

series of years, and his conviction is strengthened that when the habit of the system is interrupted by such means there is a distinct tendency for the disease to wear out (May, 1901).

The new pathological views to which reference has been made, and which identify the disease in question with certain abnormalities and pathological changes within the nasal cavities, have led to local treatment of greater or less severity, instituted with a view of getting rid of the cause entirely. Any abnormal prominences or growths connected with either the mucous membrane or the bones are attacked by the snare or galvanic cautery and destroyed, or if the trouble is found to consist in turgescence of the erectile mucous membrane, various stimulating applications are resorted to, and with most satisfactory results to those who have used them. The method is recommended by such capable observers, and specialists so skilful in their departments, that it is certainly worthy of more extended trial. As reported, the results have been very good, but it is yet too early to utter any *ex-cathedra* opinions upon the subject. Several who have undergone the treatment referred to have fallen under the writer's notice. Some have thought they were benefited, others that they were not improved, and one, at least, believed that he was worse than before. Most of the cases were met at a hay-fever resort. It is but right to add that some of the cases had not undergone the number of local applications which their attendants thought were necessary to work a complete cure. While the application of mechanical and operative measures may be safely tried within certain limits, there would seem to be danger of carrying the practice too far. It should not be forgotten that extensive tracts of cicatricial tissue may become the seat of more serious disease than hay fever. For the latter we have a tolerably certain and satisfactory palliative, if not a permanently radical cure, in temporary change of residence, while at present operative interference is undertaken only with the chance of permanent relief. As has been already stated, this form of treatment is less frequently resorted to at the present time, having proved disappointing to its advocates.

Those who desire to familiarize themselves with the natural history of hay fever will do well to consult the admirable work, "Autumnal Catarrh," by Morrill Wyman, M.D. (New York, 1872), in which they will find the best account of the disease and the most careful study of places where exemption from its attacks exists. Those who desire to know all about the pollen theory, and the extent to which it can be carried, will do well to consult "Experimental Researches on the Causes and Nature of Catarrhus Æstivus," by Charles H. Blackley, M.R.C.S. Eng. (London, 1873), and "Hay Fever: its Etiology and Treatment, with an Appendix on Rose Cold," by Morell Mackenzie, M.D. (London, 1885). This last book is most vigorously reviewed in the *American Journal of the Medical Sciences* for October, 1885, by Dr. John N. Mackenzie, of Baltimore, who has also contributed several papers bearing upon hay fever to various journals, in which he ably upholds the neurotic and anatomical theory of the disease. An able and suggestive paper will be found in the number of the *American Journal* for January, 1886, in which Sir Andrew Clark maintains very similar views, but would account for the asthmatic spasm by temporary and sudden congestion of the mucous membranes rather than by muscular constriction of the bronchial tubes. In "Hay Fever and its Successful Treatment by Superficial Organic Alteration of the Nasal Mucous Membrane," by Charles E. Sajous, M.D. (Philadelphia, 1885), there will also be found an exposition of the modern views, and details of the treatment recently so highly lauded for this most troublesome affection. Other papers upon the subject will be found scattered through the journals by Daly, Roe, Allen, Bosworth, Da Costa, Beverley Robinson, S. S. Cohen, and Hack. The work of Dr. W. C. Hollopeter, of Philadelphia, is among the more recent contributions to this subject.

Samuel Ashhurst.

**HAYWOOD WHITE SULPHUR SPRING.**—Post-Office.—Waynesville, Haywood County, North Carolina. Hotel and cottages.

Access.—From Asheville, via Murphy branch of the Western North Carolina Railroad, thirty miles west. The location of these springs is in the heart of the Alleghanies at the foot of the Great Balsam Mountains, where the peaks tower 5,000 to 6,000 feet in height. The altitude at the springs is about 2,800 feet. The surrounding scenery is of surpassing beauty, not excelled in rugged grandeur east of the Rockies. During the summer and autumn seasons the weather here is generally delightful, the temperature ranging from 56° to 80° F. The hotel is usually crowded with visitors at these times, some of them from remote points. There are two springs, one sulphur, the other iron. The temperature of the water is 54° F. No complete analysis has been made, but we are informed that the waters contain, besides sulphur and iron, salts of sodium, potassium, and magnesium. The present hotel, a large and commodious brick building, with surrounding wooden cottages, is located on the banks of the Richland River, a beautiful trout stream. Numerous attractions in the way of shooting, fishing, archery, tennis, bowling, and billiards are at the option of the guests. The medical properties of the water have been amply attested, especially in chronic functional disturbances of the liver, stomach, and kidneys. Rheumatism and neuralgic troubles are benefited by the hot baths.

James K. Crook.

**HEADACHE.**—Headache is a frequent manifestation of the most varied disorders of the nervous system and of other organs. Being merely a symptom of so many different morbid states, it cannot be consistently characterized or described as a disease, although it is occasionally of such a nature as to possess the significance of an independent affection.

