different forms of seizure, or the occasional replacement of one by another. He accordingly formed a distinct class of such disorders under the designation of "*Cerebral and Spinal seizures of Inorganic origin and Paroxysmal form;*" and to the development of this subject, in connexion with his theory of their common origin, his later years were chiefly devoted.* In this class he included not only the graver forms of epileptic, comatose, and maniacal paroxysms, but also transient forms of palsy or anæsthesia, as well as many seizures of a minor kind which, like attacks of headache or giddiness, had no distinct nosological position.

After quoting the observation of Heberden—'Paralysis et apoplexia sunt tantum diversi gradus ejusdem morbi'—he proceeds to say that "this is true in a certain limited sense, especially in the *paroxysmal forms of these diseases.* But, in the same sense, not only apoplexy [pseudo?] and paralysis but these and epilepsy and mania are one and the same disease, differing in degree. But whilst apoplexy affects the cerebrum, and paralysis a hemisphere, epilepsy affects the medulla oblongata and mania again the cerebrum." And again, "The paroxysm or paroxysms of inorganic epilepsy lead to apoplexy, to paralysis, or to mania. . . . Apoplexy and paralysis have been paroxysmal and recurrent, receding entirely in the intervals, for years—in

* "Outline of the Croonian Lectures for 1851," 2nd edit.

one case for twelve years. The peculiar form of mania of which I am treating is characterized by *lucid intervals.* Every fact conduces to the view that these cases should be separated from such as are of *organic origin,* arranged together, and connected together. 'Le petit mal' itself is sometimes, as Heberden beautifully states, 'oblivium' or apoplexy, and sometimes delirium or mania; the next stage being convulsive epilepsy." And again, in concluding his observations, he says—"In speaking of the subjects of these lectures we may now speak not of apoplexy, paralysis, epilepsy, mania, but of *nervous seizures* assuming an apoplectic, paralytic, epileptoid or maniacal form; and thus our diagnosis will be implied in our designation."* Among the minor seizures included in this category he refers on several occasions to Sick-headache, and even particularizes it as the 'Type of the class.'†

Dr. Hall then endeavours to explain the close affinity of these various paroxysmal disorders by reference to a common pathological principle, which he finds in his ingenious theory of congestion of the brain; this may be briefly stated thus:—A passing cramp or tonic spasm is supposed to affect one or more of the muscles of the neck, which condition he denominates 'Trachelismus;' or of the glottis, which he calls 'Laryngismus;' or in severe cases, of both in succession. The effect of the former is to produce compression of the veins of the neck, or 'Phlebismus,' which in turn gives rise to an uncertain degree of *cerebral congestion,* according to its severity and extent. Laryngismus, on the other hand, by closing the glottis, produces asphyxia; the return of the venous blood from the brain is still further impeded, and the congestion it occasions is more general and intense.

But how, it may be asked, do the trachelismus and laryngismus arise? What is the cause of the initial spasm?

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* "The Threatenings of Apoplexy and Paralysis," &c.; being the *Croonian Lectures for* 1851, first edit. Notes at the end, pp. 89, 90.

† See also, "Lectures on the Neck as a Medical Region," *Lancet,* vol. ii., 1849, pp. 67, 68.

For an explanation of these phenomena Dr. Hall refers us to a morbid activity of the 'true spinal system,' which is brought into operation in two principal ways,—First, by the presence of some physiological action or condition of the body, such as sleep, particular postures and movements, but above all, by the development of the emotions; and Secondly, by some eccentric source of irritation in the bowels, uterus, or elsewhere, which affects the same system 'diastaltically.' In illustration of the former he points to the aspect of a man with his face congested by anger or convulsed with laughter, and observes how closely such conditions approximate to those he has described, and how readily they may pass into pathological states of a kindred kind. "Man lives a life of emotion. No moment of that life is passed in absolute tranquillity of mind. Every emotion has its influence on every muscle of his frame. It is written on the countenance, on the posture, on the very hands. The muscles of the neck do not escape; grief and anger choke; shame and indignation flush the face and neck. But what we term *expression,* as it affects the neck, is the first stage of Trachelismus; and blushing and flushing are forms of Phlebismus; extremes of these become cerebral and spinal seizures."* And he elsewhere mentions that he has known mere blushing to become morbidly intense, constantly recurring, and even to pass into an epileptoid affection.† Again he says of the effect of certain movements and of sleep on the cerebral circulation—"The effect on the susceptible medulla oblongata of a swing, of sea-sickness, belong to the same class of morbid affections, and deserve the designation of *μικρα ἐπιλημψία* far more than that physiological act to which it has been applied; whilst the state of sleep may be viewed as a *μικρα ἀποπληξία* induced by such a tonic action in the muscles of the neck as in the orbicularis closes the eyelids."‡

* *Croonian Lectures for* 1851. 2nd ed., Introduction, p. xi.

† "The Threatenings of Apoplexy," &c.; *Croonian Lectures for* 1851. 1st edit., p. 3.

‡ "On the Neck as a Medical Region," *Lancet*, 1849, vol. i. pp. 506-7, also p. 688.

Of the second class of influences—namely, eccentric irritations, producing local spasms through 'incident-excitor' and 'reflex-motor' nerves, we have already spoken in the previous section, and I shall therefore only add what Dr. Hall here says of Megrim or Sick-headache in this connexion:—"What emotion does (in causing blushing and congestion), gastric or intestinal or uterine irritation may do: and we have in 'Sick-headache' the *type* of a *class* of maladies of which the first link is such an irritation, and the last, the effect of impeded venous circulation in the encephalon. Instead of headache there may be vertigo, momentary oblivion, or deafness, or blindness, or danger of falling, with sickness, or with acidity, flatus, &c."* And again, "This form of sickness frequently plays an important part in paroxysmal diseases, occurring as it does in its slightest form of 'sick-headache,' or of what may be termed 'sick-giddiness,' or in the form or in the course of an apoplectic seizure . . . . Mere sick-headache sometimes passes into an affection of a far more formidable character."†

In another lecture he thus sums up the result of his observations on the natural affinities of these various disorders as explained by their common origin in the manner described:—"Phlebismus leads to congestion of the intermediate blood channels, and the apoplectic *state;* and this primarily or secondarily to comatose, to paralytic, to maniacal, to epileptic affections, all having the one characteristic feature—that of paroxysmal and evanescent forms. . . . The events of each day's practice prove that these paroxysmal forms of diseases of the nervous system, not formerly viewed as paroxysmal, are extremely frequent. In fact, I believe a new ray of light is being shed on Apoplexy, and even on Paralysis and Mania in their varied forms—in a word, on a whole class of paroxysmal diseases."‡

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* "Croonian Lectures for 1850." *Synopsis of the Diastaltic Nervous System* (Foot-note).

† "Croonian Lectures for 1851," 1st edit., pp. 10, 11.

‡ "Lectures on the Neck as a Med. Region," *Lancet*, 1849, vol. i. p. 175. In his next lecture he says that his view embraces "more than three-fifths of the diseases of the nervous centres witnessed in private practice, consti-

And again : "In concluding this lecture I may observe that I am persuaded I have stated enough of fact to effect the establishment of a *class* of paroxysmal diseases of the nervous system, each and all of which involve an excitation of diastaltic action on the muscles of the neck, and compression by these of the veins of that region, and the consequent *congestion* of the tissues without or within the encephalon and spinal cavity. . . . These events are variously translated into Apoplectic, Paralytic, Epileptic, Syncopal, or Maniacal seizures, which constitute the class of cerebral and spinal paroxysmal affections. In some instances the first stage of these seizures is hidden; in others the seizures assume the form of Oneirodynia, in others again it is mere blushing, 'sick-headache,' 'sick-giddiness,' &c."*

In thus attempting to apply a uniform principle like that of venous plethora of the brain to the explanation of a great variety of nervous seizures, Dr. Hall is met by the same difficulty as Dr. Parry encountered in the case of his hypothesis of arterial hyperæmia or determinations of blood:—How can the same cause produce such varied effects? This he answers with more ingenuity than success. In the first place he points out that much will depend upon the degree of congestion and whether it is general or partial. If trachelismus only occur, the congestion will be less extensive and general than if laryngismus is superadded. To use his own words:—"Associated with *trachelismus* we have the milder forms of apoplectic and epileptic affections . . . . These may be mere vertigo, confusion, unconsciousness, nutatio, falling, transient paralysis, in the former; similar symptoms with spasmodic affections of the muscles of the eyes, face, neck, extremities, in the latter. But if the trachelismus pass into *Laryngismus*, the Apoplexia mitior assumes the form of apoplexia gravior; and the Epilepsia mitior, or the 'petit mal' of the French authors, that of

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tuting the *Class of Paroxysmal Diseases of the Nervous System*, one remaining fifth being inflammatory, and the other organic," p. 285.

* "Croonian Lectures," 1851. *Threatenings, &c.*, § 2. "On Paroxysmal Diseases of the Cerebral and Spinal System as a Class," p. 49.

epilepsia gravior or the 'grand mal' or 'haut mal' of the same writers."*

Again, with regard to Trachelismus and its effects, Dr. Hall suggests this further ingenious distinction: he supposes the jugular veins in some cases, and the vertebral in others, to be principally involved; in the former case the brain, and in the latter the medulla oblongata, would suffer, with a corresponding difference in the character of the seizures. The difference of result, he says, "may depend on the different susceptibilities of these different portions of the nervous system, or on the different channels or veins through which the cause may operate." . . . . "It is an important question—how far the action of the muscles of the neck may be specific in different instances. Are the various phenomena of external blushing or flushing, of the apoplectic or paralytic seizures, and of the epileptic attack, or of spinal syncope, the varied effects of the compression of the external and internal jugular and of the vertebral veins respectively? These questions must, I think, be answered in the affirmative. But the satisfactory *proofs* of these facts may still be wanting." Just before he had spoken more confidently on this point:—"The difference between blushing, flushing, vertigo, tinnitus, loss of consciousness, actual falling, the apoplectic, paralytic, the epileptic and maniacal states, are differences in the vein compressed and in the degree of compression."†

The foregoing sketch of his views will have made it sufficiently evident how completely Dr. Hall rested his theory of paroxysmal disorders on the principle of *cerebral congestion*. This is still more explicitly stated in other parts of his lectures.‡ At the same time he is most careful to distinguish his doctrine from that of *arterial determination*, as we have seen it expounded by Dr. Parry, and which then very generally prevailed. This he unsparingly condemns:—

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* "Croonian Lectures for 1851," 2nd edit., *Synopsis of Cerebral and Spinal Seizures*, p. 4. † Idem, p. 4.

‡ See especially "Croonian Lectures," 1851, 1st edit. *Threatenings, &c.*, § 10, p. 31.

"There is no physiological principle on which we can found the idea of 'tendency' or 'determination' of blood to the head." "Whatever the violence of the arterial circulation, there is little danger, little tendency to morbid action, as long as there is no impediment to the return of blood along the veins; the idea of 'tendency' or 'determination' of blood to the head is a fiction and a chimæra; and the real state of things in the condition which has been so designated is, in fact, its *impeded return from* the head." "The most violent action of the heart and arteries can only induce throbbing and flushing; impeded venous return induces these, with the turgescence and purpurescence to which I have adverted, and various symptoms, such as headache, vertigo, loss of consciousness, &c.—symptoms produced equally by trachelismus, and by too tight a cravat." "The doctrine, therefore, is both unfounded in fact and principle, and incapable of explaining the phenomena. Impeded venous return is both in itself the obvious effect of a familiar event, and affords the ready explanation of a subsequent series of events hitherto unexplained."*

I have selected the foregoing observations from the writings of Dr. Parry and Dr. Hall, for illustrating the doctrine of cerebral hyperæmia as a cause of functional nervous disorders, because of their representative character, the precision they gave to two opposing views, and their incidental application to the case of megrim; both authors recognising at the same time the near relationship of the latter malady to other disorders of the epileptic stock, and of these to one another, on which I have laid so much stress in the previous chapter. But the principle of hyperæmia was far more widely adopted in explanation of nervous phenomena than either of the particular theories in question. With most pathologists the doctrine did not assume the same well-defined shape; increased arterial afflux was not clearly dis-

* "Croonian Lectures," 1851. 1st Ed. pp 29- 31.

tinguished from impeded venous return, nor was any particular view suggested of the manner in which such congestions might arise. From this convenient vagueness the doctrine of cerebral plethora found perhaps more general acceptance, and was certainly less exposed to adverse criticism.

Such a principle indeed was only too readily adopted by the framers of Nosologies and Text-books of Physic, for it enabled them to form, under the head of *Cerebral Congestion*, a comprehensive class, including various disorders of a pseudo-apoplectic or epileptic character, as well as many minor seizures, to which it would have been difficult otherwise to assign any distinct position. But by this departure from the true principles of scientific nomenclature, which forbids us to embody theories in names, they contributed in no small degree to stereotype an hypothesis and bar the progress of further inquiry.

Even the classical and unrivalled work of Andral affords an excellent illustration of this. No less than eight varieties of Cerebral Congestion are there distinguished by their clinical characters.* These include what we now regard for the most part as minor or imperfect forms of epilepsy, cerebral or spinal; epileptic hemiplegia, delirium, and coma; transient and inhibitory palsies; megrim in its various forms, and the like. But from the nature of the case—the transient, functional, and rarely fatal character of the seizures—such a doctrine would not readily admit of anatomical verification or refutation, and was necessarily highly conjectural. It is quite clear that even Andral himself had serious misgivings as to the soundness of the theory, and seems to have adopted it rather in conformity with the general usage and for convenience, than from any conviction of its truth. On one occasion he significantly asks—"This congestion which we are so fond of, and which is so useful in explaining a great number of cerebral affections, is it as common as we suppose? We shall be justified in doubting it, if we reflect that in many cases in which the symptoms we attribute to

* "Clinique Médicale," tom. v. pp. 245—50.

congestion have existed during life, no anatomical indication of it whatever has been found after death. It is certainly on purely hypothetical grounds that we are constantly bringing it in to explain the phenomena of a number of diseases both organic and functional."* Elsewhere he points out that a hyperæmic condition of the brain is commonly the only morbid appearance to be found after fatal doses of various poisons—alcohol, opium, belladonna, digitalis, prussic acid, and others—and that it is therefore obvious that this cannot be assigned as the cause of such varied phenomena as they occasion. "There must be other modifications produced in the brain not demonstrable by the scalpel, but known only by the different symptoms during life. It is not the cerebral congestion which is the cause of the particular phenomena determined by the substances above named; this congestion is only one element of the morbid condition to which they give rise —a secondary element, the intensity of which is not in proportion to the gravity of the symptoms." May not the same, he asks, be the case in the numerous diseases so commonly attributed to hyperæmia of the brain?†

Further on Andral states his conviction that symptoms similar to those which are attributed to hyperæmia may attend an opposite or anæmic condition, and suggests the inference that such phenomena are referrible rather to changes in the molecular activity and condition of the nervous elements themselves, which baffle our observation, than to variations in the blood-supply. "The symptoms which characterize cerebral congestion, are they always associated with a great flow of blood to the brain? are they solely produced by that cause? Are they not sometimes manifested under the most opposite condition—anæmia? . . . . In children dead of convulsions we have found the brain bloodless. We have also seen the coma by which children's maladies often end, accompanied by a remarkable condition of pallor of the nervous centres. Often in adults

* "Clinique Médicale," tom. v. p. 610. † Idem, p. 268.

where delirium, convulsions, coma, had been present, we have been struck by the complete absence of colour in the brain, especially striking in the gray substance. Are not phenomena of this kind manifested, too, in animals dying of hæmorrhage?" "When we thus examine the foundations on which this doctrine rests, we soon come to regard hyperæmia and anæmia, in the brain as elsewhere, merely as secondary phenomena—as simply effects. But these effects, inconstant and variable, are not necessary consequences of the action of the cause; they may be wanting and the symptoms nevertheless persist. Less depends on the condition of cerebral hyperæmia or anæmia than on the organic modification which precedes or produces them. Thus our *post-mortems* show us, as an explanation of identical symptoms, in one case a state of hyperæmia, in another of anæmia, in a third, nothing unusual in the quantity of blood in the brain, and in the brain itself otherwise, no lesion appreciable by our actual means of investigation."*

The arguments here suggested by Andral have been ably employed by subsequent teachers, and enforced by many considerations of a different character, in opposition to the doctrine of cerebral congestion as a cause of various disorders attributed to it. Those who care to pursue the subject will find it ably argued and its fallacies exposed by the late Dr. Todd in his Lumleian and other Lectures,† and by Professor Trousseau in his "Clinical Medicine," and elsewhere.‡

Recent Vaso-motor Hypotheses.—In our review of the earlier forms of the sanguineous or vascular theory of nervous disorders in the preceding sections—namely, those of arterial determination and venous congestion, we have seen that both Dr. Parry and Dr. Hall, the most ingenious supporters of these respective theories, encountered a common

* "Clinique Médicale," tom. v. pp. 302, 303.

† *Lond. Med. Gaz.*, N.S., vol. x. p. 703 etc., 1850, and vol. viii. p. 838; also his "Clinical Lectures on Nervous Diseases."

‡ See "L'Union Méd." nouv. sér., tom. ix. p. 113, 1861; and "Clinical Med." (New. Syd. Soc.), vol. i. p. 19.

difficulty. Even admitting a morbid distribution of blood in the nervous centres to be the essential pathological condition which underlies the whole group of disorders referred to—and this, it should be remembered, is very far indeed from being established—the question still remains, how so nice a limitation of the hyperæmia to this or that territory or one or other side could be effected as seems essential to explain the various forms of seizure attributed to it. This question, as we have seen, was never satisfactorily answered, either by Dr. Parry or Dr. Hall, but an answer is to be found in the vaso-motor principle which we have now to consider.

If, in fact, we combine Dr. Parry's notion of a deranged arterial supply to the brain with the principle of direct or reflex irritation of the nerves embodied in Dr. Hall's ingenious view, by substituting the muscular walls of the arteries for the muscles of the neck, and vaso-motor for ordinary motor nerves, we have a theory much more perfect in its way, and which readily embraces all the clinical facts included in the hypotheses of both those physicians. It will account for the varied phenomena of different neurosal seizures, as well as for those circumstances in their history which seem to indicate a certain community of origin and character. For, while a paralytic condition of the vaso-motor nerves will explain any degree of cerebral hyperæmia and morbid exaltation of function, the opposite one of excitation will account for a like amount of anæmia and inhibition; and the particular character of the seizure will be determined by the degree and extent of the vaso-motor disorder, and the cerebral territory which is more particularly involved; and lastly, the tendency to metamorphosis, and to the occurrence of transitional and intermediate forms, is rendered sufficiently intelligible by the supposition of a trifling shifting or extension of the primary focus of disorder at the central origin of the vaso-motor fibres. In short, we may say, on this hypothesis, that, by a process of physiological centralization, we have collected together in a limited region of the medulla, the reins of government of the whole cerebral system. Such indeed are the views now very

generally adopted, in whole or in part, in neurosal pathology, and more particularly applied to the explanation of Epileptiform Seizures.

It is, I think, to the large amount of attention which has been directed of late years to the functions of the sympathetic, and above all to the investigations and demonstrations of Prof. Claude Bernard, that we owe the present popularity of vaso-motor hypotheses. It should not be forgotten, however, that if a more exact and experimental basis has thus been given to our knowledge of the subject, the control which the nervous system exerts over the local distribution of blood has long been recognised, and even applied to the pathology of nervous disorders. The natural phenomenon of blushing under the influence of mental emotion, cited by Robert Whytt, may be taken for as perfect a demonstration of that control as any which an artificial experiment can produce, and the application he makes of the principle to the malady with which we are chiefly concerned differs little in fact, as we shall presently see, from some of the theories which have recently been propounded. With regard, moreover, to the doctrine of 'determination of blood' as it formerly prevailed, the difficulty already pointed out was long since met by Mr. Solly in the following suggestive remarks:—"I believe, then, that determination of blood to the head arises simply from deficient contraction of the muscular coat of the capillaries of the Brain, preceded by excitement of the heart's action. I think it not at all improbable that the reason why these capillaries of the brain thus suddenly and unnaturally neglect to perform their duty is some defective innervation from the sympathetic nerves, whose office I hold to be the regulation of the coats of the arteries so as to produce secretions, &c."*

In the particular case of megrim, certain special developments have been given to this vaso-motor principle of late years, and it has been differently applied by several different observers in order to account for the phenomena of the

* "Solly on the Brain," p. 592. Edit. 1847.

seizure. I propose briefly to notice the principal views which have been entertained. They agree in referring some of the symptoms to a state of tension, and others to one of relaxation of the arterial system of the brain, organs of sense, and external parts of the head, but they differ widely in the particular application which is made of these principles.

I. Foremost in the rank stands the theory of Dr. Du Bois-Reymond; this deserves especial consideration, both on account of the eminence of the author as a physiologist, and because the Berlin Professor has made the pathology of megrim a special subject of study in his own person. The particulars of his case have been already given (see p. 4). He had observed that, during the height of the paroxysm, the face was pale and drawn, the temporal artery of the suffering side yielded the sensation of a hard cord to the finger, the eye was retracted and red, and the pupil dilated; whereas, towards the decline of the seizure, there was increased warmth and circulation in the parts, the ear of that side became red, and experienced a lively sensation of heat which was also perceptible to the hand. The theory he has based upon these observations I cannot do better than give, as nearly as I can render them, in his own words.

"No practitioner," he says, "would hesitate in allowing this pathological portrait to be one of moderately severe, but genuine migraine. It is, in fact, no further removed from the various descriptions of migraine than these are from each other. But amongst the explanations of the malady by different authors, there is not one which fits the particular details of my case. Migraine is universally conceived to be a Neuralgia, though there is a difference of opinion as to its anatomical seat—the reasons for which difference not being always apparent. Thus, Romberg removes its position to the brain itself; Tissot, whom Lebert follows, to the first branch of the fifth; Piorry to the iris. Andral and Valleix give no anatomical definition of migraine.

"From the following attempt to explain the symptoms which my migraine presents, I have excluded the periodicity of the affection, which it shares with many pathological and physiological phenomena of the nervous system. It is no part of my purpose to make any statements as to the ultimate cause of the disease; I do not therefore intend to notice the gastric disorder which is observed to attend it, and which probably stands in near relation to this remote cause, but I shall merely bring forward a presumptive connexion between the subjective phenomena and the observed derangement of the circulation, and point out what is in all likelihood the proximate cause of this derangement.

"Thus I maintain that in my *Migraine a Tetanus takes place in the muscular coats of the vessels of the affected half of the head; in other words, a Tetanus in the territory of the cervical portion of the right Sympathetic.*

"The condition of the temporal artery, the bloodlessness of the face, the sunken-in state of the right eye, show that the muscular coats of the vessels of the affected half of the head, so far as they are accessible to observation, are persistently contracted. From the condition of the ophthalmic artery we infer a like condition of the remaining branches of the internal carotid, and presume that it is the same for the vertebral artery.

"From the fluctuations of the blood-pressure in the brain, consequent on the contraction of the muscular walls of the vessels, which occurs as a sort of tonic spasm, reinforced by starts and then again relaxed, we readily understand (on the principle of Wollaston's theory of sea-sickness) whence the retching arises which accompanies migraine. The lowering of the blood-pressure in the visual apparatus may perhaps in a similar manner explain the glimmering before the eyes which is often observable in migraine, as also from the use of Digitalis.*

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* *See* "Neue Beiträge zur Kenntniss des Sehens in Subjectiver Hinsicht," von Johann Purkinje. Berlin, 1825, s. 120.

In the work here referred to, which is the second volume of the

"However this may be, it is quite clear whence the redness proceeds, and the increased warmth in the region of the ear, which attends the abatement of the headache. It is the same kind of phenomenon as that we observe when we come into a warm room after staying in the cold. The smooth muscular fibre becomes exhausted of course like the cross-striped variety: when the causes are abated which kept the muscular coat of the vessels so long in a state of tonic contraction, there follows from the over-exertion a state of exhaustion, in which the vascular walls yield more than they otherwise would to the lateral pressure. The effects are the same as those of section of the vaso-motor nerves and loss of tone of the vascular muscle—namely, redness and increased temperature.

"One circumstance in the foregoing portrait of the malady, which moreover is never absent from any description of migraine, does not certainly accord with our theory—namely, that during the attack there is already present a redness of the conjunctiva. But this may probably be explained in one of these ways: that the muscular walls of the conjunctival vessels become sooner exhausted, or that they begin to be affected by the spasm at an earlier period than the remaining vessels which share the disorder.

"A tonic contraction of the muscular tissue of all the vessels of one side of the head can have no other cause but a persistent excitation, a Tetanus, of the cervical portion of the Sympathetic nerve on the same side. The seat of such a Tetanus again must be sought in the corresponding half of what is termed by Budge and Waller the '*Regio Cilio-Spinalis.*' I assume at the same time that the con-

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Beobachtungen u. Versuche z. Physiol. der Sinne, Purkinje gives an account of the results of some experiments which he made upon himself with reference to the effects of Digitalis upon vision. In small doses it produced a "glimmering" [Flimmern] before the eyes; but if the action of the drug were sufficiently strong, then it would seem that determinate spectral forms appeared. On the occasion of the reading of Dr. Airy's paper, *On Transient Hemiopsia*, at the Royal Society, Dr. Sharpey drew attention to the same observations, and remarked on the similarity of the phenomena to those described by Dr. Airy. I cannot see, however, among the figures which Purkinje has given any which are like the "fortification" pattern.

traction of the vertebral artery is also controlled from the same centre, and this I think can hardly be doubted on account of the vertebral plexus, though certainly, as far as I know, it has not yet been experimentally proved. In such a migraine then as has been described, we are not dealing with an affection of the brain or of the nerves of the brain but with one of the dorsal region of the spinal cord.

"I grant that up to this point the inference may appear loose and somewhat arbitrary. But I am in a position, as I said, to lend it a degree of probability bordering on certainty.

"If there actually exists in my migraine-paroxysm a Tetanus of the contractile apparatus regulated by the cervical portion of the right sympathetic, the pupil of the affected side must be dilated. A look in the glass on the first opportunity after I had hit upon this idea, showed me that I was not mistaken. But in an experiment of this kind on oneself it is dangerous to rely on one's own judgment unless special precautions are taken. The to and fro movement of the eyes in comparing the pupils is so easily associated with an alteration in the amount of light which strikes the two eyes, that a change in the diameter of the two pupils may readily be confounded with a difference in the diameter of the two. It chanced however some time since, that, while suffering under a violent attack, I received a visit from a skilled observer, Dr. Schacht. Without telling him what was the point in question, I begged him to examine my pupils, whereupon he immediately declared that of the right eye to be the wider. The difference of width in the two pupils appeared the more considerable the more the eyes were shaded, exactly as it happens when we tetanize the cervical portion of the sympathetic. I need not remark that when not suffering from an attack my pupils are exactly equal.

"I may add that, since my attention has been directed to the '*Regio Cilio-Spinalis*' as the real seat of the disorder, I have found the spinous processes of that part to be painful on pressure during and after an attack.

"After this it may be regarded as certain that in my migraine a Tetanus of the cervical portion of the right sympathetic takes place. It now only remains to consider whether (1) this Tetanus simply accompanies the migraine —that is to say, a Neuralgia essentially constituting migraine, or (2) if it may not be the migraine itself, that is to say, the immediate cause of the headache.

"The latter view takes for granted that the tonic contraction of the smooth muscular fibre is not less painful than that of the cross-striped fibre, as in cramps of the legs, tetanus from electrical tetanization and the like. The pains of labour and of colick, justify us in making this concession. By help of it we may explain why the skin is painful in the chills of fever [ague?]. It is also readily seen why when the muscular tissue of the vessels on one side of the head is affected by tetanus, it will be felt as a headache on one side only. The fact that an animal so little sensitive as a Rabbit does not scream when the peripheral extremity of the cervical portion of its sympathetic nerve is tetanized, is no proof of the contrary. The throes of parturition in animals are likewise not so painful as in human beings.

"The muscular pain which accompanies Tetanus proceeds probably from pressure upon the nerves of sensation distributed within the muscles. This pressure, and consequently the pain, must increase if the tetanized muscles are more strained, as we find in the case of leg-cramp, when the Gastrocnemii are stretched, either by means of the antagonist muscles, or by supporting the weight of the body on the ball of the foot. The same thing takes place in Tetanus of the muscular coats of the vessels through the enhancement of the lateral pressure of the blood in the vessels. It is evident then, on this view, why the pain increases with any augmentation of the blood-pressure in the head. In admitting a Neuralgia we should have to consider, in order to explain this, that, as in similar cases, for example in toothache and abscesses, the hyper-sensitive nerves are painfully affected by a pressure of the vessels which is not ordinarily perceptible.

"It seems hardly necessary in my case, after what has been said, to seek for a further cause for the headaches besides the tetanic condition of the muscular coats of the vessels. But yet I am far from thinking that all and every migraine springs from the causes I have pointed out. Indeed I have often had opportunities of observing well-marked cases of periodical one-sided headache, in which there was no apparent difference to be seen in the diameter of the two pupils, and where, consequently, no failure of innervation appeared to have taken place in the region of the cervical portion of the Sympathetic. Since I have drawn the attention of practitioners of my acquaintance to the subject, no case similar to mine has come under their notice. We have been as little successful in discovering any like it amongst the descriptions of migraine by writers on the subject. Piorry indeed has suggested that migraine is a neuralgia of the iris, but amongst the reasons he assigns for saying so, we do not find that he advances that of an alteration in the diameter of the pupils.*

"In many, perhaps in most cases therefore, the Nature of migraine must be sought now as heretofore in a Neuralgia. But out of the multitude of cases provisionally included under this name, the form here discussed may now be very well distinguished as '*Hemicrania Sympathico-Tonica.*' Singularly enough, if Kussmaul and Tenner's doctrine is right, which places the origin of many epileptic seizures in a spasmodic constriction of all the arteries of the head, then my migraine would be distinguished from this kind of epilepsy less by the nature of the disturbance which prevails in it, than by its degree and extent.

"Our therapeutical efforts in these forms of disorder, in

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* M. Du Bois-Reymond does not state the case correctly; M. Piorry distinctly mentions extreme *contraction* of the pupil among the phenomena of the seizure—"L'examen de l'œil fait reconnaître un resserrement remarquable de la pupille, par conséquent une expansion de l'iris."—"*Mémoire*," etc., § 821, p. 414.

So again in the *Clinique de la Pitié*, p. 306, he says, "La pupille est resserrée pendant la durée des accidents dont cet organe est le siège."

default of other indications, should indubitably be directed to influence the '*Regio Cilio-Spinalis.*' "*

Before making any comments on the views here suggested, I would observe in passing, that the idea of such a spasm of the vessels of the head as a cause of the pain in these headaches is by no means new, and was first propounded, I believe, by our countryman, Robert Whytt. Writing of the causes of periodical headache in those who are subject to nervous disorders he says, the most common is "Sympathy with the stomach, by which the nerves chiefly of the fore part of the head suffer; and the small vessels to which they are distributed are either affected with a *continued spasm*, or agitated with uncommon *alternate contractions and relaxations;* in consequence of which the patient feels a pain, straitness, fulness, and pulsation about the forehead and temples."†

Returning now to the consideration of Du Bois-Reymond's narrative, I may say that I should not have found the least difficulty in accepting the facts of this interesting case, as stated by him, even had they come from a far less trustworthy source; they are not at all inconsistent with what we know of the character and course of megrim in some of its forms, although a precisely similar series of unilateral phenomena does not happen to have come under my own observation, and I must accordingly be classed with those practitioners of his acquaintance who have been unable at present to confirm his experience. Nor have I any doubt that a disturbance of the vaso-motor innervation, and a consequent spasm of the vessels in the external, and possibly in the internal parts of the head may sometimes occur, and be the immediate cause of some of the appearances and symptoms to which he refers. I have indeed other reasons for thinking that such a derangement of the circulation occasionally takes place, and may even extend to more distant parts of the body, or to the surface

* "Archiv für Anat. Phys. u. Wiss. Med.," von Dr. C. B. Reichert und Dr. E. Du Bois-Reymond. 1860. Heft iv. p. 461, etc.

† *Works*, 4to, p. 621.

generally. But while admitting thus much, I am very far indeed from admitting the principal inference which he draws with regard to the origin of megrim in a disorder of the sympathetic, and the application which he makes of it in explaining the leading phenomena of the seizure, and more particularly the pain; this I regard, on the contrary, as primarily nervous and essentially neuralgic.

My experience, so far as it goes, would lead me indeed to associate the pain and its antecedents with a condition of anæmia and spasm rather than with one of hyperæmia and relaxation of the parts: but then many, probably the majority of cases, exhibit neither of these conditions. I have witnessed severe headaches of this class attended by a perfectly blanched condition of the external parts of the head of many hours' duration. Quite lately I have seen a young lady very subject to periodical megrim, but otherwise remarkable for her vivacity and appearance of health, for there is some truth in the French saying, that "la migraine est le mal des beaux esprits;" with her the attack commences on waking, is bilateral, and lasts the greater part of the day, and she presents throughout a waxy pallor of the face and lips, inanimate features, and blank lustreless eyes, but without faintness; as the paroxysm subsides her colour and expression return. On the other hand, I have carefully watched the most typical hemicranial paroxysms in other patients, without being able to detect any marked alteration in the vascular condition of the visible parts, or any perceptible contraction and tension, unusual throbbing or fulness, of the temporal arteries, or any difference in these respects on the two sides, so far at least as my touch is sufficiently educated to distinguish them; and I may say the same as regards the pupils, even when the visual disorder has been highly developed.

For these reasons I am quite unable to recognise that immediate relation of cause and effect between the tension of the vessels and the pain in megrim, which it is the principal object of M. Du Bois-Reymond's paper to establish in his particular case. Moreover, as we shall see

by-and-by, not only are these indications of arterial spasm frequently wanting, but cases occasionally occur where the pain is attended by the opposite condition of vascular relaxation and congestion. In fact, when we come to compare the various observations which have at different times been made on the state of the circulation during the paroxysms of megrim, we become convinced that these "vaso-motor" symptoms are among the most variable and inconstant of all the phenomena of the seizure; and consequently, interpret them as we will, they cannot be safely regarded as the cause of the rest—at least of the pain and other leading features of the attacks. For the same reason we regard with equal distrust all the different theories which have been built upon them.

But it may be fairly said that we have no occasion to refute any extension or application of a theory which the author himself has never sanctioned; and indeed there is one part of Du Bois-Reymond's account which has been too much overlooked both by those who have adopted and those who have opposed his views—namely, the statement that he has not intended to put forward a theory of megrim in general, but only of the particular form of the malady from which he himself suffers. He suggests that his own is an exceptional case; that his description of the state of the circulation and of the pupils is not applicable to all or even the majority of instances; that he has repeatedly witnessed attacks in which these particular symptoms were absent, and he cannot find that they have been generally observed; and lastly, as he very candidly allows, some of the facts he records are opposed to the interpretation he would give them, even in his own case.

In thus assigning some very good reasons why his views are not generally applicable to megrim, Du Bois-Reymond has furnished, we think, the best possible argument against their adoption at all. In the first place, we cannot accept his statement that his own is quite an exceptional case, and that his theory must be viewed with reference to it alone; for in all its leading features, if we except the

state of the vessels and pupils during the paroxysm, the case is a very ordinary and characteristic one. Secondly, we cannot admit his suggestion that a host of essentially different maladies have been included under the name of migraine, and that the immediate cause of the pain may be different in different cases. On the contrary, it has been one of our objects to show, in the earlier parts of this treatise, that the various forms of the malady which have been described are different developments of the same essential disorder, and that we may accept the identification of it which has so long been made under the familiar name of *Megrim* (though not of *Hemicrania*) as convenient and substantially correct, and presenting certainly no more difficulties than the analogous case of epilepsy. Lastly, it is clear that the author intended a wider application of his theory to cases of megrim than he afterwards cares to defend; because he suggests that it may explain the remarkable visual phenomena which are not mentioned in the description of his own attacks, and likewise the vomiting.

But while rejecting the Professor's inferences, we cannot ignore any well attested facts even in individual instances; and hence, believing as we do in the essential unity of the malady, we must assign the derangement of the circulation a definite but subordinate position amongst the less regular incidents of the seizures; and in Du Bois-Reymond's case we accept the alternative view he suggests and rejects, namely,—"that the Tetanus simply accompanies the migraine—that is to say, the neuralgia which essentially constitutes migraine, and that it is not the migraine itself or the immediate cause of the headache."

Even so, and viewed in this light, the derangements of the circulation in this complaint are of very considerable interest, because, as we shall presently see, they by no means stand alone, but have their representatives in the history of other neurosal affections, and thus contribute still further to support the parallel between the different members of that group on which we have so much insisted in the previous parts of this treatise, and of which we are con-

stantly meeting with some fresh illustration, or the incidental recognition in some favourite theory.

Having now stated broadly how far, while accepting Dr. Du Bois-Reymond's facts, I reject his inferences, and my principal reason for doing so, I shall supply the place of any further criticisms of my own by the following able remarks on the subject by Dr. Brown-Séquard :—

"It is possible," he observes, "that Migraine is sometimes accompanied by a contraction of the bloodvessels of the membranes of the brain, as the eminent author of the preceding article believes; but we do not believe that the pain can be the result of the contraction of the muscular fibres of these vessels, at least if the sensory nerves of these channels are not in a state of hyperæsthesia. In fact, all the world knows that the sensibility of the bloodvessels (of those of the cranial cavity as well as of those of the extremities) is very feeble, and it is consequently impossible that the compression of these nerves by the contracted muscular fibres can be the sole or principal cause of the pain of Migraine, which is often so intense, when the sensory nerves of the vessels are in their normal state. One may offer a still more direct objection to the hypothesis of Du Bois-Reymond: it is that with animals the irritation of the great sympathetic cervical, although it occasions a spasm of the intra-cranial vessels, does not cause pain. Du Bois-Reymond has endeavoured to anticipate this objection; he says that rabbits are animals of little sensibility, and that consequently it is natural that they should not show signs of pain when the great cervical sympathetic is galvanized. Granted, but dogs and cats are very sensitive animals, and they do not cry any more than rabbits when they are subjected to the same experiment. It appears certain then that the contraction of the intra-cranial vessels cannot be, in the normal condition, the cause of migraine.

"It is possible that when the sensory nerves of the intra-cranial vessels are in a state of hyperæsthesia, the contraction of the muscular fibres of these channels may occasion pain, in the same way as the contractions of the muscles of

the face or extremities do in neuralgia of the sensitive nerves of these muscles. But if we admit that contraction of the unstriped muscle of the vessels is capable, under certain circumstances, of giving rise to pain, we cannot admit that the pain is due solely or even principally to compression of the sentient nerve-fibres by the muscular fibres of the vessels. The compression only plays a secondary part in the production of the pain in spasmodic contractions of muscles, as is shown by the fact that when the tendon of a muscle which occasions pain by its contraction has been divided, the pain ceases, while the contraction, and consequently the supposed compression of nerves, persists. It is evident from this that the pain due to muscular contraction depends chiefly on other causes. We have shown elsewhere that one of these causes, and probably the most influential, consists in a galvanic excitation of the sensory nerves of the muscles.

"Other difficulties exist with respect to the hypothesis of Du Bois-Reymond. Not only, as he has himself remarked, is his conjunctiva injected, but the *eye is furthermore small and the face drawn.* These are the symptoms of paralysis of the great sympathetic nerve, and not symptoms of its irritation. But we do not refer to these facts as constituting objections to the theory, for we admit readily that certain fibres of the cervical sympathetic may be paralysed while others are irritated.

"It is otherwise evident to us that if there is really a contraction of the bloodvessels in the case of the eminent physiologist of Berlin during his attacks of migraine, only some portions of the great cervical sympathetic are irritated, for if all the fibres of this nerve which are distributed to the encephalon were then irritated, it would not be simple attacks of migraine which would occur, but attacks of epileptic vertigo.

"There is yet another difficulty with respect to the hypothesis of Du Bois-Reymond: we refer to the irritation of the fibres of origin of the great sympathetic in the cilio-spinal centre and the medulla oblongata (it has its real

origin partly in the spinal cord and partly in the medulla oblongata). It is difficult to understand how an irritation could supervene very frequently during a number of years, in special points of the medullary nervous centre, without spreading to neighbouring parts and producing other symptoms.

"We shall add but one word more: it is, that in most cases of Migraine which we have observed, the face, ear, and eye present symptoms of paralysis of the great sympathetic nerve, and not those of irritation of that nerve."*

II. The second form of vaso-motor theory which I shall notice is that of Dr. Möllendorff of Berlin.† It may be said to be very much the converse of that of Dr. Du Bois-Reymond, for while the latter supposes an excitation of the cervical sympathetic, and a consequent contraction of the vessels of the head, to be the immediate cause of his migraine, Dr. Möllendorff considers a paralytic condition of the same nerve with dilatation of the vessels and hyperæmia of the parts to be the occasion of the suffering. "It is the intention of the author in the following paper," he writes, "to prove that Hemicrania is a partly typical partly a-typical one-sided loss of power in the vaso-motor nerves governing the carotid artery, whereby a relaxation of the artery and a flow of arterial blood towards the brain are established." After remarking on the numerous varieties of migraine which have been distinguished by different writers, he proceeds briefly to notice the leading features of the malady, very much as they have been set forth in our earlier chapters, and to show how they accord with and support this theory.

The intermittent and periodical character is first noticed. This he regards as a distinct indication of the dependence of the malady on the sympathetic nerve, and more particularly the regular returns which are so frequently observed in connexion with the catamenial period in women, either

* "Journal de Physiologie," tom. iv. p. 137. 1861.

† "Ueber Hemikranie," von Dr. Möllendorff, pract. Arzte in Berlin, *Virchow's Archiv f. Anat. u. Phys.* Bd. xli. 1867. p. 385.

shortly before or after the discharge; for the phenomena of menstruation must themselves be regarded, he thinks, as the result of a similar disposition of the sympathetic, and the consequent dilatation and repletion of the uterine vessels. An analogous fact to be similarly explained is the determination of blood to the breasts which sometimes occurs at the same time, causing swelling and painful tension of the glands. He then reviews the various exciting causes of the seizures in the non-periodical forms. Mental influences stand first, whether in the form of emotion or intellectual exertion; then any considerable irritation of the sensory nerves, as from sight-seeing, prolonged study, or any occupation requiring a close application of the eyesight. He remarks with regard to the operation of these causes, that the attacks which follow them are often delayed until the patient awakes the following morning, when a prolonged relaxation may be supposed to succeed the previous tension. I may observe in passing how remarkably this coincides with Dr. Salter's experience in the case of Asthma already recorded (see p. 173), where the effects of exertion in producing the seizure were similarly delayed until the usual hour of occurrence the following morning. The influence of atmospheric changes is admitted, but digestive derangement, and especially late suppers with indulgence in wine which have so bad a reputation, he thinks comparatively harmless and mostly inoperative. A tendency to irregular gout is an important cause of the malady in men.

The dependence of migraine on a determination of blood Dr. Möllendorff thinks is further shown by the fact—"that sometimes the one and sometimes the other side is attacked, and that even on the same day the pain may begin on one side in the morning, cease at mid-day, and afterwards pass over to the other side and last until night."

The phenomena of the paroxysm are then considered from the same point of view. The commencement on waking with a sense of tension and fulness in the brow, and the gradual increase of these until the head feels as though it would burst; the throbbing of the arteries synchronously

with the cardiac impulse; the terrible aggravation of these symptoms and of the pain which follows stooping forward and the measure of relief afforded by lying back, are dwelt upon in support of the theory. But the pain and tension, it is observed, are also felt deeply in the interior of the head, in the parts supplied by the internal carotid, and where, from their small extensibility and rigid surroundings, a trifling increase of their fluid contents would be felt as tension.

The disorder of the special senses, of the sight and hearing, and intolerance of light are briefly noticed, and it is stated that "the pupils are contracted, and the contraction is equally strong on both sides."* This, we may observe, differs very materially from the observations both of Dr. Du Bois-Reymond and M. Piorry who have both noticed an alteration in the pupils. The one says the pupil is dilated and the other that it is contracted, but on the affected side only (see p. 300).

Lastly, the condition of the scalp, the hyperæsthesia of the parts to slight contact, and the relief which follows firm counter-pressure by a cloth bound tightly round the head, are pointed out. It is also mentioned, and the fact is an interesting one, that pungent volatile substances will not excite sneezing during the paroxysm, but that it sometimes occurs spontaneously towards the close.

After this we have a description of the effect produced by compressing the carotid artery during a paroxysm; this is so important to the argument, and is, moreover, such a remarkable confirmation of the account given by Dr. Parry of a similar experiment and its results, which has been already recorded above, that I give it here in full.—"If the common carotid artery be forcibly compressed on the painful side at the level of the thyroid cartilage during the hemicranial paroxysm, so that the pulse in the temporal artery begins to fail, the headache vanishes as if by magic. The eye is livelily opened, the oppressed and suffering face brightens up, and seems to inquire with an expression of

* "Die Pupillen sind verengt, und zwar beide gleich stark," p. 387.

delight, 'What has become of the pain?' Unfortunately, however, with the intermission of the compression, with the first full pulse-wave, the pain begins afresh, and indeed the first pulsation will be felt to be much more painful because of the greater fluctuation of the blood-pressure in the vessels which are wanting in tone, but it is soon continued with uniform severity. Conversely, compression of the carotid artery of the opposite side enhances the pain, and so also does compression of the subclavian of the same side, when it has not reached its full height, because through the cutting off of the blood-flow on one side, a greater blood-wave is driven towards the slack carotid and also received by it in consequence of its enfeebled muscular tone. On the other hand, if the pain has reached its maximum, then the compression of the carotid artery on the non-painful side mitigates the headache somewhat, through the quicker lateral current of blood on the sound and the disburdening of the affected side. This experiment has infallibly succeeded with me in the case of all persons suffering from hemicrania whom I have had the opportunity of seeing in the attack."*

Dr. Möllendorff then proceeds to say that the ophthalmoscope affords a direct demonstration of the augmented arterial blood-flow which results from a widening of the vessels, but he adds with good reason that it is hard to compel patients to undergo this very trying examination during the attack, and that hence he can only bring forward the results of this investigation in the case of one individual—"This person had perfectly normal very dark-pigmented eyes; an examination when in health showed no difference in the ophthalmoscopic appearances of the two sides. The fundus then presented a dark brown-red background, the optic papilla was normal, the arteria and vena centralis retinæ alike on both sides. During the attacks, the background of the eye on the suffering side was of a

* Op. cit. pp. 387, 388.

bright scarlet-red, the optic papilla red and œdematous, the arteria and vena centralis retinæ enlarged, the latter knotty and very tortuous, and much darker in colour than at other times. The other eye had its normal dark brown-red background, and the arteria and vena centralis as usual."

