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Ptosis: Its Diagnosis and Value as
a Localizing ~~System~~.
Symptom.

ALISON BRADBURNE, F.R.C.S. Ed.

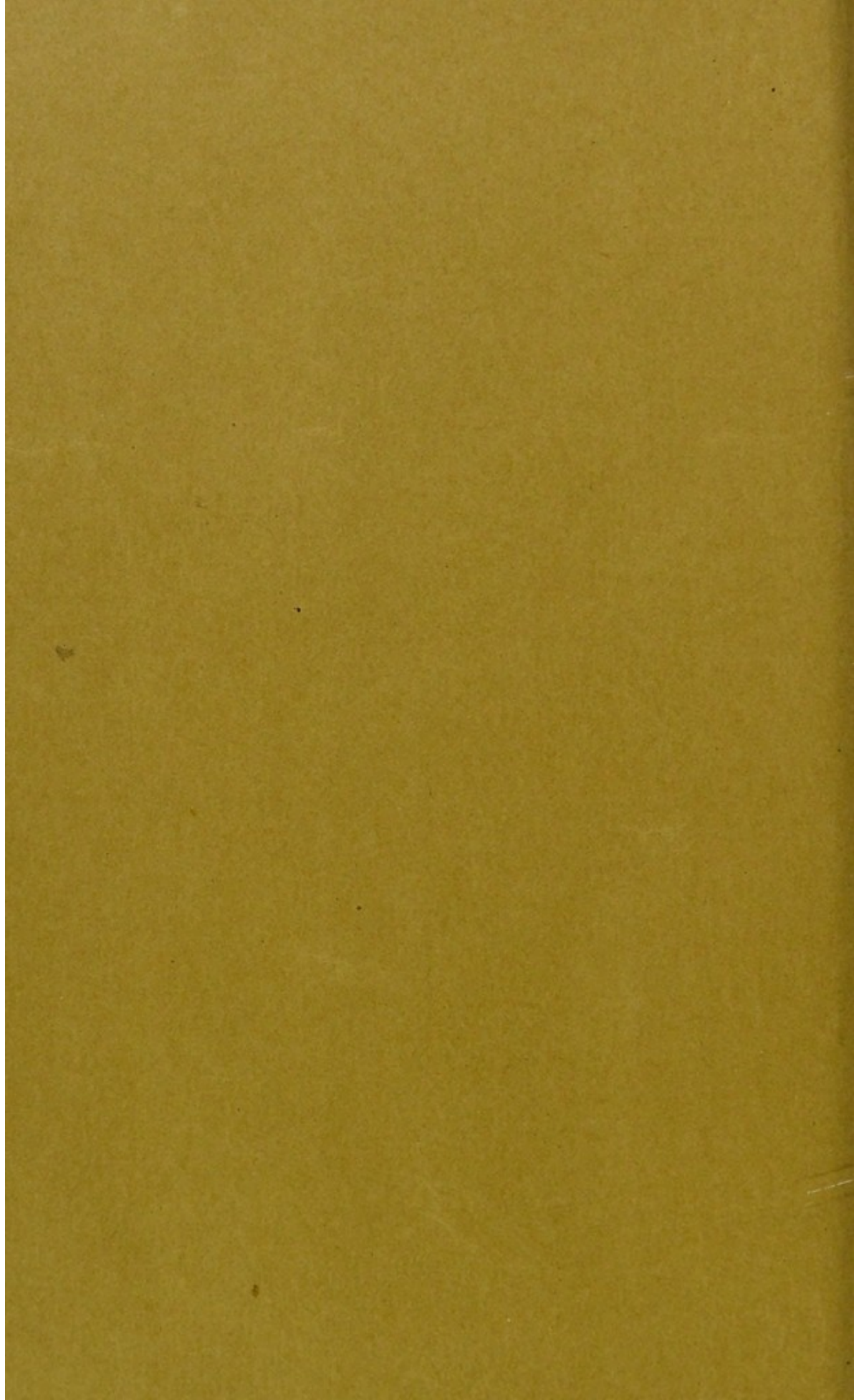
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PTOSIS: ITS DIAGNOSIS AND VALUE AS A LOCAL-IZING SYMPTOM.