It may be so fleeting or transient as to be more or less ignored by the patient, or it may attain such a degree of severity or persistency as to lead the sufferer to seek medical advice. Familiarity with its various forms is essential, and it is necessary always to bear in mind that headache is a frequent accompaniment of many constitutional diseases. Hence a description and classification of headache with suggestions as to the means of determining its causation must prove of great practical value. According to many modern observers, we know almost nothing of the structures in which the pain of headache is felt or of the mechanism of its production. As the meninges, especially the dura and a large area of the cranium, receive their sensory supply from the terminal sensory branches of the trigeminus, and as the meninges are also supplied by branches of the sympathetic nerve, it is reasonable to assume that headache is the result of direct or indirect irritation of these nerves.

Psychical disturbances, in the form of depressing emotions such as grief, worry, fright, etc., often produce headache; in such instances it must be due to processes originating in the higher cerebral centres through which superficial pain is perceived. Headache must not be confounded with true neuralgia in which the pain is paroxysmal in character and directly limited to the course of the nerve and its distribution. The idea that the location of the pain in any particular region of the head is always directly related to some special underlying, adjacent or remote pathological process (excepting pericranial inflammation), has not been substantiated by clinical experiences.\*

No definite rules can be laid down in regard to this matter that will apply in every case. It may be said, however, after perusal of the histories and observation of a large number of cases, that pain located at certain parts of the head occurs more often in this or that condition of disease. Such information, nevertheless, may

\* Recently, Head in his work on "Referred Pain" has endeavored to prove the existence of certain sensitive areas on the scalp in their relation to diseases of internal organs.

prove valuable in suggesting certain lines of inquiry when found associated with other symptoms.

The headache may be confined to the forehead, to the vertex, the parietal, temporal, or occipital region on one or both sides; it may be unilateral as in migraine, or it may affect the entire head, and is then described as general or diffused, or it may occur in various combinations.

Patients usually describe the pain in the head, which frequently dominates all other symptoms, as acute, sharp, throbbing, darting, dull ache, boring, burning, stabbing, etc. It may be transient, paroxysmal, periodical, or continuous, and may vary in degree and location from time to time. As pain is a subjective symptom we can judge of its degree only by the *tout ensemble* of the individual and by its association with unmistakable physiognomical expressions and physical manifestations.

Traditional psychology may be said to regard pain as a feeling, *i. e.*, a purely mental state or condition, with or more frequently without a physical basis in the nervous system. Physicians do not place much confidence in the patients' statement of the quality or character of the pain, largely because patients have not words, nor experience to prompt the words, in which to describe their pains. The description of pain by a patient seems to be directly proportional to (1) liveliness of imagination, (2) vocabulary, (3) experience" (Witmer). The description is often materially enhanced by the patient's gestures.

HEADACHE, for all practical purposes, may be divided into two classes—functional and organic. The so-called functional forms of headache are by far the more frequent, and include those resulting from various constitutional or psychical disorders, and from causes not situated in the skull or cranial cavity, excepting the disturbances of special-sense organs, such as the eye, ear, and nose, and dental caries. Some special forms of disturbance of the cerebral circulation may also be placed in this category.

The organic form includes all types of intracranial disease, whether vascular, meningial, or cerebral, and disease of the cranial bones.

The functional forms of headache may be classified and subdivided as follow:

- |                  |   |             |                    |
|------------------|---|-------------|--------------------|
| TOXÆMIC.         | 1. Retained excrementitious substances. |             |                    |
|                  | 2. Products of defective metabolism.    |             |                    |
|                  | 3. Infectious germs or their toxins.    |             |                    |
|                  | 4. Various drugs.                       |             |                    |
|                  | 5. Graves' disease.                     |             |                    |
| NEUROPATHIC.     | 1. Neurasthenia.                        |             |                    |
|                  | 2. Hysteria.                            |             |                    |
|                  | 3. Epilepsy.                            |             |                    |
| REFLEX . . . . . | 1. Ocular.                              | 2. Gastric. | 3. Nasopharyngeal. |
|                  | 4. Auditory.                            | 5. Dental.  | 6. Uterine.        |
|                  | 7. Sexual.                              |             |                    |
| CIRCULATORY.     | 1. Hyperæmia:                           | 2. Anæmia.  |                    |
| MIGRAINE.        |   |             |                    |

TOXÆMIC HEADACHE.

In which the blood is contaminated by various deleterious agents.

1. **RETAINED EXCREMENTITIOUS SUBSTANCES.**—(The absorption of decomposition and fermentation products developed in the alimentary canal, or the reabsorption of retained excrementitious substances.) (a) Constipation. (b) Intestinal indigestion. (c) Gastric indigestion. (d) Uræmia.

(a) *Constipation*; (b) *Intestinal Indigestion.*—In a very large majority of instances in which headache is complained of, it is due to toxæmia resulting either from constipation, or from intestinal or gastric indigestion. The clinical fact has long been established that auto-intoxication of intestinal origin plays an important rôle in the production of headache, migraine, and vertigo, but such symptoms are evidently more or less dependent upon individual susceptibility. Constipation is not incompatible with apparent health, for some persons may be constipated for a week or more at a time without any complaint of digestive trouble or headache. For this reason, the

objection has often been made to the hypothesis of auto-intoxication of fecal origin. On the other hand, Bouchard, who has made a special study of this subject, believes that constipation should be regarded as a protection against intoxication, and says: "it supposes that all that is absorbable has been absorbed, the aqueous part with what was held in solution." The lengthiest argument, however, will not controvert the familiar fact that thorough purgation causes the rapid disappearance of the headache and associated symptoms in most cases of this character.