From these appearances—the alteration in colour of the choroid from the widening of its vessels and the displacement of the pigment, and the dilatation of the central retinal vessels—Dr. Möllendorff infers a like increased arterial afflux in the brain, and venous accumulation. The injection of the vessels of the episcleral tissue up to the rim of the cornea, which has been so generally noticed, lends additional support to the same view.

The author then refers to a fact of considerable interest, and one which has been noticed by other observers—namely, that "from the beginning and during the continuation of the hemicrania the rate of the cardiac pulsations is considerably lowered, the normal pulse-rate of from 72 to 76 beats per minute, sinking to from 56 to 48 beats; the radial artery meanwhile is small and contracted, whilst in the carotid and temporal a soft broad wave is felt," because here the impulse of the blood is opposed by little more than the elasticity of the vessels, in consequence of their enfeebled muscular contractility, the reciprocating action of the two (the wave and the elasticity) giving rise to the distressing throbbing pulsations. To the unequal distribution of blood in the system which is thus occasioned several phenomena are referrible—the icy coldness of the hands and feet and shivering of the surface generally, while the affected half of the head experiences an elevation of temperature and internal sense of heat; the suppression of the perspiration, excepting sometimes on the affected side of the head, and the increase of the saliva, and copious secretion of urine. The latter, he observes—"is considerably increased, of a colour as clear as water; even after 4 or 6 hours' duration of the hemicrania it contains a tolerable quantity of oxalate

of lime; the day after the attack it is dark, with a sediment of urate of soda."* A brief notice of the gastric symptoms, the sickness and discharge of bile, and the total arrest of the peristaltic action of the bowels, completes the review of the phenomena.

Dr. Möllendorff then proceeds to draw a comparison between the fundamental conditions of the migraine paroxysm and the effects of section of the cervical ganglion of the sympathetic in animals. This operation he observes is followed by—" a dilatation of the vessels, throbbing of the smaller arteries, increase of blood pressure, elevation of temperature in the injured side, together with the disappearance of these symptoms after galvanization of the upper section of the divided sympathetic; the vessels then contract and the temperature sinks. Bernard further adds that the sensibility of that half of the head on which the nerve is divided is heightened. Brown-Séquard, that the sight and hearing are more acute." To all this he finds an exact parallel in the dilatation of the vessels on one side in hemicrania, as more particularly demonstrated by the ophthalmoscope, and in the immediate removal of all the symptoms by compression of the carotid.

Thus a determination of blood to the head is established as the fundamental fact in migraine, and is afterwards applied to the explanation of the various symptoms as follows:—When the control of the muscular coat of the cerebral arteries is withdrawn, and the blood is opposed by little more than the elasticity of the vascular walls, the lateral pressure remaining the same, an increased sectional area of these vessels and a greater stream of blood are produced, and the unyielding character of the venous sinuses not admitting a proportionate outflow, an accumulation of blood necessarily takes place in the capillaries of the brain. The cerebral hemisphere is thus overcharged with blood, enlarged through this increase of its contents, and compressed on all sides by its rigid walls. And here it becomes necessary to

* Op. cit., p. 390.

distinguish, in the case of the brain and the nerves quitting it through the anterior and middle fossæ of the skull, between—(1) Central irritation through arterial fluxion, and (2) the phenomena attributable to the pressure of the elastic brain on the basis and side walls of the skull. To the former belong the disinclination for and impossibility of mental exertion; the hyperæsthetic condition of the olfactory, optic, and auditory nerves; the morbid sensibility of the scalp, which is referrible to the trigeminus, and is augmented by slight and lessened by considerable pressure; nausea, and other symptoms of gastric disturbance, from irritation of the roots of the vagus and glosso-pharyngeal. To the latter, obscuration of the visual field, and difficulty in moving the eyeballs, the nerves of which are compressed at the base of the brain; diminished reflex activity of the trigeminus, which is seen in an incapacity for sneezing during the attack and its spontaneous occurrence at its close, also a sense of numbness in the scalp, which is followed by creeping and itching when the attack passes off. It should be further observed that no pressure-phenomena occur in the case of the nerves which leave the cranial cavity below the tentorium cerebelli.*

The reduced rate of the cardiac pulsations Dr. Möllendorff thinks may probably be explained by Professor Goltz's "tapping experiment," where loss of tone in a vascular territory is followed by weakening of the heart's activity.† Emptiness and contraction of the arteries of the extremities, fulness and abolition of tone in the territories of the carotid, mesenteric, renal, and hepatic arteries, characterize the hemi-

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* Op. cit. pp. 390, 391.

† The experiment to which I suppose Dr. Möllendorff to allude is this:—Prof. Goltz showed that if a frog be struck repeatedly on the belly the heart stops in consequence of the reflex excitation of the vagus, but this effect is not produced if, coincidently with the blows, the sensory nerves of the extremities are powerfully excited as by pinching, or by the shocks of an induction apparatus. If the animal is allowed to rest for a few minutes, and the raps on the belly are repeated without irritating the sensory nerves, the heart will again stop in diastole. The explanation he suggests, is that a considerable irritation of the sensory nerves induces a condition analogous to paralysis in the medulla oblongata, rendering it incapable of transmitting more feeble reflectorial impulses. We shall return to the consideration of this subject again.

cranial paroxysms; and as, after section of the nerves of the salivary glands, the secretion is both increased in quantity and more viscid in quality, so it is in migraine; and as, after section of the splanchnic nerves the urinary secretion is increased, so it is here; and all sufferers from migraine testify to a swelling of the liver and hypersecretion of bile. Lastly, he observes that we may at any time produce in ourselves conditions exactly similar to those here described by experimenting with small doses of curare or atropine, of which the first effect in men is paralysis of the vaso-motor nerves.

As regards the various causes which bring about the determination of blood, their operation is such as to occasion a short hyper-energy of the muscular tone of the vessels, which is followed by a more lasting loss of energy. In this respect the operation of alcohol offers a remarkable parallel with the course of hemicrania; for the headache from drink never arises during the stage of intoxication, but when its effect has passed off, and an unpleasant relaxation succeeded the agreeable excitement.

The one-sided character of hemicrania Dr. Möllendorff thinks to be quite in harmony with what we know of the functional activity of all organs which occur in pairs, and which is seldom equal on the two sides at once, and this we may suppose to be no less true of the sympathetic.

The hereditary transmission of the malady, he suggests, may be due to an inherited imperfection and defective development of the vascular muscularity, and this conjecture he thinks supported by the proneness of the arthritic and chlorotic constitutions to such headaches, in which vascular degenerations are known to occur. He mentions one fact in connexion with this hereditary transmission of the malady which deserves a passing notice, it is—"that it is bequeathed to children of either sex who bear the closest resemblance in the conformation of their bodies to the sufferers among the couples from whom they are descended;" and he goes on to say—"I have repeatedly observed this transmission through three generations, from the great-

grandmother to her son, and from him to his daughter, whilst the sons have gone free, and exactly the converse in the case of descent from the great-grandfather." I can so far confirm this that I remember one patient telling me, when I inquired if his malady were a family one, that only one out of several of his children suffered in the same way, and this was a daughter, and the only one who closely resembled himself.

The objections which I have to make to the foregoing theory are precisely similar to those which I have urged against that of Professor Du Bois-Reymond. In both cases certain symptoms are taken as evidence of a condition of the local circulation, which is regarded as the essential cause of the paroxysm, while these vascular phenomena are themselves the most variable and inconstant of the series, as might indeed be inferred from the fact that two scientific men can entertain two such opposite views with respect to them. I have myself repeatedly watched the severest paroxysms of typical megrim without being able to detect any of those indications of hyperæmia to which Dr. Möllendorff refers; cases in fact where there has been no apparent dilatation or objective throbbing of the vessels, no conjunctival redness, no contraction of the pupil. I have also carefully examined the fundus of the eye with the ophthalmoscope (see p. 81), in a severe hemicranial case, where the visual phenomena were highly developed, and where, if at all, we should certainly have expected to find the appearances Dr. Möllendorff describes; yet I have been unable to discover any distinct difference in the vascular condition of the choroid, optic disc, or retinal vessels on the two sides, or any striking departure from the appearance of the same parts in health, and certainly no evidence of hyperæmia. I am far from saying that the megrim paroxysm is never attended by such a disorder of the local circulation as Dr. Möllendorff describes, but I am sure that it is often, and I suspect very generally, absent; and this being the case, it is impossible to regard it as an essential condition of the paroxysm, or a principal cause of the symptoms.

The pain of megrim, like that of some other forms of neuralgic suffering, is more often I believe associated with a condition of spasm in the parts, which is shared by the arterial system, than with one of relaxation and congestion: while the subsidence of the attack is not unfrequently marked, as Du Bois-Reymond says, by a degree of reaction and local hyperæmia. This agrees with what Professor Rolleston has stated generally of Pain in his suggestive address on that subject—"that pain is the constant accompaniment of that condition of innervation which attends a state of spasm and tension in a part, while the opposite one of relaxation is free from pain."* The same fact is exemplified in a remarkable manner in a class of maladies where vaso-motor phenomena attain a high development: I refer to ague and its masked forms. Here, when the typical seizure is represented, as it often is, by neuralgic pain or psychical disorder, these symptoms attend or replace what would be the cold stage of the ordinary febrile accessions: and indeed this may be seen in a variety of megrim itself which is one of the forms which masked ague assumes, as in the endemic Migraña of Spain.† M. Calmeil observes:—"L'hémicrânie à type tierce coïncide souvent avec l'invasion du *frisson* d'une fièvre intermittente ordinaire et bénigne."‡ This corresponds, too, with the contracted pulse in the extremities, and the pale copious urine which Dr. Möllendorff describes.

On the other hand, it is, I repeat, impossible to deny, in the face of much independent evidence, that a remarkable hyperæmia of the external parts of the head, with increased heat, on the affected side, and redness of the conjunctiva and eyelids, occasionally accompany the true megrim paroxysm; nor have we any reason to question the ophthalmoscopic appearances observed by Dr. Möllendorff, nor the alleviation

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* "Physiology of Pain."—*Med. Times and Gaz.*, Aug. 1868.

† In the vernacular, Jaquéca (for Axaquéca) = a violent pain which seizes one side of the head; so called from the Arabic Xacáque, to split or divide, because it seems to split the head.

‡ "Dict. de Méd." en 30 tomes, tom. xx. pp. 4, 5.

of suffering which under such circumstances may have followed compression of the carotid, as attested by himself and Dr. Parry, or the occurrence of hæmorrhage with the same result which others have witnessed. Indeed, since the ordinary pulsation of the arteries in cases where there is no obvious hyperæmia is painfully felt in consequence of the morbid sensibility of the parts, it is easy to understand that the relaxed and throbbing condition of the vessels described by Dr. Möllendorff, if present at the height of the paroxysm, might greatly aggravate the suffering; and under the same circumstances compression of the carotid might considerably relieve it.

But I go further with Dr. Möllendorff than this, and believe that the vascular phenomena he describes, as well as those of an opposite character, may be correctly referred to a derangement of the vaso-motor innervation in the affected parts; and as in Du Bois-Reymond's and similar cases this must be regarded as of the nature of excitement or irritation of the sympathetic, so in cases such as those to which Dr. Parry and Dr. Möllendorff refer it must be of the nature of paralysis or inhibition. There is nothing in the history of megrim as we have traced it in our earlier chapters to render the occurrence of either of these conditions improbable, nor even of both in succession. Why should not the origin of the vaso-motor fibres be involved in the same disorder which successively affects the 2nd, 5th, and 8th nerves: if not directly, yet by reflected impressions from the sensory tract? Or why should not a primary spasm be followed by a spontaneous relaxation, as both Du Bois-Reymond and Möllendorff in some sense suggest? There seems indeed to be no good reason against the adoption of either of these views; and we shall have something further to add in their favour at the close of this section; but even so, we are only brought to regard this derangement of the circulation *as one among many phenomena of the paroxysm, and by no means as essential or the cause of the rest.*

I shall only make one further remark; it is that the

vascular fulness, ecchymosis, and swelling of the scalp and other parts which sometimes follow the seizures must, I think, be regarded as of a somewhat different character, and the result of a more persistent derangement of the local nutrition, the effect of repeated seizures. This is exactly analogous to what Sir B. Brodie has described as following other forms of neuralgic suffering:—"Nervous pains," he observes, "may, in the first instance, be readily distinguished from those produced by inflammation by the absence of throbbing, by their not being increased by pressure, by there being no evident turgescence of small vessels. But there is more difficulty in the diagnosis afterwards . . . Nerves which have been kept some time in a state of irritation transmit every impression which is made on them to the brain with a disagreeable or painful sensation superadded to it; in other words, the part afterwards will be tender to the touch. And more than this: the tenderness may be followed by increased vascularity; by a slight degree of swelling; by actual inflammation. . . . In a patient who had laboured for some time under pain in the testicle, depending on a calculus passing down the ureter into the bladder, the testicle became tender and considerably swollen. In a gentleman, who suffered for a great length of time from what was regarded as a most severe *Tic-douloureux* in the face; at first the parts to which the pain was referred retained their natural appearance, but ultimately they became swollen, from an effusion of serum into the cellular texture, and so exquisitely tender that they could not bear the slightest touch."*

III. A third form of vaso-motor theory has lately been put forward by Dr. Latham, of Cambridge; it may be briefly characterized as a sort of compromise between those of Drs. Du Bois-Reymond and Möllendorff; but I wish to take this opportunity of stating that it was suggested to

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* "Lectures on Local Nervous Affections," by B. C. Brodie, p. 17.

me by him in the course of conversation at least ten years ago, when discussing some of the more remarkable phenomena of these seizures, without any acquaintance on his part with Dr. Du Bois-Reymond's views, and years before those of Dr. Möllendorff were published.

Dr. Latham's theory is briefly this:—He believes that a morbid activity of the sympathetic nerve, in consequence of a defective control or inhibition by an exhausted or enfeebled cerebro-spinal system, is the primary cause of the malady. The effect of this morbid activity in the cervical region of the sympathetic is to cause a contraction of the vessels of the head and *anæmia* of the parts they supply, and this he regards as the immediate occasion of the paroxysm, and the cause of the earlier symptoms, and particularly of the disorder of sight; while the headache he refers to a secondary *hyperæmia*, which follows the exhaustion of this morbid activity.

After noticing the well-known effects of division of the sympathetic in the neck of animals on the circulation and condition of the pupils, and of the galvanization of the cut extremities, he continues:—"I shall now proceed to apply this to the disorder we have been considering, and to show first of all that we have *contraction* of the vessels of the brain, and so diminished supply of blood, produced by excited action of the sympathetic; and that the exhaustion of the sympathetic following on this excitement causes the *dilatation* of the vessels and the headache."

Having already described the visual disorder which so frequently precedes the headache — the glimmering and partial obliteration of the visual field—he suggests that these phenomena are analogous to the loss of vision which results from cerebral anæmia in conditions of syncope and fatal asthenia. This he illustrates by reference to the case of a sufferer from megrim who once momentarily fainted, and on recovering experienced the partial loss of sight and other visual phenomena which he had been accustomed to witness as preceding his headaches:—"I was much fatigued,"

the patient writes, "and had run quickly up some steps when I tumbled on the floor; the faint was only momentary; I immediately recovered myself and took the nearest seat. On sitting up, everything became dark before me, so I leant forward and put my head between my knees. I then noticed the appearance before my eyes; it had precisely the same characters as the wavy glimmering which preceded the headache, but was much darker, more marked and extensive; it only lasted half a minute or three-quarters, then entirely passed off and no headache followed."

With regard to this case, I confess that I have some difficulty in recognising the features of ordinary syncope; the instantaneous loss of consciousness and its momentary duration, followed instead of preceded by the affection of sight, have more of a vertiginous character, and I should be much disposed to regard the whole attack as an irregular form of the megrim to which the patient was liable. But be this as it may, although the sight is often lost in a common fainting fit, I cannot think that the phenomena are ordinarily comparable with the remarkable half-vision and well-defined spectral appearances of the megrim paroxysm. But to return to Dr. Latham's account.

We are next presented with an interesting case where the attack was brought on by the sight of falling snow. This, I may observe, is exactly the kind of dazzling impression which will sometimes occasion a paroxysm in those who are predisposed to the visual form of the malady. The *glimmering* began on the *right* side, quite to the edge of the field, and immediately extended, on the patient's lying down, over more than half the field of vision, and continued for about twenty minutes. "It was less distinct when I lay on my *left* side than when I lay on my right; when it was declining, as I turned to my *right* side, the movement was more plainly perceptible. The headache on the left side had been gradually increasing; my feet were very cold, and when the glimmering had almost disap-

peared, I got up and drew an easy chair to the fire, but had not been seated more than a minute when the glimmering became more distinct, and appeared to extend."*

"This disturbance of vision then," continues Dr. Latham, "is due to defective supply of blood to one side of the brain from the contraction of the cerebral arteries —probably of the middle cerebral. In the case which I have just read, there was loss of tone about the cerebro-spinal system from over-work; the brain is no longer able to inhibit the action of the sympathetic; a slight cause serves now to excite the action of the latter nerve; it affects more particularly the cerebral artery of the left side, causing glimmering on the right side of the field of vision. The glimmering is lessened by adopting a posture which allows the blood to flow readily towards the part affected. The patient rises before the optical disturbance and the excitement of the sympathetic are entirely over; in the erect posture the blood is driven with less force to the brain, and, with lessened pressure on the arteries, these contract more strongly, owing to the still excited state of the sympathetic, and the glimmering increases. The patient lies down again, the blood is driven with increased force to the brain, the resistance of the arteries is overcome, the action of the sympathetic is exhausted, and the same condition results as is observed after section of this nerve. The vessels become distended, the head throbs and aches, and the pupil contracts."†

Such is a brief sketch of Dr. Latham's theory, and of the argument by which he supports it. It will be observed that he lays much stress on the effects of posture, and it is not a little remarkable that all the supporters of these vascular theories appeal to the same fact in confirmation of their respective and opposite views. "Since vascular tension is the cause of the pain," says Du Bois-Reymond, "anything which increases the tension, as an increase of

* *British Medical Journal*, March 30th, 1872, p. 336.
† Idem, March 23rd and 30th.

the pressure of blood in the head from stooping, will augment the suffering." On Dr. Möllendorff's view, the pain, tension, and throbbing in the forehead and temples, are due to relaxation of the vessels and determination of blood to the parts, hence stooping forward terribly aggravates the pain, while reclining backward is a relief. Dr. Latham says, since the disorder of sight is due to anæmia of the opposite side of the brain, lying on the side opposite to that on which the "glimmering" first appears, will relieve these symptoms, while turning on the other side, or rising, will increase them. The reverse should be the case during the headache or congestive stage, but I do not find that Dr. Latham says it is.

There is one circumstance which all these writers either omit to notice or explain—namely, the almost universal testimony of sufferers that *lying down,* irrespective of particular posture, is the only thing which affords any relief to the *headache.** This, I maintain, is opposed alike to the theories of pain from hyperæmia and from vascular tension, for if lying on this side or that, reclining forward or backward, respectively aggravate and relieve these conditions, much more must the horizontal position itself occasion an increase of suffering, and relief should be found in remaining erect, whereas the reverse is the case. It must not be supposed for a moment that I intend to question the aggravation of the pain from stooping, coughing, and the like: no fact is better attested; but we may readily allow that, in the morbidly sensitive and hyperæsthetic condition of the parts, any sudden heightening of the blood-pressure, whatever its cause, may by its mere mechanical effect, considerably aggravate the pain at the moment when the change occurs, without supposing either congestion or arterial tension to be the *principal* cause of it. For the same reason the *act*

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* In addition to the evidence already given on this point, I may add the testimony of Dr. Heberden. Writing of the same form of megrim he says:—"Nec invenire potui quibus remediis sanetur, aut etiam leniatur; nisi quod cubanti in lecto dolor citius finitur, et impetus ejus aliquantum minuitur."—*Commentarii,* p. 278.

of lying down generally brings a temporary aggravation of the pain, and so does any jarring.

As regards the particular position assumed, I believe the majority of sufferers find more relief from that perfect repose and complete absence of muscular action which the recumbent position insures than from lying on this side or that, with the head a little higher or a little lower; while the muscular exertion which a change of posture involves always entails a temporary aggravation of suffering, which subsides again if the new position be patiently maintained; at least I can testify that it is so in many instances.* Dr. Symonds has justly observed in the case of patients who have failed to find relief from recumbency, that it is probably because they "have been deterred from fairly trying it by the first discomfort of the change."

The main objections which I have taken to the two preceding forms of the vaso-motor theory—namely, the inconstancy of the phenomena on which they are based, as shown by the discrepancy of the views which prevail on the subject, are no less applicable to Dr. Latham's theory; and it will be the less necessary, therefore, to dwell on any particular objections which might be urged against it; I shall only notice one or two. Since on this view the contraction of the vessels and the cerebral anæmia are the necessary antecedents of the subsequent hyperæmia and headache, how is it that all indications of the former, in disordered vision, or other symptoms, are so often wanting and the attack begins with the pain? Another objection which strikes me forcibly is this: If the "glimmering" and headache are due to opposite and antagonistic conditions, how does it happen that the latter often commences before the former has ceased? This was clearly so, for instance, in the second of Dr. Latham's cases; the patient says: "The headache on the left side had been gradually increasing; my feet were very cold, and when the glimmering had almost disappeared," &c. Again,

* Romberg says:—"The *motor* and intellectual functions of the brain increase the pain, for which reason the patients always court quiet and solitude." "A Manual of Nervous Diseases."—*Syd. Soc. Edit.*, p. 176.

as I have before observed, Dr. Latham does not say that the sitting up which renewed the glimmering removed the pain; on his view, it must have done so, but it would be contrary to all my experience, and that of many others, if such were found to be the case.

Before quitting Dr. Latham's paper, I may notice an interesting circumstance which he mentions, and which illustrates some points in the history of megrim on which I have dwelt in the earlier parts of this treatise. He says: "In perhaps one-fourth to one-third of the cases, during this glimmering stage, there is tingling in some portion of the body—the part is *asleep*. In a young woman that I saw, the tingling affected one arm and the side of the tongue; and, curiously enough, both her sister and father were affected in the same way. The tingling was on the *same side* as that on which the glimmering in the eye began." To this I may add that since writing the section on *Unilateral and Bilateral characters* (p. 65-69,) I have met with another case recorded by M. Piorry, where the tingling occurred also on the same side as the disorder of vision; to which he appends this remark:—"Jamais ces accidents n'ont lieu du côté du corps opposé à l'œil qui a été le point de départ des accidents."* So far then the weight of evidence is very much in favour of the affections of sight and touch occurring on the same side though the headache varies.†

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* "Clin. Méd. de la Pitié," p. 306. 1835.

† In the course of his lecture Dr. Latham mentions that the epileptic affinity of these attacks was first suggested to him by myself; and the context would seem to imply that I traced the analogy in the condition of the cerebral circulation, in accordance with the views of Kussmaul and Tenner, who refer the initial phenomena of the epileptic paroxysm to spasm of the cerebral vessels. We have already seen (p. 300) that such a suggestion has been made by Prof. Du Bois-Reymond with reference to his own megrim, but at no time by myself. My own view of the affinity of these disorders arose quite independently from a consideration of their common characters and metamorphic relations as already developed in the previous chapters of this Essay.

It is not a little remarkable that so many writers should have found in their respective theories indications of such a relationship—Dr. Parry in his "Determination of Blood;" Dr. Marshall Hall in his "Trachelismus;" M. Piorry in "peripheral irritations;" and Prof. Du Bois-Reymond in excitation of the sympathetic and spasm of the cerebral vessels.

Having now completed our review of the principal vasomotor theories of megrim, although I cannot go to the length of Dr. Niemeyer, who, after confounding the views of Du Bois-Reymond and Möllendorff, characterizes both as "fanciful hypotheses" ("Text-book of Prac. Med., vol. ii. p. 297. Amer. Ed. 1872); yet I would say, that until observers are better agreed upon the facts, it seems useless to prolong a discussion upon their interpretation, or to pretend to decide on the respective merits of these conflicting views. Instead of doing so, I propose to bring together some scattered observations which have been made at different times by other observers on the state of the local and general circulation during the megrim paroxysm, and to add any remarks they may happen to suggest.

1. First, with regard to the *local circulation.* Tissot says:—"We have seen the temporal arteries and those of the forehead extremely tense (tendues), and violent flushings of the face during the height of the pain; sometimes the whole face swells up at the end of the attack, and the parts which have been the seat of pain remain so acutely sensitive that the patient can't bear them touched." "The eye of the affected side is sometimes suffused: sometimes it is even very red during the attack."* He also relates the following case:—"I have been consulted by a lady in whom migraine made its appearance after excessive fatigue occasioned by the long illness of her mother, and who, during the attacks, could only see the halves of objects; it was no uncommon occurrence with her in the severer seizures for the violence of the spasm to occasion an extravasation of blood, rendering the skin of the forehead, eyelids, and even the cheeks black and blue."† Tissot also notices some other cases where local hæmorrhages occurred, and later on he observes that a *plethoric* condition is sometimes a cause of migraine: "I once saw a youth who had had several attacks between the ages of twelve and sixteen; then he began to suffer frequent bleedings from the nose, and the migraine

* "Traité des Nerfs," p. 384. † Idem, p. 387.

disappeared. At nineteen the bleeding ceased, and the migraine returned; but, after six months, the hæmorrhages having returned, the migraines terminated. Some years afterwards the hæmorrhages diminished considerably without the recurrence of migraine. Since then I have lost sight of him." He concludes thus:—"We may gather from all that has been said, that migraine is occasionally, but only very seldom, a plethoric affection."*

Labarraque has noticed the occasional occurrence of similar symptoms:—"Patients sometimes experience, on the part of the capillary circulation, symptoms which seem referrible to congestion; thus, in proportion as the headache increases, we observe such congestions of particular parts, ordinarily of the face, which becomes red, or livid . . . The conjunctivæ are injected, and even in certain cases ecchymosed."†

M. Piorry again, who takes a strictly neuralgic view of migraine, nevertheless remarks that "on examining the eye we discover a notable redness of both the lids, which present an appearance similar to that which is seen in the case of persons who have irritated their eyes by long watching and close study." And again:—"We cannot deny that certain states of the organism render the invasion of migraine more frequent, and this is sometimes the effect of plethora."‡

Dr. Parry observes of one of his patients, whose case was in all respects a very typical one, that "during the headache, if not sooner, her face is extremely hot and flushed, and her feet are cold."§ This agrees with Dr. Möllendorff's and Dr. Latham's descriptions.

Dr. John Fordyce, who made this malady the subject of careful study in his own person, long since drew attention to many of the symptoms to which Dr. Möllendorff has referred, but only as occasional incidents of the severer seizures; such are the increased pulsation of the vessels

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* "Traité des Nerfs," pp. 391, 392. † "Essai," etc. p. 34.
‡ "Mémoire," etc., §§ 821, 835; pp. 414, 420.
§ "Unpublished Writings," vol. i. p. 465.

and the retracted condition of the eye:—"Arteriarum ictus, præsertim temporalium, durante paroxysmo, augentur, et accelerantur, finito vero, denuo subsidunt tardique fiunt." "Ubi dolor sævit immanis, oculus partis affectæ ut plurimum cruciatur admodum, introtrahi videtur, imminuique, nec pati valet lumen."* Dr. Fordyce also tried the effects of bleeding on himself in some of his worst attacks, and also on his patients, but without relief:—"In paroxysmis sævissimis sanguinem mitti nec mihi, nec aliis, acerbitatem unquam lenibat doloris, nec vel minimum proderat." Leeches, however, he thought of some service. He appears also to have tried bleeding from the temporal artery with as little profit. These observations are not without their value, for it would be difficult now to find anyone willing to submit to the experiment. He does not appear to have attempted the compression of the carotid, as Parry and Möllendorff have since done, but he did try compression of the temporal artery without any good effects:—"Nec magis prodest," he says, "arteriæ ad tempus suppressio, carotidis alii namque rami non minus membranas obstructas pervellunt ac replent."†

One word more with regard to the occurrence of hæmorrhage in the neighbourhood of the affected parts. Such accidents must be very rare, but the evidence is too clear to allow us to doubt their occasional connexion with megrim; moreover, having once admitted that considerable derangement of the local circulation sometimes attends the paroxysms, and that it is reproduced with increasing facility by their frequent repetition, and in some cases perhaps may not completely subside in the intervals,—the occurrence of a local hæmorrhage presents no special difficulty. When assisting Mr. Bowman at the Moorfields' Hospital, now some fifteen years ago, a young man came to me for advice, under the following circumstances:—He was a gardener from the country, and while stooping

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* "Hist. Feb. Mil., et de Hemicrania Dissert.," p. 80, §§ v. vi. Lond.: 1758.
† Idem, §§ xxxv.

down, engaged in clipping a box border, he suddenly lost the sight in one eye; something, he said, rapidly spread over his vision, so that he could not see the box row with that eye. An ophthalmoscopic examination revealed a very extensive choroidal hæmorrhage carrying the retina far forward, and I have now before me a drawing I made at the time of the appearances presented. He could discern the light, and the shadow of a moving body, but nothing more. The only history of previous illness or trouble of any kind was a notable one of repeated and severe megrim paroxysms, from which he had suffered from childhood, and which were preceded by the usual partial blindness; they attained a maximum of severity between the ages of ten and twelve, and the last two or three years had somewhat abated, but he had not felt as strong or well since. He had had no headache on the day when he permanently lost his sight, nor on the previous one. The occurrence of hæmorrhage in connexion with a history of megrim in this case may, after all, have been a mere coincidence; but since the results of my observations on the state of the circulation in the eye during the megrim paroxysm differ so materially from those of Dr. Möllendorff, I have felt it incumbent upon me to mention this case, which seems to accord with what he has observed. I should add that Tissot refers to a case in which an eye was lost from internal hæmorrhage.

It is then unquestionable that symptoms of local hyperæmia, such as those on which Dr. Möllendorff chiefly rests his theory, have been met with from time to time by various observers, but rather as exceptional than constant phenomena of the paroxysm; and this inconstancy has been distinctly recognised by Professor Lebert. "Some persons," he says, "are red during the attack, and others present a sallow pale appearance."*

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* "Die einen sind im Anfalle roth, Andere bekommen ein gelbliches, bleiches Aussehen." "Handbuch der prak. Med." Bd. ii. p. 570. Aufl. 1860.

I shall conclude with the following remarks by M. Calmeil, which very nearly convey my own impressions in the matter :—"There is evidently," he says, "*in some subjects*, a well-marked local hyperæmia. The injection of the conjunctiva, the heat of the face, the swelling of the scalp, the arterial throbbing, the frequent occurrence of spontaneous local hæmorrhages, afford sufficient indications that a very active flow of blood takes place towards the affected parts during the attack. But even supposing this feature were constant, would the accumulation of blood which is so quickly dissipated, which presents neither the characters of an acute inflammatory affection nor those of an ordinary congestion, be sufficient to explain satisfactorily the special nervous phenomena which we have described? Ought we not rather to regard the afflux of blood itself as a concomitant effect of an unknown derangement of innervation, a derangement which is afterwards augmented by the stasis of blood in the tissues?"*

2. Passing on now to the second class of facts—viz., those which relate to the *general circulation*, it will be remembered that Dr. Möllendorff has pointed out that during the paroxysm the rate of the cardiac pulsations is considerably lowered, that the radial artery is small and contracted, while the carotid and temporal are full and dilated. There can be no doubt, I think, from other evidence besides Dr. Möllendorff's, that the rate of the heart and the arterial contractions in other regions besides the head, are sometimes considerably modified during the progress of the graver forms of megrim, but I do not think that this derangement has always the character or constancy which Dr. Möllendorff seems to assign it. The older observations which I have met with bearing on this subject are the following :—

Labarraque observes:—"The general circulation is normal at the commencement of the attack, but in proportion as the pain augments the pulse is more developed; it becomes

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* "Dict. de Méd.," en 30 vol. Tom. xx. p. 6.

hard and frequent."* Tissot gives a similar description:— "The pulse, when the suffering is severe, is always hard and quick; towards the close, it subsides."† So far we have a description of a condition which, except for the somewhat doubtful meaning of "hard," is almost the reverse of that which Dr. Möllendorff describes—a quicker and more developed pulse, instead of a slower and smaller one. But Labarraque, who has pushed the inquiry further than Tissot, makes this important addition to the previous observation: "At other times the pulse is small, tense, contracted, and sometimes even imperceptible at the moment when the suffering attains its greatest intensity; it becomes rather more developed during the efforts to vomit, and often relaxes afterwards in a very marked degree." And Calmeil says, "at the height of the paroxysm the pulse is contracted, hard, and thrilling." It would thus appear that the condition which Du Bois-Reymond has described as occurring in the arteries of the head sometimes extends to those of the extremities.

None of these observers, however, accord with Dr. Möllendorff in mentioning a reduction in the rate of the pulse as a feature of the paroxysm, but Sir James Clark, who, under the title of "Nervous Dyspeptic Headache," has drawn a very faithful portrait of typical megrim, has especially noticed this circumstance: "The pulse," he says, "is mostly slower than natural."‡ It will be remembered that this slowing of the pulse occurred to a high degree, and as a more or less persistent condition extending over some years, in two of the sufferers from megrim whose cases I have recorded, although not at the time when they were most troubled with this malady, but when suffering from another vicarious neurosis, which in Mr. A.'s case was gastralgic, and in Dr. G.'s angino-pectoral (see pp. 213, 219).

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* "Essai sur la Cephalalgie et la Migraine," p. 34.
† "Traité des Nerfs," etc., p. 386.
‡ "The Sanative Influence of Climate," 3rd Ed. 1841, p. 18.

I wish now to point out, in connexion with my general argument from analogy, that a smallness and contraction of the pulse and slowing of the heart, one or both, are by no means peculiar to megrim, but form an occasional feature in the history of other neuroses, and a frequent one in those where the vagus is particularly engaged. Sir John Floyer has some interesting, though quaint observations on this subject in the case of Asthma:—"The motion of the muscle of the heart," he says, "is altered or stopped by the fit; for the pulse is weak and intermitting, and the hands and feet cold. . . . . for the bloodvessels are constringed as well as the bronchia by the inflation of the nerves and membranes; for the par vagum sends branches both to the heart and lungs and orifice of the stomach, where the first nervous effects or inflations begin, and that by the same nerves is communicated to the heart and lungs and membranes of the breast." "The great constriction of the pulmonary arteries, and the other bloodvessels, as well as the heart itself, in the fit, stops the pulse of asthmatics, and that depresses the feverish ebullition and prevents the heat, high pulse, and high coloured urine at first." "That the nerves may stop the circulation very much in asthma is evident by the frequent circumvolutions they have about the bloodvessels near the lungs. And since the nerves make an evident constriction on the bronchia during the fit, we may observe by the intermitting pulse that they make the same sort of ligature upon the arteries."*

Dr. Salter confirms these observations as regards the smallness of the radial pulse; he says, "The pulse during severe asthma is always small, and small in proportion to the intensity of the paroxysm. It is sometimes so feeble that it can hardly be felt." "I have never known the small pulse absent in severe asthma."† He does not however mention any reduction in the rate; but Dr. Conolly

* "A Treatise of the Asthma," pp. 12, 38.
† "On Asthma." 1st edit. p. 70.

has described a remarkable case of asthma of an hysterical type where the pulse was reduced to 20 during the paroxysms.*

In Angina pectoris again, although slowing is rare, the rhythm of the heart is often deranged, and the contraction of the arteries and smallness of the radial pulse are often very remarkable. In Dr. Wall's well-known narrative it is stated that, "the patient's pulse was never irregular but always small; and during the paroxysm it sunk so much under the finger that it could hardly be felt."† Dr. Parry in his able treatise on that disorder observes: "In some cases it is either conjoined with an unequal pulse, or affects persons who are subject to that symptom. In other cases the pulse has been habitually so little changed as to lead to the opinion that the heart in no respect primarily suffers. But whatever be the state of the pulse as to regularity, I believe we shall always find it become more or less feeble according to the violence of the paroxysm." "During the fit the pulse sinks in a greater degree."‡ Recently Dr. Anstie has tested this point with the sphygmograph, and found "that arterial expansion is much diminished and arterial tension increased during the paroxysm."§ It has been even suggested that in this complaint, as in megrim, the arterial spasm is the cause of the pain; but this cannot be, since this condition of the arteries is not a constant one in angina pectoris any more than in megrim, and the pain must rather be regarded as neuralgic. Thus Sir John Forbes, who closely studied the malady, says, "The pulse is found to vary very considerably in different cases. Sometimes it is regular, sometimes irregular; in one patient frequent, in another slow; sometimes feeble, sometimes strong, and occasionally sup-

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* "Cyclop. of Pract. Med." *Art.* "Hysteria," p. 559.

† "Transac. of the Coll. of Phys.," vol. iii. p. 16.

‡ "On Angina Pectoris," by C. H. Parry, M.D., pp. 44, 46.

§ See a paper on the Action of Nitrite of Amyl, by Dr. Brunton; read before the Clin. Soc. of Lond., Feb. 11th, 1870. *Brit. Med. Journ.* Feb. 26th, 1870.

pressed altogether; most commonly, perhaps, it is regular, small, and weak."*

Similar phenomena may be observed in some painful gastric affections. We have already referred to a case by Dr. Whytt, which illustrates the occurrence of a persistent slowing of the pulse during the prevalence of a recurrent Gastralgia of the true neurosal type (see p. 216), and the case of Mr. A. is another instance. The condition of the arterial tension in the extremities is not mentioned.

Even Epilepsy occasionally exhibits the same feature, but exclusively I believe in the so-called gastric forms, where the fits are associated with some disorder of the digestive organs, or morbid sensations referrible to those parts, such as an "aura" mounting from the stomach to the head. Dr. Sieveking observes: "An exception from the general rule that an acceleration of the pulse is produced in epilepsy, if any change is perceptible, is detailed by Dr. Burnett, who quotes two similar instances from Morgagni. In Dr. Burnett's case, an officer, aged forty-five, became epileptic, and the pulse was reduced from the normal standard to 20, and at times sunk as low as 14 in the minute before the fit."†

In a case of severe and prolonged hiccup in a lad, attended by violent headache and other nervous symptoms, recorded by Dr. Danet, and which resisted purgative treatment but yielded at once to Valerianate of Zinc, a similar depression of the pulse was observed at the height of the attack. "At first small but regular, the pulse," says Dr. Danet, "became intermittent and remittent, and soon fell to 34 beats per minute, and, strange to say, became isochronous with the hiccup; so severe were the symptoms that Professor Bouillaud thought, and I too, that there must be some grave lesion of the abdominal vessels."‡

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* "Cyclop. of Pract. Med." *Art.* "Angina Pectoris," p. 82.

† "On Epilepsy," p. 41. See also "Med. Chir. Trans.," vol. xiii. p. 202; and Morgagni, "De Sed. et Causis Morb." Epist. ix. art. 7; Epist. lxiv. art. 5.

‡ "Hoquet accompagné de troubles graves dans la circulation durant douze

In Dr. Steel's remarkable case of recurrent neurosal aphasia and inhibitory palsy recorded at p. 103, it will be remembered that the pulse was reduced to 40 per minute during one of the seizures.

Recurring once more to Dr. Möllendorff's explanation of the slowing of the pulse in Migraine—namely, that it is the effect of a relaxation of the abdominal vessels,* I am very much disposed to adopt his view with this addition—that the relaxation arises from irritation of the vagus, and for the following reasons: I suppose it is as well established a fact as almost any in vaso-motor physiology, that irritation of the cranial end of the divided vagus in the neck of animals, and still more of the divided superior laryngeal (cardiac) branch, is followed by a remarkable dilatation of the abdominal bloodvessels, chiefly those of the stomach, and a diminution of the general blood-pressure, which occasions the slowing of the heart; the dilatation of the vessels probably arising from a reflex inhibitory action of the vagus on the sympathetic.† Now two sufferers from a severe type of megrim, whom I have known, at the time when they were most troubled by the malady, were also liable to occasional paroxysms of limited epigastric fulness and strong, swelling pulsation—a special form of neurosis first described by Dr. Bailie and frequently since his time. To such a degree was this sometimes carried, that it was difficult to persuade the patients at its commencement, who were both medical men,

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jours, et guéri subitement par le valérianate de zinc," par le docteur Danet. *Gaz. Hebdom. de Méd. et de Chir.*, Oct. 10, 1862, vol. ix. p. 648.

* What Dr. Möllendorff really says is this: "Die Verlangsamung des Herzschlages findet wohl hauptsächlich ihre erklärung durch die Goltz'schen Klopfversuche, wonach Aufhebung des Tonus in einem Gefässgebiete, Schwäche der Herzthätigkeit zur Folge hat. Wir finden während des Anfalles Leerheit und Contraction der Arterien der extremitäten, Fülle und Aufhebung des Tonus im Gebiete der Art. carotis, mesenterica, renalis und hepatica." *Virchow's Archiv*, vol. xli. p. 391. 1867.

† Cyon and Ludwig, "Sächs. Acad. Bericht.," 1866, p. 307; and "Journal de l'Anat.," 1867. These observations have been confirmed by the experiments of Dr. Rutherford; "Humphrey's Journal of Anat. and Phys.," 1869, p. 409.

that they were not suffering from abdominal aneurism. On one occasion during an attack, I counted the pulse at the wrist in one of these gentlemen and found it only 54; some hours later it had fallen still further to 50. I regret that I made no memorandum on the subject in the other. In a third case the same symptoms in a yet higher degree were associated with a remarkable history of so-called hysterical neuroses—hysterical hip disease, vicarious menstruation, and hysterical paroxysmal vomiting of the most exhausting kind; and although megrim formed no part of this lady's remarkable series of disorders, yet her father and sister were great sufferers from it, and there were other more serious nervous diseases in the family. On the last occasion the paroxysms of vomiting occurred at the same time with the pulsation, and the medical attendant could hardly satisfy himself that there was not an aneurism. The vomiting was then so frequent and violent as to render any observations on the rate of the pulse of no value.

All these cases I regard as neuroses of the vagus, and most probably produced in the way suggested, by inhibitory dilatation of the abdominal arteries from central excitation of the vagus, and hence I am the more disposed to adopt a similar explanation of the slowing of the pulse in megrim. Many of the facts we have been considering are less readily explained, but in the present state of our knowledge, the uncertainty of the ground, and the complexity of the phenomena, it is useless, I think, to hazard conjectures.

Theory of Nerve-Storms.

There is, however, another point of view, differing widely from any of the preceding, from which megrim and other paroxysmal nervous affections of the same class may be regarded, and to which I wish now to direct attention: it is that which considers them in the light of Nerve-storms. This view, I should add, is by no means new; it has been often suggested before, though in a fragmentary way, and I chiefly aim at presenting a more connected statement and

illustration of it than has yet been given. When we fail in our efforts to refer any train of natural phenomena to well-recognised principles of cause and effect, we may sometimes succeed, by comparing them with others of a similar kind, in discovering some common principle or law to which they conform. In the present section we shall endeavour to indicate some such principles of nervous action, the operation of which may be traced alike in neurosal disorders and in many normal phenomena of the healthy nervous system.

On this theory, then, the fundamental cause of all neuroses is to be found, not in any irritation of the visceral or cutaneous periphery, nor in any disorder or irregularity of the circulation, but in a primary and often hereditary vice or morbid disposition of the nervous system itself; this consists in a tendency on the part of the nervous centres to the irregular accumulation and discharge of nerve-force—to disruptive and unco-ordinated action, in fact; and the concentration of this tendency in particular localities, or about particular foci, will mainly determine the character of the neurosis in question. The immediate antecedent of an attack is a condition of unstable equilibrium and gradually accumulating tension in the parts of the nervous system more immediately concerned, while the paroxysm itself may be likened to a *storm*, by which this condition is dispersed and equilibrium for the time restored.*

This view, while it does not ignore any facts embraced by the different forms of the vascular and sympathetic theories already discussed, assigns them a different value and interpretation. The concurrence of derangement in the general circulation or in the local distribution of blood, as well as the co-operation of various forms of local irrita-

* If apology be needed for thus introducing the illustration of a storm or explosion, we may offer that of Willis:—"Quod si *explosionis* vocabulum, in Philosophia ac Medicina adhuc insolitum, cuipiam minus arrideat; proinde ut pathologia σπασμώδης huic basi innitens, tantum *ignoti per ignotius explicatio* videatur; facile erit istius-modi effectus, circa res tum naturales, tum artificiales, instantias, et exempla quamplurima proferre; ex quorum analogia motuum in corpore animato, tum regulariter, tum ἀνώμαλος peractorum, rationes aptissimæ desumuntur."—*De Morb. Convuls.* cap. i. Ed. Amstel., 1670, p. 4.

tion in inducing the seizures, are no longer primary and essential conditions of the disease, but must be reckoned either in the same light as the other phenomena of the paroxysm, or as subordinate and accessory causes.

