and hardness in the course of the vessels. He considers the extreme pain to be due not necessarily to inflammation, but to a kind of struggle between life and death in the parts deprived of their material of nutrition—"mais d'une sorte de lutte qui s'établit entre la vie et la mort dans les parties privées de leurs matériaux de nutrition."

Dr. Gordon (*loc. cit.*) considers the pain to be "caused in all probability by the excessive sudden distention of the coats of the artery behind the occlusion." Were this the case, however, we might expect pain at the seat of this distention. In his own case the obstruction was in the iliac, but the pain in the calf of the leg. In the case I report, no pain or tenderness was felt higher than the femoral, but in the leg only, and such is the history of most of the recorded cases. Another fact noticeable in my own case, and repeatedly alluded to by others, is that the pain was aggravated by any local disturbance from pressure or touch. No entirely satisfactory explanation of the cause of the pain has yet been given. An interesting discussion of this point may be found in the July number of the *Edinburgh Medical Journal*, 1864, p. 10.

Of the cause and exact nature and seat of the obstruction or embolus in the case now reported, the uncommon result in recovery leaves, happily, room for conjecture; but careful consideration of its history, the absence of any recognizable valvular lesion of the heart or ossification of the vessels, do not permit me to doubt that it was due either, 1st, to an atheromatous condition of the arteries and giving way of the inner coat at the point of obstruction; or, 2d, to fibrinous clot or embolus, the result of hyperinosis caused by the pleuritis which was immediately antecedent. The age of the patient, and the intermittent pulse, so indicative of weak muscular action of the heart and possibly incipient fatty degeneration of its tissues, might well be coincident with atheromatous disease of the vessels; also the previous attack in Dresden, which it now seems possible was due to partial suspension of the circulation in the right leg, and which was not preceded or accompanied by any marked febrile or inflammatory symptoms, would all point to the first of the causes indicated, while, on the other hand, the suddenness of the attack and the immediately preceding pleuritis—recognized by authors as one of the most frequent antecedents of embolus—both point to the latter supposition. However this may be, the seat of the obstruc-

tion appears to have been unquestionably in the external iliac, at or near its origin. If above that point, the gangrene would hardly have been limited to the parts below the knee. The temporary paralysis of the sphincter, confined possibly to its left half, may have been due to smaller particles of fibrin descending the internal iliac and occluding the hæmorrhoidal branches of that side.

The slight return for a few days of pulsation in the femoral, and also of warmth to the foot, have been noticed in a few other reported cases. The explanation is not clear, but the phenomena were probably due to some temporary softening or displacement of the obstructing body, or possibly enlargement of the artery itself, permitting for a short period the passage of an insufficient current of blood.

ON PARALYSIS OF THE MOTOR NERVES OF THE EYE, WITH CASES OBSERVED IN THE CLINIQUE OF PROFESSOR VON GRAEFE.

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THE most frequent and prominent symptoms of paralysis of the ocular muscles are strabismus, diplopia, ptosis, mydriasis, impairment of accommodation and luscitas, presenting either separately or collectively the various conditions of that complex affection. Paralysis leads necessarily to material and functional changes in the muscular apparatus, which destroy the natural correspondence of the optic axes, the parallelism of the horizontal and vertical diameters and the coincidence of the centres of revolution of the two eyes, and thus give rise to strabismus and diplopia. But although strabismus forms invariably a very prominent symptom in the more advanced stages of paralytic disease, and although a very close causal connection exists between them, yet the former prevails independently of paralysis, inasmuch as it originates from a great many other causes—too numerous to specify here—such, for instance, as anomalies of refraction, incongruence of the two retinæ, opacities of the cornea and in the refractive media, intra-orbital tumors and abscesses, penetrating lesions, inflammation of the muscular apparatus, &c. If uncomplicated with faulty innervation, perverted nervous action, and all the like, if merely dependent on impaired functional capacity, insufficiency and structural disorders, then it must be distinguished from the form connected with