BY ALISON BRADBURN, F.R.C.S.

Ophthalmic Surgeon to the Hydropathic Hospital, Southport, the Ormskirk Dispensary and Cottage Hospital, late Clinical Ophthalmic Assistant
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Ptosis (blepharoptosis) manifests itself by a drooping of the upper lid. According to the degree of ptosis, the vision is more or less interfered with, and to overcome it the frontalis muscle is brought into action so that the eyebrows become elevated and the head thrown back when the patient desires to overcome the defect. As ptosis is a symptom, and frequently an early and solitary one, of many affections, it is, therefore, of value as a guide to diagnosis.

Classification.—All cases of ptosis can be put under one of two heads, viz.: congenital ptosis and acquired ptosis, these again being subdivided according to the cause which gives rise to it, and, in addition, the condition may be unilateral or bilateral.

CONGENITAL PTOSIS.

This condition is usually bilateral and often associated with other congenital anomalies; it may be due to one of the following conditions: (1) Absence of or deficiency in the development of the levator muscle. (2) Absence of or deficiency in the development of the levator muscle, but associated with an absence of or deficiency in development of the superior rectus muscle of the same eye. (3) Absence of or deficiency in the development of the portion of the third nerve supplying the levator. (4) In cases known as "congenital epicanthus" associated with a narrow palpebral fissure. (5) In certain cases associated with sympathetic movements of the lower jaw. The ptosis which occurs in these

circumstances is seen to attain its highest pitch in abduction of the eye, whilst it diminishes or disappears altogether in attempts at adduction and correspondingly when the jaw is working, as in chewing, the drooped lids jerk up and down involuntarily, and this movement is best seen when the jaw is moved to the side opposite to the ptosis.

Ptosis due to congenital defects presents but little difficulty of diagnosis, as the history, appearance and absence of localizing or constitutional causes materially assists us.

ACQUIRED PTOSIS.

Ptosis is generally considered as an affection belonging solely to the levator palpebræ muscle, but, as there are so many other causes which may give rise to a drooping of the eyelid, it is necessary to consider all causes which may give rise to same so as to enable us the more correctly to differentiate between other affections than those of the levator itself.

Classification of Acquired Ptosis according to the structures which are at fault or according to the situation of the affection causing it. Thus the structures which may be at fault may be in (A) the lids; (B) the levator muscle; or the lesion may be of (C) central or (D) constitutional origin, or situated in (E) the oculomotor nerve, or (F) the sympathetic nerve.

(A) *Acquired ptosis due to an affection of the lids* may be due to one of the following:

1. Trachoma.
2. Hypertrophy from overgrowth, i. e., tuberculosis, etc., of the structures forming the lid not due to trachoma, or to
3. New growths taking place in the lid, the ptosis in these two last cases being secondary and brought about by the increased weight of the lid itself.
4. "Ptosis adiposa," so called by Sichel, who considered it arose from an excessive accumulation of fat, whereas it is in consequence of the bands of fascia connecting the skin with the tendon of the levator not being rigid enough; hence, when the lid is raised, the skin hangs down in the form of a flabby pouch.

5. Blepharochalosis, a condition in which the skin of the lids becomes relaxed and loose, and in consequence hangs down like a pouch while the free margin of the lid is scarcely lower than usual. Some authorities consider it a congenital form, and others as the result of antecedent edema (neurotic edema) swelling of the lids.
6. Edema of the lids from whatever cause—inflammation, injury, dropsy, etc.—though, in reality, a pseudo-ptosis, must be included as slight cases, may closely simulate a true ptosis.

Here, again, the diagnosis presents but little difficulty, as the causes which give rise to it are self-evident.