In these patients the headache is usually located in the frontal region, but is often diffused over the entire head. As a rule, it is not constant, and may or may not be associated with gaseous eructations.

In some it is accompanied by morbid somnolence during the day and heavy sleep at night, while in others insomnia is complained of. Occasional attacks of vertigo may also occur.

(b) *Intestinal indigestion*, with or without constipation, is more frequently productive of headache through auto-toxæmia than as a supposedly reflex cause. The urine is often of high specific gravity and may contain an excess of indoxyl.

(c) *Gastric Indigestion.*—It would seem that gastric indigestion, on the other hand (although in some instances occasioning toxic absorption), is more likely to produce headache by reflex irritation through the pneumogastric nerve from fermentation of food and gaseous distention of the stomach. Thus, headache, possibly due to both causes, is frequently an accompaniment of dilatation of the stomach on account of the anomalous fermentations that are the consequences of it. The location of the headache is usually supraorbital or frontal.

(d) *Uræmia.*—Headache due to renal disease is of very common occurrence. Two forms are found in nephritic subjects—*uræmic* and *congestive*. Either one or both may be present in the same patient. The *uræmic* form is due to the retention in the circulation of excrementitious products, and may manifest itself in any type of kidney disease, whether acute or chronic. The pain is ordinarily situated in the occipital region, extending to the neck. It may or may not be associated with somnolence, nausea, or vomiting, etc., according to the degree of damage to the kidneys and arterial system. In some cases the headache may be accompanied by vomiting, vertigo, and optic neuritis, thus simulating the general cerebral symptoms of brain tumor. The *congestive* form arises in consequence of disturbed cerebral circulation in the presence of cirrhotic kidneys, with arterio-sclerosis, cardiac hypertrophy, and increased arterial tension. (See "Circulatory" form of headache.)

*Puerperal Eclampsia.*—Headache which is at times persistent and severe is often a premonitory symptom of a convulsive attack in this affection, and may be associated with delirium, excessive somnolence, mental hebetude, or insomnia. (Edema of the face and extremities is often present. This condition is generally regarded as acute renal disease of pregnancy, the headache and other symptoms being ascribed to some form of toxæmia not yet determined. Unless the urine is carefully analyzed, and the functioning power of the kidneys ascertained beyond question, the uræmic form of headache will often pass unrecognized, thus leading to unexpected and serious consequences.

2. **PRODUCTS OF DEFECTIVE METABOLISM.**—(a) Rheumatism. (b) Gout. (c) Diabetes.

(a) *Rheumatism.*—There are two forms of headache which occur in rheumatic subjects. One is due to auto-toxæmia, the headache generally being diffused and similar to that occurring in other forms of toxæmia. The other is a true muscular rheumatism or myalgia located in the scalp and affecting particularly the occipito-frontalis muscle and its aponeurosis. The pain is increased by active or passive movement of this muscle, and it is common to obtain a history of other attacks of muscular rheumatism, affecting different parts of the body. These patients may also have suffered from acute or subacute articular rheumatism. The attack may last for from a few



hours to several weeks. Like other forms of muscular rheumatism, it is brought about by exposure to cold. One of the worst cases seen by the writer occurred in a rheumatic subject after bathing the head in cold water, and then sitting at an open window for a half-hour or more.

(b) *Gout*.—Headache is frequent in gouty subjects. It may be due to toxic products of defective oxidation, or the result of vascular disease affecting the cerebral circulation. It is not unusually accompanied by interstitial changes in the kidneys. Gout, it is claimed, is merely a hypothetical condition and presupposes an excess of uric acid in the general circulation. The headache and the irregular symptom-complex often described as lithæmia is an atypical form of gout. There is more often a sense of pressure and fullness about the head than actual pain. Haig has called special attention to the association of such symptoms with retention of uric acid in the system. It is now well established that the headache, aberrant neuralgic pains, slight stiffness in the joints, and occasional attacks of acute gout, etc., arise in connection with defective metabolism. The most essential etiological factor is deficient oxidation resulting from overindulgence in unsuitable food and overdrinking, and the lack of sufficient physical exercise.

(c) *Diabetes*.—Headache occurring in diabetics is often accompanied by hebetude and depression of spirits. As a premonitory symptom of diabetic coma, it is soon followed by delirium and dyspnoea. The prevailing theory is that the latter form of intoxication is due to the presence of acetone in the general circulation.