As I said just now, the particular form and character of the paroxysm will be determined chiefly by the extent and anatomical localization of the disturbance in each case, and may be exhibited in connexion with ideational, sensorial, motor, or vaso-motor centres. Thus we have instances of sensorial storms in the paroxysms of "epileptiform neuralgia" so graphically described by M. Trousseau (see p. 165); of ideational, in epileptic delirium and mania transitoria; of motor, in the convulsive attacks or eclampsia of infantile life; of vaso-motor or trophic, in acute pyrexial or local inflammatory paroxysms, like those respectively of ague and gout, and in the profuse perspirations or copious diuresis of certain nervous and critical states. But, as we might expect, such explosive and unco-ordinated activity is apt to become diffused beyond its primary focus, and the symptoms will vary accordingly; on the whole, however, the specific character of each nerve-storm is fairly well preserved. Moreover, besides phenomena of a positive kind which are the direct expression of this morbid activity, the seizures may be further complicated by others of a negative character, arising from the arrest or interruption of the ordinary function of the parts, either in the orderly transmission of sensory impressions from without, or of voluntary and reflected motor impulses from within; and hence various degrees of anæsthesia and transient paralysis are sometimes present.

In applying the designation "nerve-storms" to neurosal seizures, let me repeat that it has been no part of my intention to attempt a physical explanation of the phenomena, or to press the analogy it suggests very much beyond an illustration. It was adopted in the first instance as a concise expression or summary of certain facts in their history, already pretty generally recognised, and which we may now proceed to state somewhat more fully as follows:—

I. The first of these is the paroxysmal and in many cases truly explosive character of the symptoms, as, for example, in epileptiform neuralgia and epilepsy, which may be taken as types of the sensory and motor class of neuroses respectively. We have already dwelt at some length on this feature of the seizures in the preceding chapters, and illustrated it by reference to so many neuroses that any further observations here would seem superfluous. As Seneca says of his own malady, which appears to have been angina pectoris, "Brevis autem valde, *et procellæ similis*, impetus est: Intra horam fere desinit."*

II. The second is the Intermittent nature of these disorders, the tendency of the paroxysms to an approximately regular recurrence with healthy intervals, and, in the absence of disturbing causes and in typical cases, with a remarkable equality of the periods. These features are inseparably connected, as successive generations of pathologists have pointed out, with the notion of a gradual accumulation and discharge of some morbific agent—but what is the nature of this agency? The older notion was naturally that of some material product, in accordance with the humoral doctrines which then prevailed. Willis in treating of convulsive diseases, observes—"These kind of paroxysms are periodical, and return at stated times; this arises from the morbid material being daily supplied to the nervous system in about the same amount, and consequently accumulating there to *an explosive extent*, in about the same space of time."† Robert Whytt adopted a similar notion of a material accumulation. Writing of periodical headaches, he likens their periodicity to that of epilepsy, hysteria, and other nervous disorders, and suggests the gradual accumulation of morbific matter and its "dislodgment by the violence of the paroxysm."‡

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* Epist. liv.

† "Cujusmodi paroxysmi sunt periodici, et statis horis exacte repetunt: quod accidit ob materiam morbificam æquali dimenso generi nervoso quotidie suffusam; proindeque circa idem temporis spatium, ad plenitudinem explosivam etiam quotidie aggestam." *Path. Cerebri.* "De Morb. Convul." cap. i. Ed. Amstel. 1670, p. 17.

‡ "Does the morbid matter in such cases, after being dislodged by the

Granting for the present that there is at first sight some ground for such a view in the case of certain gouty and other symptomatic and exceptional forms of these disorders, there are no facts, so far as I know, which can support this doctrine of the gradual generation and accumulation of a morbid *material* and its subsequent elimination in the fit, as the cause of the great majority of these paroxysmal affections of the nervous system. Moreover, to account for their several specific characters we should have to add to our first assumption that of the production of a great variety of these morbid matters, and of a kind of elective affinity for particular districts of the nervous system, such as opium, for example, is believed to have for the cerebral hemispheres, and strychnine for the spinal cord; and the hereditary transmission of these diseases we should have to translate into an hereditary tendency to generate these specific poisons. Since then, the phenomena must, in any case, be ultimately referred to a perversion of nervous function, we are naturally led to adopt the far more direct and simple explanation of an irregular accumulation and discharge of the *nervous force itself.*

In support of this view I cannot do better than quote the observations of Sir Henry Holland 'On morbid actions of an intermittent kind,' so far as they bear on our present subject.—"One general inference," he observes, "may be drawn, which it is difficult indeed to avoid; viz., that nervous power, or the agency upon which sensation and voluntary motion in their material part depend, has the *element of quantity* in it in the most express sense; that it is literally capable of being exhausted by action and renewed by repose. The fact is familiar in common statement and application, but not duly appreciated in all the deductions to which it leads. In every intermittent action more especially, whether of long or short interval, the notions of quantity, of expenditure and re-accumulation appear needfully in-

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violence of the paroxysm, require a certain time before it is again collected or deposited on the parts affected in such a quantity as is sufficient to produce a new fit?'—*Works*, 4to, 1768, p. 621.

volved; and most distinctly where the intervals approach to uniformity in time. It is difficult, if in any sense possible, to conceive a principle of intermission which does not virtually include these conceptions; and all our views regarding the phenomena become more clear in proportion as we keep them before us. It is less, indeed, an hypothesis with which we are here engaged, than a necessary exposition of undeniable facts."* He afterwards applies these observations to the case of nervous disorders. "The spasmodic diseases already mentioned [epilepsy, catalepsy, chorea, hysteria, hooping-cough and hydrophobia,] furnish instances of another fact very important in general pathology, namely, the great lengths which the periods of intermission occasionally reach, while the series and character of the morbid actions at each occurrence remain the same. Epilepsy may be taken as a remarkable example to this effect. . . Here, though in a new form, we must again recur to the element of quantity, to aid our conception of nervous power thus brought into action. In some forms of epilepsy particularly, it seems essential to any just theory of the symptoms to suppose accumulation, or irregular supply, of this or other agent; with the further presumption that, if it be the nervous power, it is for a longer or shorter time taken out of the dominion of the will, and expended in producing spasmodic muscular movements."† And again, "I can find no better general expression for the facts regarding this disease [epilepsy] than that already given, namely, some abnormal distribution and action of nervous power, in which the brain and its nerves are chiefly concerned, and of which the accumulation and expenditure of this power seem to be a frequent or principal part. The effects on the circulation and respiration, as well as the convulsive motions, may all be received as *subordinate effects*."‡

Dr. Salter has expressed himself to much the same purpose with respect to Asthma: "In the intervals," he observes,

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* "Medical Notes and Reflections." Ed. 1839, p. 317.
† Idem, p. 325. ‡ Idem, p. 327.

"between the attacks, an unknown something—that particular condition of the nervous system in which the peculiarity of the asthmatic consists—accumulates, and each paroxysm is the discharge of the accumulated condition. At any rate this is the sort of idea that the phenomena suggest to one's mind, and I am not sure, a mere analogy as it appears, that it does not come nearer to the true expression of the pathology of the truly periodic non-organic cases than any other illustration or explanation that could be offered."*

Only the motorial or spasmodic forms of nerve-storm have been named in the foregoing observations, but it should be added that it is not solely by a series of convulsive movements that this discharge of nervous force or dispersion of nervous tension is effected, but often also by paroxysms of *pain,* and it may be by delirium, by secretion, by fever, or by some physiological act of an equivalent kind. The exhausting effects of pain or of any strong sensation are well known, and in continuation of the previous remarks Sir Henry Holland observes of intermittent affections of a painful kind that—"the degree of intensity of pain seems also to modify the tendency to intermission and the rate of its occurrence. This might perhaps be inferred, when admitting the notion of physical quantity into that agency, whatever it be, which ministers to sensation. Pain is in fact among the causes which tend directly to exhaust nervous power; and, when violent, often very suddenly and remarkably."†

III. Intimately connected with the characters of intermission and periodicity, and equally in conformity with the doctrine of nerve-storms, is the impunity with which a

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* "On Asthma," Ed. 1868, p. 97.

† "Med. Notes and Reflections," Ed. 1839, p. 320.

The equivalency or compensatory character of different nervous phenomena was distinctly taught by Dr. C. H. Parry, under the head of "Salutary reactions." Severe pain he thought inhibited the action of the heart; and as all nervous seizures were regarded by him as due to determinations of blood to the nervous centres, he believed that pain might thus prove conservative and a provision of Nature for the cure or abatement of such seizures.—*Elements of Pathology,* vol. i. p. 357, and elsewhere.

sufferer may expose himself to various influences for a certain period after a seizure, which at another time would infallibly have occasioned an attack; as well as the ratio observed in certain cases between the severity of the seizure and the length of the previous or subsequent interval. These features have been already sufficiently illustrated in the history of megrim, and other allied disorders, which have formed the subject of previous chapters, and I shall therefore content myself with directing attention to the following remarks by other observers in which an interpretation is given to them similar to that which we here adopt.

Resuming the previous extract from the work of Sir H. Holland—"Expenditure," he says, still speaking of Epilepsy, "is here the fit expression; in no other way can we adequately explain the progressive increase of irritability up to the moment of a fit, which so often occurs in the epileptic patient; and the almost entire absence of this which afterwards ensues. Such effect is more especially observed when the intervals are long, and the fits succeeding to them repeated and violent; the irritation subsiding more completely, as it would seem, in proportion to their severity."* So Dr. Salter observes of Asthma—"There is one curious circumstance about it that clearly shows that its periodicity is inherent—part of the disease. It is, that each attack seems to impart, for a time, an immunity from a repetition of the fit. For some time after an attack, the time varying according to the interval characteristic of that particular case, the patient may expose himself to the ordinary exciting causes of the paroxysms without the slightest fear of inducing one. As this period draws to a close, exposure to the provocatives of the attacks is attended with more and more risk; and when it has transpired the slightest imprudence is certain to bring on a fit. This curious feature in which Asthma so much resembles Epilepsy, suggests to one's mind the idea that each attack is *a sort of clearing shower*."†

* "Med. Notes and Reflections," p. 325.
† "On Asthma," Ed. 1868, p. 97.

IV. The consideration of the nature and variety of the different agencies which act as exciting causes of the seizures lends additional support to the same views. They are of such a kind as to render their operation only intelligible on some such notion as that of a gradually increasing instability of equilibrium in the nervous parts; when this reaches a certain point, the balance of forces is liable to be upset and the train of paroxysmal phenomena determined by causes in themselves totally inadequate to produce such effects; just as a mere scratch will shiver to dust a mass of unannealed glass, or a slight increase of temperature, a bright light, a vibration, determine a new chemical arrangement of the elements in an explosive compound; and this, in each case, in consequence of the instability of the arrangement or combination.

It will be sufficient to glance at the various exciting causes of megrim and other neuroses already set forth—so diverse in kind and often so insignificant in themselves—to make this apparent. On no principle, as it seems to me, can their operation be explained, except that of directly impressing the nervous system in the manner suggested. This impression may come from without, and be of the nature of an irritation of some peripheral nerve, visceral, muscular, or cutaneous; or it may reach the centres through the circulation, and yet be still of a simple mechanical kind —a mere variation of pressure; or it may descend from the higher centres of psychical activity as an emotion, an idea, or even a remembered sensation, or it may be of the nature of a physiological act having some affinity with the disease; or lastly, it may be of so subtle a kind as a change in the electrical tension or pressure of the atmosphere, of which a morbidly susceptible nervous system is alone cognizant. We may say generally, in the words of M. Labarraque when writing of megrim:—"Ce qu'il y a de certain, c'est que toutes les causes qui paraissent de nature à appeler une légère sur-excitation, soit vers les centres nerveux eux-mêmes, soit vers les extrémités nerveuses épanouies dans les organes des sens, doivent être considérés

comme pouvant, chez les personnes prédisposées, déterminer un accès de migraine."*

This variety and apparent insignificance of the impressions which suffice to determine the seizures when once a maximum tension from internal causes is approached, or when a recurrence of the phenomena is facilitated by habit and frequent repetition, will be still more apparent by reference to a few striking instances. In some cases this influence may be of a simple mechanical kind, as a trifling movement or cutaneous impression. In a well-marked case of Tic Douloureux, before referred to, Sir H. Holland remarked "that the muscles were often kept for half an hour or longer on the verge of spasm, which was eventually brought on by any sudden effort in speaking, swallowing, or even moving the tongue."† So in angina pectoris, although at first a violent effort or strong emotion may be required to produce an attack, yet the mobility of the nervous apparatus may be so exalted, and the facility of recurrence so much increased by repetition, that, as Sir John Forbes says in a passage already quoted—"In some unhappy individuals, almost any general bodily movement, such as the act of turning in bed, or walking across the room, or coughing, sneezing, or relieving the bowels, or even thinking intensely, will occasion a seizure." We have already noticed a case by Dr. M. Hall, where the effort of motor co-ordination required to undo a small knot would produce a fit of vertigo; a similar effort of ideational co-ordination, as in the endeavour to recover something lost in the memory, may have the same effect.‡

In some neuroses the mere recollection or ideal presentation of the phenomena or former circumstances of an attack may be sufficient to occasion a return. Sir John

* "Essai sur la Céphalalgie et la Migraine," p. 25.

† "Med. Notes and Reflections," (1839) p. 326.

‡ "All those," says Van Swieten, "who apply themselves to study, know by experience how much the head is affected when they search after anything that is hid as it were in the inmost recesses of the memory, which they are conscious they knew before and cannot then call to mind. I have seen a very great man in whom this would produce a troublesome swoon or vertigo."—*Comment. on Boerhaave.* Engl. ed., vol. x. p. 367.

Herschel says of his visual megrim "that it evidently recurred as a consequence of the mind dwelling on the description." Dr. Symonds, in his lectures on headache, alludes to a similar circumstance in the case of a patient subject to attacks of giddiness:—"I know," he says, "an individual who is particularly liable to a kind of *vertigo* on ascending a ladder, and who can not only bring on this feeling by imagining to himself some giddy height, but who actually feels when under the influence of the same idea a sensation of pain in the soles of the feet."* So again in some who suffer terribly from sea-sickness, the mere surroundings of shipboard will often excite no small degree of the malady before the vessel is out of port. Hydrophobia affords a striking instance to the same effect: in the early stages the spasms of the throat occur only on attempting to swallow; by-and-by the *idea* of the act, and hence the sight of water, will be quite sufficient to produce them, and ultimately the most trifling movement or cutaneous impression. In the only case of this terrible malady I have witnessed, on asking the patient to show how well he could swallow, he took a mug of water and holding it out of sight begged us to engage his mind with questions, then suddenly brought it to his lips and succeeded in swallowing some before the spasms came on; *the idea* of drinking was worse than the act. Twelve hours later and the slightest breath of air sufficed to determine a paroxysm. The same thing is seen in some instances of spasmodic dysphagia and spurious hydrophobia. In the case of a clergyman, recorded by Dr. Mason Good, the spasms were first occasioned by reading in church, and they afterwards recurred when he arrived at the same part of the service.†

Other illustrations of the insignificance of the exciting causes may be found in such gastric cases as those of the medical man who told me that with him the smallest particle

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* "Gulstonian Lectures."—*Med. Times and Gaz.* N. S., vol. xvi. p. 287.

† "Study of Medicine," vol. i. p. 92.

of burnt pastry, or a spoonful of wine, would occasion an attack of megrim; and of the asthmatic referred to by Dr. Salter, who found "as much asthma in a mouthful of decayed Stilton as in a whole dinner;"* also in the well authenticated instance by the same writer, where the application of cold to the instep would produce an asthmatic paroxysm; and in the case of the French Professor by M. Piorry, where it was sufficient to read only a few lines immediately after a meal to produce an attack of megrim. Esquirol, after citing numerous instances of a similar kind, in which the most trivial causes appeared sufficient to determine attacks of epilepsy, concludes thus:—"From this facility of reproduction which the seizures acquire from causes the most trifling, it seems established that there remains in the organism, in the nervous system, after the first attack a special disposition, which is set in action by the slightest cause, and determines a renewal of the seizures. This disposition, which Tissot terms *proëgumenal,* deserves the greatest attention in connexion with preventive treatment, but is just as hard to explain as the periodicity of epilepsy."† Van Swieten has expressed a very similar view of the epileptic disposition. "This diathesis," he says, "appears in fact inherent in the *sensorium commune,* where such a disposition of the parts is established that they are afterwards liable to irritation and disturbance by such occasional causes as before would have had no such effect." And after describing a case of epilepsy where the first accession was occasioned in a child by forcibly tickling the soles of the feet, he adds:—"Here no morbid humour could be blamed, nor had the head been hurt; but once disturbed through the irritation of the

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* "On Asthma," (ed. 1868), p. 265.

† "De cette facilité qu'ont les accès à se reproduire pour la plus légère cause excitante, il semble démontré qu'il reste après les premiers accès dans l organisme, dans le système nerveux, une disposition spéciale qui, à la moindre cause, est mise en action, et détermine de nouveaux accès. Cette disposition, qui Tissot appelle *proégumène*, mérite la plus grande attention dans le traitement prophylactique; mais elle n'est pas plus facile à expliquer que la périodicité de l'epilepsie."—*Mal. Ment.*, tom. i. p. 297.

nerves of the extremities, the sensorium retained the impression as a species of diathesis, which afterwards occasioned the renewal of the paroxysms on the application of many accessory causes. For if this unfortunate child saw any one only threaten to tickle another she would fall epileptic; and the paroxysms were also renewed by slight fits of anger, fear, or any protracted mental application."*

V. Lastly, it should be remembered that those who adopt other theories of neurosal affections, who introduce, for example, some disorder of the cerebral circulation as the principal cause of the phenomena, are still obliged to assume a minor degree of that same kind of morbid irritability or explosive tendency in the nervous system to which we refer, as the point of departure of every seizure and the cause of the disordered circulation. Thus Dr. M. Hall, who referred all such affections to congestion of the brain occasioned by various degrees of "trachelismus" and "laryngismus," was obliged to assume a morbid exaltation of the excito-motory function, so that an irritation or emotion produced an effect which it would not otherwise have done, in order to account for these initial muscular spasms. So also in the most approved modern theories of epilepsy, "the seat of the primary derangement is considered to be the medulla oblongata and upper part of the spinal cord, and the derangement consists in an increased and perverted readiness of action in these organs;" thus Van der Kolk perpetually speaks of that centre as "discharging itself." The first effect of this in the case of epilepsy, according to the theory, is to occasion spasm of the small arteries of the

* "Verum hæc diathesis videtur hærere in sensorio communi, illudque sic disponere, ut irritetur et turbetur postea a talibus causis accedentibus, quæ illud antea non affecissent." "Nihil hic morbosi humoris culpari poterat, nulla læsio capiti contigerat; et semel turbatum sensorium commune, per nervos in extremis partibus corporis positos, retinuit impressam quasi talem diathesin, quæ postea a pluribus aliis causis accedentibus paroxysmum epilepticum renovabat. Si enim misera hæc titillationis minas tantum intentari videret aliis, mox cadebat epileptica. A levi iracundia, terrore, attentione animi parum diutius protracta, redibat novus paroxysmus."—*V. Swieten*, Com. apud Boerhaave, vol. iii. p. 402, § 1074, 4to.

cerebral hemispheres, and consequent anæmia and unconsciousness; while another is the spasmodic closure of the glottis and fixation of the chest, the general convulsions being regarded as the result of the asphyxia so produced. And again, those who see in the phenomena of megrim the result of a spasmodic contraction and subsequent relaxation of the vessels of the head or brain, are obliged to assume a recurrent morbid irritability of the vaso-motor elements of the sympathetic, or of their origin in the cerebro-spinal centres, in order to explain the condition of the vessels to which the symptoms are referred.

The view we are considering differs from all these in not restricting the tendency to explosive action to the motor side, or to a limited class of reflex movements, and in not making the principal phenomena of the different neuroses the remote effects of the implication of the circulation; on the contrary, it assumes the same kind of morbid activity to occur in other districts of the nervous system, sensorial and ideational as well as motor, and regards the phenomena of the seizures, for the most part, as the *direct* result of the perverted or interrupted function of the parts immediately engaged.

Analogy of Healthy Nervous Actions.—There is, however, another and quite a different class of considerations from which the doctrine of "nerve-storms" is capable, I believe, of receiving considerable support and illustration—viz., those which arise from a comparison of morbid phenomena with those operations of the healthy nervous system which most nearly resemble them.

It is a remark of Sir H. Holland's, which admits of far wider application than the particular connexion in which it occurs, that "in the case of morbid actions of an intermittent kind, as in so many other instances, no arrangement is so clear, or practically so useful, as one which connects those actions with the natural and healthy functions of the same parts. The former," he continues, "grow gradually out of the latter, and though presenting in this morbid state

many peculiar modifications, yet are there none which may not be referred, directly or indirectly, to some equivalent phenomena of healthy action."* The translator of Lobstein's work on the sympathetic has a similar observation. "It is chiefly," he says, "in disease that we are made acquainted with the physiological control which one organ may exercise over the rest, for all the sympathies of disease may be considered in the first stage but as a magnified view of the customary laws of the organism."†

Dr. Reynolds has applied this principle very happily to the illustration of the phenomena of epilepsy. The essential elements, he observes, of a convulsive paroxysm exist more or less frequently during health, and as a part of the healthy processes of the body. He proceeds to point out that the co-existence of unconsciousness with the maintenance of involuntary movements is a matter of daily experience with us all in sleep, the full significance of which, we may add, is perhaps only lost sight of in its familiarity; that the movements of respiration, though ordinarily so tranquil, assume an irregular and more or less convulsive character in sighing and yawning, and are momentarily arrested by strong emotion; that the derangement of the circulation has its representative in the flushing or pallor, and the convulsive actions in the clenched teeth and hands and distorted features, of violent passion; "and thus," he continues, "the phenomena of convulsions, dissected out, as it were, occur in our daily life and as parts of our healthy activity. There is nothing to show, therefore, that the changes upon which epilepsy depends are of necessity modifications in the kind of function exercised by the organ from which it starts. Misplaced in time, in combination, and altered in degree those functions are; but no new property is conferred upon the organ, nor is any natural power changed in the quality of its exercise."‡ It is this kind of

* "Medical Notes and Reflections," (1839), p. 319.

† Lobstein, J. F., "On the Structure, Functions, and Diseases of the Human Sympathetic Nerve." Translated by J. Pancoast, p. 97.

‡ "On Epilepsy," p. 245–6, (1861).

comparison between the phenomena of health and disease which may, I think, be usefully extended to neuroses in general, and contribute to the illustration of the doctrine we are discussing, as well as to the better understanding of many circumstances in the history of this group of disorders which it is difficult otherwise to explain.

We may commence our comparison by the consideration of three familiar forms of physiological action—1. A reflex consensual act of a comparatively simple kind like that of sneezing; 2. The gradual accumulation and dispersion of a natural appetite; and 3. The somatic development of a mental emotion or fit of passion. However different in some respects the one from the other, these normal actions share to a remarkable degree those general characters of nerve-storms which we have already traced in the pathological group, and they will also form a useful basis for further inquiry.

1. The act of sneezing is one of a truly explosive kind, in which we recognise the rapid development of an intense subjective feeling limited to the nasal region, which quickly culminates and terminates in the occurrence of certain convulsive movements of the respiratory muscles, automatically combined and adapted to fulfil a conservative purpose in the general economy. As a rule, this train of phenomena is only brought into operation in response to some extraordinary irritation of the region of the nostrils, and instantly ceases on its removal; at the same time, under certain circumstances of local disorder, as a common cold, and still more in that singular condition known as hay-fever, the tendency to explosive discharge may be morbidly increased and become a persistent condition; and then we may observe that the motor ganglia, being more or less exhausted by the frequent repetitions of the act, are sometimes kept for a length of time on the eve of discharging—a condition which is attended by a perpetual recurrence of the distressing sensation of "wanting to sneeze" and being unable to do so. Under these circumstances a slight additional irritation, whether of the nasal branch of the 5th, or of the optic

nerve by a strong light, will be sufficient to produce a culmination of the sensation before described and to determine the movement. Again, under a strong restraining effort a sneeze may be sometimes baulked, and the sensation culminate and disperse without the occurrence of any convulsion.

We occasionally meet with an extreme disposition to sneeze existing in some individuals, not as the result of any local affection, but of a morbid tendency on the part of the nervous system itself—a neurosis in fact; and this condition is often hereditary. Such people, at irregular intervals, and commonly without any provocative, will begin to sneeze in the most violent way and continue to do so for 30 or 40 times.

In the natural operation of sneezing then, we have, in my opinion, a very typical instance of a nerve-storm of the convulsive kind—a miniature epilepsy—and one which may very readily assume a pathological form in consequence either of some chronic peripheral irritation or innate tendency of the nervous system itself. Nor did the analogy between this physiological act and the epileptic group of disorders escape the notice of the older writers; the following passages to this effect are quoted by Reynolds:—"Sternutatio, quæ est proximus epilepsiæ affectus et hominem in periculum convulsionis epilepticæ conjicit."* "Quamobrem meo quidem animo usus invaluit ut quum quis sternuit, ei salutem dicamus, perinde ac si timeamus ne comitiale malum incidat, cui affine sternutamentum maxime esse ostensum est."†

2. Secondly, we have in the natural development and gratification of our appetites another instance of the gathering and dispersion of a somewhat different class of nerve-storms of the sensory type, though probably few of us ever regarded the phenomena in that light. Every natural appetite is a mode of feeling impressed on certain portions

* Hovius, "Dissertatio medica inauguralis de Epilepsia," p. 7.
† Gabucinus, "De Comitiali Morbo," p. 44.

of the sentient nervous system to provide for the first necessities of organic life—the maintenance of the individual and the species—under the complex conditions of their fulfilment in the more highly differentiated types of animal organization. Such are the alimentary, respiratory, and sexual appetites.

Let us take the case of the appetite for food. Here we have a subjective feeling obscurely referrible to the sentient territory of the 8th, and principally of the glosso-pharyngeal nerve, reproduced from time to time with ultimate reference to the recurring wants of the system, but having, nevertheless, an independent periodicity of its own, which admits of considerable variation by force of habit. Ill-defined at first, and constituting only a pleasurable forecast of future gratification, it gradually accumulates to a high and even painful degree of intensity; sensory impressions from without, as the sight, smell, and taste of food, may considerably heighten or "whet" the feeling, and even determine prematurely the movements of deglutition and insalivation which properly belong to its objective realization. It is, however, only in connexion with the process of eating, and the pleasurable sensation derived from the manifold impressions of touch, taste, and smell which the food supplies—a sensation, be it observed, which culminates with each successive act of deglutition—that the appetite finds its complete fulfilment and dispersion. Here again, I think we may trace, without much difficulty, all the essential characteristics of a nerve-storm, in which the *sensory* phenomena predominate. There is the periodical recurrence, the gradually accumulating tension, the co-operation of external impressions, and the ultimate culmination and dispersion in connexion with certain automatic movements and secretions. It should be added that if baulked the appetite may subside spontaneously, only to reappear again however, transformed into the distressing qualms of hunger. Its pathological relations we shall consider by-and-by.

Again, we are not ordinarily conscious of the appetite for air, because the sentient conditions on which it depends

are satisfied by reflex action as fast as they arise; but it requires only the forcible arrest for a few seconds of the rhythmical movements of breathing to produce a train of phenomena, very analogous to those we have just considered, in connexion with the respiratory function, namely, a rapidly accumulating sense of want of breath, which quickly becomes one of the most intense, intolerable, and constraining feelings with which we are acquainted, but which is instantly dispersed on the renewal of the movements. It is worth a passing notice in connexion with our present inquiry, that a morbid development of this feeling—a subjective breathlessness—is at least one element of the asthmatic paroxysm. "What I want to point out to you," observes the late Dr. Todd, "is that this state of spasm of the bronchial tubes ought rather to be regarded as one of the accompaniments, one of the phenomena of asthma, than as its cause. The *feeling of breathlessness*, or in other words, a peculiar state of certain nerves, and of a certain nervous centre, the centre of respiration, is the first link in the chain of asthmatic phenomena. The spasm of the bronchi follows sooner or later upon this, and often it follows so quickly upon it as to appear to come simultaneously with it. Does it ever precede it? I doubt this."*

Lastly, the analogy between the phenomena of the sexual appetite and its gratification, and those of the alimentary already set forth, are too obvious to need comment; any one can fill up the parallel for themselves. I will only add that, in the well-known observation attributed to Hippocrates—*τὴν συνουσίαν εἶναι μικρὰν ἐπιλημψίαν*—we have a distinct and early recognition of the affinity which I am endeavouring to trace between certain physiological acts and those pathological nerve-storms of which epilepsy is the type.

3. It is however in connexion with a still higher order of nervous phenomena—namely, the emotions and their bodily developments, that we meet, perhaps, with the most

* "Lond. Med. Gaz.," vol. xi. p. 1002. 1850.

striking instances of physiological nerve-storms. Indeed the explosive character of these actions is recognised in our conventional language, which employs the same phraseology in speaking of a tempest and a passion. Take for example the development of a sudden fit of anger in a passionate man, or, better still, in a passionate child. We see the face flush, the eyes kindle, the lips tremble and the chest heave, while the sufferer himself becomes conscious of a painful sense of constriction in his throat, an unusual beating of his heart, and a tingling in his limbs. At this stage, if the cause of irritation be removed, or a repressing effort of the will be exerted, the fit may subside. If the development proceeds, violent muscular actions follow, which are now wasted in mutual opposition—in the set teeth and clenched fist—and now expended in noisy vociferation, stamping, and general convulsive agitation of the whole frame; or all this explosive force may be automatically thrown into some more determinate action which the impulse of the moment or the immediate surroundings suggest. The senses, too, are blunted to external impressions, there is a tumult of ideas, reflection and judgment are in abeyance, and the utterances are inarticulate and incoherent.

Here then we have a well-marked nerve-storm, the neurosal affinities of which have been long recognised in the adage, *Ira furor brevis.** But in this case the explosive action is no longer confined to a limited nerve territory or particular group of muscles, but presents a wide range of phenomena—motor, vaso-motor, sensory, and ideational; it takes its rise moreover not in any peripheral irritation or sensory impression, though it may be heightened and quickened by these, but in a psychical condition—an idea of injury or wrong. Still we have the same essential features preserved—the gradual accumulation of strong

* "Non seulement," says Esquirol, "les passions sont la cause la plus commune de l'aliénation, mais elles ont avec cette maladie et ses variétés des rapports de ressemblance bien frappant."—*Des passions considérées comme causes, symptômes, etc. de l'aliénation mentale.* Paris, 1805, p. 21.

subjective feelings, the progressive implication of the different faculties in tumultuous activity, the culminating character of the phenomena, and their spontaneous expenditure or dispersion in convulsive movements:

> "Anger is like
> A full-hot horse; who being allowed his way,
> Self-mettle tires him."

This passion too has its pathological side: so violent and groundless are the outbursts of temper in some children, so regular the recurrence, so trifling the provocation, as to amount to a positive disease, which is well understood, as I have before pointed out, to be often connected with an hereditary tendency to epilepsy or insanity, and is sometimes replaced in later life by neurosal seizures of a more determinate kind.

But it is not only in children that this morbid development of passion occurs. "I have recently seen a case," writes Sir Henry Holland, "of which the most marked feature was a frequent and sudden outbreak of passion upon subjects, partly real, partly delusive, but generally without obvious or sufficient reason at the moment;—these excesses attended with loud screaming, execrations, and acts of violence in striking or breaking things within reach. Here the patient described to me the sort of separate consciousness he had when these violent moods were upon him: his desire but feelings of inability to resist them; his satisfaction when he felt them to be passing away."*

If we turn from this particular passion to the other emotions we cannot fail to be struck with the close analogy which many of their phenomena present to those of the various neuroses which formed the subject of our last chapter. We have illustrations of those intense visceral sensations which mark the progress of so many paroxysmal disorders of the nervous system, in the painful sense of

* "Medical Notes and Reflections," p. 162.

throat constriction and the indescribable cardiac distress which attend the development of violent grief and some other emotions, and bear so close a resemblance to the "angina" and "anxiety" of disease, being still more strongly felt under circumstances of suppression. The "yearnings" of tender affection, the "qualms" of fear and the nausea of disgust, are analogous sensory phenomena likewise referrible to visceral plexuses. Other subjective feelings not of a visceral character are the "thrill" of joy or admiration, the "tinglings" of rage, and the like. It is in the power of emotion no less than of asthma or epilepsy to disturb the respiratory movements; the chest is dilated and the breathing free under the influence of courage and hope, suppressed and sighing under depressing emotions; we have the irregular heavings of anger and the convulsive sobbing of violent grief, the breath is arrested by surprise and expectation, and we "breathe again" when a crisis is past. We have examples of disordered circulation in the palpitation of fear and expectation, in the tumultuous action of the heart in joy and surprise, the increased force and frequency in anger, and the failing action in grief. Of vaso-motor phenomena in the blush of modesty and shame, the heat and flushing of anger, the pallor and collapse of terror. Convulsive movements are illustrated by the shuddering of horror, the starting of surprise, and the laughter which "shakes our sides." There is an "aphasia" of passion as well as of disease, of which a striking example has been already given; there are the stammering utterances of rage and the suppression of the voice in fear:

"Obstupui, steteruntque comæ et vox faucibus hæsit."

"Dumb with terror" and "mute with astonishment" are still something more than figures of speech, though doubtless these and other outward expressions of the passions were much more developed in the infancy of the race as they still are in that of the individual. We have other examples of the "inhibitory" power of depressing emotion in the benumbing influence of grief and despair;

in the effects of terror which relaxes the limbs, makes the knees knock, and the whole frame tremble. Lastly, the influence on secretion is seen in the tears of grief, the dryness of the mouth and diuresis of fear, and the flow of milk which attends an emotion of maternal tenderness.

Thus we have, "dissected out" for us as Dr. Reynolds says, in the normal operations of the healthy nervous system, the elements of many neurosal seizures; but we have more than this; in acts like those of vomiting and sneezing, in the gathering and dispersion of a natural appetite, and in the somatic development of the various passions, we have these elements *united in certain combinations* which in their culminating or explosive character, and in the circumstances of their origin and dispersion, maintain still more closely the analogy with pathological nerve-storms.

If now we pursue the comparison which has here been suggested a little further into detail, with particular reference to some of the problems our subject presents, we shall find much to confirm the foregoing analogies, and we shall be able to trace among the same physiological actions the representatives of many circumstances in the history of megrim and other neuroses which are among the most singular and anomalous we have to explain. The class of facts which more particularly deserve our attention are the following:—

A. The assumption from time to time of a distinctly morbid and neurosal type by the natural actions of which we have spoken, in consequence either of a great exaggeration of character or frequency or spontaneity of recurrence. B. A certain capacity of substitution or mutual replacement among such physiological actions under circumstances of health, reminding one of that same kind of equivalency among various neurosal seizures which we have been at some pains to trace in the preceding chapter. C. The transition not unfrequently observed between these normal modes of activity and certain

well-known forms of neurosal seizure, so that the former become influential exciting causes of the latter; as when a mental emotion determines an epileptic fit, or the latter aborts in one of laughter. D. The still more remarkable, and at first sight paradoxical power these normal actions possess, not only of exciting but occasionally also of dispersing others of a pathological kind, and the consequent possibility of sometimes anticipating the occurrence of an expected neurosal paroxysm by the artificial induction of a vicarious physiological action of an explosive character. E. The occasional determination of these definite trains of normal action by other influences or impressions besides those to which they are especially affiliated in connexion with their final purpose in the economy, and which call to mind the varied character and operation of the different exciting causes of neurosal seizures.

These several points I shall now endeavour to illustrate by reference to as many instances as occur to me; and I think it will thus appear that we are dealing with a class of phenomena, both healthy and morbid, which are united in obedience to certain common laws, and mutually illustrate one another; their consideration moreover will suggest I think some useful reflections on the theories of neurosal phenomena already discussed, and will help to correct or enlarge our views in this branch of pathology.

I shall again have recourse for a first illustration to those minor explosive nervous actions which are limited to the Respiratory Apparatus, such as sneezing, yawning, and hiccup. It is an observation which we owe to no less an authority than Hippocrates that—"Sneezing coming on in a person afflicted with hiccup removes the hiccup—" *ὑπὸ λυγμοῦ ἐχομένῳ πταρμοὶ ἐπιγενομένοι λύουσι τὸν λυγμόν.** The engagement of a neighbouring nervous circle in repeated acts of deglutition will have the

* "Aphorisms," Sect. VI. No. 13. So Rigaud: "Ergo solvunt singultum vomitus et sternutatio." See also Riedlin, Lin. Med., p. 148.

same effect; so will the development of any sudden emotion; and so will the induction of that painful state of nervous tension—the sense of "want of breath." We are all familiar with the nursery expedients for the cure of hiccup—the charm of the "three drops," the frightening it away by a sudden surprise or other emotion, repeating the well-known rhymes in one breath, which requires at the same time a strong effort of articulation.

Trifling as these illustrations may seem, they bring before us in epitome the operation of the principles I have just enunciated; nor should we forget, as I have already pointed out, that although hiccup and sneezing are ordinarily trivial occurrences, referrible to some transient local irritation, they are sometimes presented to us under a very distressing form, as distinct idiopathic neuroses. Some years since I had under my care, at King's College Hospital, a case of this kind: the patient was a man past middle-age, and hiccup had occurred in paroxysms of twelve hours' duration, about twice a week for four years. Dr. Prichard relates the history of a little girl of twelve, who for nearly three years was subject to fits of violent hiccup, attacking her during sleep by night as well as by day, the paroxysms lasting from ten minutes to an hour, and recurring three or four times in the course of a day and night. Sneezing and gaping occasionally set in towards the close, and the paroxysms usually ended in headache. There were no worms, but the child was cured by turpentine. Dr. Prichard justly observes of such cases "that we may look upon them as imperfect attempts to produce epilepsy, or as differing from general epilepsy in some, perhaps, trivial modification."*

Sir Benjamin Brodie relates the case of a married lady, thirty-seven years of age, who suffered from violent sneezing fits, attended with copious watery discharge from the nose. They attacked her once a week, and in each attack she sneezed not less than a hundred times.†

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* "On Diseases of the Nervous System," Pt. I. p. 390.

† "Lectures on Local Nervous Affections," p. 61.

Not unfrequently such attacks of sneezing replace or are replaced by other nervous paroxysms. The author last quoted records another instance of the same affection in a young lady eighteen years of age, where the sneezing fits were sometimes replaced by attacks of nervous cough, and sometimes of hysteria.* I have already pointed out that the paroxysms or hooping-cough are sometimes superseded by fits of sneezing (see p. 197); but one of the most striking instances in which sneezing occurs as a morbid affection is in connexion with a family history of asthma, or vicariously with the paroxysms of that complaint. This is especially, but not exclusively, seen in that form of the complaint known as "hay asthma." Among the many autograph cases in Dr. Salter's work on Asthma is one where the patient records as an hereditary complaint "an unusual amount of irritability of the mucous membrane of the nose, leading to continuous paroxysms of sneezing when once a sneeze occurs, this peculiarity having affected in a marked degree both my father and grandfather." In himself the malady was gradually developed into "hay asthma." He used to suffer from violent paroxysms of sneezing by day which were replaced by asthma at night. If the establishment of the sneezing could be prevented by stopping the first sneeze, the lachrymation and coryza which usually followed would be prevented too, and the amount of sneezing very much determined the amount of subsequent asthma. The darkness of night appeared to bring about the asthmatic transformation, and the tendency to sneeze was restored with the sunlight.† But this morbid disposition to sneeze, and the influence of sneezing as an exciting cause of the paroxysms, are not confined to cases of hay asthma. In another instance, which was not of this type, and where the sufferer was well-known to myself as well as to Dr. Salter, *neuralgia* and *paroxysmal sternutation* are mentioned as pathological associates of the complaint.‡

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* "Lectures on Local Nervous Affections," p. 62.

† "On Asthma," (ed. 1868), p. 328.

‡ Idem, p. 339. This gentleman, now about forty years of age, tells me that he has completely lost his asthma.

In further illustration of the vicarious character of these minor storms and their incompatibility with graver seizures, I may recall the remarkable circumstance noticed by Möllendorff in cases of severe megrim, and already recorded above, that the various agents which ordinarily occasion violent sneezing, completely fail to do so while the megrim paroxysm runs its course, but that sneezing sometimes sets in spontaneously towards its close.

Lastly, I shall refer to a very ancient method of treating epilepsy, megrim, and other paroxysmal affections by sternutatories, which is, in fact, a practical application to therapeutical purposes of the same principles. This practice has been lately revived by Dr. Laycock, who recommends the use of these remedies as well as tickling the fauces "for the arrest or modification of epileptic and other nervous paroxysms."* Dr. Laycock observes that the effect of the sternutatories is much lessened if sneezing does not occur, and that of tickling the fauces if retching does not. This is important in connexion with our present inquiry, because it implies that an effect of a similar kind, though less in degree, follows the induction of a high grade of sentient tension in a particular territory, whether in the form of the intolerable sensation which precedes sneezing, or in that of nausea. Without entering on the discussion of Dr. Laycock's theory of their operation, may we not infer that it is by the substitution for the original malady of an explosive movement—a quasi-epileptic paroxysm of sneezing or retching, or of a high degree of sentient tension, that such agencies produce their effect?

Leaving these respiratory phenomena and passing on to those connected with the Ingestion of Food, we find the same principles in operation—a similar proneness to displacement and occasional pathological conversion, and the same relations maintained with various neurosal seizures. To begin with that remarkable subjective feeling which consti-

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* *Brit. and For. Med.-Chir. Rev.*, January, 1866, p. 235; and *Med. Times and Gazette*, May 6, 1865, p. 461.

tutes the sense of appetite and hunger: this is very liable to displacement and metamorphosis, even within the limits of health and common experience. It is a well-known fact that the keenest appetite may be instantly dispelled by a piece of bad news; other emotional conditions may have a similar effect, and may even go further, converting the pleasurable feeling into one of nausea and loathing, and rendering deglutition, for the time, impossible. Most people have experienced something of this kind under circumstances of strong feeling and excitement. Ovid introduces it in depicting the jealousy of Paris:—

"Lumina demitto, dum te tenet arctius ille;
Crescit et invito lentus in ore cibus."

Numerous instances in which the fasting state has proved an exciting cause of neurosal paroxysms have already been brought before us; we have seen attacks of megrim, of angina pectoris, and of epilepsy, determined in this way; and this effect is due, I believe, not so much to deprivation of nutriment (for the effect is too rapidly induced) as to the production of that state of innervation on which the sense of hunger depends; this we have seen to be a condition of nervous tension of a cumulative character like that which precedes or forms a part of many nerve-storms, and it is not therefore surprising that it should readily give place to a pathological condition of an analogous kind to which the sensory ganglia may happen to be prone. In the same way a very slight degree of abstinence in some people of morbid sensibility is apt to be attended by epigastric distress and a tendency to faint; here again the result cannot be attributed to the deprivation, which may be quite insignificant, but must be regarded as a morbid graft on the natural sense of hunger. Dr. C. B. Radcliffe has pointed out that epileptics are particularly prone to suffer in this way, and I believe the same is true of those who labour under some other neurosal affections.* A tendency

* See ante, p. 188-9. It is only fair to add, however, that Dr. Radcliffe attributes the effect in the case of epileptics to the deprivation. The remarks on Boulimia, page 364, tend to support the view I have taken.

to swoon on trifling occasions sometimes constitutes the only manifestation of the neurosal diathesis.

M. Piorry takes a somewhat similar view of the influence of fasting in nervous disorders, though he has expressed it rather differently. In a dissertation on the "Effects of Abstinence in Diseases of the Brain," he points out that an injurious influence may be exerted in two ways. 1. Immediately through the stomach, which is directly affected in hunger and reacts on the nervous system. 2. Remotely, by depriving the brain of nutrient supplies. As an illustration of the former he cites the case of Megrim, and after recalling the successive phenomena of a severe attack, he continues, "These grave accidents, which will not permit us to ignore the serious implication of the encephalon and its dependencies, are nevertheless sometimes produced by a delay of some minutes in the customary hour of taking food."*

On the same principle a neurosal paroxysm may occasionally be arrested. The last author observes in his treatise on migraine that "the progress of a seizure may sometimes be stopped by producing an irritation in the stomach which determines a brisk nervous action there. When the affection comes on during fasting, and when the patient has suffered from hunger, food, and especially that of a stimulating kind, as wine, quickly checks the further development of the symptoms."† Tissot also "knew a patient who cured his megrim in this way, by taking supper, and always carrying a piece of bread in his pocket to eat whenever he felt a sense of gnawing in his stomach."‡

In other instances a morbid sense of appetite or craving for food occurs as the forerunner or first symptom of a neurosal paroxysm. Willis records a case of hereditary megrim where the attacks were always ushered in in this way;§

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* "Du Procédé Opératoire," &c., p. 397. † Idem, § 829, p. 419.

‡ "Traité des Nerfs," p. 386. See also above, p. 189 and note.

§ "Mulier formosa, et juvenis, gracili corporis habitu, et sanguine calido prædita, cum *cephalalgiæ hæreditariæ* obnoxia fuisset, paroxysmos ejus crebros, et vagos, alios nempe de levi occasione, aliosque sponte, hoc est, absque causa evidenti oriundos, pati solebat. Pridie morbi accessionem

and I am myself acquainted with a lady very subject to a severe and obstinate form of the malady in whom the same symptom sometimes occurs, and who can often foretell an attack by this morbid craving for food. At such times, she tells me, she could "devour a whole tin of biscuits without being satisfied." The same thing has been observed in connexion with epilepsy and other affections of the same class, and sometimes as an independent neurosis under the name of Boulimia. "This disorder," says M. Fabre, "is a devouring and almost insatiable hunger, accompanied with general uneasiness, and so urgent, that it occasions fainting and even syncope if not satisfied. . . . . In the case of an epileptic woman at the Salpêtrière recorded by Professor Rostan, such was the patient's voracity that she consumed 11, 13, or even 26 pounds of bread in the twenty-four hours. . . . . The malady is ordinarily continuous, but subject to exacerbations, and this was strikingly the case with M. Rostan's patient who was commonly satisfied with 9 or 11 pounds of bread, but during the exacerbations she required almost three times as much. Boulimia is scarcely ever connected with any material alteration in the digestive or biliary apparatus; it is a *neurosis* supervening on some other neurosal affection as epilepsy, mania, hysteria, or gastralgia, or occurring independently."* Lastly, a similar craving for food has been occasionally observed as the forerunner of gout, a malady which has many affinities with the neurosal stock. Sir C. Scudamore remarks that "an excessive appetite for one or more days before the fit is not unusual. One patient informs me that for a week before the attack his appetite cannot be satisfied. To use his own words "he could eat all day long."†

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spontaneam, vesperi valde esuriens, cœnam uberiorem cum appetitu famelico, ne dicam canino, devorabat; hoc signo dolorem capitis mane sequenti invasurum certissime præsagiens; cui augurio eventus nunquam defuit. Quam primum enim evigilabat, cruciatu per totum sinciput acerrimo afflicta, insuper vomitu humoris modo acidi, et quasi vitriolici, modo biliosi, et summe amaricantis afficiebatur." "De Cephalalg. Curat." Cap. ii. p. 289. 12mo Amstel.