(B) *Acquired Ptosis Due to an Affection of the Levator Palpebrae.*—The two causes which may give rise to this condition are:

1. Traumatism, as after operation or a poke in the eye from a stick.
2. Atrophy of the muscle, known as ptosis myopathica, a condition that develops in women in middle life and progresses very slowly and is always bilateral. The diagnosis that the condition was due to disease of the muscle and not to an affection of the third nerve would depend upon the absence of other symptoms of nerve degeneration, and, as ptosis may be a very early symptom in such cases as myasthenia gravis, chronic progressive ophthalmoplegia, etc., a guarded prognosis would have to be given until sufficient time has elapsed to be certain that the condition is not due to some constitutional and general affection.

(C) *Acquired Ptosis Due to Central or Cerebral Cause.*—Partial or complete ptosis—cerebral ptosis—may be present without any localizing symptoms due to defect in the cortical center for innervation of the levator. The existence of such a center is still undecided, but is believed to be situated in front of the upper extremity of the ascending frontal convolution close to the arm center (Swanzy).

Diagnosis.—Ptosis due to cortical lesion would present only one-sided drooping of the eyelid as the only local symptom, the other

branches of the third nerve, being unaffected, would distinguish it from a lesion situated elsewhere in the brain, though occasionally disease in the pons has produced ptosis without involving other parts of the third nerve (see ptosis due to nuclear lesion).

(D) *Acquired Ptosis Due to Constitutional Cause.*—As mentioned before, ptosis is sometimes an early symptom in several diseases, and it is important to bear them in mind. In such cases the ptosis is usually bilateral, localizing symptoms pointing to lesions in the oculo-motor tract of the third nerve are absent and other signs of disease of the central nervous system can be found by careful examination. The following conditions may be associated with ptosis in some part of their course:

- | | |
|---|---------------------------------------|
| 1. Myasthenia gravis. | 8. Influenza. |
| 2. Locomotor ataxia. | 9. Sequel to exanthemata. |
| 3. Myxedema. | 10. Morning ptosis of delicate women. |
| 4. Chronic progressive ophthalmoplegia. | 11. Hysterical ptosis. |
| 5. Idiopathic muscular atrophy. | 12. Reflex from neuralgia. |
| 6. Myotonia congenita. | 13. Migraine ophthalmoplegique. |
| 7. Toxic poisons—lead, carbon dioxide, ptomaines. | |

It would be out of place here to attempt to give the distinguishing features of each of the constitutional affections in which ptosis may be a symptom, but it must be borne in mind, when investigating a case, that the condition may not be due to a local cause at all, and, though such should be examined for, if not found, attention should be directed to searching for other symptoms which would prove the cause to be due to some constitutional affection.

(E) *Acquired Ptosis Due to Some Lesion in the Tract of the Third Nerve.*—Classification would be arranged according to the situation of the lesion, thus:

- | | |
|----------------|----------------|
| 1. Nuclear. | 4. Sphenoidal. |
| 2. Fascicular. | 5. Orbital. |
| 3. Basal. | |

Nuclear Ptosis.—The nucleus of the third nerve lying on the floor of the fourth ventricle consists of several paired and one un-

paired group of ganglion cells. Thus it is possible for a lesion to pick out only one or two of these groups, the others remaining unaffected. Moreover, as the nucleus of the fourth nerve (the nerve which innervates the superior oblique of the eye) lies just behind the third-nerve nucleus, it may be affected at the same time. Thus, it is seen that a ptosis occurring on one side without any other offocal symptom is probably due to a nuclear lesion, though, as previously mentioned, in rarer cases it might arise from a cortical affection. Again, a ptosis occurring simultaneously with a paralysis of the superior oblique or along with an affection of some of the other groups of the third nerve nucleus, viz.: for the pupil, accommodation, convergence, superior rectus (subserving elevation of the eye), in which some of these were affected and some escaped, would give presumptive evidence of a nuclear origin as the cause. When the entire nucleus of the third nerve is involved the ptosis would be accompanied by total ophthalmoplegia; such a condition could also occur from a lesion affecting the third nerve itself further forward, but in this case there would be signs of involvement of neighboring structures, such as hemiplegia, anesthesia, proptosis, etc., according to the site and nature of the lesion. Thus a ptosis occurring without any localizing signs or accompanied by isolated symptoms pointing to nuclear lesions is due to a lesion affecting the nuclear region of the third nerve in the floor of the fourth ventricle. The causes which lead to a nuclear ptosis are principally syphilis, tubercle, hemorrhage, new growths, aneurysm of the central arteries, some poisons, and reflexly from neuralgia, etc.