3. INFECTIOUS GERMS OR THEIR TOXINS.—(a) Acute infectious diseases. Headache is frequently a prominent symptom in the early period of all acute infectious diseases. It is usually described by the patient as a generalized or frontal headache. As an initial symptom of typhoid fever, it is sometimes so severe and persistent as to demand special attention. The pain is often located in the occiput and back of the neck. It may be accompanied by photophobia, retraction of the head, and muscular twitching, thus simulating meningitis. In the early stage of smallpox, the intense frontal headache is accompanied by pains in the back and limbs. The same may be said of the grippe. General headache also occurs in the early period of acute croupous pneumonia and may simulate meningitis until the lung trouble has clearly developed. During the febrile stage of malarial intermittent or remittent fever, violent headache is often present. In general, it may be said that headache occurs in all conditions accompanied by fever. As a routine practice, the temperature should be taken in every case of acute headache. The character and frequency of the pulse, and the presence of fever are always suggestive of the probably infectious or inflammatory origin of the trouble.

4. VARIOUS DRUGS.—(Nitrite of amyl, nitroglycerin, alcohol, tobacco, coffee, lead.) *Nitrite of Amyl* and *Nitroglycerin* will be mentioned under the head of "Disturbances of the Intracranial Circulation."

*Alcohol*.—Headache is often due to acute or chronic alcoholic poisoning. The nervous system is at times so sensitive that a small dose of alcohol may produce violent but transient general headache of a congestive type. Very frequently, after large doses sufficient to produce heavy sleep, the individual awakes with a severe headache the result of such indiscretion. This picture is unfortunately so familiar that it requires no further elaboration. Chronic alcoholic poisoning is often the cause of daily or constant headache. The headache is commonly due to a combination of causes, such as toxæmia, interference with the digestive processes, and cerebral arteriosclerosis. It is often accompanied by cirrhotic changes in the liver and kidneys, and by many of the attendant phenomena of these conditions.

*Tobacco*.—The habitual and excessive use of tobacco may be the indirect cause of headache, through its deleterious action on the digestive organs, its interference with the cardiac rhythm and the cerebral circulation, and the ultimate production of neurasthenia.

*Coffee*.—In some individuals the injudicious and excessive use of coffee is productive of headache and a sense of fullness in the head.

*Lead*.—Headache due to the toxic action of lead is a comparatively rare symptom. In some cases of chronic lead poisoning, however, headache does occur, and its cause must be recognized. It is probably due to the direct action of the lead on the cerebral nerve centres, or indirectly through the production of pathological conditions in the liver and kidneys. A rare form of saturnism, which is productive of serious cerebral symptoms and which may terminate fatally, is known as "Lead Encephalopathy." In this condition the headache is usually severe, and is associated with vertigo and bilateral optic neuritis (which may end in complete blindness) and a series of symptoms simulating the presence of an intracranial tumor. The more severe forms terminate in convulsions, delirium, and coma.

5. GRAVES' DISEASE.—Recent studies regarding the pathogeny of the symptom group known as Graves' disease lead us to assume that the condition is due to autotoxæmia from hypersecretion of the thyroid gland, which is often preceded by sudden or prolonged depressing emotions. Headache is not common in this affection, but it is sometimes a troublesome symptom, and may be confined to one side. It is occasionally accompanied by a sense of throbbing in the head, a pulsating noise in the ears, and transient vertigo. The rapid action of the heart and cardiac palpitation, the presence of thyroid enlargement, exophthalmos, tremor and excessive perspiration, will lead to a correct diagnosis.

#### NEUROPATHIC HEADACHE.

1. NEURASTHENIA.—Headache is often an important symptom in neurasthenia, but it is not present in all cases. As a rule it is not general, but is commonly located in the frontal or occipital region, and is often accompanied by occasional vertigo and muscæ volitantes. The headache, which is usually slight in degree, is either continuous or occurs at brief intervals. In the majority of neurasthenics actual pain is not complained of, but the sensations in the head are described as the feeling of "a constricting band about the forehead," "fullness in the head" as if there was "something pressing from within against the skull," etc. Frequently it is a sensation of weight or numbness, and occasionally of throbbing. The headache and other sensations increase after fatigue, and are often diminished by rest. Difficulty in concentrating the attention is often present. As a result of these varied forms of cephalic paresthesia, such patients are inclined more or less to indulge in excessive introspection. They often become morbid and apprehensive, dreading the possibility of a brain tumor or other serious cerebral disease. All of these symptoms are modified in proportion to the attention given them by the patient. The presence of other signs of neurasthenia, their development or increase through mental effort or emotional excitement, and the absence of evidence of organic cerebral disease, make the diagnosis clear.

2. HYSTERIA.—Headache that is confined to a small spot, which has for many years been described as "clavus," is comparatively unusual in this country, and occurs most frequently among the premonitory symptoms of convulsive hysteria. The scalp is sometimes so sensitive that the slightest touch is not tolerated without wincing. In the majority of cases of hysteria, however, the headache corresponds with that of neurasthenia. It may be limited to one side and thus simulate migraine. In some instances, it may be characterized as a veritable psychalgia. The peculiar character of the headache, its dependence upon the momentary psychical condition of the patient, its rapid disappearance or variation in degree, the favorable influence of suggestion or diversion, and its occasional association with other signs of hysteria (paralysis, spasm, convulsive attacks, disturbances of sensibility, etc.) enable us to make a correct diagnosis. The stigmata of hysteria are not always present.