* "Bibl. du Médecin Prat." tom. ix. Art. 13. "De la Boulimie," p. 680. Paris, 1849.

† "Treatise on Gout," p. 16.

But it is not solely in its sentient aspect that the physiological process of ingestion exhibits relations with neurosal phenomena. We have seen that the natural convulsive movements of sneezing will sometimes displace another form of nervous seizure, and the same is the case with those of swallowing. Dr. Graves relates the following instance. He was called to see a young lady supposed to be in imminent danger—face pale and anxious, sitting up in bed sipping water from a cup every five seconds, apparently swallowed with great effort, and complaining of an intolerable sensation at the back of the tongue and throat threatening immediate suffocation, and saying she should be immediately choked if she did not continue the sipping. Attempts to take the cup from her threw her into an agony and brought on convulsions. This had been going on for some hours. She was a nervous subject, and liable to common hysterical attacks. Dr. Graves remarks—"I have mentioned this case because it presented some circumstances concerning the act of deglutition worthy of remark. In the first place, it is clear that the uneasy sensation referred to the throat was a variety, not a usual variety however, of globus hystericus. This uneasy sensation was like globus accompanied by the sensation of impending suffocation. The efficacy of the constant sipping and swallowing, in alleviating this feeling may be somewhat analogous to their well known effects in stopping another affection plainly of a spasmodic nature; I mean hiccup, which in most cases may be cured by a similar succession of quickly repeated deglutitions of very small quantities of water. Again, it is worthy of notice that any attempt to prevent this process was immediately followed by general hysterical convulsions."*

The sense of Nausea, though painful instead of pleasurable, is intimately related to the alimentary appetite; it is a similar subjective visceral sensation, referrible to nearly the same nerve territory; it presents much the same

* *Dublin Journ. of Med. and Chem. Science*, vol. iii. p. 165.

cumulative character, and when it reaches a certain height it gives rise to the convulsive movements of vomiting by which it is, for a time at least, dispersed, while these movements have an effect the reverse of those of deglutition and empty the stomach. In this train of physiological phenomena and in the various causes which contribute to excite or disperse them, we again find the whole history of nerve-storms and the laws to which they conform remarkably illustrated. When arising under circumstances of health from the ingestion of some irritating matter, nausea and vomiting may be regarded as the expression of a conservative organization for the protection of the alimentary ways, just as those of sneezing and coughing are in the case of the respiratory; but they are also determined by a variety of different circumstances and impressions, both centric and eccentric, where no such purpose can be served.

It is well known that the simple mechanical operation of tickling when applied to the fauces will excite a high degree of nausea, just as a similar application to the nostrils will produce sneezing, and to the region of the external respiratory nerve of Bell, laughter. Nausea also constitutes the bodily part or expression of the emotion of disgust, and it occasionally attends the development of grief, fear, and other depressing passions. Again it forms by far the most distressing part of sea-sickness, from which indeed its name of *ναυσία* is derived: the circumstances of ship-board supply the most favourable conditions for its development, but carriage-sickness and mountain-sickness are precisely similar disorders. In this form it is the result of a temporary disturbance of the sensorium in susceptible persons, by a particular class of impressions received through the muscular sense, to which attention has been already directed in a previous chapter (p. 121), and it ceases with the removal of the cause; but it is well known that a very similar condition may arise as the result of injury to the head or of organic disease of the brain. Lastly, we have seen sickness of this character, whether attended or not by actual vomiting, among the more constant phenomena of

megrim, and in cases of true "sick-headache," and "sick-giddiness," constituting a principal part of the paroxysms. The intimate relation of such a condition to minor epilepsy and so to the whole epileptoid family, was pointed out by Dr. Marshall Hall in several of his later writings, and in the following passage, which, though already quoted, I shall venture here to repeat: "Sick-headache, sickness, faintishness, vertigo, sickness the effect of disgust, are not dissimilar from minor epilepsy—the *petit mal* of French writers. The effect on the susceptible medulla of a swing, of sea-sickness, belong to the same *class* of morbid affections and deserve the designation μικρὰ ἐπιλημψία far more than the physiological act to which it has been applied."*

Strange as it may seem, yet in strict conformity with the principles we are endeavouring to illustrate, it is in the power of a strongly felt emotion at once to disperse a condition of nausea and sickness such as has just been described, even in the intractable and distressing form which it assumes at sea. Dr. Erasmus Darwin long since pointed out that sea-sickness may be instantly cured by the emotion of danger, as well as by other circumstances which powerfully engage the mind.† But let us take an actual instance: Mr. Howship thus relates his own experience in this matter—"On one occasion at sea in heavy weather, I was myself extremely ill, sick, and lying down; a sudden noise and commotion upon deck drew my attention, when one of the officers running into the cabin, told me the hold of the ship was all in flames. The more powerful impression in an instant took the lead; I jumped up, and although almost by a miracle the fire was extinguished, and the ship and all the lives providentially saved, I from that moment felt neither headache nor sickness."‡

But if nausea and vomiting may be thus dispersed by an emotional storm, the converse is no less true, and the

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* *Lancet*, 1849, vol. i. p. 688. † "Zoonomia," § xx. 6, p. 234. 1796.

‡ "Practical Remarks upon Indigestion, and particularly as connected with Bilious and Nervous Affections of the Head and other parts," by John Howship. 1825.

natural supervention or artificial induction of a similar state of sickness may, in its turn, relieve or dissipate a nervous paroxysm of a more formidable kind. The use of nauseants and emetics for such a purpose is a very ancient practice, although the principle of their operation has not been always recognised, and they have been sometimes erroneously regarded as producing their effect by the evacuation of unhealthy humours or ingesta, not by the restoration of nervous equilibrium. Asthma is one of those maladies for which emetics have thus been successfully employed. Willis, who carefully distinguishes the true spasmodic or "convulsive" asthma from the "humoral," and other maladies so designated, states that an emetic in the midst of the paroxysm is useful; and he gives this shrewd explanation, which, making allowance for the physiological ideas and phraseology of the period, is as near the truth as may be:—"The spirits," he says, that is, the "animal spirits," the equivalent of our nervous force, "cease to be disordered in the lungs when they are attacked or molested in other parts."* Floyer and other writers on this disease down to our own time commend the same practice.

Robert Whytt in his well known Treatise on Nervous Disorders, when discussing the treatment of periodical headaches, recommends "that when they are regular as to their periods, *vomits* should be given an hour and a half beforehand."† Richter highly commends the employment of emetics in neuroses generally. "I know," he says, "of no medicine which will so certainly prevent an epileptic fit as a vomit given an hour before the attack. This indeed can only be had recourse to when we can foresee the fit, that is, when the disease is periodical or preceded by a forewarning." He records several cases in which this treatment was successfully adopted.‡ Dr. Abercrombie observes that "Fothergill used emetics in Apoplexy on the principle of its

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* Thom. Willis, "Pharm. Ration.," Pars II. § i. c. xii.

† Robert Whytt, M.D., F.R.S., "On Nervous Disorders," p. 305. 1765.

‡ "Med. and Surg. Obsv." (Eng. Trans.), p. 142, 146. Cases, Nos. 45, 46, 48.

arising from the stomach;" he goes on to explain that numerous cases occur where the symptoms consist in loss of consciousness and various degrees of hemiplegic palsy occurring suddenly, which were formerly regarded as apoplectic, but are really of a transient character and unconnected with any organic lesion of the brain.* The terms "Inorganic Apoplexy," and "Paroxysmal Apoplexy," were afterwards employed to distinguish these affections, and we now recognise their true pathological affinities in such designations as Epileptic Coma and Epileptic Hemiplegia. It was doubtless in cases like these, as Abercrombie suggests, and not in instances of cerebral hæmorrhage, that Dr. Fothergill's emetic practice proved successful.

The late Dr. M. Hall was well aware of the value of this class of remedies in many paroxysmal disorders, and correctly explained their operation. "The movements" (sensations?), he says, "which precede sneezing, and sneezing itself, may frequently be arrested by forcibly rubbing the point of the nose. A fresh excitement is induced in another branch of the trifacial nerve, by which the former are superseded. . . . In this manner, I think, to induce vomiting, frequently supersedes other and more formidable excitations of the true spinal system; thus the crowing inspiration and its frequent issue in convulsions—thus the fit of epilepsy is frequently prevented. . . . I have this very day evidence of the efficacy of this remedy in the prevention of convulsions in a little girl, and in two cases of epilepsy. . . . I need scarcely remark how pertussis and asthma are relieved by the same means."† Elsewhere he refers to a case of "paroxysmal mania which came on at uncertain intervals, after a prolonged and perfect 'lucid interval,' and was superseded by the well-timed periodical administration of emetics."‡

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* "Researches on the Pathology of the Brain." *Ed. Med. and Surg. Journ.*, vol. xv. p. 19. 1819.

† "On Diseases and Derangements of the Nervous System." Postscript. p. 363. Reprinted from Memoirs in *Transac. of Med. Chir. Soc.*, vols. xxii. xxiii.

‡ "Synopsis of Paroxysmal Diseases of the Nervous Centres." *Croonian Lectures* for 1851, p. 98.

It is important to notice that it is not always necessary for this curative influence that actual vomiting should occur; the particular condition of sentient tension which constitutes nausea, and naturally precedes these movements, may have a similar though less powerful effect. This has been already noticed in connexion with Dr. Laycock's observations on the use of sternutatories; it was long since pointed out and correctly explained according to the knowledge of the period by Lobstein in his work on the sympathetic nervous system. When referring to the erroneous views which formerly prevailed as to the origin of such complaints as hypochondriasis, megrim, and mania in bad humours, visceral obstructions, and so forth, and indicating their purely nervous character, he observes—"The wonderful power of emetics, when productive of nausea only, the beneficial use of which is proved by experience in diseases of the mind, substantiates this fact. This class of medicines never act in these cases as solvents or evacuants of the 'sordes' or 'saburral' matters; but as efficacious irritants to the gastric nerves, through which the effect is subsequently extended to the solar plexus, and thus changes its mode of action; or at least, through the intimate connexion of that plexus with the brain, the disorder of the latter is counteracted and drawn to the abdomen."*

Some of Dr. Salter's cases of asthma afford excellent illustrations of the influence of such a condition of nausea in dispersing nervous paroxysms; in this way Antimony, Ipecacuanha, and Tobacco are sometimes very effectual remedies. "As for treatment," writes one of the sufferers, "two things alone did me any good—strong depressants, and any sudden, violent emotion. Of the depressants, the two that acted the most efficiently were ipecacuanha and tobacco. The ipecacuanha I had been accustomed to take in emetic doses from my earliest childhood; 20 grains of the

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* Lobstein, J. F., "On the Structure, Functions, and Diseases of the Human Sympathetic Nerve." Trans. by T. Pancoast, § iii. p. 115.

powder never failed to cure me in a quarter of an hour. It was conceived by those who administered it to me that it acted by relieving the stomach and clearing the air passages, but this could not have been the case, as the spasm gave way *as soon as the sense of nausea was felt*, and before any vomiting or expectoration had taken place; moreover, from my day's starving my stomach was as empty before the operation of the emetic as after. An emetic was the closing scene of each attack; how long the attack would have lasted had I not taken one I cannot say, but the spasms showed very little inclination to give way till the ipecacuanha began to take effect. I rarely took the emetic before evening, but now I think that if I had taken it immediately on the asthma awakening me, I should have cut short the spasm at once, and saved myself a day's suffering. . . . The efficacy and value of tobacco depend on my never acquiring a tolerance of it; a few whiffs of a pipe, or half a cigar, always brought on the characteristic physiological effects of the drug—faintness, giddiness, cold perspiration and nausea, and on the supervention of these the asthma instantly vanished."*

Lastly, we must refer to the same principle the curtailment of the megrim paroxysm which is sometimes observed as a consequence of vomiting, whether this occurs spontaneously in the natural progress of the seizure, or is induced artificially by the use of an emetic or other means. Many illustrations of this will be found in the earlier parts of this treatise.

Passing on now to the case of the Sexual Passion, it will be remembered that the analogy of the phenomena with those of the natural appetite for food and its gratification on the one hand, as well as with those of the true emotions and their corporeal developments on the other, has been already pointed out—an analogy which is recognised in the latter case by the common name of "Passion," and in the

* "On Asthma" (1st ed.), Case V., p. 299.

former by that of "Appetite," which we apply indiscriminately to both.

The sexual feeling or desire when fully awakened implies a state of nervous tension, similar to that which precedes other explosive nervous actions whether healthy or morbid, and this condition finds its natural culmination and dispersion in sexual relations of the most intimate kind. But it should be remembered, in connexion with our present inquiry and the doctrine of Centric and Eccentric neuroses, that although peripheral impressions of mutual contact are ordinarily necessary for the completion of the physiological act, yet they are not essential, and the whole train of phenomena may be centrically determined under particular states of ideational consciousness such as dreaming; while the analogy they bear to those of an epileptic paroxysm has been recognised from a very early period in the history of medicine (see above, p. 353).

It need occasion no great surprise then, that a state of high sexual excitement should sometimes determine the occurrence of a particular nervous seizure to which the system may chance to be predisposed. This has been frequently observed in the case of epilepsy. "Il y a tant d'analogie," writes Esquirol, "entre un léger accès épileptique et l'orgasme spasmodique qui accomplit l'acte de la reproduction, que les anciens ont défini le coït *Epilepsia brevis*. Cet acte est quelquefois suivi d'épilepsie. Sauvages parle d'une personne chez qui le coït était constamment suivi d'un accès. L'onanisme prédispose à cette terrible maladie, en devient la cause excitante, même dans l'enfance. Zimmermann a connu un jeune homme qui avait un accès chaque fois qu'il s'était livré à l'onanisme."* Dr. Reynolds believes that an exaggerated estimate, and often a groundless suspicion of the influence of this cause in epilepsy very generally prevail,† and I do not doubt that he is right; moreover it should be remembered that a neurosal disposition not unfrequently shows itself in morbid or exaggerated sexual propensities, which must then be looked upon as an

* "Maladies Mentales," tom. i. p. 301. † "On Epilepsy," p. 136.

effect rather than a cause, though even so I see only another illustration of the metamorphic tendencies we are considering. This, however, is not the particular aspect of the subject with which we are now concerned. Dr. Reynolds himself refers to the cases above mentioned as instances of "the passage of normal involuntary movements into the epileptic attack,"* and we have taken a similar view; he records moreover two additional illustrations; in one of these there was no hereditary predisposition, the fits commenced at twenty-five, apparently from sexual excesses, and the first distinct attack occurred during intercourse.† V. Swieten justly observes that such an effect is especially to be dreaded in those who are already epileptic—"Omnium autem maxime hoc metuendum est in illis, qui antea huic morbo obnoxii fuerunt: et contigisse novi, quod talis primas conjugalis lecti delicias epileptico insultu fœdaverit."‡ I may add that an instance of precisely the same kind has recently come to my own knowledge.

What has now been stated of epilepsy is equally true of some other neuroses. "Venereal excitement," says Dr. Salter, "will bring on Asthma. A gentleman once told me that one of the severest attacks he ever had in his life was brought on in this way."§ But asthma also affords a remarkable instance of the opposite or curative influence of the same mode of physiological activity. "Not long ago," writes the same author, "I was informed by a patient at the hospital, who had suffered greatly for many years from spasmodic asthma, that however severe an attack might be, venereal excitement would almost invariably cure it. I have known two or three cases, in which sexual excitement has had just the same effect."‖

Another and at first sight paradoxical fact of the same class, is that a state of continence may favour the occurrence of various neurosal seizures. Esquirol says, "La continence a quelquefois produit l'épilepsie; mais ici l'excès

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* "On Epilepsy," p. 52. † Idem, Case IV. p. 92.

‡ H. Boerhaave, "Commentaria," &c. Ed. 2nd, 4to, Lugd. Bat., vol. iii. p. 412.

§ "On Asthma" (Ed. 1868), p. 26. ‖ Idem, p. 211.

est moins à redouter que l'abus contraire."* There is nothing however which is really contradictory in this. I have already said that where the sexual faculty has been once fully aroused (and this is an important qualification) continence implies, at least with some individuals, a perpetually recurring state of nervous tension, and one which, if baulked in its natural development, is very apt to find expression in morbid phenomena where a neurosal predisposition exists. Lastly, we find the completion of our parallel in the occasional assumption by the sexual faculty of a distinctly morbid and neurosal type under the form of Eroto-mania.

From the sexual passion the transition to the higher Emotions is sufficiently easy, and we are naturally led to inquire whether the same principles of mutual equivalency and substitution, and the same power of exciting and dispersing neurosal paroxysms, can be traced in connexion with them, which we have observed in the case of the consensual operations of the respiratory, alimentary, and sexual systems. In the first place we observe between the emotions themselves, or at least their outward expressions, a tendency to transformation and mutual replacement, and the readiness with which one emotional condition is thus superseded by another has been often a subject of comment both among psychological writers and ordinary observers of human nature. Sir A. Crichton remarks—"Many (I am almost tempted to say most people) now and then have been inclined to laugh when a person has first begun to relate some misfortune. Nay, a more unaccountable circumstance of this kind is, that many people, when they have to tell us of the death of another person, feel themselves often inclined to laugh at the moment they begin to speak of it." Nor is this only seen in a mere misplacement of the outward expression; the saying "extrema gaudii luctus occupat" has passed

* "Mal. Ment.," tom. i. p. 301.

into a nursery proverb, so easy is the transition from laughter to tears in the emotional nature of children. On the same principle there is no way in which we are so quickly rid of a dominant passion or inward feeling as when it is replaced by another :—

> "Be comforted :
> Let's make us med'cines of our great revenge,
> To cure this deadly grief."

And again,

> "Be this the whetstone of your sword : let grief
> Convert to anger."

In the work already quoted, Esquirol observes that a fit of anger has been instantly dispersed by an emotion of surprise or the unexpected appearance of an important personage.* Fear will have the same effect : "Dum iratissimo homini," writes Boerhaave's commentator, "maximus incutitur metus, compescitur ira, non mutato corpore, sed mutata mente in cogitatione sua. . . . Summæ ergo utilitatis est cognoscere oppositos animi affectus. Iram supprimit summus metus ; meticulosissimus homo ira audax fit."† So a celebrated author, whose writings present a singular mixture of humour and seriousness, justly observes of the regulation of the emotional part of our nature that a mistake is often made "in trusting the issue of these commotions to reason only.—I can safely say for myself, I was never able to conquer any one single bad sensation in my heart so decisively, as by beating up as fast as I could for some kindly and gentle sensation to fight it upon its own ground."‡

Again, we find the same tendencies on the part of emotional phenomena which we have observed in the case of the natural appetites to awaken, or to merge into, any form of paroxysmal disorder to which the system may be liable. At other times they themselves assume a distinctly morbid

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* "Des passions considérées comme causes, symptômes, et moyens curatifs de l'aliénation mentale," p. 21. Paris, 1805.

† G. van Swieten, "Commentaria," &c., vol. i. p. 147, § 103-4.

‡ "A Sentimental Journey," by Laurence Sterne.

character and occur intercurrently or vicariously with those of a true neurosis; and lastly, the natural development of a strong emotion will occasionally disperse some other neurosal paroxysm, just as we have seen a fit of hiccup, a keen appetite, an attack of sea-sickness, or another passion dispersed by the same means. Let us take in illustration of these various points the emotion of *Fear*.

We have already pointed out in a previous chapter how frequently "a fright" is the exciting cause of a first attack of epilepsy or chorea; we have also drawn attention to the similar influence of various emotional conditions in renewing the paroxysms not only of these but of many other neuroses, such as asthma, angina pectoris, and megrim, and we need not repeat the illustrations then given. Sometimes, however, an emotion of fear or terror is not a cause, but a symptom, and constitutes the whole or a part of the seizure. We have before stated that the "night terrors" of young children, are often the representatives of future epilepsy, and so sometimes are their ungovernable passions. It has occasionally happened, where fear has been the exciting cause of a first attack of epilepsy, that the original scene or sense of terror has been subjectively reproduced with each returning seizure. We have already had before us some remarkable instances in which a vague and groundless sense of fear or dread has occurred in the course of the megrim paroxysm and in that of periodic gastralgia; the following description of the same emotional condition as an incident of epilepsy is from the pen of M. Moreau:—"All at once, in the midst of exuberant health both physical and moral, during a profound intellectual and emotional calm, while engaged in occupations the most tranquillizing and exempt from all mental excitement, the patient becomes suddenly conscious of *fear*. Fear of what? Absolutely nothing so far as he is aware, but he has the sensation of fear; he experiences morally and physically all the effects of that emotion; he trembles from head to foot, his heart beats quick, he has a sense of oppression at the chest, his vision is disordered, his eyes look haggard, and

he cries with stifled voice—*J'ai peur ! J'ai peur !* These phenomena," continues M. Moreau, "are closely related to that outburst of hilarity, that uncontrollable laughter which affects certain individuals threatened with an attack of mania."* To take another instance: just as we may observe in the somatic development of violent Grief and Terror something of the cardiac distress and collapse of angina pectoris, so we may trace in the latter malady no small amount of the psychical element of those depressing passions. "There seems always to be something peculiar in the pain," says Sir John Forbes in a passage already quoted, "whatever be its degree, unlike the pains of other parts of the body, and as if it were combined with something of a *mental* quality. There is a feeling and a fear of impending death; and the primary symptoms of corporeal disorder are speedily modified by the consequences of mental impressions conveyed through the nervous system. 'Quid ni?' exclaims Seneca, reflecting on his own suffering from this disease, 'aliud enim quidquid est ægrotare est; hoc est animam agere.'"†

Not only, however, is a sense of Fear at one time a cause and at another a symptom of various neurosal seizures, but as if to carry out the former parallel, the natural development of the emotion may sometimes have a curative influence. Thus Dr. Hughes relates a case of chorea which was terminated in this way. "This complaint," he observes, "may be sometimes cured also by that which originally produced it. A curious instance of this occurred a few years ago. A girl who had been in the hospital for chorea, and who went out cured, had a return of her complaint. She was going to the hospital to apply for re-admission, but, on her way, was much alarmed as she passed over London bridge by a person being run-over. She, however, pursued her course. On her arriving at the room in which the patients are selected for admission, both she and her

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* "Psychologie Morbide," p. 281. Paris, 1859.
† "Cyclop. of Pract. Med." Art. *Angina Pectoris*, p. 82.

mother were much surprised to find that the complaint had left her. She therefore went home again, and had not, so far as I know, any return of the disorder."* The same effect has been frequently observed in asthma. Dr. Parry records the case of a gentleman, a sufferer from a regular form of this complaint; on one occasion, when taking ether, some fell on him and took fire, and the fright thus occasioned dispersed the paroxysm.† Dr. Salter says: "The cure of asthma by violent emotion is more sudden and complete than by any other remedy whatever; indeed, I know of few things more striking and curious in the whole history of therapeutics." He gives the following illustrations of the effects of alarm:—"A gentleman suffering an unusually severe attack, so bad that he had been unable to speak or move all day, was suddenly alarmed by the illness of a relative; he ran down two flights of stairs and up again, and administered the restoratives he had procured, and then observed, to his astonishment, that his asthma was gone. This gentleman tells me that on many other occasions different forms of mental emotion have cured his asthma."

"C. R., a confirmed asthmatic, states that when he was suffering from an unusually severe attack, a fire occurred just opposite his house. Previously to the occurrence of the fire he was in bed, breathing with the greatest difficulty, and unable to move. When the excitement of the fire was over, he found that he had been standing in his night-shirt, looking with others out of the window, and that he had forgotten all about his asthma. His breath was not quite well the rest of the day, but nearly so."‡

M. Labarraque relates a very similar instance of the cure of megrim. The patient was a lady, thirty-five years of age, who suffered from violent attacks of this malady, which returned periodically every eight or ten days. One

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* "Guy's Hospital Reports," 2nd Series, vol. iv. p. 374. 1846.
† "Unpublished Writings," vol. ii. p. 35.
‡ "On Asthma," p. 211. (Ed. 1868.)

day, when she felt an attack coming on, going to look at her face in the glass, her cap caught fire and burnt her forehead. The expected seizure never came on, and furthermore, she had no return for some years.*

If we compare the foregoing instances with Mr. Howship's narrative of the cure of his sea-sickness by a sudden alarm, we cannot fail to be struck by the analogy of the facts.

The curative influence of other emotions is not less striking. In the interesting "Journal of an Asthmatic," the sufferer describes the good effect which followed the visit of a friend whom he had not seen for twelve months. "Before his arrival I was not 'very ill,' and the coffee and foot-bath were probably of service, but certain it is that the pleasurable excitement of his conversation (in which I soon began to join) entirely removed the asthmatic fit."† A very similar instance is to be found in Dr. Salter's treatise: "I was sitting," writes the patient, "with fixed elbows on a sofa, breathing hard; a lady came into the room whom I had known very well, and whom I had not seen for several years. I got up to receive her, and sat down again on a music stool, with no especial purchase therefore for the respiratory muscles, and yet with comparative ease of breathing. This ease lasted for about half an hour, and then the difficulty of breathing came on again. I attributed the temporary amendment to the diversion of nervous energy. Just the same thing has happened to me more than once."‡ The same effect is sometimes seen in megrim. Dr. Wollaston thus records his own experience:—"On this occasion, the affection, having lasted with little alteration about twenty minutes, was removed suddenly and entirely by the excitement of agreeable news respecting the safe arrival of a friend from a very hazardous enterprise."§

But it is not solely, perhaps not chiefly, the inward

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* "Essai sur la Cephalalgie et la Migraine," p. 44.
† *Dub. Journ. of Med. and Chem. Science*, vol. xiii. p. 35. 1838.
‡ "On Asthma," p. 342. (Ed. 1868.) § "Phil. Trans." 1824.

feeling and mental development of an emotion which is thus capable of exciting or replacing a neurosal paroxysm. A similar capacity is exhibited, and similar relations are maintained with morbid phenomena by those consensual and automatic actions which constitute the outward expression of the passions. A fit of laughter ordinarily follows an idea of the ridiculous or is the expression of mirth and good humour, but it is well known that it may also be excited by a simple mechanical irritation of the surface, especially in certain localities, as in the childish amusement of tickling. Whichever way induced, the paroxysm may easily pass into a neurosal seizure of a far graver kind.

Dr. Salter records numerous cases of Asthma in which a fit of laughter is mentioned among the exciting causes. "So great is the tendency of laughing," writes one of his patients, "to induce Asthma, that I have always been obliged, especially in childhood, to avoid it as much as possible on account of its distressing consequences."* Another observes: "I have frequently had short spasms of asthma produced by laughing, from which I have recovered as rapidly as when under the influence of Ipecacuanha, going through the stages of silent asthma, audible asthma, and the expectoration mentioned above, in about the space of ten minutes or a quarter of an hour."† Many years ago Dr. Laycock stated that he had known attacks of minor epilepsy excited by laughter. Indeed, he says, "if we review the phenomena of epilepsy in reference to the exciting causes and the organs they implicate, little difference will be found between them and the phenomena of other paroxysmal disorders of the nervous system: in most cases mental emotion will induce and prevent a paroxysm."‡

But just as a fit of laughing may be excited by tickling the soles of the feet, so may an epileptic paroxysm be induced by the same means in those who are predisposed to the malady, as in the following well-known case recorded by

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* "On Asthma," p. 380. (Ed. 1868.) † Idem, p. 168. (1st Edit.)
‡ *Edin. Med. and Surg. Journ.*, vol. l. p. 330. 1839.

Van Swieten :—"I have seen a very healthy girl of ten years old, the offspring of vigorous parents, who had never suffered from epilepsy, rendered epileptic for many years, and seized with her first paroxysm while some girls tickled the soles of her feet in play, others holding her firmly down on the ground so that she should not escape the intolerable sensation by changing her posture."* Dr. Reynolds refers to this case as an instance of the development of the epileptic paroxysm "by the induction of an analogous state of the organism." "In this manner," he says, "pertussis passes into convulsion; coition into epilepsy; and in the same way the latter has been developed by violent laughing from tickling the soles of the feet."† He also gives another illustration from his own practice :—"The first convulsive attack occurred on April 7th, 1849, A. B. being then fifteen years of age. On the evening of the sixth the boy had eaten freely of buns; and in the morning of the seventh, while he was lying asleep, some of his schoolfellows amused themselves by tickling the soles of his feet; and although this tickling did not awaken him, the fit occurred during the process."‡ Dr. M. Hall mentions in one of his lectures that he had details of the case of a little girl who was "tickled into such terror and convulsions as broke up her nervous system."§

Lastly, a fit of laughing may itself be a pathological condition, and the forerunner or representative of some grave neurosal seizure; in other instances it may constitute a part of the paroxysm. Laughter and crying are thus a normal part of the hysterical fit. In a passage already quoted, M. Moreau observes that an outburst of hilarity and of uncontrollable laughter is sometimes the forerunner of an attack of mania; in other instances it may have a choreic

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* "Vidi sanissimam puellam decem annorum, a parentibus vegetis, nunquam epilepsiam passis, natam, per plures annos fuisse epilepticam, et primo paroxysmo fuisse correptam, dum joci gratia humi decumbentem sub plantis pedum titillassent diu quædam puellæ, aliis illam immotam vi retinentibus, ne intolerabilem ipsi hanc molestiam, mutato situ corporis, vitare posset."—*Commentaria, &c.* 4to, vol. iii. p. 402.

† "On Epilepsy," p. 253. ‡ Idem, p. 135.

§ "Diseases and Derangements of the Nervous System," p. 116.

or epileptic basis. Among cases of puerperal chorea recorded by Dr. Lever, is one where the affection had been foreshadowed at an earlier period by a "laughing fit" of so morbid a character as to have been especially noted, as well as by severe megrim.*

I have notes of a case which came many years ago under the care of my friend the late Dr. R. B. Todd. The patient was a boy of thirteen, who, apparently in consequence of a fall on his head, began to suffer from "laughing fits," which at first recurred daily or several times a day, and sometimes during sleep. They were said to have lasted at first about a quarter of an hour, but afterwards they only occupied from two to five minutes. After he had been about a month under treatment the laughing paroxysms were replaced from time to time by fits of crying. It is well known that Dr. Marshall Hall regarded chorea as a disorder of the "centre of emotion" which he placed in the medulla oblongata, and Dr. Todd was disposed to consider the preceding case as a modification of chorea; but it is noteworthy that there was occasionally a momentary loss of consciousness during the fits, suggesting epileptic affinities.

Professor Paget of Cambridge, has recorded a very interesting case of epilepsy complicated by the occurrence of frequent outbursts of unmeaning laughter. The laughter lasted about a minute, and then generally ended like the laugh of a person tickled with something ludicrous. It was not loud and unnatural like an hysterical laugh, and the face had the natural expression.† In a later paper Dr. Paget again refers to this case as an instance of "Gastric Epilepsy." "I failed," he says, "to recognise its gastric character until I learned that the patient (a robust agricultural labourer) almost every day hiccoughed twice or thrice about two hours after dinner. . . . Besides his regular epileptic fits, which were numerous and of the most

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* "Guy's Hosp. Repts.," vol. v. (2nd Ser.) p. 10.

† *Brit. Med. Journ.*, Sept. 22, 1860.

severe kind, and even nearly fatal, the patient was troubled with sudden and transient attacks of involuntary and meaningless laughter associated with no ludicrous ideas, and occurring frequently by night as well as by day, in sleep as well as awake. He was ultimately cured by bismuth and magnesia, and after a period of seven years he is still remaining quite well."*

To take another illustration. The phenomenon of blushing, which is the natural expression of the emotion of modesty or shame, is not uncommonly morbidly developed in connexion with a distressing sense of self-consciousness, and sometimes as the expression of more serious neurosal tendencies. The late Dr. Marshall Hall with his usual sagacity discerned the true affinities of all such disorders and included them in the same "class of paroxysmal affections" as epilepsy.† "In some instances," he says, "*the first stage* of these seizures (Epileptoid) is hidden; in others the seizures assume the form of oneirodynia; in others, again, it is mere blushing, 'sick-headache,' 'sick-giddiness,' etc." "I have known mere blushing to become intense, constantly recurrent on every slight occasion, and attended by varied mental distress, and even to pass into an epileptoid affection."‡ In these and many similar remarks Dr. Hall has recognised the very analogies for which we contend, and has only erred in the mechanical theory which a superabundant ingenuity devised to account for them.

I shall only notice one more instance. The momentary shock and rigidity of the frame which occurs as an effect of surprise or alarm when we "jump," as we say, at an unexpected appearance, is not without its pathological representatives. The painful and violent shock which some persons experience when first dropping off to sleep is an occurrence of a similar kind, and if too familiar to be con-

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* *Lancet*, April 18, 1868, p. 492.

† "Of Paroxysmal Diseases of the Cerebro-spinal System as a Class." *Croonian Lectures*, 1851, § 2, p. 49. ‡ Idem, p. 3.

sidered morbid, it certainly occupies the confines between health and disease, like hiccup, sneezing, and so many minor explosive nervous actions; and with some persons at certain times it occurs so frequently and occasions so much distress as to amount to a positive malady; it exhibits, moreover, in the time of its occurrence a further conformity to the neurosal character. Sir H. Holland has pointed out that a very similar affection may occur by day a as distinct malady of the epileptic class:—"In another instance which happened to me lately, where the remarkable symptom at the time was that singular shock or jar which patients themselves often compare to an electric shock, and which in this case occurred with frequency and violence in the lower limbs, the attacks when most severe in degree, came on almost exactly at equal intervals of somewhat more than two minutes. . . . The patient in this case described the sensation as 'a sudden shot into the limbs, seeming as suddenly to disperse itself into innumerable sparks which penetrated into every corner of them.' Most persons," continues Sir Henry, "will probably recognise in this description a frequent occurrence of ordinary health, where a sudden shock or jar is felt to spread in an instant through the whole body, happening generally without obvious cause, yet most frequently during the approaches of sleep."*

There remains one other class of facts connected with the history of neurosal disorders to which we have not hitherto referred, but which may be briefly noticed here, as forming an additional link between those disorders and the actions of the healthy nervous system which most nearly resemble them. I refer to the influence of Involuntary Imitation and Habit in determining or reproducing the seizures.

Recurring once more to those normal convulsive actions which belong to the respiratory system. We all know

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* "Med. Notes and Reflections," p. 326. Ed. 1839.

how involuntarily and often unconsciously the act of yawning, if once started, will go the round of a whole circle of people who are not very actively engaged, and the interest and significance of the fact are only lost sight of in its familiarity. It is much the same with the act of coughing; it sometimes requires a considerable effort to resist the impulse to cough in sympathy with another, and its epidemic propagation through a whole assembly of people may often be noticed in our churches. The same influence may be observed in connexion with the sensations and movements of sickness; many people are made sick by merely seeing others so, and in susceptible persons this is not confined to the sense of nausea, but may extend to the convulsive actions of retching and vomiting. Cullen says of himself, "I have often coughed when another person has coughed; and I cannot help vomiting when I see another person straining and vomiting." Even the natural appetite for food admits of being considerably heightened by company, and the sight of others eating.

It should be observed however, and the fact bears directly on our present inquiry and the analogy of neurosal phenomena, that this influence of imitation becomes much more apparent when the persons concerned are in any way predisposed to the actions in question; to yawning, for example, by weariness, to coughing by the prevalence of catarrh, and to sickness by being at sea.

Again, in the case of the emotions and their outward expression we trace the operation of the same principle. Every one knows how a laughing face makes us laugh and a suffering one makes us sad; how quickly women and children are moved to tears by the sight of others crying. Let a person unexpectedly find himself in merry company, and he is instantly caught by the prevailing humour and laughing with the rest before he has any distinct idea of the cause of merriment. A curious instance of this involuntary imitation of laughter is quoted by Percival from Wesley's Journal. "Part of Sunday my brother and I then used to

spend in walking in the meadows and singing psalms. But one day, just as we were beginning to sing, he burst out into loud laughter. I asked him if he was distracted, and began to be very angry, and presently after to laugh as loud as he. Nor could we possibly refrain, though we were ready to tear ourselves in pieces, but we were forced to go home without singing another line."

The power which great actors and orators possess of working on the feelings of their audience lies in their ability successfully to assume the outward expressions and gestures of the deeper passions. We have instances too of the propagation of violent emotions among large bodies of people, and of the accumulated intensity they may attain by sympathetic imitation, in the outbreaks of fury, of panic, and of admiration, to which mobs and armies are liable.

If now we turn our attention to pathological cases, we shall have no difficulty in tracing the same influence of imitation in the case of various neurosal seizures which we have just observed under circumstances of health. Thus it is a well established fact, that persons have been rendered epileptic by seeing others so affected. In a case of epilepsy recorded by Mr. Solly, to which reference has already been made, a little girl became epileptic at the age of seven, after seeing her nurse in an epileptic fit. So Van Swieten observes:—"I have known a great many rendered epileptic and who have remained so for the rest of their lives, from another person falling down in a fit before them; and there are a great many such cases to be met with among medical writers."* The same influence is still more strikingly seen in hysteria. "It has frequently happened in the Royal Infirmary here (Edinburgh)," writes Robert Whytt, "that women have been seized with hysteric fits from seeing others attacked with them;"† and this experience has been repeatedly confirmed. Dr. Bright relates in his reports of cases at Guy's Hospital that having occasion to pass a

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* "Comment. apud Boerhaave," § 1075, vol. iii. p. 414.
† "Works," 4to, p. 581.

probang for an hysterical patient, the operation was followed by a convulsive paroxysm, which was immediately repeated among several patients in the same ward. Dr. Laycock has given an interesting account of the spread of hysterical retching and vomiting with other symptoms among four female patients in the wards of the York Hospital, so as to give rise at first to a suspicion of poisoning ;* and it would be easy to refer to many more instances.

Chorea appears to be sometimes communicated in a similar way. Dr. Bright, in the excellent clinical reports just referred to, relates an instance of this malady in a child, for which there was no assignable cause except association with a choreic schoolfellow. "Neither she nor her friends," says Dr. Bright, "could assign any cause for its coming on ; but on my inquiring whether she knew any other person with this complaint, I found that a little girl at the same school was severely affected with a similar disease. . . . It is not improbable that the disease was the result of unconscious imitation."† To this we may add that convulsive fits and various forms of choreic movement have prevailed from time to time in certain districts, or spread through large communities, under the same kind of sympathetic influence ; and to this class must be referred the epidemic ecstasies, dancings, tremors, and ravings of religious enthusiasts in all ages.

Lastly, Sir H. Holland observes of Asthma: "I have known asthmatic patients in whom a certain degree of this affection was generally brought on by seeing others suffering under the same disorder."‡

The influence of *Habit* on the functions of organic life, both in health and disease, is very remarkable, and directly referrible to the share which the nervous system takes in their production. We know how much our natural appetites respond to this influence—how much they may be heightened or weakened by force of habit. The sense of hunger, and

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* *Edin. Med. and Surg. Journ* , vol. xlix. p. 450. 1828.
† "Reports of Medical Cases," vol. ii. p. 474-5.
‡ "Medical Notes and Reflections," p. 70.

the disposition to sleep, tend naturally to return at stated intervals, but these admit of almost indefinite modification to suit our particular circumstances or social requirements; and in the matter of quantity, we may accustom ourselves to be satisfied with little or much, quite irrespective of the material needs of the system. The movement of the bowels affords another illustration of the force of habit, and even the uterus may acquire a habit of abortion. It is the same with the emotions in their corporeal developments: the habit of yielding to any of these promotes their recurrence and increases their force; a man who gives way, as we say, to the passion of anger, that is, who freely indulges in its outward expression, developes a power which he cannot control, and soon becomes furious on the most trifling provocation, real or imaginary.

A similar effect of habit may be traced in the case of various neuroses. In epilepsy, when the fits have recurred for a length of time under the influence of a particular class of impressions, they will often continue to recur when the exciting cause is removed. If, however, this habit be broken by some new impression or change of circumstances, they may then cease altogether. So Dr. Babington observes of chorea: "It is probable that as in whooping-cough and other spasmodic diseases, mere habit will perpetuate what at first originated in disease; and consequently, that it is, to a certain extent, within the power of the patient, if the mind be calmly and steadily directed to the point, to effect his own cure."

Dr. Salter makes a similar observation with respect to asthma: "There is one point which such cases seem to illustrate, and that is, the disposition to *habit* which characterizes asthma—to repeat that which has once been started, to continue the effect even after the cause has ceased—as we see sometimes apparently in epilepsy, and all nervous diseases that are of the 'repetitive' type. Thus, in the cases I have just cited, the first visit to Ryde began with asthma, and it went on getting worse and worse; the second began well, and so it continued, and would apparently

ad infinitum; the same with regard to the second case. It seems, as I have remarked in a previous chapter, as if it were a law of the disease to continue its present type and peculiarities, whatever they may be, till something occurs to 'break the spell,' and then to continue the acquired change, whatever that may be, till something else occurs, and so on."* Dr. Mason Good remarks of all this class of disorders: "Whenever a forcible and anomalous movement of this kind has once been excited, and when from accident, or a continuance of the exciting cause, it has been repeated, it forms a habit of recurrence that is often broken off with great difficulty. Hence the convulsive spasm of whooping-cough always outlasts the disease itself for some weeks, and is best removed by the introduction of some counter-habit obtained by a change of residence, atmosphere, or even hours. . . . . A habit of sneezing has sometimes been produced in the same manner, and has followed upon an obstinate catarrh; after which the slightest stimulus, even the sneezing of another person, has been sufficient to call up fresh paroxysms, and, in some cases which I have seen, of very long and troublesome continuance."† Dr. Vaughan relates a case in the Memoirs of the Medical Society of London, where the stomach contracted a troublesome habit of vomiting, which he at last succeeded in breaking by feeding the patient by the bowel.

Lastly, there is no doubt that by frequent returns from frequent exposure to determining causes, the recurrence of many neurosal seizures is greatly facilitated and the morbid habit strengthened, so that the most trifling impression of a particular kind may at length be sufficient to occasion a return. It will be remembered that Sir John Herschel could bring on his megrim by allowing his mind to dwell on the idea or description of the phenomena, and M. Piorry by fixing his sight intently. Hence it becomes important to avoid as far as is possible those circumstances which by association

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* "On Asthma," p. 299. Ed. 1868.

† "Study of Medicine," vol. iii. p. 398.

or otherwise favour the return of the seizures. Again, just as the assumption of the outward expression and gesture of a particular passion is well known to awaken much of the inward feeling, so it is certain that true epilepsy has been produced by frequently feigning it. "L'habitude de simuler l'épilepsie a provoqué cette maladie," says Esquirol.* Nor are such complaints so utterly removed from the dominion of the will as to render a voluntary effort to prevent them entirely useless. "A person," says Cullen, "may have had epilepsy brought on at first by a natural cause; but it is certain that a number of people can by the recollection of certain ideas, by the power of their own imagination, throw themselves into a real epileptic fit, and they will give proofs, by an absolute insensibility, that it is sufficiently real, although there is little doubt that they can bring it on."† And conversely, it is probable that in certain cases and within certain limits, as Dr. Babington says above of chorea, "it is within the power of the patient, if the mind be calmly and steadily directed to the point," to contribute something at least to his own cure.

We may now briefly sum up the results at which we arrive from the considerations adduced in the present section with regard to the essential nature of neurosal seizures.

1. In the first place we have seen that the whole group of disorders to which megrim belongs have their foundation in a certain tendency of the nervous system, for the most part innate and often hereditary, to the irregular accumulation and discharge of nerve-force, which is manifested from time to time in phenomena of a more or less explosive character, whether sensorial, motor, ideational, or organic. In the words of M. Moreau, these diseases exist as "a general malady, *totius substantiæ*, before the morbid disposition becomes localized in a determinate system of organs under

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* "Mal. Ment.," tom. i. p. 296.
† "Works," 8vo, vol. ii. p. 418. Edin. 1827.

the influence of various accidental causes physical and moral." This 'Nervous diathesis' may in fact be latent in the individual until circumstances arise to awaken it, either in connexion with the natural evolution of the nervous functions, or from extraneous sources of exhaustion and irritation which cooperate with the morbid tendency, or from the presence of physiological conditions of the system having some neurosal affinities.

2. When fully developed, and in the absence of complications, the tendency of this morbid disposition is to reproduce spontaneously the conditions on which the phenomena of the seizures immediately depend in approximately equal times, with intervals of perfect health; but the natural intervals are subject to considerable variation from the operation of various accessory and exciting causes. In any case the occurrence of the seizures exhausts for a time the morbid activity and leaves the patient free; and the whole train of phenomena may be not inaptly compared to the gathering and dispersion of a storm, this analogy being more or less apparent in different cases and different forms of disorder.

3. The form of the neurosis or the particular character of the seizure will be determined for the most part by the concentration of this explosive tendency about particular foci, or its limitation to particular territories, of the encephalic system; and in accordance with this view a certain correspondence may be traced between the characters of various neuroses and the principal physiological divisions of that system. At the same time the tendency of such irregular activity to overleap these limits, and in severer seizures to implicate a larger area, or on the other hand to become abruptly transferred to a different focus, will explain the variations observed in individual cases, and the transitional and metamorphic characters occasionally exhibited by all the members of the group.