Fascicular Ptosis.—The lesions here would be situated in the course of the third-nerve fibers between its nucleus and its point of emergence from the brain on the floor of the skull. It will be recollected that the fibers coming from the nucleus of the third nerve pass downward through the crus cerebri in close relationship to the pyramidal motor tract and finally emerge as a united trunk at the anterior border of the pons. Thus it is evident that a lesion affecting these fibers would also implicate the motor tract, producing, along with the ptosis, a hemiplegia of the side opposite to the ptosis. When a lesion occurs in the cerebral peduncle it affects, as a rule, all the fibers of the third nerve, producing a complete ophthal-

moplegia, but paralysis of only some of its fibers may be produced and the one to the levator palpebræ is the most commonly affected.

The association of ptosis (with or without ophthalmoplegia) with hemiplegia is a localizing sign of great value, provided that the two conditions occur simultaneously. If they occur at different times, it is evident the two conditions may be due to separate and distinct lesions, neither of which may be situated in the crus; for instance, the cause of the ptosis may be due to a basal lesion and the hemiplegia to a cortical one. In rare cases it has been observed where the lesion has been peduncular for the ptosis or third-nerve paralysis to precede the hemiplegia by a considerable interval. The causes of a fascicular ptosis would be hemorrhage, syphilis, tubercle, new growths, etc.

Basal Ptosis.—On emerging from the base of the brain the fibers of the third nerve are united into a common trunk which from this point runs forward along the outer wall of the cavernous sinus to enter the orbit through the sphenoidal fissure, being in close relationship to the first division of the fifth nerve. It is perfectly plain, then, that ptosis arising from a lesion affecting this part of the course of the third nerve would be associated with signs showing involvement of neighboring structures. Thus there would be complete ophthalmoplegia as the whole of the fibers form one cord; there would be edema, proptosis and venous engorgement of the ophthalmic veins, eyelids, etc., from implication of the cavernous sinus and anesthesia of the supra-orbital region from implication of the first division of the fifth, with probably implication of other nerves, as optic neuritis from pressure on the ophthalmic nerve. Causes of basal ptosis are principally fractures of the base of the skull and affections of the cavernous sinus or a gumma at the base of the skull.

Sphenoidal Ptosis.—As the third nerve enters the orbit it divides into two branches, the upper division being the nerve supply of the levator and superior recti muscles. Thus an affection here would closely simulate one situated posteriorly (i. e., basal) or anteriorly (i. e., orbital). From the basal lesion it would be distinguished by the absence of edema and proptosis showing the cause to lie anterior to the cavernous sinus, and from a purely orbital lesion by the implication of the nerves which are in so close

relationship to it at the sphenoidal fissure, viz.: the fourth, the nasal, frontal, lacrimal divisions of the first.

The causes would be fracture, periostitis, new growths, etc.

Orbital Ptosis.—Here the diagnosis of the cause of ptosis would not rest upon the absence of any of the previously mentioned localizing signs and would be associated with an involvement of the other division of the superior branch of the third nerve, viz.: paralysis of the superior rectus muscle. The causes would be intra-orbital, local among which would be new growths, simple and malignant, periostitis, etc.