3. EPILEPSY.—While headache cannot be regarded as a symptom of epilepsy, its occurrence is at times of great importance in the diagnosis of obscure cases. An attack of *grand mal* is often followed by severe general headache which may last for several hours. This fact is of value in interpreting the cause of the headache when it is mentioned as occurring in the early morning on awaking. It is at times indicative of a nocturnal epileptic attack, and the diagnosis is positive when such headache is associated with soreness of the muscles and joints of the extremities, a bitten tongue or mucous membrane of the cheek, and wetting of the bed.

#### REFLEX HEADACHE.

1. Ocular; 2. Gastric; 3. Nasopharyngeal; 4. Auditory; 5. Dental; 6. Uterine; 7. Sexual.

1. OCULAR.—Ocular defects, such as errors of refraction and insufficiency of the ocular muscles, are a common source of headache. The two conditions may be found in various combinations. It has been claimed that fully sixty per cent. of functional headaches due to errors of refraction are caused by astigmatism alone, or in conjunction with other forms of ametropia (De Schweinitz). The headache is produced by strain on the ciliary muscles, and frequently arises in connection with hypermetropic astigmatism. The pain may be situated in any part of the head, but it is most frequently located in the supraorbital region. It may be persistent in character, and is often aggravated by using the eyes. It is relieved temporarily by the instillation of atropine, which paralyzes the ciliary muscles, or permanently, by wearing suitable glasses.

Headache caused by insufficiency of the ocular muscles may affect any portion of the cranium, but is often located in the occipital region. It may immediately follow the use of the eyes, but usually this is not the case, the pain occurring at irregular intervals. At times it may develop into a typical attack of migraine, and is often associated with symptoms of neurasthenia. The claims of certain writers, that the lack of balance in the action of the muscles of both eyes is a prolific cause of headache and various forms of nervous disease, have certainly been much exaggerated. The headache arises as a result of repeated or continuous efforts to obtain and preserve binocular single vision. It is a fact well known to all ophthalmologists that so-called ocular headache does not occur in patients in whom there is a congenital or acquired absence of binocular vision, as such patients are known habitually to suppress the image in one eye. Hence, the causative element of "effort at binocular fixation" is negligible under such circumstances. This occurs with high degrees of strabismus; paralysis of ocular muscles; when vision is greatly diminished or lost in one eye; and when there is considerable difference in the refraction of the two eyes. When headache occurs in such people it is invariably due to some other cause. The writer knows of a patient with ocular headache from muscular trouble in whom the pain entirely disappeared after the accidental destruction of one eye.

The improved methods in the examination of the power and action of the ocular muscles, introduced within recent years, have led to a more accurate and thorough study of these conditions. Curiously enough, the muscular troubles which occasion the greatest amount of discomfort to the patient at times produce no evident changes in the gross appearance of the eyes. Hence it is only after the most careful and painstaking investigation that they can be discovered and rectified. This is accomplished either by the use of suitable lenses to neutralize any existing refractive anomaly, and thus indirectly influence muscular action, or by surgical operation, or both. There must be a peculiar individual predisposition to headache, for there are persons who have both muscular and refractive anomalies without any symptoms of headache.

Headache often results from inflammatory eye troubles such as iritis, glaucoma, etc. In iritis, the pain is gener-

ally supraorbital, but may extend to the whole side of the head. Acute inflammatory glaucoma is accompanied by violent pain radiating through the head from the eye. The headache occurring in these conditions cannot be classified as of reflex origin. It is due to direct inflammation of the ophthalmic division of the trigeminus.

2. GASTRIC.—(Vide supra) Gastric indigestion.

*Headache Superinduced by Hunger*.—In some individuals headache arises as a result of hunger. A delay of a few hours in the time of the customary meal causes general discomfort and headache which disappear at once when food is taken. This form of headache is probably produced through irritation reflected from the gastric mucosa, or from temporary impoverishment of the blood diminishing the nutrition of the cerebral sensory centres. Such individuals often manifest a peculiar susceptibility to headache from other causes, especially migraine.

3. NASOPHARYNGEAL.—Any of the following pathological processes may occasion headache: adenoids in the nasopharynx; polypoid obstruction to nasal breathing; lesions of the turbinated bones, especially of the middle and posterior parts of the inferior turbinate; spurs from the nasal septum; or intranasal synechia. Hence, headache is not an uncommon condition in mouth-breathers. The pain is ordinarily located in the temporal region or the forehead. When such abnormalities are removed the headache has often been known to disappear.

4. AUDITORY.—Impacted cerumen has in rare instances been the supposed cause of headache. In middle-ear disease, the headache affects the vertex or is situated in the temporal or mastoid region on the same side.

5. DENTAL.—Caries of the teeth in the upper jaw is an occasional cause of headache.

6. UTERINE; 7. SEXUAL.—Headache occurring in patients with uterine or ovarian disease should not be looked upon as a symptom of reflex origin. It is merely one of many phenomena associated with a neurasthenic condition which so frequently accompanies intrapelvic disease in women. The headache frequently affects the vertex but is more often general, and is at times accompanied by tenderness of the scalp. Other causes are usually operative independently of any local uterine lesion. The morbid self-consciousness developed in many women who have or think they have uterine or ovarian disease, is often sufficient in itself to engender a depressive form of neurasthenia. The same may be said, *mutatis mutandis*, of affections of the male genito-urinary organs.