4. Anomalous and difficult to explain as neurosal phenomena may at first sight appear, a thoughtful inquiry reveals many latent analogies with certain operations of the healthy nervous system, of which the true character and

affinities are apt to be overlooked in their familiarity and subservience to higher functions. Such especially are certain minor consensual and automatic movements which fulfil a conservative purpose in connexion with the respiratory and alimentary systems, like sneezing, coughing, gaping and vomiting; the natural appetites and their gratification; the passions and their somatic developments. Many of these are marked by a similar antecedent state of nervous tension, arising either spontaneously and periodically, or under the influence of particular external impressions, and the discharge of this condition in actions or sensations of a more or less explosive kind, although so co-ordinated in these instances as to serve a particular purpose in the economy of life. And this analogy is further strengthened by the consideration, that these physiological actions will sometimes themselves assume a distinctly morbid and neurosal type, and on the other hand will occasionally displace certain familiar forms of neurosal seizure.

A further prosecution of the comparison thus suggested between morbid and healthy nervous actions, is found to throw light on many points in the history of neuroses, and to suggest some important lessons with regard to the vascular and eccentric theories of those disorders, which we may briefly sum up as follows:—

5. With regard to the vascular theories which find such ready acceptance in the case of neuroses, it is a significant fact that no physiologist has ever suggested a similar explanation of those physiological actions which most nearly resemble and sometimes replace them. No one thinks, for instance, of a condition of hyperæmia or anæmia of the nervous centres as the necessary antecedent of a fit of sneezing, vomiting, laughter or terror, or imagines that such an hypothesis would assist our comprehension of the nature of the phenomena. These actions we regard as primarily nervous, and any disturbance of the circulation which attends them as an *effect* of the nervous disorder. In the blush of shame, in the heat and congestion of anger,

the pallor and collapse of fear, we have certain very obvious signs of disturbance, both in the general circulation and in the local distribution of blood in the capillary vessels, yet no one thinks of pointing to these incidents of their development as a key to the condition of the nervous centres on which the paroxysms depend. There seems no good reason why we should take an essentially different view of pathological cases. It is of course quite true that certain conditions of blood-supply are necessary for the maintenance in functional activity of every system of the body, whether muscular, secreting, or nervous, but they are not the cause of those functions; and just as we look to the original endowments of the nervous system for an explanation of the physiological actions to which we have referred, so we should look to a perversion of those endowments, and not to accidents of blood-supply, for an explanation of the pathological ones. And if we allow our attention to be diverted to a collateral inquiry into the mechanism of the circulation when the laws of nervous action are the proper subject of research, we may indeed be solving a problem of considerable interest, but not the one we have proposed to ourselves.

6. Another application of the comparison we have instituted between morbid and healthy phenomena has reference to the sympathetic and eccentric theories of neuroses, and suggests, I think, a more correct estimate of the influence of local irritations, and of the share they take in the production of the seizures, than that which generally prevails. It will be allowed that irritation of the nostrils would not excite the convulsive movements of sneezing, and the peculiar sensations which precede them, unless the whole train of phenomena were already preorganized in the constitution of the nervous system itself for a particular purpose; and a similar remark may be made with respect to the other physiological actions to which we have referred, whether recurring spontaneously like a natural appetite, or the movements of respiration, at approximately regular intervals with a similar economic

design; or remaining indefinitely latent like sneezing, vomiting, and laughter, until called into activity by particular exciting impressions from the sentient or ideational periphery. Analogy suggests that neuroses themselves have a similar functional organization in the nervous system, although of a pathological kind, without which the various local causes to which they are so often referred would prove inoperative. This analogy is further strengthened by the following considerations:—In the physiological actions to which we have referred, although a special affiliation is exhibited with the particular impressions or states of the system by which they are ordinarily determined, in connexion with the end they serve in the economy of life, yet we may observe that they are sometimes excited by other impressions which have no such connexion with their final purpose. Thus, although sneezing is ordinarily determined by irritation of the nostrils, a dazzling light may have the same effect; and though the movements of laughter are usually called forth by an idea of the ridiculous, they may be sometimes excited by tickling the axillæ or feet; and though nausea and vomiting are for the most part occasioned by irritation of the stomach, they sometimes follow an idea of disgust. Under ordinary circumstances the movements of respiration are rhythmically performed in response to the respiratory needs of the system, but a dash of cold water on the face will powerfully excite them when arrested by syncope, coma, or asphyxia; emotional phenomena are more especially associated with particular states of ideational consciousness, yet we know how deeply that part of our nature may be stirred and the passions aroused by such a succession of auditory impressions as music affords. It is precisely the same in pathological cases: a similar dependence on a similar variety of exciting causes is often exhibited by neurosal seizures, even when a special connexion may be observed with a particular class of impressions, and hence it is impossible to regard the latter as essential; and no illustration or analogy could show more clearly than this

the true light in which such influences should be regarded, namely, as accessory and subordinate to the neurosal constitution.

7. Lastly, the same comparison of the operations of the nervous system in health and disease tends to throw light on those circumstances of metamorphosis and substitution which form so remarkable a chapter in the history of neurosal disorders. Much of the present section has been devoted to illustrations of the fact, that the natural operations of the economy which most nearly resemble those disorders, whether as examples of sentient tension or explosive motion, exhibit a similar kind of equivalency and mutual replacement; and hence it would seem that the phenomena of neurosal transformation are but a particular manifestation of a general law, the operation of which may be traced under circumstances of health as well as of disease. The capacity too which the same physiological actions exhibit of sometimes exciting and sometimes dispersing neurosal paroxysms, is a fact of a similar kind and admits of a similar explanation.

Anatomical Seat of Megrim.—It only now remains to point out what is the probable seat of the morbid action in the case of Megrim. Referring to his own attacks of transient half-vision, and to the fact on which we have so much insisted, that the visual field is similarly affected in both eyes, Dr. Wollaston justly observes that this must be owing to some source of disorder posterior to the decussation of the optic nerves, and probably in the Optic Thalamus: "Since the corresponding points of the two eyes sympathise in disease, their sympathy is evidently from structure, not from mere habit of feeling together, as might be inferred if reference were had to the reception of ordinary impressions alone. Any two corresponding points must be supplied with a pair of filaments from the same nerve, and the seat of a disease in which similar parts of both eyes are affected, must be considered as situated at a distance from the eyes at some place in the course of the nerves where these

filaments are still united, and probably in one or the other Thalamus Nervorum Opticorum."*

We are led to adopt a similar view of the central seat of the disorder from a consideration of the phenomena of the fully developed paroxysm, in which the functions of the second pair of cranial nerves, those of touch in the extremities, and of the sentient divisions of the fifth and eighth are successively involved, as indicated by the disorder of vision, the numbness and tingling, the headache, the nausea and vomiting, which succeed one another in the typical seizure. To what part, except their common encephalic origin and connexions, could a disorder be referred which involves in quick succession the functions of so many nerves so remote in their distribution as those we have indicated?

Again, the phenomena of megrim are almost exclusively Sensory, and if spasmodic or convulsive movements occur, they are quite exceptional and secondary to the sensorial disturbance; as for instance the vomiting which sometimes follows a high degree of nausea, and the facial spasm which has been known to attend the pain. Hence we infer that the disorder is limited for the most part to the sensory tract and the ganglia of the sensory nerves, from the optic thalamus above to the nucleus of the vagus below. And since in the typical seizure the visual disorder is always the initial symptom, the headache the middle, and the nausea and vomiting last, we infer that the "Storm" has its point of departure or principal focus in the optic thalamus, and that its normal course is from above downwards, or from before backwards, in the sensory tract.

The implication of the optic thalami appears sufficient to account for the numbness and tingling in the extremities which either accompany or immediately follow the affection of sight, since these ganglia are believed to be the chief foci of the nerves of touch or common sensibility as well as the termination of the optic tracts.

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* "Phil. Transac.," 1824, p. 222.

Since the mesocephale is also regarded as the "Centre of Emotion," the occurrence of emotional phenomena in the course of the seizure is sufficiently intelligible on this view of its anatomy; but to explain the disorder of ideation and the impairment of memory which sometimes occur, we must suppose a radiation or extension of the disorder from the optic thalami to the hemispheric ganglia.

The disorder of speech, so far as it is memorial and dependent on an interruption of the association between ideas and names, must be similarly explained; while in its motorial aspect, as a succession of movements adjusted by sensorial impressions, and probably depending on the co-operation of the optic thalamus and corpus striatum (left side), it seems sufficiently accounted for by the functional derangement of the former; and this also accords with the fact that it is almost always the immediate sequel or attendant of the tactile disorder in the right extremities, and of the centripetal progress of the latter to the head and face.

With regard to the unilateral and bilateral characters—the occurrence of the sensorial phenomena sometimes on one side and sometimes on both; the fact that in the unilateral cases the hemicrania and disordered vision may be on the same or opposite sides, as also the hemicrania and disorder of touch, as first pointed out by M. Calmeil; and further that the disorder of touch when unilateral in the extremities may become bilateral in the mouth and tongue; these facts can only be explained, as it seems to me, on the hypothesis of a centric origin, and by reference to the intimate commissural connexion which exists between the sensory tracts of opposite sides at the base of the brain, and which allows of a transfer of the disorder from one side to the other.

The implication of the vaso-motor fibres of the sympathetic on Du Bois-Reymond's supposition of their origin in the "Regio Cilio-spinalis," is not compatible with the view we have taken of the anatomy of megrim; but there are grounds for assuming a higher origin, and if with Dr. Möllendorff we suppose it to be in the cerebral peduncle or

optic thalamus, all difficulty vanishes.* The slowing of the heart we have already referred to irritation of the pneumogastric ganglion.

The foregoing account has been derived from a consideration of the typical seizure; in less complete forms the disorder will be proportionately limited, and the principal focus will vary with the character of the attack. Thus, in a simple case of transient half-vision it will probably be in the optic thalamus; in the sea-sick form, in the medulla oblongata.

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* "Gewiss gibt es centrale Verbindungen zwischen beiden Seiten, sehr wohl kann aber auch die Leitung einseitig durch den rechten oder linken Grenzstrang fortgepflanzt werden; ob bis zum Pedunculus cerebri oder Thalamus Opticus, wo das Centrum des Nervus Sympathicus sein soll, lässt sich freilich nicht entscheiden. Bis zur Centralstelle geleitet ist die Affection gewiss in dem Falle, wenn, wie in den heftigsten Anfällen, ein Uebersprungen von der einen zur anderen Seite statt-findet," *Virchow's Archiv.* Bd. xli. p. 392.

CHAPTER VI.

Symptomatic Megrim :—Arthritic or Gouty; Malarial, or Brow Ague; Megrim Symptomatic of Organic disease of the Brain.

HITHERTO I have spoken of Megrim only as an Idiopathic neurosis or primary disorder of the nervous system of a functional kind; but just as Epileptic seizures are sometimes symptomatic of Structural lesions of the Brain, or of a Toxic condition of the blood and secondary poisoning of the nervous centres, so it is in megrim; in the toxic cases the morbid material may either be introduced from without, or generated within the system by imperfect assimilation or defective excretion. I propose to notice three forms of such symptomatic or pseudo-megrim :—First, the Gouty or arthritic; secondly, the Aguish or malarial; and lastly, megrim associated with organic disease of the Brain.

I. *Gouty or Arthritic Megrim.* Megrim is sometimes the expression of a latent gouty diathesis; a father may have suffered from gout, and his son may become the victim of inveterate megrim. Again, it occasionally happens that a man who has been afflicted with the latter malady in the earlier years of his life is immediately set free on the occurrence of gout at a later period.

Most of the writers on megrim refer to its frequent connexion with a gouty habit or constitution, and to the occasional replacement of the paroxysms by those of gout. Fordyce says :—"Si in iis quos vexare consuevit Hemicrania ætate auctâ superveniat Arthritis, illa, cum utrumque vitium non penitus dissimile sit, ut plurimum evanescit, materiâ forsan in articulos jam translatâ."* Tissot refers

* "De Hemicrania Dissert.," p. 87.

to it as a matter of general observation :—" Migraine terminates with some people when they are attacked with gout; the latter malady sets them free from the former."* M. Labarraque gives the case of a Professor at Besançon who had been long subject to migraine; he submitted himself to a prolonged course of mineral waters, when the migraine was replaced by a severe gout, which in turn was cured by the reproduction of the migraine. Dr. Parry, after describing his own disorder, which was of the purely visual type, consisting of a blind spot followed by the usual zigzag spectrum, observes that "similar affections have not unfrequently occurred to other dyspeptic patients, more especially to those who with dyspepsia were subject to occasional gout."† Dr. Möllendorff allows that gout is an influential cause of megrim in men.‡

Sir Henry Holland has the following remarks in his Notes on Hereditary Disease, which have a similar bearing :— "There is much that is curious in the tendency to headaches thus transmitted by descent, and often going through whole families with similar characters. The cause here presumably varies in different instances. Sometimes, and especially perhaps where they are periodical, the affection may belong to the gouty habit, and to the matter of gout in the circulation."§ And again in the chapter on morbid actions of an Intermittent kind :—"I know instances where such intermittent headaches have occurred during the greater part of a protracted life. More frequently, however, it happens that they affect especially certain periods of life;—in this, as in many other circumstances, showing a singular relation to various disordered actions of the gouty constitution, with which, as I have stated in a former chapter, I cannot doubt their close

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* "Traité des Nerfs," p. 395.

† "Unpublished Writings of Dr. C. H. Parry," vol. i. p. 557.

‡ "Ein grosses Contingent in der Männerwelt liefert die Gicht, namentlich in ihren anomalen Formen, wenn keine regelmässigen Podagraanfälle eintreten."—*Virchow's Archiv f. Anat. u. Phys.*, Bd. xli. p. 386. 1867.

§ "Med. Notes and Reflections," p. 31.

kindred and dependence on the same causes. In conformity with this view, there is reason to believe that the kidneys are the excretory organs most concerned in giving relief in these cases; and principally by an increased separation of lithic acid and its compounds."*

Much additional evidence on the same subject and many illustrative cases will be found in the various treatises on gout. "I state the following case," writes Sir Charles Scudamore, "of the frequent and severe occurrence of Gout, as also of *Sick-Headache,* yielding so completely to the same plan of treatment, that in this individual example the two complaints, however distinct in their nature, appeared to owe their support to the same cause of irritation. D. A., aged fifty-one, tall and of middle bulk; of the nervous temperament; was first affected with hereditary gout (from father and mother) nine years ago at the ball of the great toe, and since in various parts, a fit taking place usually twice in a year and sometimes more frequently. The premonitory symptoms: acidity of the stomach; depression of spirits; the pulse, which is always rather irregular, becoming so in a greater degree; and cramps in the muscles of the legs.

"He had also been much afflicted with the complaint commonly called 'Sick-Headache,' which is preceded by remarkable coldness of the feet, and by that kind of nervous depression the day before, which gave him the desire of taking more than his ordinary quantity of wine. On the day of the headache he could not bear cold air, or the use of cold water; and he was completely overpowered with *torpor,* and with the most *extreme oppression of sleep.*" Both maladies yielded to the same treatment—viz., "a corrective and aperient plan of medicines," continued for a year, with country air, horse exercise, and warm baths.†

The most recent writer on the gouty origin of megrim is

* "Med. Notes and Reflections," p. 283, 1839.

† "A Treatise on Gout and Gravel." By Charles Scudamore, M.D., p. 368. 1823.

the late Prof. Trousseau, who has dwelt very fully on the subject in his excellent clinical lectures. "There is," he says, "a larvaceous form of gout as well as of fever: the gouty diathesis may declare itself by affections essentially different from those which characterize ordinary gout. As they may constitute its primary manifestations, the difficulty of detecting the nature of the disease can be easily understood.

"To give you a striking example, let me recall to your recollection a case which I related on a former occasion. I had as an intimate friend an English major who had been long subject to migraine, recurring with a periodicity so well marked every second Wednesday that almost the exact hour of the seizure was known. So regular were the paroxysms in their progress and duration, that, strange to say, the time of their termination could also be foretold. They lasted some hours, and then left the patient in perfect health. . . . . Matters were in this state when I became acquainted with this gentleman in Paris. He was so worn out with his sufferings, that he asked me at any price to deliver him from them. This occurred in 1825, when I was just commencing the practice of medicine, and did not know what migraine was. . . . . Under the influence of repeated purging, the attacks lost their periodicity, and occurred at longer intervals. But these changes did not prove very beneficial to the general health. Previously the paroxysms had been succeeded by a condition of well-being, which contrasted in a remarkable manner with the feelings of discomfort which gave notice of their return. . . . . One morning he caused me to be awoke that he might show me his foot, which occasioned him extreme suffering. Swelling and great redness of the parts plainly told me that I had to do with a paroxysm of acute gout of a very decided character. I then suspected that it was a case of regular gout; but I did not know to what extent its manifestations ought to be respected. Moreover, I did not then know that Gout and Migraine are sisters. . . . .

Leeches were applied to the affected parts, which were forthwith enveloped in poultices sprinkled with laudanum. The inflammation subsided, to the great joy of the patient, and to the great satisfaction of the physician. Only too soon had I to regret my imprudent intervention. From that moment my unlucky friend lost his former good health. He had a second attack, which was an attack of chronic gout—irregular, moderate, and atonic. Not only was the general health altered, but there was likewise a deplorable corresponding effect produced upon the spirits and mental powers. The major lost his mental acumen and habitual gaiety of manner. He became heavy, cross, and tiresome. Ere long he had a first attack of apoplexy; and, two years later, he was carried off by a second attack.

"Such, then, is the nature of larvaceous gout—*migraine*, periodic migraine, preceded by general discomfort, accompanied by vomiting; which latter symptom, with the headache, are characteristic, and generally last for some hours. Récamier always called the attention of his audience to it; and, before him, many others had pointed out the nature of this singular neurosis. So evidently is it in many cases a manifestation of the gouty diathesis, that articular gout and migraine are observed in the same person, the one subsiding on the approach of the other; and it is often, also, the only expression of the hereditary tendency in subjects who are the children of decidedly gouty parents."*

The same displacement of megrim may also occur on the appearance of some anomalous form of gout, as well as of a regular fit. The elder Mr. Travers, it will be remembered, suffered from severe attacks of megrim, with hemiplegic numbness and disordered speech. His son appears to have inherited the disposition, and to have been a regular sufferer from hemicrania until he got an attack of acute *Urethritis;* and from that time his former malady

* "Lectures on Clin. Medicine," vol. iv. p. 378 (New Syd. Soc. ed.).

ceased. This he describes in his "Observations on Surgery" among other illustrations of gouty affections of the male urinary passages: "My medical friends called it 'gouty gonorrhœa.' I can only affirm it was not 'venereal,' and could not be. This opinion as to the cause of this disease derived additional countenance from the comparative infrequency, or rather cessation, afterwards of a severe hemicranial and brow pain, which always lasted two days, and which recurred before this illness about once a month on an average."* It will be remembered that the father of Dr. G., whose case I have recorded above (pp. 125, 218), suffered from gout, and also his son; while he himself was the victim of megrim and other neurosal seizures.

There can be no question then, I think, as to the frequent connexion of megrim, whether in its blind, sick, or simply hemicranial forms, with a gouty diathesis, and its occasional replacement by fits of regular gout. Megrim, however, is far from being the only neurosis which is thus associated with gout; a similar connexion may be traced in the case of asthma, angina pectoris, gastralgic paroxysms, and certain forms of transient mental derangement. The consideration suggests an interesting inquiry as to the nature of the relationship between these various neuroses and regular gout. The view which is commonly entertained is that the excessive generation or retention of uric acid in the system, which is regarded as the fundamental fact in the pathology of gout, exerts a toxic influence upon the nervous centres, while the particular character of the disorder is determined by the territory involved. This limited operation of a cause so general in its nature is a real obstacle to this view; on the other hand, there is much in the history of gout—its hereditary character, limitation to particular ages and sexes, periodicity, explosive character, sudden translations and remarkable metamorphic relations with nervous disorders—which seems to stamp the malady as a pure neurosis; and even the fit itself, with its sudden

* "Observations on Surgery," p. 167. 1852.

nocturnal invasion, the late Dr. Todd was accustomed to compare to one of epilepsy or of asthma. Moreover, although the presence of uric acid in the blood of gouty subjects is no longer inferential and admits of ready demonstration, the dependence of the remaining phenomena of gout upon this associated condition is, to say the least, far from proved; and it is further certain that uric acid is also present in excess under other pathological conditions which have no connexion whatever with gout. On the whole, there is much to be said in support of the view that gout in its various forms is the manifestation of a disorder which has its primary seat in the nervous system itself; and there is no more difficulty in conceiving that inflammation and pain may be an effect of deranged innervation in the case of Arthritis, than in the analogous case of Herpes Zoster; or that an excess of uric acid should be generated or retained in the system under a similar influence, than that sugar should in the parallel case of the diabetes which follows a lesion in the floor of the fourth ventricle.

II. *Malarial Megrim.*—"Hemicrania Intermittens," or "Brow Ague," was once very common in this country, but is now seldom met with, at least in town. I have already referred to the endemic prevalence of a malady of this kind in the Migraña of some parts of Spain and other malarial countries. Most of the writers on megrim have recognised Marsh poison as one of the causes of the disorder. Robert Whytt, besides the idiopathic, gastric, catamenial, and arthritic varieties of periodical headache, describes a fifth as maintaining exactly regular periods and evidently of an aguish character, and he mentions having found opium of great value in the treatment of a violent quotidian hemicrania.* Tissot himself appears to have suffered from the epidemic prevalence of a migraine of this kind. "When thus epidemic," he says, "it is symptomatic of intermittent fever, as I have experienced in my

* "On Nervous Disorders," Art. XIV. p. 305. 1765.

own case, and as has been observed by M. Schobelt in a case where the affection returned very regularly at the same hour every other night, and terminated by sweating."*

Dr. Macculloch, who has left us by far the best treatise on malarial disorders which we have in our language, and has especially directed his attention to the aguish origin of many neuroses, describes periodical headache as one of the commonest of the masked or irregular forms of intermittent fever; and with regard to the situation and character of such headaches, he considers "*Hemicrania* as undoubtedly the most important variety." In other instances the pain may be of a still more circumscribed character and take the form of "clavus hystericus," which is but a variety of megrim; and many of the cases commonly known as "nervous headache," and the so-called "determinations of blood to the head," he believes to have a similar origin. As an acute affection, or "brow ague" strictly speaking, such periodical headache may, he says, present "any of the types of Intermittent; and if I have not myself seen it under every form, I have at least known it as a double quotidian, as a single one, and as a tertian."† It is, however, the more chronic forms which have the greatest interest for us, assuming as they do more nearly the character of idiopathic megrim in respect to periodicity and the length of intervals. "Where the intermittent has been of long duration, it is more common for the periodical headache which is united with it to recur in a very irregular manner, as is true generally of the disorder in all its modes, when of such standing; and it is in these cases especially, that its real nature is so commonly mistaken, as it then wants those obvious characters which alone would arrest the attention of a superficial observer."‡

With regard to the dependence of such hemicrania on

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* "Traité des Nerfs," p. 391. Schobelt, "Tract. de Hemicrania." Berlin, 1776.

† "An Essay on the Remittent and Intermittent Diseases, including Marsh Fever and Neuralgia." By John Macculloch, M.D., F.R.S., &c. Lond. 1828. Part II. p. 31, &c. ‡ Op. cit., p. 33.

malaria, "It will be found," Dr. Macculloch says, "that this disorder is most common in situations of the unhealthy nature formerly described, and that it is often directly brought on by causes which produce ordinary Intermittent. But what affords a much stronger proof of its identity, is the fact that it occurs frequently, perhaps most frequently, in those who labour under chronic Intermittents or Remittents, or have formerly suffered from these disorders. Thus it may occupy the whole period of one relapse, as the substitute of what would otherwise have been a common one; as it is even found to do, in frequent interchanges, and through a long life, in those who possess that inveterate *habit* of intermittent which may almost fairly be esteemed incurable. Still more remarkably, it is sometimes found to interchange by paroxysms with the common intermittent; or the ordinary fever of one day is replaced on another by the headache. Thus I have seen the headache and the ague fit occupy alternate days, a modification which may be considered a double tertian, and proceeding thus through a long period."

Respecting the nature of its relation to ague, Dr. Macculloch holds that the difference between the regular and irregular forms of malarial disorder is merely a difference of localization of the same essential morbid action in different territories of the nervous system: "The action of malaria is on the nervous system, on the whole and on the parts; or affecting the whole in a slender manner, it may exert its chief influence on some peculiar nerve or portion of a nerve. And till we know more of their nature and of this action, we cannot pronounce a negative, or say that no cause but malaria shall produce even a simple intermittent." And again—"Everything tends to show that if the diseases produced by malaria are not purely, and all, mere affections of the nervous system, the principal action of this poison is on that system, and the greater proportion of the disorders which are caused by it, disorders of the nerves."*

* Op. cit., p. 33; also Part I. p. 291.

Under this view of its affinities with ague, some other nervous phenomena which often attend the headache, or form a part of the same paroxysm, become at once intelligible—"Such as previous yawning, increased and sudden secretion of urine, spasmodic and hysterical affections, derangements of the mental faculties, and, as I conjecture, vomiting." With regard to this associated vomiting, he adds—"In this particular disorder (headache) that act generally occupies the same place in the paroxysm which it does in the common intermittent (terminal); and though I do not doubt that there is a headache, terminating in vomiting, of a different nature, and commonly called 'bilious headache,' I have had no difficulty in tracing many reputed cases of this nature to the disorder which I am now describing."* In an earlier part of the treatise he had written of this sickness, thus:—"I have already remarked that the ordinary paroxysm of an Intermittent sometimes terminates in vomiting, while nausea also occurs in them as in Chronic Remittents; often very durable and forming a very distressing addition to the other symptoms. In the cases to which I would here specially call attention, and which are the chronic ones, the vomiting becomes the most conspicuous symptom, or even the only one which the patient may notice. . . . . I must also remark that it is very commonly preceded by a state of drowsiness of which it is the termination. It is, in reality, in all cases where it occurs, the real termination of the paroxysm, as in well-marked Intermittents. . . . . I need only add, that as far as I have seen, the vomiting is very transitory; occurring whether the stomach is full or empty, and when past, leaving it without any derangement, or rather being the immediate forerunner of the interval of temporary health. And when its period is arrived, the slightest cause, even a glass of water, will bring it on instantly; while it also comes on at times with so little previous notice, that the patient has not even time to leave his seat or change his position. Thus have I seen it con-

* Op. cit., p. 38.

tinue for three months; being either removed only by the cessation of that particular relapse, or else becoming exchanged for some other local symptom."*

I have myself had a case of malarial vomiting of this kind under my care, and can confirm what Dr. Macculloch here says about it. It yielded completely to Quinine, having resisted other remedies. On the attendant drowsiness to which he refers, and its neurosal affinities, we have already spoken. (See p. 145.)

Of the Psychical complications which sometimes attend this form of Hemicrania, the same author says—"When the disease is strongly marked or the pain intense, the confusion of thought, formerly noticed, frequently amounts to absolute delirium, as the whole disease is commonly attended with those affections of mind or temper which were formerly enumerated under simple intermittent fever." In the enumeration to which he refers he had described the intellectual derangement as occurring under two forms, "the first consisting in an inability to think, sometimes attended by confusion of thought, and the other in an excessive flow or crowding of ideas, necessarily in many cases attended also by a similar confusion, but from a reverse cause. I am much mistaken if both these states are not well known to many studious persons, and most of all to authors. . . . . It is for authors and studious men themselves to investigate from how many causes they are subject to these two states of mind; my business here is merely to show how they are associated with a masked fever."† The emotional disorder of a masked intermittent he has described as follows: "It thus happens that almost in a second of time, and even in the midst of active good humour, or passive feelings of comfort or happiness, the fit of ill-temper, or irritability, or despair, of a moral change under modes too various to detail, will occur, to last as long as the cold fit would have lasted had it been present, or lasting when that is visible, just as long as the duration of the peculiar physiognomy which I

* Op. cit., Pt. I. p. 338. † Op. cit., Pt. 1. p. 70.

have described."* A causeless sense of fear or dread is described as another phase of the same disorder. "The ordinary complaint of patients in this case is an unaccountable sense of fear, rather than of anxiety, but sometimes of both united, coming on at the same period of the day, but very generally at night, and above all, upon the first attempt to sleep. And this sense of fear is described as being sometimes so violent or perfect, as to produce that trembling in the hams which notoriously attends this passion, although the patient is in his bed, and can assign or discover no cause for fear."†

But just as we have seen in the case of idiopathic megrim, so in the malarial variety, the intellectual functions appear to be sometimes more persistently impaired. "If I have formerly pointed out," continues our author, "the occasional effect of Intermittent on the intellectual faculties, I must also notice the parallel consequences which occur in periodical headache." This "hebetude or tendency to fatuity," appears at first only on the days of the paroxysm, but it is liable to become confirmed by depleting or debilitating treatment.

Of giddiness or vertigo as an attendant on this form of headache, Dr. Macculloch observes that it is not necessarily connected with the headache, though it often occurs with it; he has occasionally seen it occur "quite independently as a mere variation of chronic intermittent, a substitute for the ordinary paroxysms or for other anomalous ones, and without pain." The mind he adds is quite clear "but in everything but this it resembles the giddiness of intoxication, so that the patient with all his efforts cannot walk straight; or when it is excessive fancies the neighbouring objects are in motion." "When it attends the intermittent headache, it either actually accompanies the pain, which is occasionally a mere neuralgic point, or it comes alone alternating with that, or else it will return periodically even for weeks by itself; and in the last mode also I have known it replace an ordinary chronic intermittent."‡

* Op. cit., Pt. I. p. 246. † Op. cit., Pt. I. p. 365.
‡ Op. cit., Pt. II. pp. 65-67.

We thus see how very closely not only the hemicranial pain, but many of the less regular phenomena of Idiopathic megrim—the nausea and vomiting, the drowsiness, the intellectual and emotional disturbance, and the giddiness—are reproduced under the influence of the malarial diathesis. It would be easy to pursue the comparison between the Idiopathic and Malarial forms still further, and even to extend it to those common characters which megrim shares with the whole family of neurosal disorders. Whatever be the nature of the malarial agency, it is certainly not of a zymotic character—there is nothing of the nature of incubation, elimination, and subsequent immunity, but rather of a new and morbid type of action impressed upon the Nervous system. A "proegumenal" condition (p. 346) is in fact acquired; this may be latent for an indefinite period, but when once a person has had an attack of ague in any of its forms he remains liable to a recurrence for the rest of his life under the influence of certain accessory causes; among these we may reckon locality and season, bodily exhaustion or mental depression, as the most influential, malarial disorders exhibiting in this respect a remarkable parallel with idiopathic neuroses, epilepsy, asthma, and the like. "Further it may happen," observes Dr. Macculloch, "that the possessors of a chronic ague have arrived at such a state that no traces of the disease remain but a susceptibility of recurrence on slight causes, while the paroxysms thus produced almost terminate in the exciting circumstances. And here also we see distinctly the necessity of avoiding them; above all the caution required respecting malaria."* And again,—"It is in the philosophy of Physic an interesting fact to observe how instantly sudden grief, fear, disappointment, or other strongly depressing passions, will bring on that relapse which generally runs the same course as all the preceding." . . . . "And reversely, while courage, exertion, or resolution not to submit to aught but absolute necessity, diminish the effects

* Op. cit., Pt. I. p. 273.

of all such diseases on patients, it is further true that a powerful exertion will often terminate the accession altogether; just as similar efforts of mind often cure intermittents and have removed even gout."*

Again, the characters of periodicity and intermission which are seen in their highest development in regular ague, we have already shown to belong in an especial manner to the functions of the nervous system, and in a greater or less degree to all neuroses. We might further point to the same capriciousness and occasional interruption of the paroxysms by change of circumstances, the same tendency to perpetuation by force of "habit" in malarial disorders which we have already observed in Asthma, Epilepsy, and Megrim.† We may even trace in them indications of a limitation to certain periods of life so characteristic of many nervous affections. It is a fact, says Dr. Macculloch, observed in all countries and places where malarial fever becomes chronic, that the malady "disappears at a certain age whether merely chronic or intermixed with acute attacks." In the aguish districts of France and Italy "the period from 35 to 50 is the period of trial, and where, if this is once passed, the individual often attains an old age. And for the sake of those who prefer facts from our own country, it will be found that the same rule holds in Hampshire, and in other districts subject to the fevers of malaria wherever these become chronic, or attend the whole of life."‡

If anything further were wanting to confirm the parallel between malarial disorders and idiopathic neuroses, it might be found in the fact that no other class of maladies exhibit such remarkable metamorphoses: if hysteria is Protean, ague in its larvaceous forms is scarcely less so, and almost every known form of paroxysmal disorder has its malarial counterpart. It would be easy to give instances of tic douloureux, of asthma, of angina pectoris, of gastralgia, of

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* Op. cit., Pt. II. pp. 111, 115.

† For observations on "the incurable habit of malarial disorders" see Macculloch, op. cit., pp. 5–6, 80–81. ‡ Op. cit., Pt. I. pp. 103–4.

pseudo-apoplexy and paralysis, and of transient mania occurring on a malarial basis, but this would occupy too much space.

Thus then we see that megrim is but one expression of that neurosal habit or disposition which is impressed on the nervous system by malarial influences.

There is one other point in connexion with this kind of megrim on which I would make a few concluding remarks. When reviewing the Vascular Theories of the Idiopathic disorder, I quoted M. Calmeil to the effect that when megrim occurs as a masked intermittent it corresponds with the *cold stage.* This I believe to be generally true, as far as can be ascertained, of the majority of neuralgic affections having this origin; but it is right to add that Dr. Macculloch has expressed a different opinion. In all painful or neuralgic forms of intermittent he believes the pain to belong to the period corresponding with the *hot stage* of Ague. He thinks in well-marked cases the previous cold stage may be traced by certain signs which he points out, while the pain is accompanied by a local heat and vascular excitement; the increased pulsation, for example, which is observed in the carotids he regards as belonging to the same order of phenomena as the fulness and rapidity of the pulse which mark the pyrexial stage of ordinary intermittent.—"Immediately before the attack, if the pulse is examined, it will be found to put on that character which it possesses in the cold stage of an intermittent; while, during the progress of the paroxysm, it passes through the other analogous changes." He also believes that if the patient is attentive to his own feelings he will generally be conscious of something like a cold stage preceding the pain. "The skin, at least of the face, also becomes pale and shrunk, with that peculiar physiognomy attending ague, so indicative of all these disorders, if so perpetually overlooked." "Occasionally this paleness is local instead of general; and I have seen cases where I could pronounce that the paroxysm was threatening, from one side of the face turning suddenly white while the other retained its natural aspect and colour. If this is the cold stage of this

particular intermittent disease, the fit of pain appears to belong to the hot one."* This is a description of facial neuralgia, but he afterwards observes that it is equally applicable to Hemicrania.†

Dr. Macculloch therefore indicates two successive stages in a paroxysm of malarial megrim—one of chill, anæmia, and depression, the other of heat, throbbing, and pain—analogous to those Dr. Latham has described in the idiopathic affection; and the headache he attributes, as Dr. Latham does, to the second, or hyperæmic. How are we to reconcile this with the observation of M. Calmeil, and with the general opinion, which does not connect the pains of malarial neuralgia with a condition of vascular excitement? The answer, I believe, is that which we have already given, namely, that pain may be the associate of either condition, but is not dependent on the one or the other; and this is confirmed by the observations of Cullen on malarial headache: "Intermittent fevers," he says, "during an epidemic period, often operate solely in producing Headache. Perhaps, then, we have headaches precisely in the situation of intermittents, with this difference only, that they are topical instead of general." He proceeds to distinguish two varieties of such headache —one analogous to "plethoric headache," and proceeding from distension, the other arising from spasm and constriction: "In the febrile headache itself, the pain, commencing before the cold fit, or accompanying it, cannot be of the distending kind, but must certainly be of the constricting, as there is then every proof that the blood is not impelled into the head with the same impetus as usual." ‡ And before, when describing the signs of determination of blood to the head, he had said: "To these symptoms I would next join Headache. This is commonly considered as the first of the marks of increased impetus; but no morbid symptom is of more difficult theory than

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* Op. cit., Pt. II. pp. 19, 20. † Idem, p. 37.
‡ "Works of W. Cullen, M.D.," vol. ii. p. 549.

Headache. Thus I find that it sometimes appears with a slow pulse and pallid countenance, and then certainly it cannot depend upon an increased impetus."* Again, after describing those singular cases where ague has been localized in a particular limb or other part, he says: "The other cases are different from these. They are merely pain attacking one particular part, and that pain occurring with the circumstance of a *cold or hot* fit. But it returns regularly at a certain hour, subsists for a certain number of hours, and is cured, like the general Intermittents, by the use of bark. The most noted is the *Quotidiana Cephalalgica,* or the *Hemicrania* which is so frequently quotidian."†

III. *Megrim associated with Organic Disease of the Brain.*—Andral relates at length some fatal cases of hypertrophy and induration of the cerebral hemispheres where the textural changes were the most striking feature, and where the early symptoms had been those of Megrim.‡ In the first case, the patient was a man twenty-nine years of age. "At the age of seventeen he began to suffer from violent headaches, accompanied with vomitings. The attacks lasted twenty-four hours. From seventeen to twenty-eight he was rarely two months without having one; and they were regarded by himself and those who saw him as due to Migraine. When not suffering from an attack, he enjoyed excellent health." A year before the fatal termination, the malady changed its character. The pain became continuous, never completely leaving him in the intervals, though subject to exacerbations from time to time of the greatest severity. Six months later, painful convulsive paroxysms commenced in the arms, recurring five or six times in the course of six months. These gradually became more frequent, general, and severe. The paroxysms of headache continued; but there was no impairment of intelligence

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* "Works of W. Cullen, M.D.," vol. i. p. 565. † Idem, vol. i. p. 540.
‡ "Clin. Médicale," vol. v. p. 600.

throughout. The patient ultimately died of the malady, which proved to be of the nature I have stated above.

The same distinguished author, when describing the early symptoms of meningitis, observes: "Some individuals have appeared for a time to be suffering only from a more or less severe form of Migraine. This mistake is the more readily made in cases where, shortly after the accession of headache, vomiting has taken place more or less freely."*

Professor Lallemand cites the cases of several patients who suffered from obstinate headaches, which, during their lives, had always been regarded as Migraines, but which were found, after death, to be due to "saillies épineuses à l'intérieur du crâne."†

Abercrombie, again, has recorded some striking cases of Tumours of the Brain, with some attendant softening or suppuration, where the patients were affected with severe intermittent headaches, with giddiness, sickness, and transient disorders of vision and speech, very much as in the severer forms of megrim. "Many other cases," he adds, "are on record in which the only morbid appearances were in the head, though some of the most prominent symptoms had been in the stomach. Some of these resemble what has been called 'Sick-Headache;' while others are chiefly distinguished by a remarkable disturbance of the digestive organs."‡ In another part of the same work, he observes of Tubercular Tumours of the Brain: "The symptoms are often exceedingly obscure and variable—perhaps little more than a tendency to headache, which assumes no formidable character, or sometimes assumes the appearance of what has been called Periodical Headache, or the Sick-Headache. The symptoms may go on for a long time in this manner without exciting any alarm, until the disease suddenly assumes a more active character,

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* "Clin. Médicale." vol. v. p. 170.

† "Lettres sur l'encéphale." Lettre V., No. 12.

‡ "Diseases of the Brain." Pt. III. supplt. p. 440. See also case lxxxiii. p. 248 (French edit.).

and is speedily fatal."* Such a case we find communicated by him to the Ed. Medico-Chirurg. Society:—

"J. Scott, aged six, began to suffer in September, 1829, from fits of severe *Sick-headache*, recurring at first about once a fortnight, then increasing in frequency to one or two a week. For four months he continued to enjoy good health in the intervals. . . . The attacks usually came on early in the morning, awaking him with severe headache and nausea, increasing for some minutes to excruciating agony, when he called out for his head to be compressed, and vomited. . . . The pain commenced in the forehead, over the left eye, extending from thence to the occiput. The duration of the paroxysm, consisting of these aggravations of pain and sickness, with remissions of varying duration, was from five to twelve hours, terminating in long and calm sleep, from which he awoke lively and free from complaint. The next day he appeared in full health and spirits."

Five or six months later the cerebral symptoms assumed a different and more persistent character; and the disease terminated fatally in two months from that time. The principal morbid appearances were softening of both cerebellar lobes, with a tumour the size of a walnut in the left, effusion into the lateral ventricles, and inflammatory products along the vessels at the base of the brain.†

Professor Lebert, in his magnificent work on Cancer, describing the symptoms which mark the progress of malignant tumours of the Encephalon, and more particularly the headache, says: "The pain is only occasional and transient in the early stages, but gradually becomes more and more continuous. In two cases it retained its periodical character during the whole duration of the malady. . . . In five other individuals, the paroxysms of increased intensity which supervened in the course of an habitual headache were attended by vertigo, by nausea,

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* "Diseases of the Brain." Append. to Pt. I. p. 167.
† *Edinb. Med. and Surg. Journ.*, vol. xlii. p. 260. 1824.

and more or less copious vomiting, which, in the absence of other symptoms, might have led to these attacks being confounded with those of *Migraine*. This latter form occurred in one of our patients, with whom these Pseudo-migraines were accompanied by numbness and transient tinglings of the right side."* The Professor then proceeds to caution his readers against the opposite error, namely, of mistaking a true migraine of the severer and more cerebral type for an indication of organic disease; and, in support of this, he relates his own case, already recorded (see page 15).

There is, however, another way in which megrim may be connected with structural lesions of the brain besides that of being purely symptomatic of already existing disease. It must, I think, be admitted that, in a certain proportion of cases where the malady is strictly functional and idiopathic, it is, nevertheless, associated with some innate weakness or defect of cerebral organization, which may make itself apparent in a premature degeneration of structure and function in later life; or else, that the repeated seizures, by impairing the nutrition of the brain, predispose to a similar result. I do not see otherwise how to account for the number of instances which have come to my knowledge where habitual megrim has terminated in some singular or fatal form of cerebral disease. I do not mean that this is at all a common event; but the occurrence is too frequent and striking to be regarded as a mere coincidence. It is not a little remarkable that two of the distinguished men of science, who were among the first to record their own experiences of this singular disorder, both ultimately became the victims of cerebral disease of a remarkable kind. I refer to Drs. Parry and Wollaston.

In the introduction (p. ii.) to his posthumous works, I find the following notice of Dr. Parry's fatal illness by his son: "He was proceeding to a second volume of his Pathology, which was to contain his therapeutical views,

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* "Maladies Cancéreuses," p. 778. Paris, 1851.

when visited by that malady which for a long time impaired his mental faculties, and for a series of melancholy years deprived him not only of the means of communicating his ideas by writing, but also interrupted his power of speech."

Dr. Bright thus introduces the subject of Wollaston's death. After describing the case of a young woman under his care which was marked by a succession of symptoms not unlike those of the severer forms of megrim, he continues :—"From the experience I have had in these symptoms which are generally spoken of as nervous, and are too often referred solely to the effects of the stomach, I should be inclined to say that an approach to the condition of this patient is by no means uncommon; for as I have just now said, the temporary or the partial loss of sight followed by or accompanied with acute pain in the temples, is amongst the most frequent complaints of such patients (nervous); . . . and looking to the comparative frequency of such occurrences in persons possessing tolerable health, and to the slightness of the discoverable morbid appearances, I think it probable that some cause of simple vascular turgescence and overdistension, or some very small effusion or organic change may be quite sufficient to produce all the symptoms of the present case. At the same time I am well aware that these slight derangements are often the consequences of disease in the structure of the vessels, or may be the forerunners of very extensive mischief in the substance of the brain: these partial defects of vision were among the symptoms spoken of by the late Dr. Wollaston, many years before his death from disorganization of the brain."*

Sir Henry Holland thus refers to the same event—"The case of Dr. Wollaston is known from his own description, and was too well explained by the circumstances of cerebral disease which closed the days of this extraordinary and excellent man. During the latter period of his life, when the existence of such disease, and the certainty of its event, were alike known to him, he was accustomed to take exact

* "Reports of Cases," p. 533.

note of the changes progressively occurring in his sensations, memory, and voluntary power. He made daily experiments to ascertain their amount, and described the results in a manner which can never be forgotten by those who heard him. It was a mind unimpaired in its higher parts, watching over the physical phenomena of approaching death; and, what well deserves note, watching over the progressive change in those functions which seem nearest to the line separating material from intellectual existence."*

We have already recorded (p. 221) a termination very like that of Dr. Parry's malady in the case of the father of my patient Mr. S., who, like his sons, had been a sufferer from typical megrim. This gentleman had a seizure supposed to be of an apoplectic kind. From this he recovered so far that "his spirits were excellent, and he had good health and strength, and a good appetite;" but from that time until his death, a year and a half later from a bronchial attack, he never regained the use of his speech.

Nor are gouty cases exempt from a like unfavourable termination. Prof. Trousseau records the history of a gentleman, M. X., who had been subject from puberty to paroxysms of migraine, very violent and very long, recurring two or three times a month. These continued until the age of forty-five, when the migraine was replaced by attacks of ordinary gout. Some time after the cessation of the periodical migraine and the appearance of gout (for which he was largely treated with Vichy water), he had a singular nervous attack which presented many of the features of migraine. He was standing up when a sudden sense of dazzling obscured his sight and senses; this soon passed off, but left a slight uncomfortable feeling in the right hand, and difficulty in writing. The gout afterwards returned. Some two or three years later a second similar attack occurred of rather longer duration, leaving the right arm weaker than before, and his speech slightly embarrassed. This was followed up by a worse fit and an apoplectic stupor of ten hours' duration, leaving

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* "Med. Notes and Reflections," p. 156. Note. Edit. 1839.

hemiplegia of the right side and loss of speech. From this he also recovered in great measure, excepting the faculty of speech; this was still defective some two or three years later when M. Trousseau last saw him.*

In cases like these we can scarcely doubt that the brain has sustained some serious and permanent injury.