(F) *Acquired Ptosis Due to Affection of the Sympathetic Nerve.*

Ptosis Sympathica or Pseudo-ptosis.—Innervated by the sympathetic nerve is a bundle of non-striated muscular fibers arising from between the striated fibers of the levator, along the under surface of which they run to be inserted in the upper margin of the tarsus. This muscle, discovered by Heinrich Müller and named after him, is an accessory to the levator, and paralysis of the sympathetic nerve results in an involuntary paralysis of Müller's muscle, producing a drooping of the eyelid. The diagnosis would be made from the concurrent signs of involvement of the sympathetic, viz.: contracted pupil, sinking in of the eyeball (enophthalmos), and symptoms of vasomotor paralysis of the same side of the head and face as the ptosis, viz.: redness and fullness with increased perspiration in the early stages—and afterward the opposite—is the case, the paralyzed side being paler and cooler and no longer sweating. Nothnagel states he has found these symptoms in lesions of the corpus striatum (Swanzy).

The Causes of Ptosis Sympathica.—Such would naturally be those productive of sympathetic paralysis, either from central affections, such as tabes or injury, or disease of the uppermost part of the cervical cord, but more frequently from pressure on the sympathetic nerve by tumors in the neck, such as new growths, aneurysm, enlarged sympathetic glands, goiter, callus after fracture of the clavicle or direct pressure after fracture or dislocation, following injury to the nerve after operation or accident, and in some cases from pressure caused by a cervical rib. Note that the ptosis which occurs in exophthalmic goiter is not a true ptosis in that it

is due to a spasm of Müller's muscle, which by causing one lid to be at a higher level than the other gives a false impression of the position of the other lid. This appearance is rare, as the condition is generally in both eyes.

RESUME.

To assist one in forming an opinion as to the situation of a lesion or the cause of a case of ptosis, a brief summary is appended. The first point to ascertain is whether the condition is congenital or acquired. If the former, it will be usually bilateral, and the history and appearance furnish sufficient material to clear up the diagnosis. When the condition is acquired, we examine for the structure involved and the site of the lesion causing it, and where no localizing signs are present we attribute the cause to a central or constitutional cause. We can not pretend to diagnose with certainty every case of ptosis, but in a great many it can be done with certainty and ease, and, moreover, will afford means of exceptional value of localizing a lesion.

Congenital.

Unilateral.

Bilateral.

Partial.

Total.

Acquired.

Unilateral.

Bilateral.

Partial.

Total.

Congenital Muscular Defects.

Absence or deficiency in development of levator.

Absence of or deficiency in development, associated with same defect in superior rectus.

Developmental Defects.

Absence of or deficiency in development of cerebral center.

Congenital Nerve Defects.

Absence of or deficiency in development of third nerve to levator.

Absence of or deficiency in development of third nerve to levator, associated with a narrow palpebral fissure, the condition known as congenital epicanthus.

Defect in or Affection of the Lids.

1. Trachoma.
2. Hypertrophy.
3. New growth.
4. Ptosis adiposa.
5. Blepharochalosis.

Affection of Levator Muscle.

1. Traumatism.
2. Ptosis myopathica.

Affection of the Sympathetic Nerve.

1. Central Causes.
2. Local causes.

Affection of the Oculo-Motor Nerve.

1. Nuclear.
2. Fascicular.
3. Basal.
4. Sphenoidal.
5. Orbital.

Affections of Constitutional Origin.

1. Myasthenia gravis.
2. General paralysis of the sane.

3. Locomotor ataxia.

4. Myxedema.

5. Disease of the thymus gland.

6. Sequel to exanthemata.

7. Sequel to influenza.

8. Toxic poisoning (lead, ptomaines, carbon dioxid, etc.).

9. Chronic progressive ophthalmoplegia.

10. "Morning ptosis."

11. Hysteria.

12. Idiopathic muscular atrophy.

13. Migraine ophthalmoplegique.

Affections of Cerebral Origin.

1. Disease or injury affecting cortical center in the brain.