According to Head (Allbutt's "System of Medicine," vol. vii., p. 749) headache may be secondary to disease of the organs within the thorax and abdomen. The pains in the head may be very slight, but are always associated with scalp tenderness in certain areas. The degree to which these pains in the head intrude on the patient's consciousness varies greatly. Thus, sometimes he is quite unaware that the scalp is tender, and the associated tenderness is discovered only by examination. He may, however, complain of headache which leaves behind it a feeling of intense soreness.

#### CIRCULATORY HEADACHE.

1. Hyperæmia. 2. Anæmia. Headache due to disturbance of the cerebral circulation in the absence of organic intracranial disease.

Headache is at times the result of hyperæmia or congestion of the intracranial circulation. It may also be occasioned by cerebral anæmia. When it is due to increased arterial supply it is called *active*. If it is caused by obstruction of the venous circulation, it is termed *passive*.

(a) *Active Hyperæmia*.—This condition has been described as "cephalalgia vasomotoria" by Eulenburg, and is due to paralysis of the vasoconstrictors permitting distention of the vessels. It may be either acute or chronic, but it is most frequently acute. As a rule, in the severe cases, it is accompanied by throbbing and pulsating general headache, vertigo, tinnitus, muscæ volitantes, photopsia, insomnia, mental confusion, and delir-



ium, all of which are made worse by lowering the head. There may also be photophobia and general hyperæsthesia. The face and scalp are red, and the conjunctivæ injected. There are fulness and throbbing of the temporal arteries, and contracted pupils. The pulse is full, and may be either slow or increased in frequency. Occasionally there is a slight rise of temperature. In some individuals, such attacks occur periodically. The severe forms of this condition are fortunately rare. In the milder degrees it is not uncommon, but the diagnosis may at first be doubtful. Somewhat similar phenomena occasionally occur in the early stage of acute leptomenigitis of the convexity. There may be considerable variation in the intensity of the process, hence the above described symptom-complex is manifested in varying degrees. The condition is usually due to mental overwork, emotional disturbances, alcoholism, excessive use of tobacco, onanism, and injuries to the head. It occasionally occurs as a sequel of sunstroke, and from sudden suppression of menstruation in plethoric women.

The writer has in several instances witnessed a similar but slightly modified array of symptoms occur periodically in young women after removal of both ovaries. A prototype of this group of symptoms can be produced by the administration of various drugs, such as nitrite of amyl, nitroglycerin, etc.

(b) *Passive Hyperæmia.*—Venous hyperæmia of the cerebral vessels is an important cause of habitual headache. It may be either acute or chronic, but is most frequently chronic. The pain is of a dull character, and is often accompanied by a sensation of fulness and heaviness in the head. The face and ears may be slightly cyanotic in the more pronounced cases. The attacks also vary in degree, the minor forms not being uncommon. Passive cerebral congestion is generally caused by mechanical hindrance to the return of blood from the head. Thus, it results from growths in the neck making pressure on the jugular veins, cardiac disease, pulmonary emphysema, and persistent cough, as in pertussis. It may also be produced by a tight collar, or by continuous flexion of the head. The headache and other symptoms are aggravated by straining at stool, coughing, sneezing, stooping, or muscular effort.

*Cerebral Anæmia.*—Anæmia of the brain, as a rule, is a part of a general condition of anæmia and malnutrition. It may be the result of arterio-sclerosis including disease of the coronary arteries. Whether the general anæmia be of a chlorotic nature or from loss of blood, it is almost always accompanied by headache. The condition of cerebral anæmia in which headache occurs, is generally of the chronic form. The headache may be frontal, vertical, or diffused, and is commonly of a dull character. It is often associated with attacks of syncope, tinnitus, dizziness, incapacity for mental work, depression, and irritability. The pupils are usually dilated. The headache often diminishes or subsides when the patient assumes the recumbent position with the head low.

## MIGRAINE.

*Definition.*—This affection has also been termed "sick headache," "hemicrania," and "paroxysmal headache." It is a periodical neurosis occurring most frequently in women, and is characterized by paroxysmal attacks of severe pain usually confined to one side of the head, chiefly in the course of the fifth nerve. At times it is preceded by a variety of transient visual disturbances and paræsthesiæ, and followed by nausea and vomiting.