To take another instance. The medical man to whose case I have referred at page 45, and who for thirty years of an active professional life had been the victim of well-marked megrim, which prevented him from taking even the smallest quantity of wine without the certainty of suffering; this gentleman, a year or two before his death at about the age of fifty, became very much relieved of his former head-aches, and to his great surprise was able to take as much wine as other people and with benefit. It soon became evident, however, that some serious change was going on in his nervous system; he began to suffer from occasional paroxysms of Tic-douloureux; these gradually increased in frequency and severity, and at length assumed the true epileptiform type. He now tried change of air and relaxation from business, and on two occasions while travelling far from home in search of health he was attacked in a way which was new to him. On the first occasion, during a somewhat fatiguing walk in the early morning, he felt a sudden prostration of strength which almost deprived him of the use of his limbs, and when he had succeeded in dragging himself to the nearest house, was followed by a heavy sleep of some hours, from which he awoke perfectly recovered. On the second occasion he experienced a sudden impairment of speech and loss of power in one side, but of so transient a character as not to prevent the prosecution of his journey. A third attack was of a much more serious kind. He fell in the street, but recovered himself sufficiently to stagger home, and then became hemiplegic. He never entirely regained the use of his limbs. The next seizure terminated quickly in fatal coma.

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* "Clinique Médicale," vol. ii. p. 583.

It is impossible to review these and many similar cases to which I could refer, without concluding that there is some connexion between the megrim and the final issue in organic disease of the brain; but what is the nature of this connexion? We cannot accept the suggestion made in Wollaston's case—namely, that the symptoms have been from the first indicative of structural changes already going on in the brain, inasmuch as in most of these cases the malady commenced in childhood or youth, and continued through life, presenting all the features of the ordinary functional disorder. We must rather conclude, as I said above, that an hereditary tendency to megrim indicates also a tendency to premature cerebral disorganization at a later period of life, or that the constant return of the seizures impairs the nutrition of the brain and predisposes to hæmorrhage or softening.

That an impairment of cerebral nutrition may follow repeated attacks is shown I think by the blunting of the intellect which sometimes persists during the intervals of the seizures. This was very well seen in the case of my patient, W. R. (p. 108), and has been noticed by most of the writers on megrim. M. Calmeil observes that—"Migraine is a malady which is ordinarily free from all dangerous consequences: and when once the attack has passed, the majority of patients never dream of taking any measures to prevent its recurrence. But experience teaches us that the length, the frequency, and the violence of the seizures may give rise to impairment of the intellectual faculties, influencing also most unfavourably the character and moral disposition of the patient."* This is clearly analogous to what we sometimes see in epilepsy and chorea, and has been similarly explained. "The distress and the mischief," writes Dr. Beddoes, "arising from epilepsy, nervous headache, and all kindred ailments, from the violent excitement of the blood-vessels which produces the flushed face, throbbings in the neck or temples and ringing at the ears, is such as to justify all the care that can be

* "Dict. de Méd." en 30 Tomes. Tom. xx. p. 6.

bestowed on their prevention."* This explanation is open to the objection that the resulting mischief in the case of epilepsy is often greater in the 'minor' than in the 'major' forms of the disease, though the vascular disturbance is so much less; but however explained the facts remain.

There is still another way in which megrim may be connected with the fatal result in some of the cases referred to. We may readily admit that when from declining life, a gouty constitution, or other cause, textural changes have already commenced in the vascular or nervous elements of the brain, then the disturbance occasioned by the return of the seizures, which was formerly harmless, may now be sufficient to determine the occurrence of hæmorrhage or the disintegration of tissue. I have never denied that the paroxysms of megrim are attended or followed in some individuals by considerable derangement of the local circulation; I have only maintained that this is by no means a constant occurrence and cannot be regarded as the cause of the fit. I can readily believe that just as we have met with hæmorrhages in the choroid, apparently the result of repeated megrim paroxysms, so we may meet with hæmorrhages in the brain, more particularly under the circumstances I have mentioned above. Hence, too, I think Dr. Bright's suggestion of small recurring extravasations, the best explanation that can be given of some of the cases to which we refer.

In conclusion, I would repeat Prof. Lebert's caution against hastily mistaking such occasional incidents in the history of megrim as transient losses of speech or memory, hemiplegic numbness or inhibitory palsy, for indications of cerebral disorganization. Our diagnosis must rest on the age of the patient, the previous history and attendant circumstances; if these are such as to exclude the idea of degenerative changes in the nervous and vascular structures, while they supply a history of previous megrim and of conditions of life which tend to its aggrava-

* "Essay," &c., p. 116.

tion, we may be able to dispel much needless alarm. Take for instance the following cases :—

A gentleman engaged in somewhat arduous and anxious professional duties complained to me on one or two occasions of a numbness in the hand and arm of one side. The least pressure increased it, as by falling asleep on that side, but it could not be referred to any local cause. He was not forty years of age; there were some arthritic tendencies, and he was overworked, dyspeptic, and sleeping badly at night; kidneys healthy. I assured him that in my opinion the disorder was purely functional, and greatly dependent on the state of his general health. A few days afterwards I saw him again, and he then told me that he had been attacked while delivering an address with numbness in the same side of his mouth, so that he had great difficulty in articulating clearly and completing what he had to say, and that his arm was also more affected than before. He was already better when I saw him, but somewhat alarmed as to his state; there was no drawing of the mouth or other evident sign of palsy. Then came out a family history of megrim, and of frequent previous attacks of transient half-vision and headache. I urged his getting rest, with change of air and exercise, and the result was all that could be desired.

In the autumn of 1871, I saw among the patients at the Middlesex Hospital, under the care of my brother Dr. Robert Liveing, a man whose chief complaint was double vision and facial neuralgia. He was a gardener, about forty years of age; on a hot day in August, while working as usual at the borders, he experienced a sudden glimmering before his sight, with clouds and other appearances which he could not describe, and a sense of confusion in his head; after which he fell unconscious, and must (he says) have remained so some time. When he recovered his consciousness it was on waking from a sound sleep and feeling as well as usual. This was on Monday; on the Thursday week following he awoke with a glimmering before his eyes, and throughout the day objects appeared confused and ran together.

On Friday he discovered that he was suffering from double vision, but could see clearly on shutting either eye. For this condition he was admitted under the care of the ophthalmic surgeon, but afterwards transferred to the medical wards, the eyes themselves appearing healthy. When I saw him there was a considerable paralysis of the internal rectus of the right eye, and to some extent of the superior oblique. Closing either eye he could see well. At first, objects had appeared much brighter to the right eye, and white ones presented prismatic fringes, but this had disappeared.

Here, then, was a case suggestive of some serious mischief in the brain, which had given rise to the fit, and impaired the functions of the third nerve. On inquiring into his previous health, and whether there were any nervous complaints in his family, he told me that from his childhood he had suffered from "Sick-headaches." Up to about the age of twenty these had occurred periodically once a month. They came on with nausea, and commonly lasted the whole day. But if he could be actually sick, he obtained instant relief; also, if he could leave his work, and get even half an hour's quiet sleep, he would awake quite well. One of his children, a little girl of the age of seven, was a sufferer like himself. For the last eight or nine years his headaches had ceased, or been much less frequent, but he had been greatly troubled instead with facial neuralgia. Bearing this history in mind, it seemed to me that the supposed "fit," or "sunstroke," might have been only an irregular form of his previous megrim, and the paralysis the result of inhibition.

The termination is especially interesting. His condition remained the same until the 15th of September, when a violent sneezing fit occurred, during which he sneezed ten or a dozen times. This was followed by a great and instantaneous improvement in his sight; and the following day he was no longer conscious of any double vision, although the right internal rectus still responded a little sluggishly to the movements of the other eye.

Dr. Bright, in his "Reports of Medical Cases," relates a somewhat similar instance of the relief of inhibitory Ptosis by a fit of sneezing which followed a pinch of snuff.* In all such cases, we must suppose an inhibition of function to be occasioned by a particular 'nerve-storm' which a volitional impulse is unable to overcome, but which may nevertheless be effected by another form of explosive action.

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* "Case of Amaurosis and loss of power over the eyelid with seizures of a mingled epileptic and paralytic character." Case cclxii. Vol. ii. Pt. II. p. 533.

CHAPTER VII.

Treatment of Megrim. Reputed Incurability, how far real. Treatment of the General Malady: Hygienic Measures; Correction of Faulty Habits of Life, and Sources of Nervous Exhaustion; Pharmaceutical Remedies—Sedatives, Tonics, Specifics. To Prevent or Remedy the Exciting Causes of the Seizures. Treatment of the Paroxysms.

MEGRIM, and especially the form known as "sick-headache," is almost universally regarded by the patients themselves, as well as by medical practitioners, as an incurable malady. I am constantly told by those who consult me for other complaints that they have suffered all their lives from these headaches, adding, "But it is not for that I want your advice," or "I know that you cannot do anything for that." Mr. B. said that he had "never derived any good from medicine;" W. R., "no permanent benefit;" S. A., "no relief from medicine," and so on. It was the same in the time of Drs. Fothergill and Heberden; the former observes of the sufferers from sick-headache that, "wearied perhaps with ineffectual endeavours they at length give up all hopes of getting rid of their malady, and think patience must be their only cure." Of that form which consists in transient half-blindness followed by headache, Dr. Heberden says, "I have never been able to discover any remedies either for their cure or relief;" and he afterwards observes of such headaches in general, "I have noticed in numberless instances that they almost always become milder, and generally vanish towards the decline of life. This consideration must supply the place of a remedy where every other fails; for it is some consolation for a man to know, that if he cannot

cure his distemper, he will nevertheless have a good chance to outlive it. This is likewise true of that headache mentioned among the diseases of the eyes, which begins with a mist before the sight." Similar views prevail on the Continent. "L'art est impuissant à guérir la Migraine"—such, says Labarraque, is the objection commonly urged against all attempts to remedy this malady.

It cannot be denied that there is a large amount of truth in all this, and yet it is not the whole truth. Where a person, otherwise in the enjoyment of excellent health, suffers from well-marked hereditary megrim, which has commenced in early life, and recurred with great regularity for a number of years, I know of nothing which will certainly free him from this constitutional infirmity; it will often spontaneously decline, but it cannot, I think, be said to be curable.* Tissot, who shared the popular fear of deranging a megrim of this sort, suggests "that in such cases it may be safer not to interfere by direct remedies of any kind." On the other hand, it is no less certain that a tendency to megrim may often be greatly aggravated by general mismanagement and faulty habits of life, and thus a previously latent or trifling disorder may become a source of the greatest suffering, and perhaps give rise to serious alarm. Under these circumstances, a skilful and judicious method of treatment becomes a matter of the utmost moment to the patient, and will frequently succeed in relieving and sometimes in ridding him of his malady.

The principles on which this treatment must be conducted follow immediately from the considerations adduced in the previous chapters on the pathology of the disease; and as we have shown that this affection maintains the closest pathological relations with epilepsy, asthma, the various forms of neuralgia, and other maladies of the same class, so must the treatment be similar. We may con-

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* So Willis: "Sin vero dispositio *νοσερὰ* inveterata fuerit, ita ut à multis annis, paroxysmi sæpe sponte sua, ac insuper à levi quavis occasione repetant, morbosum etsi non periculose admodum ægrotare, attamen non facile curatum iri prædicimus."—*Cephalalgiæ Curatio*, cap. II.

veniently consider the subject under two heads—A. The treatment of the general malady, or neurosal disposition, during the intervals of the seizures; and B. The treatment of the paroxysms.

A. *Treatment of the General Malady.*

Here our aim must be twofold—First, to lessen the tendency to explosive action in the nervous centres by measures directed to the improvement of the general health, the removal of accessory causes, and the diversion of nervous energy into natural channels, as well as by pharmaceutical remedies; and, Secondly, to avoid or remove the exciting causes of the seizures, and so to reduce as far as possible the number of attacks. The same principles are observed in the treatment of other neuroses. "In the treatment of epilepsy," remarks Dr. Bright, "two great objects present themselves; to correct as far as possible the condition of the brain, which favours the disease, and to remove, when we can, the exciting cause." Dr. Salter makes a similar observation in the case of asthma. In neuralgic affections again Mr. Abernethy used to say that there were always two functions wrong, those of the nervous system on the one hand, those of the digestive system on the other. "The two," he thought, "were the common parents of a numerous progeny of very dissimilar local diseases. In tic-douloureux you must seek to put the digestive organs right, or to soothe the nervous system, according as the one or the other may seem to be the principal or primary cause of the disease. Take away one of the parents, and there will be no more propagation." We must proceed to consider the various means at our disposal for accomplishing this twofold intention in the case of megrim.

I. To reduce the tendency to explosive action in the nervous centres.

1. *Hygienic Measures.*—The treatment of megrim by measures directed to the improvement of the general health,

or the correction of faulty hygienic conditions, is by no means the least important aspect of the subject. As we have already said, it is not that all or perhaps a majority of cases can be successfully treated in this way, for many habitual sufferers from megrim enjoy in other respects, and during the intervals of their attacks, very good health; and others suffer all the same, though leading the most regular, tranquil, abstemious, and otherwise healthy lives; but, according to my experience, the greater number of patients who seek medical advice for their complaint are those with whom it has been first awakened, or greatly aggravated, by failing health from other causes, or some injurious habits of life. The principal circumstances which are thus *accessory* to the constitutional tendency or neurosal diathesis have been already pointed out in an earlier chapter (p. 57), and in avoiding or correcting these we may often alleviate and sometimes cure the malady itself.

The first of these is a condition of general debility and want of nutritive vigour. We have before referred to the "great physiological law" enunciated by Trousseau, namely, that the weaker the nervous system the readier the response to disturbing agencies of all kinds; in other words, "in proportion as the nutritive and vegetative functions are feeble and languishing, nervous phenomena are mobile, exalted, irregular;" and hence it is that various forms of anæmia and cachexia, the exhaustion which is produced by a poor and insufficient diet, by chronic losses of blood or other discharges, and in women by too frequent child-bearing or prolonged suckling; that also which arises from excessive hours of labour, or occupations which entail a close confinement in the unwholesome and ill-ventilated workshops and dwellings of our crowded towns, with insufficient change and rest; these conditions often render attacks of megrim, which before may have been of a simple and trifling character, so frequent and severe that the patient is completely disabled by constant suffering, or the malady assumes an alarming cerebral type.

The treatment in such cases is obvious, however difficult

to fulfil. If we can succeed in placing the patient in better hygienic conditions; if we can supply him with a sufficient and nutritious diet, and check any sources of exhaustion, while prescribing tonic and restorative remedies suitable to the particular circumstances of the case, we may hope, in course of time, at least to reduce the malady within its former limits. The details of such treatment belong to the rudiments of medicine and need not detain us here. I will only add that it is in some of these cases that iron has proved of the greatest service. (See p. 59.)

Another class of cases for which we are often consulted, and which are met with for the most part in a somewhat higher social grade than the last, are those where a similar development or aggravation of the malady has been brought about by excessive brain-work, with a deficiency of bodily exercise, short restless nights, and insufficient sleep. By excessive brain-work I do not mean exclusively work of an intellectual kind, as in the close application of the mind to study or literary composition, to the business of chambers or counting-house, but also that strain of the affective or emotional part of our nature, which is the result of prolonged mental anxiety, vexation, and disappointment, whether associated with the former or occurring independently, and which is far more rapidly exhaustive of nervous power than any intellectual efforts which are free from such emotional complications.

The influence of these conditions in developing or heightening a tendency to megrim, may be often seen among ambitious students, the candidates for university distinction or professional qualifications; and later in life as an effect of the struggle for competence or professional position, and when these are attained, by the pressure and responsibilities of business, the competition and excitement of commercial speculations, reverses of fortune, and the like. But similar influences and similar effects may often be traced in the narrower sphere of domestic life, in the anxious forecasting and much serving, which slowly undermine the nervous energies of many wives and mothers. Under all these

circumstances we may see a neurosal disposition, which has hitherto been latent or only manifested in megrim of a comparatively simple type, assume a much more formidable development, becoming the source of severe and almost unintermittent suffering, or being replaced by some other type of seizure, the true nature of which may be readily overlooked or mistaken. Here again, any more specific treatment of the malady must be quite subordinate to the correction of those radical errors in the moral and material conditions of life, which by their direct operation on the nervous system favour the development of its specific morbid tendencies.

Take for example the case of an overworked and over-anxious student. Here the task will be comparatively easy. Insist on complete rest for a time, and as this is never to be had under such circumstances by mere vacancy, inasmuch as the brain will continue to work automatically in the old grooves, insure it by such change of scene and occupation as shall engage the mind in spite of itself in some new trains of thought and feeling. As want of sleep and restlessness at night are common incidents of such a state of 'brain-fag,' sedatives may be useful, especially henbane and bromide of potassium. But the most important remedial agency is undoubtedly out-door life and exercise, which may be taken in the form most congenial with the tastes and habits of the individual—riding, walking, or any form of field sports which inclination or opportunities may suggest, taking care to stop short of any considerable bodily fatigue. This is at once the most natural, and often the most effectual promoter of sleep we can employ, and by the diversion of activity from the hemispheric ganglia which it occasions, they are more effectually rested, and the balance of nervous functions restored, than by any drugs. Active bodily exertion is well known to be incompatible with a maximum of intellectual work, and in this case the principle may be turned to good therapeutical account.

But exercise serves another useful purpose in such cases,

and must be continued in a methodical way when work is resumed. An intellectual life is very apt to become too sedentary a one, unless a systematic effort be made to correct it, and in a sedentary life the organic functions are very liable to suffer; respiration is shallow, and in profound thought is slow and sometimes interrupted, the circulation is slow, the intestinal movements sluggish, appetite small, digestion feeble, and the secretions and excretions scanty; the nervous system not only shares in the general feebleness of nutrition, but is moreover exposed to irritation from the products of imperfect metamorphosis and retained excreta, to which the neurosal constitution is peculiarly responsive.

It is remarkable how many distinguished literary and scientific men have suffered severely from megrim, and it would seem that some of them have succeeded in ridding themselves of the malady by the adoption of some simple hygienic measures. Such cases more particularly exhibit the benefit of bodily exercise and abstemious habits of life. "Marmontel," says Labarraque, "who was for seven years tormented by paroxysms of migraine of a very painful character, and who had consulted the Queen's physician to no purpose, cured himself by following the prescription of a farrier who advised him to drink water, to eat little, and to take exercise. Haller, too, was very subject to megrim, and he cured himself by drinking every day a large quantity of fresh water, and exchanging a highly nutritious regimen for a much lighter dietary, which had the effect of not taxing the nervous susceptibility of his stomach so much. Linnæus again cured himself by the same means, and by taking exercise every day before dinner."*

Returning now to the results of intellectual and moral strain in middle life, the task of prescribing with any success is often a much more difficult one: the indications, indeed, are precisely the same as in the case we have just considered, but the conditions of their fulfilment are less

* "Essai sur la Cephalalgie et la Migraine," p. 66.

easily satisfied. The complex engagements and responsibilities of an active professional life, the insuperable difficulty of finding a substitute in cases where individual character and qualifications are everything, the necessity of providing for a family, and the ambition of wealth, these and many similar considerations often induce men to put off from day to day, under what appears necessity, and the delusive expectation of a leisure which never comes, the most imperative calls of an exhausted and irritable brain to rest; and it is not until completely disabled, or after the alarm of some less familiar seizure—a severe vertigo, a transient attack of aphasia or hemiplegia—that the patient consults his medical adviser, or thinks of complying with the all-important item of his advice, if he has previously consented to ask it. "How often," exclaims Dr. Marshall Hall, "would due attention to 'sick-headache,' and similar warning affections ward off the more formidable attacks of apoplexy, or of epilepsy—yes, and of mania!"*

We meet with similar difficulties again in the case of heads of households—wives and mothers—where the nervous system is in danger of breaking down under the accumulating weight of family cares. The very circumstances which have occasioned the necessity for repose, render it all the more difficult to obtain. People so situated, and accustomed to rely on their own resources and experience, have rarely any one about them competent to divide the duties or share the responsibilities with them even where that is possible, or if they have, can be induced to make the trial. Under such circumstances an illness of another kind has sometimes proved of signal good by forcibly interrupting the tyranny of routine, and developing the latent capabilities of others. It will be the duty of the medical man to anticipate such an event, and by strongly insisting on a temporary absence

* "Essays on the Theory of Paroxysmal Diseases," § 6; 1849. It should be observed that Dr. Hall is here treating, to use his own words, of *Paroxysmal Apoplexy*, "or that form of apoplexy, with its too usual sequel paralysis, which arising from causes distinct in the first instance from disease within the head, appears in the form of threatenings—the *minæ apoplexiæ* of the classic Heberden."

from home, to bring about a similar result. This will be far, indeed, from accomplishing all that is needed, and cannot reach the root of the evil—"Scandit æratas vitiosa naves Cura;"—but it is the first and often the only practicable step which can be taken towards a better state of things.

One form of remedial agency which may be conveniently noticed in connexion with the hygienic treatment of megrim, and which occasionally proves of signal service in some varieties of the complaint, as it does also in asthma, neuralgia, and other neurosal affections, is a thorough change of locality or climate. No doubt the good effect is due in some cases to removal from a malarious or otherwise unhealthy locality; and as we have seen that both megrim and asthma are remarkable for their response to particular atmospheric states, which often prove the exciting causes of the seizures, we can readily suppose that a change of residence or of climate may remove the sufferers from some equally subtle and inappreciable influence, which has been sufficient, nevertheless, to determine the attacks. In other cases the benefit must be referred to a concomitant change of habits, or to the favourable influence of change on the general nutrition.

Tissot says that he was acquainted with a clergyman who had suffered ever since he was very young from attacks of severe megrim, which was also hereditary. He went to be vicar for seven years in a mountainous part of the country, and while there was completely free from his malady, which returned again on his leaving the district.* The same writer mentions that long voyages have sometimes been of service, and I may add that one of my patients, R. W., found his attacks immediately lessened and ultimately cured by going to sea for some years, and another was benefited for a time by a short voyage. It is worth noting under this head that the author of the interesting "Journal of an Asthmatic," to which I have so frequently

* "Traité des Nerfs," p. 397.

referred, was finally cured of his Asthma by a voyage to Tasmania and a residence of some years there.*

In what has now been said on the treatment of megrim by measures directed to the improvement of the general health, I have confined myself to that particular aspect of the subject to which my own attention has been more immediately directed. To have pursued it further would have occupied too much space; to have omitted it altogether would have been to pass over what should always form a principal part of any therapeutical inquiry. For the management of the climacteric period in women, which is frequently attended by a serious aggravation or metamorphosis of megrim, I must refer to the standard works on such subjects. The dietetic treatment I shall have to consider again under the head of exciting causes. We must now pass on to inquire how far the morbid excitability or explosive tendencies of the nervous centres are remediable by other means.

2. *Pharmaceutical Remedies.*—We shall find that the remedies of this class which are most serviceable in the treatment of megrim are the same which enjoy a reputation for the cure or relief of other maladies of the same kind—Neuralgias, Epilepsies, Asthmas, and other paroxysmal affections of the nervous system; and thus our therapeutics will be found to confirm the view we have taken of the pathological affinities of these disorders.

One circumstance common to the operation of pharmaceutical remedies in all this group of affections is the singular uncertainty of their curative influence. In a certain proportion of cases the administration of a particular drug is followed by well-marked and often immediate benefit; in others, which apparently differ but little if at all in their character, it will be perfectly inert. With respect to some of the vegetable preparations and the active principles derived from them, a part of this uncertainty depends, I think, on the variable quality of the drugs, and the nearly worthless specimens which are occasionally met with in the

* Salter, "On Asthma." Appendix, p. 366.

shops. Good drugs and sufficient doses are indispensable; but even when these are provided there still remains a want of uniformity in their therapeutical effects which has led some practitioners too hastily to discard some remedies of this class as useless, and to attribute the benefit which in other hands has undoubtedly followed their exhibition to a mere coincident improvement. This may be the case with a few of the remedies which at various times have enjoyed an ephemeral reputation for the cure of nervous complaints, the caprice of which is well known, but the beneficial influence of others is too well attested to be thus explained away, although the nature of their operation is not understood. After all, when we remember that rabbits will eat deadly nightshade, pigeons opium, and goats hemlock with impunity, and that the peculiar power of other drugs, quinine, for example, is only seen in disease, there seems less to surprise us in the development of such pathological idiosyncrasies in connexion with the nervous functions.

Another unsatisfactory feature of many of the pharmaceutical remedies for nervous complaints is the temporary and evanescent character of their operation. After a time, which varies with different individuals and different remedies, they lose their effect, and either the dose must be indefinitely increased, or their use discontinued for a time in favour of some other remedy, to be resumed again at a later period. It is precisely the same with regard to the physiological action in healthy persons of many drugs which exert their influence on the nervous system, tobacco and opium for example, the effects of which are greatly lessened by habitual use. But even a temporary operation of this kind may be of the highest value in nervous disorders, for they are constantly subject to temporary aggravations, and peculiarly liable to be perpetuated and strengthened by a pathological habit which we may thus be enabled to break.

The pharmaceutical remedies which are more particularly useful in nervous complaints may be arranged for convenience in three classes—*a*, sedatives; *b*, tonics; *c*, specifics.

a. The first of these have a distinct physiological action on the nervous system which is directly opposed to that extreme mobility and explosive tendency which appears to be at the root of epilepsy, megrim, and other disorders of this class. A part of this action is doubtless to render the nervous system less susceptible of disturbance by various exciting causes of the seizures. Those which I have found of the greatest value in megrim are belladonna and hyoscyamus. The former I usually give in doses of one-quarter of a grain of the extract or ten minims of the tincture at night, both gradually increased, and either alone or combined with some of the other remedies to be presently named; the latter in doses of 5 to 10 grains of the extract, or from half a drachm to a drachm of the tincture. In some serious cases it may be necessary to repeat the dose once or more in the twenty-four hours. It is of the utmost importance that the drugs should be of the best quality. I have been lately told by a professional friend that he has succeeded in curing or greatly relieving some troublesome cases of megrim by atropine. I have myself no experience of the alkaloid, but it is worth observing that an efficacy has been attributed to it superior to that of belladonna in cases of epilepsy.*

b. The good effect of the remedies to which the ill-chosen name of Tonics is applied in the case of neurosal affections is doubtless referrible in great part to the improvement they effect in the nutrition of the nervous system, and is in accordance with that well-known law of nervous action to which we have so often referred—namely, that strength and mobility are inversely proportional.

Of remedies which may be considered tonic, I am disposed to give Iron the first place. It is of course in those instances to which I have before referred, where megrim is aggravated by conditions of anæmia, chlorosis, and general debility, that its value is especially seen; but I think that in some other cases it exerts a directly

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* "Epilepsy." By J. R. Reynolds, M.D. P. 320.

beneficial influence on the nervous system itself. The rapidly curative power of large doses of the old sesquioxide of iron and of the modern saccharated carbonate in many forms of neuralgia is well known, and the same effect may be observed in some hemicranial cases. For conditions of general debility, Griffith's mixture is a valuable form, and also the Tartrate of Iron in effervescence with bicarbonate of potash and tartaric acid. Where an astringent is also required, as in the case of uterine fluxes, the perchloride will be a better form.

Strychnine, given in very small doses, such as five minims of the liquor strychniæ, and continued for a considerable time, I have found of much value where the malady has been aggravated by a condition of nervous exhaustion and general debility. The late Dr. Marshall Hall used to employ as small doses as one-thirtieth of a grain in the treatment of this and other neurosal affections. It is worth noting that this drug seems to have something of a specific effect in some disorders of this class, and particularly in hay-asthma. "The continued use of *strychnine* during the afflicting season," says a writer of an autograph account in Dr. Salter's work, "is almost an absolute cure with many persons. I have a lady friend who takes it every year, and while she does so has perfect immunity from the malady."*

Quinine in full doses is doubtless of the greatest value in brow-ague and other malarial forms of hemicrania, and perhaps also in some gouty cases when combined with other remedies; but in idiopathic megrim, and in small doses as a tonic, I have found it of less service than many other drugs. Tissot has expressed a very similar opinion. Speaking of the value of bitter drugs he says, "That of Quina has been generally overrated; it does most good in cases which recur very frequently and with a regular periodicity, and have something of an aguish character; but it does not answer equally well in other cases." Lebert says on the same subject: "Vom Chinin habe ich nur

* "On Asthma." Appendix, p. 333.

zuweilen mehr als Tonicum gute Wirkung gesehen, sonst hat es keine eigentliche Wirkung auf die Krankheit selbst."*

Of arsenic I have no experience, but the late Dr. Bright spoke in praise of it as a remedy for hemicrania. His estimate of its value may possibly have been derived from malarial cases, in which it is of undoubted service.

c. I have applied the term Specifics to a third class of remedies, of course only provisionally, and in doubt or ignorance of their mode of action. They are not characterized by any well-marked physiological action in health to which their therapeutical effect can be referred, like that of strychnia, morphia, or atropia; while in various neurosal disorders they seem to possess a specific power of correcting or controlling the morbid activity of the nervous system. Some of them may, perhaps, be reckoned more or less appropriately as belonging to one of the two preceding classes of sedatives or tonics.

Iodide of Potassium is a remedy which I have employed, in some cases with singular success, in the treatment of aggravated megrim, but like all remedies of this class it is somewhat uncertain in its effect. It was first recommended to me some fifteen years or more since by the late Dr. R. B. Todd, who then mentioned that he had found it to be the only remedy productive of any permanent benefit in cases of confirmed Sick-headache, for which he was often consulted. This was before bromide of potassium had come into general use for the treatment of neurosal affections. One case in which I successfully prescribed it has left a particular impression on my mind. The patient was a man of from thirty-five to forty years of age, a maker of walking-sticks, who came to me at the hospital on account of headaches of the true megrim type, from which he was an habitual sufferer, and which had latterly become so frequent and severe as to render his life a burden. Iodide of potassium continued for some weeks in the ordinary dose of five grains, three times a day, set him

* "Handbuch," &c., Bd. ii. p. 571.

almost free. After some time he came back to make his grateful acknowledgments, and to say that he had not enjoyed such ease and freedom from his malady for many years. I infer that the benefit was permanent, or that he continued to resort to the medicine when required, as I did not see him again. I should add that there was no history and no suspicion of a syphilitic origin in this case. In other instances I have found a great reduction in the number and intensity of the seizures under the influence of the same drug. This was the case, for example, with the patient R. S——, with whom the malady was of the blind and aphasic type. In some cases, on the other hand, as in that of S. B——, it has been productive of no permanent benefit.

Iodide of potassium is a remedy which has a very similar beneficial influence in other neurosal affections. In the last edition of his work on Asthma, Dr. Salter devotes a chapter to the consideration of its value in that complaint. "Iodide of potassium," he says, "is a remedy that, in the opinion of many competent men, holds a high place in the treatment of asthma. Dr. Williams evidently thinks highly of it. I see many asthmatic patients who have been under the care of that eminent and able physician, and I find that for almost all of them he has ordered iodide of potassium. I remember some years ago receiving a long and interesting letter from my friend the late Dr. Oke, of Southampton, begging me to try it, and assuring me that he had found it an almost unfailing remedy, and had seen it succeed in the most obstinate cases; indeed, he regarded it in the light of a specific. In many other equally respectable directions I have heard its praises as loudly sounded."* Dr. Salter's own experience of the drug would lead him to assign it a more qualified praise, having only found it of service in perhaps one case in five; but he adds—"still, one case in five would be a great deal in such a disease as asthma—

* "On Asthma," p. 302.

a disease so painful, and often so intractable; and I should not think it right to omit its trial in any case in which it had not been fairly tried. . . . Sometimes I have seen most striking results attend its use, as the following cases will show." One of these was that of a lady who had been long a sufferer from spasmodic asthma. She had severe paroxysms at long intervals lasting several days, and slight ones every night, for which she had tried all the remedies round. She began the iodide of potassium when going on a visit to a place where she always suffered severely. From the commencement of the medicine she lost her attacks, both severe and slight, and two months later there had been no return. Other instances follow, and Dr. Salter admits that he is obliged to modify the view he formerly held—namely, that the benefit was due to the asthma having a bronchitic or a gouty basis. "Of its ultimate and exact *modus operandi* I can," he says, "neither offer any explanation, nor form any reasonable opinion. I am not, however, the less satisfied of its occasional great value, and of the propriety of its use in any case in which it has not been tried."*

But iodide of potassium has its value also as a remedy for some neuralgic affections. My friend the late Dr. Brinton prescribed it extensively for painful disorders of the stomach and other forms of deranged pneumogastric innervation. Sir Thomas Watson mentions in his lectures on Neuralgia that he has given it with success in painful forms of face-ache, not due to carious teeth, and not of paroxysmal character, but of the same kind as that which he finds relieved by chloride of ammonium. "In two or three instances," he says, "of a similar kind that I have recently had to treat, I have found the iodide of potassium, in doses of five to six grains, work a speedy and permanent cure."† He suggests, indeed, that the pain in such cases may have a periosteal origin, but there appears to be no

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* "On Asthma," p. 308.

† "Lectures on the Practice of Physic," p. 732. Ed. 1857.

reason for thinking so beyond the benefit derived from the iodide, nor would this explain the similar action of chloride of ammonium. Lastly, iodide of potassium enjoys a considerable reputation for the treatment of some forms of epilepsy, and perhaps its good effects have been too exclusively attributed to a syphilitic origin of the malady in these cases.

In 1857, Sir C. Locock introduced the use of Bromide of Potassium for the treatment of catamenial epilepsy in the following remarks at a meeting of the Medico-Chirurgical Society. "There is a form of epilepsy to which special notice has not been drawn, and which I have been in the habit of regarding as hysterical epilepsy. It is confined to women, and observes a regular return connected with the menstruation. It is as baffling a form of epilepsy as any other. The paroxysms only occur (except in the case of great mental excitement) at the menstrual period. Having been often baffled in these cases, of which I have seen a considerable number, I have been led within the last twelve months to try a remedy which has so far answered my expectations that I think it desirable it should have a larger trial by being made known to a larger number of persons." He then related the particulars of a case of this kind which had been cured by ten-grain doses of the bromide given three times a day and continued for some months, and added—"I have tried the remedy in fourteen or fifteen cases (all under thirty) and it has only failed in one."*

From this time the remedy was extensively employed, and it was soon found that its value was not confined to catamenial cases, or even to epilepsy or hysteria. Dr. C. B. Radcliffe observed in 1861—"I can testify indeed that this remedy has proved more or less serviceable in cases the most dissimilar in character—so serviceable that the name of Sir C. Locock ought to be remembered with gratitude by every epileptic and by many sufferers from other forms of convulsive disorder."† It was soon introduced into

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* *Med. Times*, May, 1857, p. 525. † "On Epilepsy," p. 167.

lunacy practice, and in large doses was found to possess a considerable power of calming mental excitement and promoting sleep.* It appears also to have been scarcely less successful in the treatment of Hooping-cough with some practitioners than bromide of ammonium with others.†

After reading Sir C. Locock's paper, I began trying the bromide for cases of megrim, at first for those of a catamenial character, and afterwards for all that presented themselves. On the whole, I should say that the results accord very much with the general experience in the case of epilepsy; in a certain proportion of cases the continued use of the remedy has been attended with a considerable reduction in the number and severity of the attacks, while in others there has been no appreciable benefit. I have been unable to observe any difference in this respect between catamenial and other cases. I cannot recall a case which could be fairly characterized as a cure. In quoting from Sir C. Locock's paper above, I omitted a passage with regard to a particular physiological operation of bromide of potassium in health which first suggested to him its possible use in disease. "Some years ago," he observes, "I chanced to see a paragraph in the *Brit. and For. Med. Chir. Rev.* giving an account of some experiments that a German had been making with bromide of potassium. He found that by taking ten-grain doses three times a day for about a fortnight he became impotent, but upon leaving off the medicine his power returned; he tried a similar experiment with others and a similar result was produced. I accordingly thought I would try the bromide in many hysterical cases unconnected with epilepsy in which there was a great deal of sexual excitement and disturbance attended with various distressing symptoms difficult to manage; and I found that from five to ten grains three times daily had the effect of calming the excitement to a very marked degree." In view of the wide reputation which the bromide has now

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* See an interesting paper, "On the Therapeutical Effects of Bromide of Potassium." By Dr. J. Begbie, *Edin. Med. Journ.*, Dec. 1866.

† *Bull. Gén. de Thérap.*, Mai 30, 1867.

attained in the treatment of neurosal affections generally, this physiological action of the drug appears to me of considerable interest in connexion with that affinity we have traced between these disorders and the natural appetites.

Chloride of Ammonium has long enjoyed a reputation as an anodyne in some forms of neuralgia. In the lecture above referred to, Sir Thomas Watson observes—"There is a kind of *face-ache* which cannot properly be reckoned as a species of neuralgia, for it does not occur in short stabbing paroxysms, nor is the pain acute enough to entitle it to the name of tic-douloureux; but which is very common, very distressing, and under ordinary treatment sometimes very intractable. . . . It is often thought to proceed from tooth-ache, and bad or suspected teeth are extracted, but with no good effect. Now I allude to this for the sake of saying that some years ago I was instructed by an experienced old apothecary, that this face-ache might be almost always and speedily cured by the muriate of ammonia—a medicine that we seldom give internally here, although it is so much used in Germany. And I have again and again availed myself of this hint and been much thanked by my patients for the good I did them by this muriate of ammonia. It does not *always* succeed; but it *often* does. It should be given in half-drachm doses, dissolved in water three or four times a day." To this I would add that I do not think this anodyne effect of chloride of ammonium is confined to the particular form of face-ache which Sir Thomas Watson describes; I have occasionally observed a similar beneficial influence in strictly neuralgic forms—at least, where the pain occurs in paroxysms. This has induced me to try it in some cases of megrim and other neurosal affections, and I think with advantage in reducing the frequency and severity of the seizures; but like all remedies of this class it is uncertain, and it is impossible to predict beforehand whether it will answer or not. Dr. Symonds has found a similar good effect from this drug in those "Nervous Headaches" which I regard as a variety of megrim. "I can also speak favourably," he says, "from experience of large doses of muriate of ammonia in this form

of headache."* It is further interesting to notice that Dr. Marotte of La Pitié found it of signal service in the facial and other neuralgic complications of an epidemic influenza which prevailed a few years ago in Paris. He had previously witnessed a similar efficacy in the treatment of agues—a fact which well accords with the neurosal character we have attributed to malarial disorders.†

The only other remedy of the same class which I have to notice is Common Salt. I have no experience of it myself, but Dr. Symonds has found it of much value in that variety of megrim which is known as "bilious headache." "I will only mention," he says, "as a contribution from my own experience of such cases, that long periods of exemption from returns of their headaches have occurred to patients who have faithfully observed my directions that they should drink a tumbler of common salt and water every morning an hour before breakfast."‡ Probably we should find the remedy no less efficacious and more acceptable if prescribed in the form of some of the natural mineral waters, such as those of Selters, which contain a large proportion of chloride of sodium.

It is worthy of notice that the last four remedies I have named have this in common besides their therapeutical influence in neurosal affections—namely, that they are all salts formed by the union of the closely allied elements, iodine, bromine, and chlorine, with alkaline metals. Dr. Radcliffe observes of bromide of potassium—"How to explain the *modus operandi* of this medicine in epilepsy is no very easy matter; but I am inclined to think that it is, in part at least, by an alterative action upon the blood, analogous to that of iodide of potassium and common salt. . . . At any rate the alkaline character of the compound would seem to be necessary in some cases; for on looking over about thirty cases in which I tried bromide of iron and bromide of

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* "Gulstonian Lectures on Headache," *Medical Times*, May 15th, 1858, p. 495.

† *Bull. Gén. de Thérap.*, Mai 15, 1867.

‡ "Gulstonian Lectures," 1858; p. 495.

potassium month by month alternately, I found that the latter preparation seemed to exert a more beneficial influence than the former."* In view however of the fact, that besides the permanent benefit derived from the more prolonged use of these remedies in correcting a neurosal disposition, a single full dose of some of them will often cut short a neuralgic paroxysm or induce sleep, we must, I think, consider that their principal operation is directly on the nervous system itself, and of a specific sedative kind; this is more especially seen under circumstances of morbid activity, but may also be traced in connexion with some physiological actions of the healthy economy, as in the arrest of the disposition to cough on irritation of the throat by bromide of ammonium, and of the sexual propensities by bromide of potassium.

Valerian and the Valerianate of Zinc are remedies of great value in the treatment of some cases of megrim, as they are in many other neuroses. I prescribe them alone or in combination with henbane or belladonna. It is well known that Valerian has been successfully employed both in epilepsy and hysteria from a very early period in the history of medicine, and the combination of zinc with valerian and hyoscyamus, in the form of *Meglin's Pills*, has earned a great reputation for the relief of facial (hemicranial) and other forms of neuralgia. The modern valerianate of zinc is a still better preparation of the same drugs, and is now extensively used in the treatment both of neuralgic and epileptic affections. We have already recorded (p. 333) an instance of the cure of an intractable hiccup by this remedy.

Dr. Fordyce thus speaks of the very great benefit he derived from the use of large doses of Valerian in his own sufferings from megrim:—"Ad id tandem devenio quod palmarium mihi videtur remedium, radicem scilicet Valerianæ sylvestris, quæ largiori dosi sumpta, et repetita sæpe sola dolores sanat tum acutos tum diuturnos. Me

* "On Epilepsy," 3rd edition, 1861, p. 167.

profectò adeo multa et gravia per quadriennium quotidie perpessum, ut vitæ fere tæderet, maxime sublevabat, et curabat. Virtus tota in radice est, pulvisque ejus sponte ortæ, et extirpatæ antequam caulem edat, ad unam ter, quaterve de die, aut alteram, si ferat ventriculus, exhibitus drachmam, ut plurimum votis respondet.*" A writer in an early number of the *Medico-Chirurgical Review* confirms this experience of Fordyce on the action of valerian. "Some instances," he says, "have come to our knowledge where one-drachm doses of the powder of valerian every four or six hours put a speedy termination to periodical Hemicrania, after bark, antimony, and many other medicines had entirely failed."†

Dr. Symonds observes of the treatment of "nervous headache" that he has found valerian "less beneficial as a remedy for *attacks* of pain, than as a corrective of the *neurotic sensibility* which gives rise to them. The latter treatment may be said to be prophylactic to the attacks, and curative of the diathesis, and it is of far greater importance than that which merely contemplates the removal of the present pain." The same writer afterwards enlarges on the advantages offered by the modern preparations, especially the valerianate of zinc, over the old combinations of the crude drug:—"None of these can compete in convenience and efficacy with that invaluable salt the valerianate of zinc. Many years before this substance was introduced, I had been in the habit of prescribing a well-known combination of oxide of zinc, extract of valerian, and extract of hyoscyamus, with a degree of benefit which had often far exceeded my expectations. And I remember the eager interest with which I first observed in one of the foreign journals the announcement of this new combination of zinc and valerianic acid. If I may venture such a remark I should say that, judging from the prescriptions which I have met with, this medicine is usually given in doses far too small. My own knowledge of the larger doses was in

* "De Hemicrania Dissert," § l. li. † Vol. i. June, 1824.

the first instance accidental. For a lady, suffering a singular laryngeal spasm after influenza, I had prescribed a grain of valerianate of zinc to be taken every three hours. . . . The dispenser had sent six powders each of six grains. In the morning I found the powders had been taken with marvellous benefit, and no distress to the stomach."*

The following is a still earlier testimony to the curative power of valerianate of zinc in paroxysmal headache, even when hereditary, as well as a good illustration of the beneficial change which has taken place in the treatment of such cases:—"N. M., a woman, thirty years of age, of strong constitution, the mother of several children, suffered from frequent attacks of paroxysmal headache, in common with all the members of her family. This headache was formerly attributed to a plethoric condition, and was treated by bleedings, though menstruation was abundant; but the effect was trifling, and the headaches quickly returned with their accustomed violence. . . . Valerianate of zinc was prescribed, but was not to be commenced until after a menstrual period, the better to ascertain whether the sufferings depended on a plethoric condition or on a simple neurosis. The cure was complete after the administration of only 24 grains of the drug."†

Hitherto I have referred to valerianate of zinc merely as a preparation of valerian, for the simple reason that I am not prepared to say how much of the benefit is due to one drug and how much to the other, or whether the combination, as in Meglin's pills, may not be superior to both. But zinc without valerian, either as oxide or sulphate, has occasionally proved of service in the treatment of megrim, as well as of epilepsy, chorea, and various neuralgic affections. Dr. Symonds mentions that he has found benefit in the long-continued use of zinc in different forms of "nervous headache," and Dr. Parry

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* "Gulstonian Lectures on Headache," 1858. *Med. Times,* vol. xvi. p. 475.

† "Nouv. Encyclogr. des Sciences Médicales." Tom v. p. 261. Brux. 1846.

records a case of Hemicranial Sick-headache of long standing where the paroxysms were determined by the incidence of strong light or the attempt to read small print, and which was cured by the use of sulphate of zinc.*

The prolonged use of Caffeine in one-grain doses is said to be of service in reducing the tendency to megrim paroxysms; and Brazilian cocoa or Guarana, the powder of the resinous juice and seeds of the Paullinia Sorbilis, in 10—15 grain doses, once or more daily, has been recommended for a similar purpose.† I shall refer to these remedies again when speaking of the treatment of the *paroxysm* for which they are better adapted.

Colchicum may prove of service in correcting a tendency to megrim when the malady is connected, as it often is, with an hereditary disposition to gout, or a gouty diathesis. The late Prof. Trousseau, who abstained on principle from the use of any remedial measures in acute articular gout, nevertheless thought intervention admissible in visceral and other irregular forms of the disorder. For the relief of gouty megrim, "I adopt," he says, "Becquerel's formula for pills—

℞ Sulphate of Quinine . . . about 23 grains.
Extract of Digitalis . . . „ 4 „
Extract of Colchicum seeds . „ 8 „

Mix, and divide into 10 pills. Two or three to be taken in the course of twenty-four hours, and continued from three to five days. These differ very little from pills prepared according to an older formula of Dr. Debout, who employed them with good results in cases of gouty megrim. The following is his formula:—

℞ Extract of Colchicum . about 46 grains.
Sulphate of Quinine . . „ 46 „
Powder of Digitalis . . „ 23 „

Mix, and divide into 30 pills. One pill to be taken every evening."‡

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* "Unpublished Writings," p. 563.
† *See* Lebert, "Handbuch der prak. Med.," Bd. ii. p. 571.
‡ "Clinical Medicine," vol. iv. p. 400, and *Bull. de Thérap.*, Fév. 1857.