*Symptoms.*—The headache does not arise suddenly, but is generally preceded by premonitory symptoms, such as vague indisposition, restless sleep, irritability, depression of spirits, somnolence, sensation of fulness in the head, slight dizziness, etc., and, later, transient ocular symptoms may develop. The headache is dull and slight at first, but gradually reaches such intensity that it is often described as unendurable, and the patient is frequently obliged to go to bed. During the attack all of the senses become more acute, and there is general hyperæ-

sthesia, the sufferer being disturbed by bright light or the slightest sound. The temperature is normal, and the pulse is either slightly accelerated or slow. Sometimes, on the affected side, the face is flushed and hot, the conjunctiva injected, the pupil contracted, and there is strong pulsation of the arteries; or the face is pale and the pupil dilated. But such phenomena are by no means constant; in fact they are quite rare. They usually alternate during the attack and are most frequently bilateral. The former has been interpreted as due to sympathetic vaso-motor paralysis (angio-paralytic), and the latter as being due to vaso-motor spasm (angio-spastic). Too much stress has been laid by some writers upon the value of such manifestations. They are so uncertain and variable that as a rule they are of no special clinical significance. The pain is usually confined to one side of the head. It may, however, affect either side alternately, or both sides may become involved at the same time, the pain varying in degree on the two sides. The left side is more frequently affected. At one time it may have its greatest intensity in the forehead, and at another time it may be situated in the occipital region. Nausea and vomiting generally take place either during the early part of the attack or toward the end. In some patients vomiting is absent. Polyuria occasionally occurs at the termination of the attack. When the pain subsides, sleep follows, and the patient awakes free from discomfort. The headache may last for from several hours to three or four days. Ocular symptoms constitute a prominent feature in a certain number of cases, but they do not occur in every attack. In the most common type of migraine they are entirely absent. The visual disturbances occur in the form of photophobia, blurring of vision, bright lights, vibrating or luminous sensations which commence over a small area and gradually widen out, the flashing increasing in intensity and often assuming a zigzag shape like the outline of fortifications (scotoma scintillans), hemianopsia and transient amblyopia or blindness. This type has often been termed "ophthalmic migraine."

Other abnormal sensations are also complained of, such as disturbed sensation in the extremities, numbness and tingling in the skin, as well as partial aphasia. The eye symptoms and paræsthesiæ when present almost invariably precede the headache (just as certain auræ precede an attack of epilepsy), and last for from a few minutes to half an hour. In rare instances, such sensory phenomena occur paroxysmally without the headache.

*Etiology.*—It is pre-eminently an inherited disease. The constitutional peculiarity which predisposes certain people to migraine is not clearly understood. That some persistent pathological condition must exist is quite evident. Many of the so-called reflex causes, such as uterine and menstrual disorders, eye-strain, dental caries, or nasopharyngeal disease, are frequently only coincidental conditions. Ocular defects are more frequently the cause of other forms of headache.

Indigestion and intestinal autotoxæmia are the most important acquired factors in the causation and persistence of the affection. Neurasthenia and hysteria, gout and various lithæmic conditions also play an important rôle. The constitutional substratum varies in different individuals. Among the exciting causes of attacks may be mentioned mental overwork and anxiety, excessive fatigue or exhaustion from any cause, constipation, errors in diet, menstruation, and emotional excitement.

*Diagnosis.*—It is differentiated from other forms of headache by its periodical and paroxysmal character, its usual limitation to one side of the head, and its association with transient visual disturbances and other evanescent sensory symptoms, and the absence of evidence of organic intracranial disease.

*Course and Duration.*—Migraine usually begins after the twentieth year, but it has been known to commence as early as the fifth or sixth year of life. The interval between the attacks varies from two weeks to several months, the length of time often being modified by treatment. During these intervening periods, the patient

may appear perfectly well. In women the attacks seem to occur more frequently at or about the menstrual period. In the ordinary form it has a tendency to subside spontaneously about the menopause in women, and after the age of fifty years in men. This is not the rule, for it sometimes lasts through a whole lifetime. When the affection has persisted for several years, the attacks being frequent and severe, it usually leads to a general neurasthenic condition. It is thus commonly found in association with neurasthenia and hysteria. The ophthalmic form of migraine usually appears later in life, occasionally growing progressively worse, and it has been known to be the precursor of serious organic brain disease. Migraine has occasionally been found in conjunction with epilepsy. In such cases, the migraine attacks have at times alternated with the epileptic seizures or epilepsy has followed migraine which had entirely disappeared.

In rare instances, the attack of migraine is complicated by sudden paresis or paralysis of the third nerve on the same side. The ocular paralysis is usually transient and recurs in varying degrees in subsequent attacks of migraine. In many of the reported cases, the patients have eventually made a complete recovery both from the attacks of migraine and from the accompanying third-nerve affection. But the outcome is not always so fortunate, for in some cases the paralysis gradually increases during the intervals and ultimately becomes permanent.

*Pathology.*—The pathology is still obscure. The prevailing and most plausible theory is that the attacks are due to periodical discharges of nerve force originating in the cerebral cortex or in the sensory centres, involving principally the intracranial branches of the trigeminus and the pneumogastric nerves. According to a recent "mechanical" theory, the attack is produced by an acute transient closure of the foramen of Munro and a consecutive swelling of the brain (Spitzer).