The value of the quinine in these receipts has been confirmed by other observers. Dr. Symonds writes—"There is another form of headache which often occurs in the gouty habit, and which is of a neurotic character, and usually assumes the form of Hemicrania. The paroxysms are often intensely severe." "I have found this headache amenable to most of the remedies which are useful in the headaches which have not this complication. But colchicum often comes in usefully. I am informed by Mr. Spencer Wells that having seen how great a control quinine exerts over this form of cephalalgia, he has been disposed to inquire whether its action bears any relation to some curious observations of Ranke on the diminution of uric acid in the urine of persons under its operation. As far as my observation goes, I should incline to the belief that the cephalalgia of the gouty diathesis is not the direct product of a gouty poison, but only a *neurotic disorder* belonging to that state into which the nervous system has grown in these subjects, analogous to that which occurs in other derangements of the constitution."*

3. *Diversion of Nervous Energy.*—We have seen that a sudden emotion will often cut short a neurosal seizure, but an agency of this kind is not to be commanded at pleasure; moreover we are now considering not so much what will relieve present suffering as by a continuous use assist in correcting a persistent morbid tendency of the nervous centres. There is only one remedy of the kind now referred to which is practically applicable for this purpose, and that is—Sustained muscular exertion. We have already spoken of exercise in the treatment of megrim as promoting the general health in various ways, favouring assimilation and excretion, diverting the mind and procuring sleep; but sustained bodily exercise seems also to have a more specific power in controlling irregular nervous action in the manner now suggested. In many instances it has proved

* "Gulstonian Lectures on Headache," 1858. *Med. Times*, vol. xvi. p. 496.

of signal service in reducing the number and severity of the megrim paroxysms, and occasionally in preventing their return for a considerable period. Prof. Du Bois-Reymond says of his attacks—"Auf Fussreisen bleiben sie ganz aus;" and in my patient, Mr. S——, and others, I have observed the same curative power of exercise. Dr. Parry relates a case of habitual periodical megrim in a military man, "who found that his complaint had been constantly prevented, or its violence diminished, by strong bodily exertion." In another instance of sick-headache from childhood recorded by him, where "the complaint was always supposed to originate in the stomach, and various remedies were, under that view, ineffectually employed, the most beneficial of all was bodily exercise."* It is not equally successful however with all, and some discretion is required in its use. Thus, to set a delicate and debilitated female to walk half a dozen miles would be certainly to aggravate the malady; and even with those who are strong, the first effect of any unusual exertion is often to determine a seizure. Exercise then must be proportioned at first to the strength and habits of the individual, and any sudden *strain* should be, as far as possible, avoided.

It is interesting to observe that this beneficial influence of sustained exertion is seen not only in megrim but in other neuroses—epilepsy and asthma, for example. Dr. Salter observes of the latter affection:—"I have seen several cases in which prolonged bodily exercise has been of great benefit; indeed, some in which it has been the best remedy to which the asthmatic could resort. . . . This treatment is, of course, rather prophylactic than curative—it must be taken in the intervals of the attacks; but when so taken it seems to have a marvellous efficacy in keeping them off, and in giving to the asthmatic a lightness and freedom of respiration to which at other times

* "Unpublished Writings," pp. 467, 480.

he is a stranger. Its rationale puzzles me."* "Of all the remedies," writes my friend Dr. D——, to Dr. Salter, "there is none for me so complete and lasting as a day of severe walking exercise—five-and-twenty miles over hilly ground or across heath. The strain must never be great. I begin slowly, almost saunteringly, and only increase my pace when it is pleasanter to do so than not. Towards the end of my day I can usually climb a hundred feet of cliff as fast as I can plant my feet, or run a mile or two to catch a train. Habitually I can never run or go fast up hill. In this matter of exercise it is *of paramount importance not to overstrain*. . . . Rowing I consider bad, because the temptation to overexertion is too great; and riding is most excellent, because exertion is sure, and overexertion next to impossible. This habit of severe walking exercise I consider among the most valuable hints which my experience enables me to give to asthmatics."†

It is the same in epilepsy. Dr. Reynolds observes, "Muscular exercise, regularly taken, and carried as far as possible, short of fatiguing, has always been of some service in cases which have come under my care. Brown-Séquard's guinea-pigs, when shut up in cages and abundantly fed, had forty or fifty fits in the day; but when allowed their liberty and another kind of regimen, the convulsive tendency disappeared in a few weeks."‡

II. To avoid or to remedy the exciting causes of the seizures.

The second indication in the treatment of megrim is to avoid or correct those external circumstances or internal conditions of the body which prove exciting causes of the paroxysms. I have already pointed out that where the malady is deeply rooted in the original constitution of the nervous system and the seizures observe an approximate

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* "On Asthma," p. 308. Ed. 1868.
† Idem, pp. 310–11; Appendix, p. 341.
‡ "On Epilepsy," p. 335; and *Arch. Gén. de Méd.*, Fév. 1856.

regularity of recurrence with healthy intervals, they will too often continue to occur even when the most scrupulous care is taken to avoid whatever has seemed to provoke them. I also pointed out that a longer interval of freedom than usual is often followed by a more severe seizure, and I referred to the remarkable expression of one of my patients that "she knew she had a certain amount of suffering to go through, and would as soon have it regularly as not." It might seem therefore at first sight an unprofitable task to live in the constant observance of precautionary rules and an irksome self-restraint for so doubtful an advantage. There may be a certain amount of truth in this, but it is no less certain that in the great majority of cases, even of the regular type to which I have referred, the malady is very liable to aggravation, and the seizures prone to acquire an additional facility of recurrence, from frequent exposure to the same exciting causes. Moreover in a great many instances the disorder is not of that well-developed and spontaneously recurrent type, and then by carefully avoiding certain well-known influences the patient may often enjoy long periods of exemption from his troublesome complaint. Hence we may say generally, that it becomes an important part of the treatment of megrim to discover what are the provocatives of the seizures in each individual case, and to take what measures we can for their prevention or removal.

In this respect again megrim maintains the closest parallel with epilepsy, asthma, angina pectoris, and other neuroses, and requires the same kind of management, although it is a less formidable malady perhaps than any of those we have named. "In epilepsy," says Dr. Latham in his admirable lectures on clinical medicine, "we are, above all, inquisitive after any notable circumstance within or without the body, immediately preceding the paroxysm, which can have force to call it forth. Thus we address ourselves to the treatment of epilepsy. And we address ourselves to the treatment of angina pectoris in like manner. . . . In angina pectoris even more than in epilepsy, and more than in any disease of paroxysms, we desire to come at a sure knowledge of the con-

ditions which in each particular case are apt to call forth the attack, whether they proceed from the body or mind, or from meats and drinks, from within or without, from things that can be avoided, or things that cannot." So of asthma the writer of one of the autograph cases in Dr. Salter's treatise observes:—"Of remedies I have not much to say, as I have seldom used any; to speak paradoxically, the best of remedies is the avoiding the causes." And the treatise itself contains an admirable exposition of this "causal treatment" of that particular neurosis.

A glance at the chapter on the exciting causes of the paroxysms in megrim will at once suggest all that is most important under this head in the treatment of the malady before us. Unfortunately some of these, as for example the return of the catamenial period, are in their nature irremediable, while others are but imperfectly under our control. I shall confine myself here to the consideration of those points which appear to me of most practical importance and where precautionary measures will most avail.

The first is the prevention or correction of Gastric disorder or irritation. I have already expressed my belief that far too much importance has been attached to this condition as a principal cause of the malady, and so far has this doctrine been carried that the presence of megrim alone has come to be regarded as the most unequivocal sign of gastric disorder. I have pointed out on the contrary that the latter when actually present is often the expression of deranged pneumogastric innervation, and an effect rather than a cause of the malady. Nevertheless it is not denied that in some cases at least the state of the stomach may prove a determining cause of the seizures, and general experience also concurs in stating that remedies employed with a view to correct the gastric disorder—to relieve the attendant pain or correct the irregular secretion—as well as precautions in diet, have also succeeded in preventing the attacks; and hence we obtain a practical indication for treatment which we cannot afford to overlook. When therefore a sufferer from megrim is also the subject of dyspeptic

symptoms, either occurring in the intervals of the attacks or immediately preceding the seizure, or when the latter is apparently brought on by a particular meal or article of food, we cannot do better than endeavour to remedy these conditions by suitable medicines and suitable diet.

According to my experience a morbid irritability of the stomach with irregular secretion of acid, a sudden generation of gas, and a variable amount of heartburn, is the form of gastric disorder most frequently met with in those who suffer from megrim. This may or may not be associated with the headache, and is often independent of food. It is most effectually relieved by full doses of the bicarbonates of potash or of soda, by magnesia or its carbonate, administered at the time in natural or aërated water. Small doses of opium, with or without ipecacuanha, I have occasionally found of signal service under similar circumstances. The preparations of bismuth sometimes prove of great value in giving more permanent relief to this and other forms of gastric irritability and pain; and I have found it the best remedy for those severe paroxysms of gastralgia with pyloric (?) spasm or paralysis, which sometimes alternate with megrim. (See p. 215.)

Vegetable Bitters have enjoyed a considerable reputation in the treatment of megrim, especially in cases supposed to have a gastric origin, and attended with dyspeptic symptoms. Tissot recommends such bitter infusions where there is reason to suspect an "atony" of the stomach. The nature of their operation, and the cases to which they are suited, appear to me obscure, but I am not for this reason disposed to deny their good effect, and in other hands they have been of greater service than in my own. The ancients attributed the therapeutical properties of bitters to their action on the stomach, and they may have been right. There is undoubtedly in many cases of megrim a deranged pneumogastric innervation; bitter medicines produce, we know, very powerful impressions on the sentient nerves of the mouth, and there seems nothing unreasonable in the supposi-

tion that by a similar, but unfelt impression on the nerves of the stomach, the morbid susceptibility of the latter may be corrected, while digestion and appetite are improved. Among the best of such bitters are the gentians and calumba; and it is worth observing that a specially beneficial influence has been assigned to the former in the peculiar dyspepsia of gout, and to the latter in the sickness of pregnancy, both being referrible to a derangement of gastric innervation.

In all cases where megrim appears to be in any degree dependent on, or associated with dyspepsia, it will be necessary to enjoin moderate and regular meals, with a simple and nutritious dietary adapted to the digestive capacity and nutritive requirements of the individual, avoiding all such articles of food as are notoriously unwholesome or known to disagree. It is scarcely possible to lay down detailed rules which shall be generally applicable to such cases. Where there is much cardialgia, Lebert recommends a flesh diet; and there are cases, no doubt, where farinaceous and vegetable substances increase acidity and flatulence. Butter and other fatty materials are often shunned by sufferers from megrim in accordance with the precept of Fothergill, and under the notion that they generate bile. This is a doctrine altogether untenable, and I agree with Dr. Buzzard that, as in other neuroses so in sick-headache, oleaginous food, as a general rule, is peculiarly necessary, and that much benefit is often derived from Cod Liver oil.* Nevertheless it is only right to add that I have known instances where an abstinence from *butter* for a time has appeared to diminish the attacks: such are the caprices of this singular disease.

A practical remark by Dr. Reynolds on the treatment of epilepsy is equally applicable to the case of megrim:—"Too great importance," he thinks, "cannot be attached to *regularity* of hours, not only in regard of the fact of taking food, but in respect of both its

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* See a case of Sick Headache, with Remarks, by Dr. Buzzard. *Lancet*, July 23rd, 1870.

quantity and quality. A similar kind of meal should be taken at the same hours daily, and with great punctuality."*

Malt liquors Fothergill condemns, and in most cases I think with reason. Wine, especially if taken in larger quantity, or of a different quality from that to which the patient is accustomed, or if several kinds are taken, will often occasion an attack; but this is not the case when the same kind is taken daily with moderation and regularity; and with many patients it is very beneficial. Occasionally when the stomach is disordered, or a headache threatening, it will be found expedient to substitute an equivalent quantity of brandy with potash or seltzer water. Some few individuals cannot tolerate any kind of beer or wine; this was the case with the gentleman of whom I have already spoken (see p. 45), and who for thirty years of an active professional life, was obliged to refrain from every form, and the smallest quantity, of alcoholic stimulant. But such a case is quite exceptional, and a statement by Möllendorff having quite an opposite bearing holds good for many individuals:—"Dagegen viel seltener Störungen der Verdauung; spätes Abendessen mit Genuss des Weines, welche noch vielfach beschuldigt werden, gehen oft spurlos an den sensibelsten Individuen vorüber."†

Where there is a tendency to constipation in the *intervals,* I have found the soap and aloes pill, with or without a little extract of nux vomica, before the principal meal very serviceable. It should be remembered that the megrim paroxysm itself tends to inhibit the peristaltic action of the bowels with some individuals, and may therefore be attended by constipation, but aperients are useless at the time of the seizure.

I cannot quit this part of my subject without renewing a protest against a practice which not long since was almost universal in the treatment of this disorder, and though now dying out, is still far from extinct. I refer to the indis-

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* "On Epilepsy," p. 334.

† "Ueber Hemikranie," *Virchow's Archiv*, Bd. xli. p. 386.

criminate administration of so-called alteratives and purgatives for the purpose of correcting or removing some supposed source of visceral irritation. I have already traced the origin of the purgative treatment to the bilious theory of this disease, and explained the modified form in which it was enforced by Fothergill. Still more recently, Mr. Abernethy gave a fresh impulse to principles and practice of a very similar kind, regarding the whole family of local nervous disorders to which megrim belongs, as chiefly dependent on gastric or intestinal irritation, which led to that well-known treatment of such affections by repeated doses of blue-pill for which he obtained so equivocal a reputation. There is much which is vigorous and admirable in Mr. Abernethy's writings, and, as moderately stated by himself in such passages as that I have quoted above (see p. 429), on the "double parentage" of nervous affections, there is little in his principles from which we can dissent; moreover, it is well known that he sometimes gave his patients excellent advice as to the general management of their health, habits of life, diet, exercise and so forth, besides the universal recipe. The chief error of his system lay in the exclusive attention which was practically paid to one of the "parents" referred to in the foregoing passage, to the total neglect of the other, and in the purely imaginary superstructure of 'vitiated' and retained 'secretions,' which gradually grew out of the frequent and minute inspection which was made of the intestinal evacuations, so that what we may call a chromatic scale of aberration was at length established. But the gravest miscarriage was in treatment; for whatever it may have been in the hands of the master, in those of a whole generation of imitators and admirers it rapidly degenerated into the wholesale administration of mercurial alteratives and aperients, until a certain imaginary standard of excellence was approached in the colour and consistence of the evacuations! To such an extent was this carried, that we became for a time the laughingstock of the Continent, and expressions like the following were in common

use, (1824)—"The digestive organs were *Abernethianized* without any benefit to the local complaint."*

Sounder principles and sounder practice were not left however without witness even among ourselves. In the treatise to which we have already referred, Sir James Clark wrote in 1829—"The common expressions of the liver being 'affected,' 'touched,' &c., so generally employed in cases of dyspepsia, are to be regarded as words without any definite meaning being attached to them, even by those who use them; and are too often, I fear, employed to conceal our ignorance of the nature of the diseases. On this account these indefinite expressions deserve condemnation; but I notice them here chiefly to deprecate the mischievous practice to which they too often lead. I allude to the indiscriminate use of mercury in the form of calomel or blue pill, and of irritating purgatives. This is a mode of treatment which, notwithstanding its very general employment, I think I may venture to say never yet cured a single case of dyspepsia; and I am satisfied that in this disease, it has been and continues to be, productive of incalculable mischief."† In contrast to the extravagances of the Abernethians, I would refer once more to an admirable lecture by Professor G. E. Paget, as presenting a much truer estimate of the part played by gastric disorder in the production of neurosal seizures, as well as some excellent illustrations of the practical application of the doctrine to the treatment of epilepsy.‡

Emotional disturbance is another very frequent exciting cause of the megrim paroxysms, certainly no less so than gastric disorder. Unfortunately, as Dr. Latham has truly said in the parallel case of Angina pectoris, "the will is

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* *Med. Chir. Review*, vol. i. p. 198. In this case the complaint was a neuralgia, which nevertheless yielded to carbonate of iron. See also Broussai "Examen. &c." Tom. iii. p. 235. "Ainsi nous retrouvons constamment parmi les médecins d'Angleterre l'observation fixée sur l'appareil digestif, mais jamais dans le sens de la bonne physiologie."

† "On the Influence of Climate on Chronic Diseases." By J. C., M.D. P. 190. 1829.

‡ "On Gastric Epilepsy." By G. E. Paget, M.D. *Lancet*, April, 1868.

far less master of the mind than of the body. A man may resolve never to move from his chair, but he cannot resolve never to be angry." It is, of course, quite impossible for any one to avoid the circumstances which call forth emotional feeling, but it is no less certain that the development of our passions and their reaction on the bodily functions, may be very much heightened or subdued by force of habit. A man cannot alter his natural temperament, and the best resolution never to be angry, grieved, or anxious, would certainly fail, nor would it be desirable that it should be otherwise; but there is such a thing as "giving way" to tempers and "nursing" griefs and fears; and in proportion as this is done, so will they become organized in our constitution, their force increased, and recurrence facilitated, until a degree of emotional disturbance is at length excited by the merest trifles which is only worthy of some great occasion. Hence it becomes of the utmost importance for the sufferers from every form of neurosal seizure to cultivate habits of tranquillity and cheerfulness, and as far as possible to avoid all needless occasions of excitement; and as regards the regulation of the emotional part of our nature, I cannot help thinking that there is much practical wisdom in the reflection I have quoted from Sterne: "I was never able to conquer any one single bad sensation in my heart so decisively, as by beating up as fast as I could for some kindly and gentle sensation to fight it upon its own ground."

Another provocative of the seizures which is frequently met with in megrim, is the over-stimulation of the sensorium from any occupation or engagement which involves a prolonged exercise of any of the senses, or a more general excitement and strain of the sensorial faculties. A day of sight-seeing in town, a long railway journey, a public spectacle or military review, are pretty sure to be followed in some individuals by one or more attacks. Evening entertainments of almost every kind are particularly trying; the concert, the playhouse, the evening assembly, and even the church, present a combination of impressions,—

of sights and sounds, of glaring lights and impure air,—together with a certain element of emotional excitement, which are extremely prejudicial, and should be shunned as far as possible by the sufferers from megrim, who must content themselves with simpler forms of social enjoyment.

Where the occupation is such as considerably to tax the sight, and the seizures appear to be in any way connected with the use of the eyes, we should inquire carefully into the state of vision, and if we detect the presence of myopia, hypermetropia, or other faulty condition, we should endeavour to correct it as far as possible by suitable glasses and rest.

Bodily fatigue is another exciting cause of megrim, and especially any violent effort or sudden exertion. When speaking of the value of exercise as a remedial agency, I pointed out the precautions which are necessary in this respect. Where manual labour is a means of livelihood, it is for the most part limited by the customary and regular hours of work, but this is not the case with much of that domestic labour which falls to the lot of many women of the poorer class who are often worked beyond their strength and in a very irregular way; here it is easy to discern but difficult to apply the remedy. Standing about is a form of bodily exertion to which many are liable whose business it is to overlook the labour of others, and though it counts for little, and is very apt to be indefinitely prolonged under a pressure of business, it is about as exhausting a form of labour as any with which I am acquainted, and patients may require to be cautioned on the subject. "To avoid excessive exertion after fatigue," says Prof. Lebert, "and to take proper rest after such fatigue, are often the best preservatives against Migräne."

Intellectual strain as well as bodily exertion may prove an exciting cause of megrim, and studious and literary as well as professional persons should exercise caution in this respect; but as far as my experience goes it is far more frequently accessory to the general malady in the

manner I have already explained than a provocative of the seizures.

Lastly, the following passage from Dr. Salter's work on the treatment of Asthma, is scarcely less applicable to the case of some habitual sufferers from megrim. "There is one general rule," he says, "which, trifling as it may seem, is perhaps exceeded in importance by none, and by attending to which the asthmatic may do more to evade his attacks than by any other. It is, to establish a *rigorous uniformity of life*, to make one day the exact counterpart of another, and to avoid irregularities of every kind. Asthma often seems as if it were lying in ambush watching its opportunity, or on the look out for some loophole through which to make its attack, and there is hardly any change of life or habit of which it will not, as it were, take advantage—change of air, change of sleeping apartment, alteration of meal hours. I have already referred to this subject in speaking of the tendency to habitude which characterizes asthma; and I would only now enforce the great importance of the asthmatic guarding himself from all sources of offence by tying himself down to a life of monotonous regularity."*

B. *Treatment of the Paroxysms.*

As the suffering in megrim is greatly aggravated by every form of motion and muscular exertion, as well as by sensorial impressions of all kinds, and, on the other hand, is relieved by recumbency and quiet, the patient from the first commencement of an attack should retire to a darkened room, as free from noise and disturbance as possible, and lying down endeavour to maintain whatever position appears at first most comfortable. If by this means he should also succeed in getting to sleep the attack will often be shortened, and in any case the suffering will be less than it would have been had he persevered in remaining about.

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* "On Asthma," p. 314.

Dr. Heberden says on this point, "Nec invenire potui quibus remediis sanetur, aut etiam leniatur; nisi quod cubanti in lecto dolor citius finitur, et impetus ejus aliquantum minuitur."* Professor Lebert recommends that the position should be a slight incline with the head highest. My own opinion is that fixity and the absence of all effort are the most important considerations; but if the vessels of the head are relaxed and throbbing, it may be desirable to adopt the Professor's suggestion. If there is chilliness and the feet are cold, a hot bottle and blankets will be required.

A full dose of Brandy or other alcoholic stimulant, if taken sufficiently early, will occasionally disperse an incipient seizure. This fact was long since pointed out by Dr. Parry, and explained by him on the supposition of its quickening the circulation and overcoming some local determination of blood.† M. Piorry also confirms this occasional value of stimulants, but attributes the effect to a vigorous counter nervous action set up in the stomach. It is worth remarking that Dr. Salter has observed a precisely similar effect of alcohol in dispersing a paroxysm of asthma. The operation is probably the same in both cases, and referrible to the direct effect of the drug on the nervous centres. I have known it succeed in some cases and fail in others. It is always worth a trial.

Several of the drugs already mentioned, which, when taken continuously, tend to correct that morbid disposition of the nervous system which is the cause of megrim, if administered in full doses at the approach of a paroxysm will sometimes cut it short. I have known twenty or thirty grains of Bromide of Potassium taken during the blind stage of the seizure bring on sleep and prevent the accession of the pain; but I have more frequently known it fail. Sometimes a dose of Bicarbonate of Potash will have the same effect; and it is not a little interesting to find that a similar operation

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* "Commentarii," cap. 66, p. 278.
† "Unpublished Writings," vol. i. p. 399.

of the latter drug has been occasionally observed in epilepsy. Dr. Reynolds says: "In many cases I have known the attacks warded off for a long period by the patient carrying in constant readiness, and taking a draught containing twenty grains of bicarbonate of potash, a fluid drachm of sal-volatile or chloric ether, or of tincture of valerian, and an ounce of camphor mixture."*

It is well known that both strong Coffee and Tea will often prevent a threatened megrim seizure, especially under the milder form of "nervous headache," and sometimes they will quicken the departure of a fully-developed attack. Like all remedies of the same class, they are uncertain in their effects, acting admirably with some persons on some occasions and entirely failing with others. They should be given strong without sugar or milk, and, if possible, on an empty stomach; and they are more effectual when the patient is accustomed to use them sparingly as articles of diet. Both Tissot and Lebert recognise this curative power of coffee in megrim, and Dr. Symonds observes: "I am not acquainted with any agents which equal these substances in the power of removing headache without leaving inconvenient results. And as their physiological action is so purely cerebral, restoring the intellectual faculties, and ministering to the sensations of personal well-being, as well as lessening any sad emotions, we have here an adequate presumption, were any required, that this headache is seated in the nerves, which are immediately related with the molecular action of the brain."†

The parallel we have observed throughout between different forms of neurosal disorder is also seen in this power of coffee occasionally to prevent or disperse a seizure. Two cases are recorded by M. Piorry of Neuralgia successfully treated in this way; one was an instance of "neuralgia of the 5th confined to the frontal branches, which had resisted a number of therapeutical measures, and which yielded to

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* "On Epilepsy," p. 346–7.

† "Gulstonian Lectures on Headache." 1858. *Med. Times and Gaz.*

the continuous use during several days of a very concentrated decoction of coffee." The other was also a case of facial neuralgia recurring every other day, which valerianate of zinc and quinia together had completely failed to relieve, but which yielded on the addition of large doses of coffee. Afterwards, "whenever the patient was threatened with a return of the malady, which she learned to know by the occurrence of certain vague pains, a strong cup of coffee would completely prevent the accession."* The same effect is seen in Asthma: long since Sir John Pringle wrote to Dr. Percival—"On reading the section on coffee in the second volume of your essays, one quality occurred to me, which I had observed of that liquor confirming what you had said of its sedative powers. It is the best abater of the periodic asthma that I have seen."† Dr. Salter says: "I should think from my own experience that coffee relieves asthma in two-thirds of the cases in which it is tried. The relief is very unequal, often merely temporary, and sometimes very slight; sometimes it is complete and permanent. It cannot be given too strong. Unless sufficiently strong to produce its characteristic physiological effects it does no good."‡ He explains its action in asthma on the supposition that it exalts the functions of the hemispheric ganglia, and so is opposed to the reflectorial activity of the medulla oblongata. Bornetwuk, adopting a vaso-motor theory of megrim, explains its curative power in this affection as similar to that of quinine, correcting the secondary atony of the vessels which follows a primary spasm.§

Guarana I have already mentioned. It has been long used in France in the treatment of megrim and gastric disorders. Since Dr. Wilks brought it more particularly to our notice in this country,‖ I have several times prescribed it at the commencement of an attack, but with

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* *Gaz. des Hôp.*, 1846, tome viii. p. 213.

† "Philosophical, Medical, and Experimental Essays." By Thomas Percival, M.D., vol. iii.

‡ "On Asthma," p. 202.

§ *Biennial Retrospect*, 1867-8, p. 99. (New Syd. Soc.)

‖ *British Medical Journal*, April 20th, 1872.

very variable success. In the first two cases of habitual megrim in which I tried it, it acted like a charm; in one it greatly abbreviated the seizure, and in the other (that of the lady referred to at pp. 140, 364) it rendered abortive a seizure which, from certain well-known signs, had threatened to be a severe one; yet on subsequent occasions it has entirely failed. In another family of sufferers it has never been productive of any decided benefit, although with one of them it proves emetic. We find, in fact, the same uncertainty in this as in many other reputed remedies for nervous disorders, and this I believe is very much the experience of most of those who have tried it in this country. But this is no reason for discarding it altogether; in so capricious a malady we cannot be too variously armed, and what fails in one case may succeed in another; as Lebert justly says:—"Ausserdem werden verschiedene Individuen durch sehr verschiedene Mittel erleichtert."

We have seen that in a certain proportion of cases the megrim paroxysms terminate spontaneously in vomiting, and in a few individuals are indefinitely prolonged until vomiting occurs; hence Emetics have been frequently employed with the view of anticipating this spontaneous termination, but with very uncertain success. In the blind form of megrim Heberden says they do no good and may do harm,—"Vomitus parum aut nihil juvat; sunt qui putant eum nocuisse." Dr. Airy tried an emetic in his own case, but without benefit.* Fordyce, on the contrary, says that "emetics have sometimes a most favourable effect. Lepois, who suffered for thirty years of his life, generally got relief when he could produce vomiting." Tissot refers to instances both of useful and useless vomiting, and he says that some patients derive benefit from whatever promotes it, as warm water. He occasionally prescribed ipecacuanha in emetic doses, but chiefly as a corrective of gastric disorder, especially in con-

* "Phil. Trans.," 1870, p. 261.

ditions of atony attended with the production of glairy mucus.*

Having admitted that gastric disorder occasionally operates as a determining cause of the seizures, it would be difficult to deny that emetics may sometimes prove serviceable by clearing the stomach; but we have already shown (pp. 139, 239, &c.) that the spontaneous vomiting of megrim is cerebral vomiting, and it does not of course follow that, because it forms the final stage of many seizures, therefore its artificial production should shorten the natural course; nevertheless it may do so, as we have already explained (p. 368, &c.), by substituting one form of nervous paroxysm for another. Dr. Parry relates of one of his patients who had been a sufferer from megrim from boyhood, and "where the bowels had been habitually open twice a day, and his digestion always good, notwithstanding this, and no deviation from the usual state of the alimentary canal at the time of these attacks, they have been often relieved by hot water drunk in such quantities as to excite vomiting."† I do not myself advise anything more than the promotion of natural vomiting in the manner here suggested.

The inhalation of Chloroform will relieve the pain of megrim; but, as Dr. Symonds observes, its effect is too transient to be of much service.

Of local remedies, MM. Piorry and Trousseau recommend the use of Belladonna. The former writes:—"It is in the early stages that the local application of extract of belladonna is most successful, which my friend and colleague M. Trousseau has employed as well as myself in the treatment of this malady. . . . M. Trousseau has succeeded in quickly dispersing the migraine paroxysms in a large number of cases by rubbing a mixture of equal parts of cerate and extract on the temples. Dr. Blanc has also applied it successfully in a case of hemicrania. . . . I myself employ the extract diluted with water to a syrupy consistence, and

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* "Œuvres Complètes," tom. xi. p. 147.
† "Unpublished Writings of Dr. C. H. Parry," p. 467.

rubbed on the lids. The quantity required varies from one to four grains. . . . I have twice arrested the progress of a seizure in a person who was frequently affected; and it is now six months since she had any return."* Dr. Symonds has applied aconitia ointment in the same way with great benefit. M. Lebert has found "ether on cotton wool, covered with a watch-glass, and applied to the painful spot, particularly useful; also a liniment of chloroform."†

In some cases the pain is mitigated by compressing the supra-orbital branch of the frontal nerve where it leaves the orbit, as well as by friction in the same situation. I have found both of much service in simply hemicranial cases, and they were long since recommended by Fordyce:— "Compressio vel frictio nervi qui cranium supra oculi orbitam perforat, dolorem aliquando lenit, certe nunquam delet."‡

Compression of the Carotid in the neck, according to the recommendation of Drs. Parry and Möllendorff, might perhaps be tried for the temporary alleviation of the severer paroxysms; but there are difficulties in the way of its general application which will always render it more a matter of physiological interest than practical value. The following extract, however, from Dr. Reynolds's treatise on the prevention of the epileptic paroxysm by similar means deserves our notice:—"Compression of the carotids and vagus appears to curtail the attacks, and sometimes to prevent them. Romberg says he has found it 'an effectual prophylactic.' Cooke speaks well of it, relating cases by Earle. Van der Kolk alludes to a case of Reimers, mentioned also in Schmidt's Jahrbücher, 1857, where the fit was cut short twenty-two times, the 'patient experiencing great relief and improvement in his memory and mental condition.'"§

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* "Mémoire, etc.," p. 417. † "Handbuch," p. 571.
‡ De Hemicrania, sec. xxxvi.
§ "On Epilepsy." By J. R. Reynolds, M.D.

When the symptoms arise which are more particularly attributed to congestion of the brain, such as the affection of speech, Professor Lebert advises that mustard plasters should be applied to the neck and calves of the legs, and cold affusion to the head. This latter measure alone, adopted during the blind stage, Professor Dufour of Lausanne has found to prevent the accession of the subsequent headache in his own case; but with Dr. Airy, who tried it on his recommendation, it has not succeeded.* The patient R. W. (No. 27) used to plunge his head into cold water, often with great relief to the pain, and Fordyce gives a similar testimony—"Aquâ frigidâ caput irrigare expedit."

M. Piorry states that stimulating the feet by hot water or similar means will sometimes cut short a paroxysm: "Une vive stimulation des pieds par l'eau chaude ou par la proximité d'un brasier, a quelquefois arrêté brusquement la migraine."† Dr. Graves recommends the same measure as very effectual for the relief of headache in young women, observing that "in explaining effects so striking, we must not only regard the efficacy of this measure in restoring the local circulation in the part, but must bear in mind the high nervous endowment of the surface of the parts, especially the soles of the feet."‡

It has been proposed by the supporters of the vaso-motor theories of megrim to treat the disorder by galvanizing the sympathetic, and this, it is said, has been shown by the experience both of Benedict and of Eulenburg and Guttmann to be extremely effective especially in palliating the pain.§ I regret to have nothing to add from my own experience of this remedy.

Notwithstanding the numerous measures which have been here suggested for the treatment of the paroxysm, I am

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* *Phil. Trans.* for 1870, vol. clx. pp. 251, 261.

† "Mémoire, etc.," p. 830.

‡ *Dub. Journ. of Med. and Chem. Science*, vol. iii. p. 152.

§ *Arch. f. Psych. u. Nervenkrank*, 1868, p. 421. And *Schmidt's Jahrb.*, cxxxix. p. 290.

bound to say that, with the exception of perfect repose, and whatever may tend to promote it, they often completely fail in the severer forms of seizure. What Tissot says is only too true of many instances:—"During the paroxysm there is scarcely anything to be done; moreover the patients are so much afraid of all noise, motion, or anything approaching them, that they infinitely prefer to be left perfectly quiet than tormented with useless measures." "Baths to the legs, enemas, applications to the forehead, do no good and only worry the patient."

APPENDIX.

THE following cases, to which reference was made at p. 20, are recorded by Abercrombie, who appears to have regarded them as *sui generis*, and not to have recognised their affinity to more ordinary cases of megrim. They are included among his illustrations of "Local Affections of Nerves," a subject which he considers involved in great obscurity. Abercrombie, "Dis. of Brain and Sp. Cord," 2nd Edition, 1829, p. 420:—

"Some time ago I was consulted about a singular disease of this nature, which occurs in paroxysms and affects in the same manner two (three) individuals of one family, a young lady of twenty five, and a young man of twenty-two (and another of twenty). The lady describes the attack in the following manner:—She is first affected with *blindness* of the right eye, which comes on gradually as if a cloud passed slowly over the eye; about a quarter of an hour after this she feels a numbness of the little finger of the right hand, beginning at the point of it and extending very gradually over the whole hand and arm, producing a complete loss of sensibility of the parts, but without any loss of the power of motion. The feeling of numbness thus extends to the right side of the head, and from this it seems to spread downwards towards the stomach. When it reaches the side of the head, she becomes oppressed and partially confused, answers questions slowly and confusedly, and her speech (articulation?) is considerably affected. When it reaches the stomach she sometimes vomits. The feeling of numbness then begins to subside, and as it goes off, she is seized with violent headache, which continues for several hours, and leaves her for a day or two feeble and languid.

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"The progress of the feeling of numbness from the little finger to the stomach sometimes occupies several hours, and the common duration of the whole paroxysm is about twenty-four hours. The frequency of its occurrence varies from a few days to several months; she has been liable to it for several years, but in the intervals betwixt the attacks she enjoys perfect health.

"Her brother, who is twenty-two years of age, is affected almost exactly in the same manner, and he has been liable to the paroxysms for many years. He is a banker's clerk, and in the intervals between the attacks enjoys perfect health. When he feels the commencement of the attack, he hastily brings to a conclusion any business on which he happens to be engaged, gives distinct instructions to another of the clerks in regard to the state in which he leaves the affairs of his department; then walks home, goes to bed, and soon after becomes insensible. Next day he is in his usual health, except a considerable degree of languor.

"These singular cases are under the care of Dr. Gibson, of Montrose, and in a letter received from him as these sheets were going to press, he informs me that they are considerably improved. . . . . Dr. Gibson adds that another of the family, a stout young man of twenty, has lately had several attacks of a similar affection though in a slighter degree."

These cases are so closely similar to some in the text that they need little comment. I shall only notice that the family proclivity to the malady seems here to have attained a high degree of intensity, and it is to be regretted that we know nothing of the history of their parents. The wandering progress of the "numbness" from fingers to the head, and then from the head to the stomach is very remarkable.

The insensibility spoken of in the second case probably refers to sleep or stupor, analogous to that of the young woman C——, p. 14. As regards the disorder of vision, which is said to have been in the *right eye*, I strongly sus-

pect, from my experience of these cases, that the real condition was obliteration of a portion of the field of view towards the *right side* in each eye, a condition which, by the generality of patients, would be interpreted as an affection of the right eye.

The case which follows is one among several of a somewhat similar character in the "Collections from the Unpublished Writings of Dr. C. H. Parry." Edited by his son, vol. i. p. 465. 1825.

The patient was a married lady, thirty years of age, the mother of four children, who had been for many years subject to fits of indigestion. Before her marriage she experienced a remarkable attack of the following kind, which has been repeated occasionally ever since:—"After considerable uneasiness in her stomach and bowels, and commonly after unusual costiveness, she is suddenly seized with giddiness in her head and great dimness of sight, followed in about twenty minutes with 'a glimmering before her eyes.' The giddiness is sometimes attended with great sickness; then the right hand and arm lose more or less, but always a great deal, of their sensibility, and in some degree the power of motion, so that she cannot hold anything in her hand. By degrees the numbness ascends to the shoulder, and then to the face, always, as she thinks, on the right side, immediately after which the right half of the tongue is affected in a similar way, and she loses the power of articulation. At this period also her intellect becomes confused, and her memory is at the same time for about half an hour so much impaired, that she cannot even remember the name of any medicine which she has just taken. On account of this want of recollection at that precise period, she is unable always to tell what part of her tongue is numbed, or whether there is any local diminution of the faculty of tasting. Soon after these occurrences the symptoms gradually subside, leaving her with a most distracting headache, which continues the whole day. During

this headache, if not sooner, her face is extremely hot and flushed, and her feet are very cold. The pain in her head sometimes extends itself to the occiput, but is always greatest, if not wholly, on the left side; and more or less sleepiness continues for some days afterwards. The pulse in the radial artery is, in the commencement at least, in the natural state."

Another case by the same author (vol. i. p. 370), forms an interesting supplement to those given in the section on the "Metamorphic and Vicarious Relations of Megrim," p. 204. We have seen megrim occurring on an epileptic basis, here it seems to have been connected with an hysterical one, and is a good illustration of the transition of ordinary hysterical seizures into those of typical megrim:—

"Miss E. A., in her twentieth year, had been long subject to attacks of palpitation, so violent as to prevent her speaking, brought on by trifling causes of agitation, and succeeded by globus and convulsive movements, with crying of ten minutes' duration. Before the cessation of these symptoms, there always comes on an insensibility of one side only, like in quality but greater in degree than that which occurs in what is called a sleepy foot or hand. It sometimes affects the whole side from head to foot, and when least never fails to attack the hand and foot together. It is accompanied with great coldness and want of muscular power in the parts affected, so that she cannot hold anything in her hand. She is for a time insensible, and when she comes to herself her head is extremely confused and giddy, and she becomes sick and has straining to vomit, which she encourages by drinking warm water. The chief of the numbness goes away with a tingling in about a quarter of an hour, though her limbs do not for the whole day feel in their usual way.

"At first these attacks came on twice a week and affected either side indiscriminately; but of late they have occurred much seldomer, and the numbness is only in the left side, always in the arm and more rarely in the

face. Her last attack was about a month ago. She is not subject to headaches, though at times they precede (?) her attacks, and are then in a very violent degree. She is always best after menstruation, which is in every respect regular; and between the attacks she has occasionally slight bleedings at the nose, sometimes six or seven times a day. She knows no cause for the first attack. Her bowels are costive and her appetite small. Her attacks are brought on by whatever disagrees with her stomach, as suppers which oppress the stomach and make her sick. It is obvious, however, that she has no real dyspepsia, as fruits and acids do not disagree with her. Violent exertion has brought on a paroxysm, in consequence of which she has almost wholly discontinued exercise on foot."

Then follows a description of an attack which occurred when under Dr. Parry's care, unattended by hysterical symptoms, and apparently a typical megrim paroxysm: "About two in the afternoon, while sitting at work, without any previous indisposition, she was seized with numbness, tingling, and loss of power, first in the right hand, and then, in quick succession, in thigh, leg, foot, arm, face, tongue, throat, so as to prevent Articulation as well as motion of her side. The fit was at first unattended with any affection of the head; but there soon came on a giddiness and violent pain over her left eye, accompanied with sickness, at first without vomiting. In a quarter of an hour after the accession of the giddiness she went to sleep; and an hour after when she awoke the numbness was gone, but the giddiness, pain in her head, and sickness continued. She then vomited up a great deal of bile; after which the giddiness ceased, but the headache continued till night, when she went to bed. This attack was unaccompanied with any choking in the throat, and was otherwise less than usual. The next day she was free from complaint."

The following case is from a Memoir by M. Piorry, "On the Nature and Treatment of several Neuroses, and

on the analogy which exists between them and Neuralgias," in his "Clinique Médicale de l'Hôpital de la Pitié," p. 305, Paris, 1835 :—

"Une jeune fille de quatorze ans, non réglée, marchande de modes, et très appliquée au travail que nécessite son état, par conséquent fixant très attentivement des objets délicats, éprouve, lorsqu'elle a travaillé plus que d'ordinaire, lorsqu'elle a été frappée par une lumière vive, surtout lorsque ces choses lui arrivent après avoir mangé, un éblouissement dans l'œil droit. Une sorte de nuage se répand sur les objets ; celui-ci s'entoure bientôt d'un demi-cercle lumineux, disposé en *zig-zag*, coloré et scintillant, qui, d'abord très petit, s'étend bientôt, s'élargit, et, après dix minutes, envahit tout l'espace, devient plus sombre et disparaît alors. Dès le commencement des accidents, les paupières et le pourtour des orbites sont rouges et les yeux larmoyants. Les sens s'engourdissent, et une sorte de stupeur s'y joint ; un quart d'heure après, l'œil devient douloureux ; des élancemens ont lieu, des nausées commencent, la malade se sent défaillir ; quelquefois des vomissemens surviennent, et ces derniers accidents, toujours sans fièvre, durent vingt-quatre heures. L'obscurité et le sommeil en calment la violence.

"Quelquefois une nouvelle série de symptômes se dessine. Les extrémités des doigts de la main droite deviennent le siége d'un mouvement de vibration, de frémissement très analogue, pour le sens du toucher, à ce qu'est l'oscillation du demi-cercle lumineux pour la vue ; peu-à-peu ce mouvement abandonne l'extrémité des doigts qui sont légèrement rouges, puis s'élève vers la paume de la main, puis envahit celle-ci, l'avant-bras et le bras, et disparaît à l'épaule. Jamais ces accidents n'ont lieu du côté du corps opposé à l'œil qui a été le point de départ des accidents."

The following is a general description of the malady by the same distinguished author, from which we have quoted largely in the text. It is from a Memoir, "Sur l'une des

Affections désignées sous le nom de Migraine ou Hemicranie," published in his well-known work entitled, *Du Procédé Opératoire à suivre dans l'Exploration des Organes par la Percussion,* p. 409, Paris, 1835; and is known to embody the circumstances of his own case :—

" Au moment de l'invasion, la vue est moins nette, on éprouve une sensation très analogue à l'éblouissement; il semblerait qu'un nuage se manifeste au centre de l'image qui se peint sur la rétine; peu-à-peu le point terne qu'on observait s'étend; bientôt, et après une ou deux minutes, se dessine à l'entour de l'espace obscurci un arc de cercle lumineux, coloré chez quelques individus, mais pâle chez d'autres, disposé en zig-zags, agité par une sorte d'oscillation continuelle. D'abord très-petite, cette portion de cercle grandit en même temps que le point central obscurci commence à s'éclaircir, et se développant de plus en plus, scintillant continuellement, semblant se rapprocher successivement de la circonférence de l'iris, l'arc lumineux finit par disparaître lorsqu'il arrive à l'extrémité du champ de la vision. Que l'œil soit ouvert ou fermé, l'hallucination continue; mais elle se dessine mieux dans un demi-jour ou dans les ténèbres que dans une lumière vive. C'est presque toujours d'un seul côté qu'elle a lieu; je n'ai jamais vu personne qui ait éprouvé la sensation de doubles images. Chez presque tous les sujets de mes observations, la forme de ces images était, à peu de chose près, la même; de sorte qu'en la dessinant, ils reconnaissaient ce qu'ils avaient souvent vu. La durée de cette première lésion varie : ordinairement elle ne dépasse pas quelques minutes; quelquefois l'image met une demi-heure à parvenir à son entier développement et à sa disparition.

" Jusque là, et même un peu par-delà, point de douleur, seulement sorte de stupeur, trouble dans la vision et légère pesanteur de tête. Dans quelques cas, l'éblouissement, même léger, et le nuage, sont les seules lésions optiques qui précèdent la douleur, et il arrive que les troubles de la vision sont quelquefois assez légers pour que les malades n'y aient pas fait attention et ne se les rappellent qu'après les

questions réitérées du médecin. Cependant, après un temps dont la durée varie, quelques élancemens se font sentir dans l'œil et dans la tempe du côté où l'éblouissement avait eu lieu ; tout le globe oculaire est douloureux, et la moindre pression qu'on exerce sur lui détermine un sentiment pénible, dont le caractère ne diffère pas des élancemens spontanés qui surviennent ; il semblerait que l'œil soit trop plein, et qu'on y donne des coups de marteau. C'est spécialement en haut et en dedans que la douleur est la plus intense. Celle-ci n'est pas constamment portée au même degré pendant toute sa durée ; elle est extrême durant quelques minutes, puis se calme, pour reparaître ensuite avec la même énergie. Du reste, elle ne cesse pas complètement, et, s'il est vrai que des exacerbations se manifestent toutes les dix minutes, tous les quarts d'heure, on ne peut pas dire qu'il y ait intermittence. La durée de la douleur varie depuis plusieurs heures jusqu'à deux ou trois jours.

" La vue, l'ouïe, le goût, l'odorat sont altérés pendant que la névralgie suit ses périodes ; les paupières sont rouges, tuméfiées par le sang ; la lumière la plus légère ramène les paroxismes ou les rend plus intenses ; le moindre bruit est insupportable ; le dégoût pour les alimens est quelquefois extrême, et les odeurs les plus suaves sont difficilement supportées par les malades.