*Treatment.*—Patients with migraine should lead a regular life free from excesses of any kind. The avoidance of mental overwork, and the systematic practice of some form of outdoor exercise are always necessary. All sources of reflex irritation should be investigated. Refractive errors should be corrected by suitable lenses, and if there is any defect in the eye muscles it should be remedied if practicable. This does not necessarily imply that every patient with migraine must be subjected to operation or the wearing of spectacles as a routine method. The same rule holds good in regard to operation for deviation of the nasal septum. While some of these patients are in fairly good health during the intervals between the attacks, many suffer from various manifestations of toxæmia due to gout or rheumatism, such as stiffness and pain in the muscles and joints, vague and fleeting neuralgic pains, etc. The neurasthenic state also requires careful management. Certainly such indications are to be met, and treatment is to be instituted accordingly. Particular attention should be given to the regulation of the action of the bowels and to proper diet. Hydrotherapy is also a valuable adjunct in these cases. The more intelligent patients usually judge from personal experience when the attack is approaching, and in time they also learn to avoid exciting causes. Various drugs have been recommended to abort the attack in its incipency, or to relieve the pain during the paroxysm, and as a rule they are more effectual the earlier they are administered. Among these may be mentioned R Caffeine, gr. ij.; Phenacetin, gr. x., with or without potassium bromide, gr. xv. R Acetanilid, gr. ij.; Caffeine, gr. ij., to be repeated in twenty or thirty minutes if necessary; or R Codeine, gr. ʒ; Acetanilid, Caffeine, ʒ gr. ij. At times a brisk cathartic, such as two or three ounces of Rubinat water, or a few ounces of a strong infusion of coffee, or a moderate dose of wine, whiskey, or champagne will abort the attack, if taken early. If the paroxysm is very severe the pain will generally be relieved by the hypodermic injection of morphine, or morphine or codeine may be given by the mouth if nausea and vomiting are absent. Some pa-

tients obtain relief from applications, to the head, of hot-water cloths or a hot-water bag, while others prefer the ice bag. This is purely a matter of individual susceptibility. A mustard plaster over the nucha, or over the side of the neck in the course of the pneumogastric nerve, also at times diminishes the pain. The use of arsenious acid and extract of cannabis indica administered for a prolonged period of time, has proved that they are most serviceable drugs. R Ext. cannabis indica, gr. ʒ; Acid. arsenios., Strych. sulph., ʒ gr. ʒ; Quinin. sulph., gr. ʒ; Extr. taraxaci, q. s. M. ft. pil. No. i. These pills, given after meals for one week—the dose of the various ingredients being gradually increased each week—should be taken regularly for many months or a year.

When the attacks are frequent and severe, the administration of potassium bromide gr. xv., and fluid extract of ergot ʒ xv. t.i.d. proves serviceable during the first few weeks of treatment.

## ORGANIC HEADACHE.

Headache is commonly a pronounced symptom of all inflammatory processes which affect the exterior or interior of the skull. It thus occurs in disease of the periosseum, in caries of the petrous portion of the temporal bone, in inflammation in the cavities situated in the skull, as the frontal and sphenoidal sinuses, the orbital cavity and the middle ear, and in diseases of the brain and meninges. Headache as it occurs in the following conditions will be briefly described: 1. Intracranial tumor. 2. Cerebral abscess. 3. Leptomenigitis. 4. Pachymeningitis. 5. Intracranial syphilis. 6. Vascular disease. 7. Encephalitis. 8. Mastoid disease and sinus thrombosis. 9. Disease of the cranial bones. 10. Diseases of the frontal sinus. 11. Caries of the cervical vertebrae. 12. Acromegaly. 13. Spinal-cord disease.

1. *INTRACRANIAL TUMOR.*—The most persistent and distressing form of headache is that which occurs in patients with intracranial tumor. It is one of the most constant and obtrusive symptoms. In exceptional instances, headache may be absent during the entire course of the disease. But such a condition is very rare, the headache varying in intensity in different cases. Occasionally it may be of a mild character. As a rule it attains great severity, preventing sleep, and at times becoming so unendurable that the patient has been known to commit suicide. Sometimes the pain is paroxysmal, but more frequently it is almost continuous with periods of great exacerbation. The headache is usually diffuse, but it may be limited to the forehead, parietal region, or occiput, changing its location from time to time. The seat of the pain in the cranium does not necessarily imply that the growth is subjacent. When the pain is confined to the frontal region it by no means indicates that the frontal lobes are involved, for such pain often occurs in cerebellar tumor. The presence of persistent occipital pain extending to the neck would lead us to assume that the growth is probably situated in the posterior cranial fossa. If the headache is limited to a circumscribed area it most frequently corresponds with the location of the growth which has also involved the underlying meninges. If it be confined to one side of the head, the probability is that the tumor is on the same side. This is not an invariable rule, however. The pain is aggravated by everything that interferes with the cerebral circulation. It is thus made worse by psychical excitement, alcohol, coffee, muscular activity, coughing, straining at stool, sneezing, etc. Headache can be considered only one of the prominent general symptoms of brain tumor, and in itself it is of no value in localization. The other important general symptoms frequently found in association with the headache are vomiting, double optic neuritis (choked disc), and vertigo. Various symptoms indicating the location of the lesion are usually present. It is universally assumed that the headache is produced by irritation of the numerous branches of the trigeminus supplying the dura. The dura may also be stretched and irritated as a result of intracranial press-