" Les facultés intellectuelles ne sont pas altérées ; seulement, il y a le plus souvent une grande tendance au sommeil.

" Dans les cas les plus simples, la maladie se borne aux symptômes que je viens de signaler ; mais trop souvent l'estomac participe à la souffrance de l'œil. Quelque temps après les éblouissemens et l'invasion de la douleur, des éructations surviennent, des gaz s'échappent par l'œsophage, puis des nausées se déclarent, des vomissemens les suivent ; les alimens que contenait l'estomac, plus ou moins digérés, suivant le temps qu'ils ont séjourné dans ce viscère, sont rejetés au-dehors. Ces vomissemens ne dépendent pas de la présence des alimens, car ils se déclarent quelquefois

lorsque l'estomac est complètement vide, et ce sont même ceux-là qui fatiguent le plus les malades.

" Mais il ne faudrait pas penser que ce fussent là les seuls accidens dont une migraine excessive soit accompagnée ; il arrive qu'un des côtés de la langue ou de la face, que les membres inférieurs, et surtout les supérieurs, éprouvent un frémissement douloureux qui rappelle les oscillations de l'image dans l'œil, qui en a le caractère de vibration, et qui, commençant par la pointe de la langue, une partie de la face, le bout des doigts ou des orteils, remonte peu-à-peu vers l'axe cérébro-spinal, en disparaissant successivement vers les points où d'abord il s'était développé. Cette sensation bizarre ressemble assez bien à celle que l'on éprouve dans les crampes, ou au sentiment pénible que l'on ressent au bout des doigts lorsqu'on s'est heurté le nerf cubital au coude. Quand cette douleur est parvenue vers le centre nerveux, elle cesse de se faire sentir.

" Le cœur, les poumons, le tube intestinal ne donnent pas lieu, en général, à des symptômes dignes d'être notés. Le plus souvent un sommeil réparateur termine la maladie, soit après plusieurs heures, soit après un ou deux jours. Les douleurs se font encore sentir pendant que la malade dort, mais elles s'amortissent, et finissent par disparaître. Quelquefois des nausées, suivies de vomissemens, réveillent, et le sommeil revient ensuite. La migraine n'existe ordinairement plus le matin, ou il n'en reste qu'une pesanteur de tête qui se dissipe bientôt.

Heberden has clearly identified Blind Megrim in his *Commentaries,* cap. 66, p. 278 (1802), under the head of " Diseases of the Eyes."

" Istius generis caligines oculis interdum offunduntur, in quibus modo maculæ nigræ in aëre videntur volitare ; modo dimidia tantum pars rerum cerni potest : quæ cum duraverint circiter tertiam horæ partem, desinunt in vehementem capitis dolorem multas horas sævientem ; simul quoque in quibusdam nausea et vomitus sunt. Angor harum

accessionum vix est tolerabilis, periculum autem prorsus nullum, quantum conjicio ex iis, qui vixerunt annos viginti sæpe tentati hâc ægrotatione, et tamen cessante dolore satis commode valuerunt. Hoc malum nulla certa tempora redeundi servat; nec invenire potui quibus de causis repetat, quibusve remediis sanetur, aut etiam leniatur; nisi quod cubanti in lecto dolor citius finitur, et impetus ejus aliquantum minuitur. Æstate, et regionibus tepidioribus, rarius est; item in ætate provecta vel multum minuitur, vel prorsus finitur. Vomitus parum aut nihil juvat; sunt qui putant eum nocuisse."

In another chapter on *Headache* (cap. 17, p. 82) he again refers to the same disorder as having characters in common with other forms of habitually recurrent Headache, and with Hemicrania, which differs from them, he thinks, only by its one-sided character. After observing that *Headache* has qualities of its own which distinguish it from all other pains, he continues:—

"Hujus profecto morbi sedes [namely, the Brain], et longa ejus mora, et crebri reditus, jure possent incutere metum magni cujusdam detrimenti subsecuturi; quod tamen contra fit. Atroces enim capitis dolores nonnullos fatigarunt per totam fere vitam, absque eo ut vel mors acceleraretur, vel ingenii vires minuerentur; at ubi dolor conquieverit, ægri omnes res, sicut antea, ministrarunt. Paralyseos levissima accessio longe plus detrimenti affert, quam capitis dolores vehementes, crebrique, a pueritia usque ad senectutis initium. In hoc longo certamine valetudo corporis adeo non succumbit, ut morbum tandem ipsum vincere videatur, quem quidem ex innumeris ægris didici ætate ingravescente fieri mitiorem, et demum prorsus finiri. Quæ res vicem remedii implere debet, ubi omnia remedia frustra fuerunt: haud leve enim ægro solatium est, nosse morbum suum, qui medicamentis cedere recusat, tempori tandem esse cessurum. Idem quoque exitus est istius doloris capitis, qui incipit a caligine oculorum.

"Hemicrania, sive dolor dimidii capitis, nomen inter medicos veteres obtinuit, quo ab aliis capitis affectibus dis-

tinguitur: tamen ex tam longa experientia nondum didicimus, præter sedem, quodnam sit discrimen inter hunc et alios ejusdem partis dolores. Mihi profecto hemicrania a latere sinistro, sæpius quam a dextro, visa est; sive id casu acciderit, quod potius credo, seu lege quadam naturæ. In multis ægris subinde redire consuevit per totam vitam; et morbo articulari superveniente non levata est: sæpe quoque secuta est istum oculorum affectum, in quo dimidium rerum interit."

Addition to p. 129.

The following passage from Robert Whytt's "Treatise on Nervous Disorders" (Works, p. 622, 1768), has reference to a form of giddiness described at page 129, to which those who possess the neurosal constitution are particularly liable, and which was explained by Wollaston in his own case simply as an effect of a variation of blood-pressure in the brain. It shows that Whytt had recognised this form of giddiness as a distinct neurosis many years before, and more correctly explained it by reference to a peculiarity of nervous organization as well as a variation in blood-pressure:—

"*A Giddiness.*—This may proceed from some of the causes which have been mentioned above, as producing Periodic Headache, especially when they affect the anterior part of the brain or dura mater.

"Many people of a delicate nervous and vascular system, after stooping and suddenly raising their head, are apt to be seized with a *vertigo* which is sometimes accompanied with faintness. In this case, the vessels of the brain, being too weak, seem to yield more than usual to the weight of the blood when the head is inclined; and afterwards, when it is suddenly raised, and the blood at once descends towards the heart, those vessels do not contract fast enough, so as to accommodate themselves to the quantity of blood remaining in them. At the same

time the brain, on account of its *too great sensibility,* is more affected than usual by any sudden change in the motion of the fluids through its vessels."

Addition to p. 201.

In a later edition of his work, p. 256, Dr. Salter gives the following additional illustrations of the metamorphoses of asthma, and of the transfer of a neurosis from one nervous territory to another:—

"A little girl began to suffer when about eight years of age from extreme Irritability of the Stomach. It was intolerant of anything. The moment food of any kind was swallowed it was rejected. There was no pain, no tenderness, no feeling of sickness at any other time. The vomiting was not violent; it was the simple and immediate rejection of anything put into her stomach. Before the child had half finished her breakfast she would have to rise from the table and run to the garden. Then an act or two of vomiting would empty the stomach, and she would return to the house quite well." No treatment was of any avail but that of feeding her with teaspoonfuls of milk. "I heard nothing of her," continues Dr. Salter, "for some years, and then, upon inquiry, I was told that her vomiting had ceased, but that its disappearance had been accompanied by the appearance of another disease, Spasmodic Asthma, which had apparently supplanted it. With my previously conceived notions about the pneumogastric pathology of asthma, this was particularly interesting to me, and this interest was increased by my further inquiries; for I found that not only had the vomiting ceased when the asthma appeared, but that when the vomiting had again appeared, as it had more than once, the asthma had ceased. In this way they alternated, the vomiting always coming on when the asthma was better. . . .

"Now I do not think that I am giving way to fanciful speculation in believing that the malady in this case was throughout one and individual—morbidly-exalted pneumo-

gastric irritability, and that the supplanting of the vomiting by the asthma—the stomach contraction by the bronchial contraction—merely indicated the transference of this perverted innervation of the pneumogastric from its gastric to its pulmonary portion.

"In another case of Asthma, violent paroxysms of Pain in the Epigastrium, clearly dependent on cramps and irregular peristalsis, occurred at irregular intervals of two or three months apart. They were at first thought to be colicky, but were afterwards clearly proved to have their seat in the stomach, and, I believe, depended upon a strong hour-glass contraction, or spasm of the pylorus, through which the cardiac portion of the stomach was in vain endeavouring to drive its contents. It certainly so happened that when this patient was freest from his asthma he was most apt to be attacked with these paroxysms of pain, and *vice versâ*, and that he never had the two together."

These cases should be compared with the Gastralgic Transformations of Megrim recorded at page 215.

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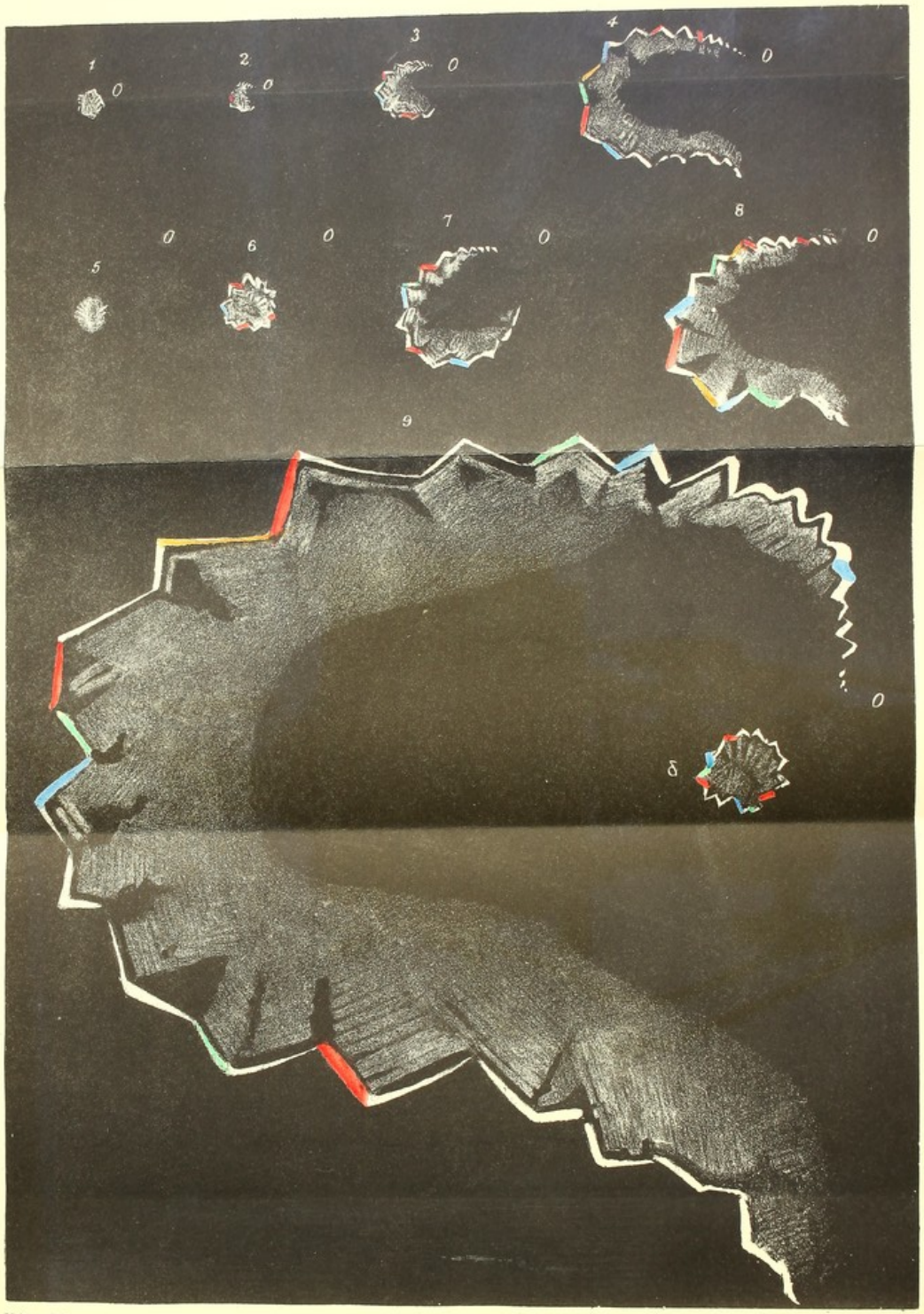
EXPLANATION OF THE PLATE.

(From Dr. Hubert Airy's Paper—"On a Distinct Form of Transient Hemiopsia," *Phil. Trans.* for 1870, p. 247. *See* p. 83.)

Figs. 1—4. Early stages of sinistral Teichopsia beginning close to the sight-point, as seen in the dark. The letter *O* marks the sight-point in every figure.

Figs. 5—8. A similar series of the early stages of sinistral Teichopsia beginning a few degrees below and to the left of the sight-point.

Fig. 9. Sinistral Teichopsia fully developed. δ. Beginning of a secondary attack, which never attains full development unless it arise on the opposite side. *See* Text, p. 69.



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No.	Name and References.	Sex.	Age at Commencement.	Age at Termination or Persistence.	Hereditary Disposition and Family History.	Causes Accessory to the Disease.	Causes Exciti the Seizures.
1.	E. C. Hosp. Mem. i. 170. Text, 59 and *passim*.	F.	10	Persisting at 35.	Father suffered from megrim.	Aggravated by leucorrhœa and lactation.	
2.	W. R. Hosp. Mem. i. 217. Text, 99, 100, 109.	M.	21	Persisting at 32.	None known.	Attacks more frequent when out of health.	None known: called "Bilious."
3.	E. L. Hosp. Mem. i. 243. Text, 49 and *passim*.	F.	Ever since she can remember.	Persisting at 37.	Mother suffered from "sick-headaches."		Muscular strain, as li ing.
4.	E. G. T. Hosp. Mem. ii. p. 416.	M.	10	Persisting at 14.	None known.		Sleep or waki
5.	E. F. Hosp. Mem. ii. 358.	F.	15	Persisting at 44.	None known.		Precede the catamenia.
6.	E. N. Hosp. Mem. ii. 310.	F.	30	Persisting at 39.	Mother suffered from "sick-headaches."	Ovarian irritation (?)	
7.	W. C. Hosp. Mem. ii. 268.	M.		Persisting at 30.		None.	None. Ob ves a reg periodicity
8.	H. S. Hosp. Mem. ii. 615.	M.	32	Persisting at 33.	None known.		Mental exci ment.
9.	F. P. Hosp. Mem. iii. 243. Text, p. 231.	F.	From childhood.	Persisting at 38.	Many of family, father, mother, &c. suffer from megrim.		Mental e tion; c menial per
10.	H. T. Hosp. Mem. iii. 204. Text, pp. 16, 65, 88, 102.	M.	28	Persisting at 33.	Mother suffered from sick-headache.		None.
11.	J. H. Hosp. Mem. iii. 69.	F.	Ever since she can remember.	Persisting at 51.	Several of her children suffer from similar headaches.	None.	None.
12.	I. M. Hosp. Mem. iii. 294. Text, pp. 29, 231.	M.	Ever since he can remember.	Persisting at 28.	Father and family suffer from similar attacks.		None kno called "Bil attacks."
13.	E. D Hosp. Mem. iii. 270.	F.	Ever since she can remember.	Persisting at 26.	Mother suffered from megrim.	None.	None. Reg periodicit
14.	Mr. A. (Private.) Text, pp. 213, 217, 31, 125.	M.	19	Terminated at 27; returned occasionally at 35.	Brother, sisters, son, from blind-megrim or sick headache. Sleep-walking and nocturnal incontinence of urine in children. Brother and son from acute rheumatism. Two maternal cousins insane; two epileptic.	Over-study and anxiety. Want of exercise.	

ANALYTICAL TABLE OF CASES.

Periodicity and Interval.	*Duration of Attacks.*	*Affection of Sight.*	*Affection of Touch and General Sensibility.*	*Affection of Speech.*	*Emotional and Intellectual Disorder.*	*Vertigo.*	*Headache.*	*Nausea and Vomiting.*	*Termination of Seizures.*	*Metamorphosis.*	*Effects of Remedies.*	*Memoranda.*
1 week.	12 to 24 hours.	Central obliteration and sparkling. Both eyes; Right most.				Giddy.	Frontal and occipital. Bilateral.	Occasional vomiting.	Gradual.		Diminished under tonic treatment.	
About a month.	All day; goes off at night.	Dimness and dazzling of whole visual field. Both eyes.	Hands numb; both sides.	Aphasia; memorial and motorial.	Confusion of ideas.	Giddy. Double vision.	Frontal. Bilateral. After-tenderness.	None.	By sleep. A night's rest.		Benefited by iodide of potassium.	Some persistent impairment of memory.
About a month.		"Glimmering" before sight. Right eye (side?)					Frontal. Unilateral.	Nausea; occasional vomiting.				
2 months.	All day from first waking.						Frontal. Bilateral.	Vomiting.	By sleep at night.		"No good."	
1 month.							General. Bilateral.	Violent retching.	Gradual.		"No good from medicine."	
2 weeks.		A general impairment of vision precedes headache.					General. Bilateral.	Vomiting.	Gradual.			
2 weeks.		General obscuration and "glimmerings" precede headache.					General. Bilateral.	Nausea.				
1 month.	48 hours.				Confusion of ideas; impaired memory.	Giddy.	General. Bilateral. After-tenderness.	Occasional vomiting.	Cut short by vomiting. If not then in sleep.		Benefited by bromide of potassium.	
1 month.	12 hours.						General. Bilateral.	Vomiting.				Occasionally slight jaundice follows attacks.
6 months.	All day; goes off at night.	Obscuration of visual field with dazzling, sparkles, and colours. Both eyes. Precedes headache.	Numbness and tingling in hand, arm, throat, lips, tongue: right side. Bilateral in tongue.	Aphasia; memorial and motorial.			Frontal. Bilateral.	"Sick."	Shortened by sleep.		Relief from quiet and recumbency. Benefit from bromide of potassium and chloride of ammonium.	
1 to 4 weeks.	Several hours.	Blank spots in field of vision, and sparklings. Both eyes.					Frontal. Unequally bilateral. Left side most.	"Sick."				Wasting of dorsal interossei, 3 spaces right hand.
From 3 days to 3 weeks.	About 5 hours.	Dim vision of both eyes preceding headache.	Numbness in hands and arms. Bilateral.				Bilateral.	Vomiting.	Gradual.			Jaundice after some attacks. Such jaundice hereditary in family.
							General. Bilateral.	Violent retching.				
Irregular and distant intervals.	Several hours.	Central, centrifugal obscuration, followed by dazzling and sparkling. Both eyes. In later attacks no visual disorder.				Sometimes giddy. Independent attacks of vertigo.	Frontal. Unequally bilateral. Later attacks unilateral.	Nausea.	In sleep.	Vicarious attacks of periodical gastralgia. Nocturnal laryngeal spasms.	Relief from recumbency, quiet, sleep. Occasionally from bromide of potassium.	

No.	Name and References.	Sex.	Age at Commencement.	Age at Termination or Persistence.	Hereditary Disposition and Family History.	Causes Accessory to the Disease	Causes Exciting the Seizures.
15.	Dr. K. (Private.) Text, pp. 32, 46, 60, 68, 74, 76, 78, 134.	M.	24	Terminated at 32; returned occasionally later.	A sister epileptic from a child.	Over-study, mental anxiety.	Perhaps gastri disorder.
16.	Mr. B. Communicated by Dr. Latham. Text, p. 11.	M.	12	Persisting at 21, but abating.	Mother, up to age of 22, suffered from similar attacks; two sisters neuralgic.		Emotion, mu cular exertio Gastric di order.
17.	F. T. Hosp. Mem. Summer, 1863. Text, pp. 30, 58, 85.	F.	Ever since she can remember.	Aggravated after marriage at 26; persisting at 36.	Brother from asthma, and paroxysmal insanity.	Aggravated by condition of debility.	None.
18.	Mr. A.'s brother. (Private.)	M.	13	Headaches terminated at 17; hemiopia at 25.	See No. 14, above.	Mental fatigue.	
19.	S. H. Hosp. Mem. Feb. 1863. Text, pp. 205, 32, 47.	F.	12	Termination in epilepsy at 35.	Sister and brother epileptic.		Unusual exe tion. Catamenial period.
20.	S. Br. Hosp. Mem. 1863. Text, pp. 48, 46.	F.	27	Persisting at 31.	Brother suffers from sick-headaches.		A hearty meal Catamenial period.
21.	S. Bur. Hosp. Mem. Jan. 1863. Text, p. 29.	F.	From childhood.	Persisting at 34.	Mother, brothers, and sisters from similar sick-headaches.	None.	None. Reg larly perio cal.
22.	Mrs. N. (Private.) Text, pp. 32, 46, 149.	F.	From 15	Persisting at 35.	Father megrim; one brother neuralgia; another paroxysmal insanity; sister epileptiform vomiting, &c. Children, various neuroses.		Catamenial p riod. Abse during pre nancy. Referred "stomach liver."
23.	M. Du Bois-Reymond. Arch. f. Anat. u. Phys. 1860. p. 461. Text, pp. 4, 295.	M.	20			Winter; excessive intellectual exertion. Deficient exercise.	Prolonged s stinence. Evening ent tainments.
24.	R. S. Hosp. Mem. Jan. 1863. Text, pp. 59, 100, 114.	F.	15	Persisting at 30.	None known.	Overwork as sempstress.	None.
25.	From Abercrombie on the Brain, 2nd Ed. p. 420, Case I. Text, p. 89 and appendix, p. 473.	F.		Persisting at 25.	Two brothers from similar attacks.	None.	
26.	Idem. Case II. Text, p. 89 and append. p. 474.	M.		Persisting at 22.	Brother and sister from similar attacks.		
27.	R. W. Oct. 1863. (Private.) Text, p. 49.	M.	To some extent as long as can remember; worse since 11.	Terminating at 14.	Mother epileptic.		None.

ANALYTICAL TABLE OF CASES.

Periodicity and Interval.	*Duration of Attacks.*	*Affection of Sight.*	*Affection of Touch and General Sensibility.*	*Affection of Speech.*	*Emotional and Intellectual Disorder.*	*Vertigo.*	*Headache.*	*Nausea and Vomiting.*	*Termination of Seizures.*	*Metamorphosis.*	*Effects of Remedies.*	*Memoranda.*
2 to 3 months.	6 to 8 hours.	Sometimes central, sometimes hemiopic obscuration; with dazzling and sparks spreading from right margin of the visual field. Both eyes.	Numbness and tingling in the upper extremities on one occasion.				Temporal. Unilateral, opposite side to the dazzling.	Occasional retching and vomiting.	In sleep, or by artificial vomiting.		Relief from rest and recumbency.	Temporary incapacity for mental exertion after an attack.
2 weeks.		Horizontal hemiopic obliteration, followed by chromatic zigzag spectrum.			Vague sense of terror.		Frontal. Bilateral.	Nausea; occasional vomiting.	Sleep or vomiting.			
2 to 3 months.	Several hours.	Vertical hemiopic obscuration. Both eyes.	Numbness and tingling both hands.				Frontal. Bilateral.	Occasional vomiting.	Gradual.		Some relief from recumbency; none from vomiting.	
Irregular intervals.		Obscuration, more on one side of visual field than other.					Frontal. Sometimes bilateral, sometimes not.	Nausea.			Rest and out-door exercise.	Rheumatic fever when young.
1 month.	Exacerbations and remissions for 2 to 3 days.	Dimness of vision.	Numbness of fingers.				General. Bilateral.	Nausea and vomiting.	Partially by vomiting.	Replaced by epilepsy.	"No benefit from medicine." Purgatives useless.	
1 month.	Exacerbations and remissions for 2 to 3 days.	Dimness of vision.					General. Bilateral.	Vomiting.	Partial crisis in vomiting.			
2 weeks.	12 hours from waking.	Obliteration and dazzling, most on the right of visual field.				Giddy.	Imperfectly bilateral. Most on right side.	Vomiting.	By a night's sleep.			
1 month.		Vision obscured, mostly to right of visual field.					Frontal. Unequally bilateral. Mostly to right side.	Nausea; vomiting rarely.	Crisis in copious tears occasionally.		"Nothing does any good."	There is nothing of an hysterical character about this lady or her complaints.
3 to 4 weeks.	All day from waking.						Unilateral. After-tenderness.	Nausea.	In sleep.			Slight gastric disorder follows each attack.
Irregular and distant intervals; lately frequent.	All day.	Obscuration (central?) followed by zigzag spectrum. Both eyes.		Aphasia; difficult articulation on several occasions.	Indescribable feeling of fear.		Bilateral.	Nausea.	By a night's sleep.		"Nothing does good."	
Variable; days to months.	24 hours.	Nebulous appearance before right eye. Right side of visual field (?)	Numbness, unilateral, right side.	Aphasia; memorial and motorial.	Confusion of ideas.		Unilateral (?)	Occasional vomiting.			Improved under tonic treatment.	Temporary feebleness after attacks.
Days to months.	24 hours.	(As above.)	(As above.)	(As above.)	Utterly incapacitated.		Unilateral (?)	Occasional vomiting.	In sleep.			(As above.)
		None.	"Sensations" in hands.				Bilateral.	Vomiting.	In vomiting.		Relief from cold douche to head, also from vomiting. Cured by going to sea.	(As above.)

No.	*Name and References.*	*Sex.*	*Age at Commencement.*	*Age at Termination or Persistence.*	*Hereditary Disposition and Family History.*	*Causes Accessory to the Disease.*	*Causes Exciting the Seizures.*
28.	Mr. P. (Private.)	M.	14	Terminating at 16.	Mother suffered from sick-headaches.		None.
29.	A. M. (Private.) Text, pp. 6, 141.	F.	Ever since she can remember.	Persisting at 27.	Mother and sisters from sick-headaches.	None.	Emotion; tr velling infal bly.
30.	E. H. Sieveking on Epilepsy, p. 27. Text, p. 208.	F.	30	Persisting at 32; then replaced by epilepsy.	Sister epileptic.		
31.	E. G. Sieveking on Epilepsy, p. 57. Text, pp. 209, 88.	F.	36	Persisting at 37.			None. Regul periodicity.
32.	C —. Dispen. Mem. D.S. 5. Text, pp. 14, 143.	F.	9	Persisting at 17.	Mother suffered from similar headaches.	None.	None. A re lar periodic
33.	From Tissot, Traité des Nerfs (Bayle), p. 384.	M.	28	Persisting at 40.			Always beg in sleep.
34.	Idem, p. 385.	M.	8	Terminating at 70.	None known.		None.
35.	Idem, p. 385.	M.	From childhood.	Terminating a few years before death at age of 68.	No inquiry (?)		None.
36.	Idem, p. 385.	F.		Terminated about 50.	No inquiry (?)		
37.	Idem, p. 386.	F.	13	Persisting at 23.	No inquiry (?)		
38.	C. Lepois. (Autograph.) Text, pp. 56, 143.	M.	15	Changing its character at 30, and abating.	One of his children from "Carus" or trance.	Mental exertion; studious life in Paris. Winter.	Change of wi wet and clo weather.
39.	By C. Lepois. De Hemicrania, obs. xiii. p. 92.	F.	12	Persisting at 17; attacks less severe.			Tempest rain - stor or change wind.
40.	Austrian officer by Tissot, p. 388. Text, pp. 64, 86.	M.	9	Persisting at 32.			None. Reg periodici
41.	By Van der Linden. — "De Hemicrania Menstrua." Text, pp. 47, 150.	F.	Late.	Persisting at 31.			Catamen period.

ANALYTICAL TABLE OF CASES.

Periodicity and Interval.	*Duration of Attacks.*	*Affection of Sight.*	*Affection of Touch and General Sensibility.*	*Affection of Speech.*	*Emotional and Intellectual Disorder.*	*Vertigo.*	*Headache.*	*Nausea and Vomiting.*	*Termination of Seizures.*	*Metamorphosis.*	*Effects of Remedies.*	*Memoranda.*
At first 2 to 3 months; then weekly.		Obscuration (central?) before both eyes.	Numbness of hands; bilateral.				Bilateral.	None.	Gradual.		Doubtful if warded off by aperients. No benefit from recumbency or medicine at the time.	
2 months.	Begins at various hours; ends at night.				Reckless indifference.	Condition of sea-sickness.	Bilateral.	Nausea and vomiting.	Termination in sleep at night.			
2 to 6 weeks.	2 to 3 days.	Transient loss of sight. Both eyes.	Numbness of hands, arms, sides. Bilateral.	Aphasia.		Giddy.	Frontal. Bilateral.			Merged into epilepsy.		
1 month.	All day.	"Film" before the eyes.	Numbness of leg, hand, arm, and face; unilateral, right side.	Impaired articulation.	Confusion of ideas.		Unilateral (?)					
2 weeks.	All day.	None.	Numbness and tingling in hand and arm, right side, which becomes so useless as to drop things.		Stupor; almost coma.	None.	Unilateral. Right brow.	Nausea and vomiting.	Gradual.		Relieved by vomiting; also by ammonium chloride.	
At first 2 months; later, weekly.	10 to 14 hours.						Unilateral. Right.	Vomiting only in severer seizures.	Gradual.		No relief from vomiting.	Attacks commence with gastralgia.
	5 to 6 hours.	Intolerance of light, noise, &c.			Depression and ill humour before.		Bilateral.	None.	In sleep at night.		No benefit.	Premonitory chills and shivering.
At first, distant; then 1 month; then 2 weeks; then 1 week.	12 hours.						Bilateral.	Vomiting.	Always by vomiting.	Vicaricus asthma.	By vomiting.	Temporary feebleness after attacks.
							Unilateral. Alternate sides.	Vomiting.	Always by vomiting.		By vomiting.	Feeble digestion.
1 month; afterwards 1 week.							Unilateral. Alternate sides.					Perspirations on right side of body only.
Irregularly periodical.	Several hours.				Drowsiness approaching coma.		Bilateral.	Vomiting "Watery bile."	By vomiting and heavy sleep.	Vicarious colic or gastralgia. Attacks of drowsiness and sickness without headache after 30.	Relief from vomiting. Attacks absent when perspiration free in summer.	
			Tingling in fingers, arm, side of neck; left side.				Unilateral. Temple and eye of left side.	Vomiting bilious watery fluid.				On first occasion some attendant spasm of muscles of neck; and after-numbness of side two days.
2 months.	7 to 8 hours.	Obscuration, more or less to one side of visual field.	Numbness and tingling of extremities and tongue; one or other side.	Aphasia; difficulty in articulation.			Bilateral. Frontal.	Occasional vomiting.	Sometimes by vomiting; otherwise gradual.		Relief from change of locality.	
1 month.	24 hours.	Intolerance of light, &c.		Inability to speak.			Unilateral. Alternate sides.				Recumbency and quiet.	Copious diuresis and salivation occasional incidents of seizures.

No.	Name and References.	Sex.	Age at Commencement.	Age at Termination or Persistence.	Hereditary Disposition and Family History.	Causes Accessory to the Disease.	Causes Exciting the Seizures.
42.	From Tissot, p. 387.	F.	Adult.			Bodily and mental exhaustion.	
43.	From Tissot, p. 361.	M.	15				
44.	Miss M. (Private.) Text, pp. 29, 49, 53.	F.	18	Persisting at 43.	Mother, brother, and two sisters from sick-headaches.		Mental emotion. Travelling.
45.	Mr. A.'s Son. (Private.) Text, pp. 80, 118, 31, 60, 147.	M.	12	Persisting at 15.	Family history of megrim and other neuroses. (See above, No. 14.)	Strain of school-work.	
46.	Mr. S. (Private.) Text, pp. 221, 73, 93, 101, 46, 78.	M.	14	Persisting, though abating at 27.	Father and brother from similar blind-megrim. Father died permanently aphasic.	Over-work at the University.	Anxiety; excess of wine. Great muscular fatigue. Travelling.
47.	Mr. S.'s Father. (Private.) Text, p. 221.	M.		Through life.	Two sons from similar attacks, and other neuroses.		Called "Bilious attacks."
48.	S. Ar. Communicated by Dr. Fenn, of Richmond. Text, pp. 206, 32.	F.	14	Persisting at 29.	Mother suffered from sick-headaches.	None.	
49.	Miss E. A. From Doctor Parry's Post. Works, i. 370. Text, pp. 49, 88, and appendix, p. 476.	F.	When quite young.	Persisting at 20.	No inquiry (?)	None.	Dyspepsia. Muscular exertion.
50.	Mrs. — From Dr. Parry, i. 465. Text, pp. 88, 100, 108, and appendix, p. 475.	F.	24	Persisting at 30.	No inquiry (?)		Disorder of bowels, or constipation.
51.	Dr. Parry. (Autograph.) Idem, i. 557, and introduction, p. ii. Text, pp. 9, 46.	M.		Persisting at middle age.	No information.		Fasting. Bodily and mental fatigue.
52.	Jane M. Dispens. Mem. L. ii. Text, pp. 59, 229.	F.	15 or 16	Persisting at 33.	Sister suffers from sick-headaches.	Increased by prolonged lactation and other causes of exhaustion. Absent in pregnancy.	Butter and "Bilious food
53.	From M. Moreau, Etiol. de l'Épilep., p. 23. Text, p. 31.	F.	When young.	Persisting at middle age.	Brother suffered from megrim: child epileptic.		

ANALYTICAL TABLE OF CASES.

Periodicity and Interval.	*Duration of Attacks.*	*Affection of Sight.*	*Affection of Touch and General Sensibility.*	*Affection of Speech.*	*Emotional and Intellectual Disorder.*	*Vertigo.*	*Headache.*	*Nausea and Vomiting.*	*Termination of Seizures.*	*Metamorphosis.*	*Effects of Remedies.*	*Memoranda.*
		Hemiopic obscuration.					Unilateral. Very intense.					Ecchymosis in seat of pain.
						Special paroxysms of vertigo.	Bilateral.	Vomiting.		Merged into epilepsy.		Persistent feebleness of mind and body after attacks.
2 weeks; very periodical.	All day.	Nebulous obscuration, both eyes.	Numbness and uselessness of hands.				Bilateral. Frontal, occipital, vertical.	Nausea; occasional vomiting.	Partial crisis in vomiting.		Unsatisfactory.	
At first 3 months; then irregular.	5 to 6 hours.	Central or lateral obscuration and dazzling. Both eyes.	Numbness and tingling in hand and arm, on one occasion; opposite side to visual disorder.			Sometimes very giddy.	Frontal. Bilateral or unilateral; then same side as numbness, opposite to visual disorder.	Nausea; occasional vomiting.	In sleep.	Day trances and somnambulism. Acute rheumatism.	Quiet, recumbency, and bromide of potassium relieve. Permanent benefit from change and rest.	
At first 2 weeks; then less frequent.	Several hours, or rest of the day.	Obscuration in right half of visual field.	Numbness and tingling ascending from fingers to face, lips, tongue; Bilateral (?) Subjective tastes.	Aphasia; once total. Misuse and want of words often.	Transient failure of memory occasionally.		Frontal and occipital. Bilateral.	Rarely nausea; never vomiting.	Gradual.	Intercurrent epilepsy and insanity. Acute rheumatism.	Relief from recumbency and quiet. Permanent relief by change and rest of mind, and exercise.	
		Obscuration, both eyes.					Bilateral.					A sudden seizure left permanent aphasia.
2 weeks.	Exacerbations for 3 days.	Partial loss of sight for from half an hour to a day before headache.			Feels "silly."		Bilateral.	Vomiting.	By vomiting.	Two intercurrent epileptic fits.	Leeches and pills without benefit.	
At first 2 weeks.	Rest of the day.		Numbness and tingling and loss of power—Foot, leg, hand, arm, throat, face. Unilateral, right side.	Aphasia; in worst attacks.	"Head confused."	Giddy.	Frontal. Unilateral, left side, opposite to numbness. Sometimes absent.	Nausea and vomiting bilious.	By sleep, 1 hour, and vomiting.	Replacing hysterical seizures, which had also been attended by transient hemiplegic numbness.		
To certain interval.	For rest of the day.	Obscuration for 20 minutes, then "glimmering." Both eyes.	Numbness and tingling ascending from fingers to face and tongue. Right side. Drops things.	Aphasia; difficulty in articulating.	Memory fails ½ an hour. After drowsiness a day or two.	Initial sudden giddiness.	Imperfectly unilateral, most on left side. Very intense. Sometimes occipital.	Vomiting occasional.	In drowsiness.		Periodical bleedings, diet, purgatives. Recovered.	Radial pulse natural at commencement. Flushing at headache stage.
Frequent, but irregular.	20 minutes to half an hour.	Obscuration central or lateral followed by zigzag coruscating spectrum. Both eyes.		(See on.)			None.	Gastric flatus and eructation follow disorder of vision.				Ultimately attacked with permanent aphasia and agraphia.
2 weeks.		Field of vision "all alive" before the headache.					Bilateral. Very intense and culminating.	Nausea and vomiting.	Gradual; or hangs about for a day or two.		Great benefit from tonic regimen and iron, &c.	Absent during all her pregnancies.
"Frequent."					Terminal stupor, almost coma.		Unilateral. "Violent hemicrania."		In profound stupor.	When young the attacks were convulsive; afterwards replaced by megrim.		

No.	*Name and References.*	*Sex.*	*Age at Commencement.*	*Age at Termination or Persistence.*	*Hereditary Disposition and Family History.*	*Causes Accessory to the Disease.*	*Causes Exciting the Seizures.*
54.	Prof. Lebert. (Autograph.) Mal. Cancer, p. 778. Text, pp. 15, 98.	M.		Persisting at middle age.	No information.		
55.	Mr. Travers, senr. (Autograph.) "Diseases of Eye," p. 176, 1820. Text, p. 86.	M.	When young (?)	Abating or ceasing with advancing years.	Son from simple megrim, and gouty urethritis and lumbago.		So-called "Bilious headaches."
56.	Mr. B. Travers, junr. (Autograph.) "Obsv. on Surg." p. 168-9, 1852. Text, p. 403.	M.		Replaced by irregular gout.	Father from blind, numb, and aphasic megrim.		
57.	Mrs. Lock. Dispen. Mem. 1864, a.a. 36. Text, p. 31.	F.		Persisting at 30.	Son from epilepsy with transient blindness before fits. Daughter from chorea.	Aggravated by suckling and debility.	Called "Bilious attacks." Always wake with it.
58.	Caroline J—. Dispen. Mem. Nov. 1863. Text, p. 50.	F.	15	Persisting at 35.		Aggravated by exhausting circumstances and poor living at age of 35.	Waking; exertion; anything which upset her. Not catamenial.
59.	Sir G. B. Airy. (Autograph.) Phil. Mag. July, 1865, p. 19. Text, p. 19.	M.		Persisting at age of 65.	Son and other members of family from similar or more complicated attacks.		No known excitant.
60.	Dr. Hubert Airy. (Autograph.) Phil. Trans., 1871, p. 247. Text, p. 81.	M.	When at school.		Father and other members of family from similar attacks.	Close study and want of exercise.	Close reading; Atmospheric influences; change of residence; over exertion.

ANALYTICAL TABLE OF CASES.—(*First Supplement. See Note p. 22.*)

Periodicity and Interval.	*Duration of Attacks.*	*Affection of Sight.*	*Affection of Touch and General Sensibility.*	*Affection of Speech.*	*Emotional and Intellectual Disorder.*	*Vertigo.*	*Headache.*	*Nausea and Vomiting.*	*Termination of Seizures.*	*Metamorphosis.*	*Effects of Remedies.*	*Memoranda.*
imple hemicrania frequent; severe seizures at distant intervals.	Rest of the day; no trace next morning.		Numbness and tingling in fingers and tongue. Right side. In severe seizures only.	"Difficulty in finding right words," in severe seizures only.	Incoherence of ideas in severe seizures. Initial.		Frontal. Unilateral, right side (same as numbness). After an hour from commencement. Very acute.	Vomiting copious.	By vomiting and sleep.			
Frequent.		Ocular spectra preceding headache. Both eyes (?)	Touch and taste muffled in fingers and tongue, coincident with visual disorder. Bilateral (?)	Power of intelligible expression almost lost.	Confusion of ideas and temporary suspension of memory, follow numbness.		Intense "Bilious headache." Bilateral (?)	Vomiting.				
1 month.	2 days.						Unilateral. Frontal.			Replaced by gouty urethritis and lumbago.		
1 week during sucking; otherwise at distant intervals.					"Destroys her memory for the time."		Frontal. Unequally bilateral; most on right.	Vomiting on getting up or moving.	By vomiting and sleep.		Relief from vomiting.	
3 to 6 weeks; never over 2 months.	For rest of the day; no trace next morning.						Intense "Bilious headache." Bilateral. Culminating at mid-day.	Nausea; sometimes vomiting.			Relief from recumbency; sometimes from vomiting.	
Irregular; 20 attacks in all.	20 to 30 minutes.	Unilateral (right or left) obscuration and zigzag trembling spectrum, with centrifugal expansion. Probably both eyes.		Lost the "usual command of speech" on one occasion.	"Memory failed so much that he did not know what he said."		None.					
Irregular; 100 attacks in all.	5 to 6 hours.	Hemiopic obscuration (right or left). Boiling, zigzag, chromatic spectrum; centrifugal expansion. Duration ½ hour. Both eyes.		None.			General. Bilateral. Slight or severe. Duration 5 to 6 hours.	Nausea slight. Vomiting once.				

No.	*Name and References.*	*Sex.*	*Age at Commencement.*	*Age at Termination or Persistence.*	*Hereditary Disposition and Family History.*	*Causes Accessory to the Disease.*	*Causes Exciting the Seizures.*
61.	M. X—. By Trousseau, Clinique Méd. T. ii. p. 583. Text, p. 420.	M.	From puberty.	Replaced by gout at 45; returned again irregularly.			
62.	Dr. G. (Private.) Text, pp. 125, 218.	M.	From youth.	Headaches replaced at 55 by visual and vertiginous megrim.	Patient's father and son from regular gout.		Called "Bilio headaches."
63.	By Dr. Latham, Brit. Med. Jour., March 23rd, 1872, p. 306. Text, p. 324.	F.	When young.		Father and sister suffer from precisely similar attacks.		
64.	From M. Piorry's Clinique Méd. de la Pitié, p. 305, 1835. Text, Appendix, p. 478.	F.	14		No information.	Long hours of work and confinement at dressmaking.	Strong light, straining ey at work, esp cially aft food.
65.	W. E. Hosp. Mem. (Dr. Robert Liveing), 1871. Text, p. 424.	M.	From childhood.	Less frequent after age of 20.	One daughter aged 7 and like him in appearance suffers in same way.		
66.	General A. From Dr. Parry, vol. i. p. 467.	M.	Childhood.	Abated at age of 47.		None. Healthy, abstemious; digestion good; bowels regular.	Wine, be &c., will bri them on hence l drinks on water.
67.	Mr. —. (Private.) Text, pp. 45, 421.	M.	From youth.	Ceased before age of 50.	Several near relatives suffer from megrim.	None. Vigorous, healthy, abstemious.	The small quantity wine, beer, burnt pa will bring an attack.

ANALYTICAL TABLE OF CASES.—(*Second Supplement.*)

Periodicity and Interval.	*Duration of Attacks.*	*Affection of Sight.*	*Affection of Touch and General Sensibility.*	*Affection of Speech.*	*Emotional and Intellectual Disorder.*	*Vertigo.*	*Headache.*	*Nausea and Vomiting.*	*Termination of Seizures.*	*Metamorphosis.*	*Effects of Remedies.*	*Memoranda.*
2 or 3 in a month.	Very prolonged.	On two occasions later in life transient obscuration and dazzling before the sight, followed by disordered touch in the right hand.	Transient impairment of sensation in right hand on two occasions. Some persistent weakness after the second.	Slight embarrassment of speech on last occasion.			Severe hemicrania in earlier attacks.			Replaced by gout at 45. Afterwards the disorders alternated.		At age of 57 a stupor of ten hours, right hemiplegia and aphasia. Recovered except aphasia, which remained two or three years later.
Frequent.		Attacks of disordered vision with the characteristic zigzag spectrum replacing former "bilious headaches."				Intercurrent attacks of intense giddiness or vertiginous megrim.	Severe headache constituting the earlier seizures; absent in later.			Attacks of Angina pectoris apparently replacing the visual and vertiginous megrim for a time.		
		Obscuration and glimmering to one side of visual field preceding headaches.	Tingling of one arm and side of tongue; same side as visual disorder.				Unilateral (?)					
	24 hours.	Obscuration bordered by semicircular zigzag spectrum, vibrating, sparkling, and gradually enlarging 10 minutes. Right side.	Occasionally tingling in fingers, gradually extending up arm, and disappearing at shoulder. Right side.		Sense of confusion or stupor.		Severe pains follow in ½ hour in the eye and head of affected side.	Nausea and faintness; occasionally vomiting.				
1 month.	Generally the whole day.	(See on.)					Severe "Sick-headache."	Nausea; sometimes vomiting.	Attacks sometimes cut short by vomiting and sleep.			At age of 40 a supposed sun-stroke:—"Glimmering" before sight and obscuration; confusion and loss of consciousness, followed by heavy sleep. Awoke well.
1 week.	10 hours from the morning.	Sudden obfuscation of sight for ½ an hour. On one occasion after cessation of headaches at 47.				Attacks of giddiness after abatement of headaches.	Violent pain in temples and eyeballs. Unilateral or bilateral.	Sickness rare.	Artificial vomiting shortens.		Relief from hot water so as to produce vomiting. Strong exercise diminishes the attacks.	A year after cessation of headaches, sudden sense of weight in limbs, difficulty in walking, and inarticulate speech. No paralysis. Recovered, but died soon after.
Frequent.	Called "Bilious headaches."						Frontal, Bilateral.			Epileptiform Tic douloureux after cessation of Habitual headaches.		Hemiplegic attacks, followed by fatal apoplexy a few years after cessation of headaches.

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