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and owing to paralysis of the muscles. In pure concomitant strabismus, where the motor nerves are perfectly intact, and where no secondary atrophy has taken place in the muscles at fault, the deformed eye accompanies all the movements of its partner; not so in paralytic strabismus, where the mobility of the affected eye is impaired in proportion to the intensity and extensive nature of the disease. Although both are equally characterized by loss of the natural correspondence of the optic axes, the deviation in the former is nearly constant, and the bulbi themselves are but little restrained in their associated movements, while in the latter the deviation changes according to the degree of the paralysis, and the eye, being impaired in its excursive capacity, remains fixed more or less immovably in one direction. In pure strabismus the primary deviation of the squinting eye is as great as the secondary of its sound associate, or, in other words, the primary and secondary strabismic angles are the same; in paralytic strabismus, on the contrary, the secondary deviation of the healthy eye is much greater than the primary of the one affected, and the sum of mobility of both bulbi is not the same, but decreased in the diseased eye towards the paralyzed muscle. Want of harmony in the movements of the eyes is the chief characteristic of the former; loss of motion distinguishes the latter.

The complication with binocular diplopia is, under ordinary circumstances, an exception in pure strabismus, for the reason that the false image is usually suppressed or rather unnoticed, by the patient giving his undivided attention to the sensations of the healthy eye; the impressions on this being much more vivid, the mind perceives the stronger to the exclusion of the weaker. Although diplopia arises from various causes, the proximate cause is most frequently paralysis of some one or more of the muscles of the eyeball; and in paralytic disease of the motor apparatus it plays indeed a very important part, being one of the most, if not the most, conspicuous and troublesome symptoms. Diplopia does not take place in all parts of the visual field, but is confined to the path of the paralyzed muscle; and its greater or less extent, although chiefly dependent on the amount of paralysis present, varies with the influence of other very important conditions, such as the capacity of fusion, the power of accommodation, the refractive state of the eye, &c. As at times the deviation of the axes and diameters of the

eyes is caused only by an adjustment for certain distances and in particular directions, so does diplopia in such cases become manifest only when the patient looks at those distances and in those directions; and the double images will appear either homonymous or crossed, according as there is a pathological convergence or divergence of the visual axes. The relative situation and position of the double images most generally indicate the seat of the affection, and the greater the distance between them the more decided is the paralysis. Whenever the difference in the distance of separation of the double images is found equal and constant, the diplopia is not due to paralysis; that alone causing the discrepancies in their relative distance from each other. (*Die Differenz der Drehungsbögen und Willenskräfte ist bedingt durch Lähmung.*—v. Graefe.)

The binocular double vision, which originates from muscular and nervous derangements and attends pure and paralytic strabismus, must be distinguished from the monocular diplopia and polyopia, owing to disorders in the dioptric organs and frequently accompanying ametropia and irregular astigmatism; they are mere circles of dispersion, and easily corrected by spherical and cylindrical glasses, or a combination of both, according to the nature of the anomaly of refraction.

Paralysis of the muscle supplied by the abducens, or the rectus externus, is marked by a more or less complete incapacity of the bulbus to be turned outwards; by homonymous, horizontal double images, which become more separated from each other the more the eye is turned in the direction of the paralyzed muscle, and which diverge obliquely upwards as the eye is directed outwards and upwards. In order to avoid the troublesome double vision, patients turn the head towards the side of the affected externus muscle, and thus get the object in a relatively favorable situation for the adjustment of both eyes.

Paralysis of the muscle supplied by the trochlear nerve, or the superior oblique, is characterized by homonymous double images, confined to the lower field of vision, and becoming further separated from each other in the vertical meridian the more the eye is directed downwards. The two images converge upwards and grow more oblique if the object be moved towards the affected eye; the vertical distances of separation, on the contrary, decrease in the direction of the affected side and increase towards the sound eye. The

false image appears nearer and below the true one, only on looking very much downwards, it stands higher.

In paralysis of the muscles supplied by the oculomotor nerve, viz., the internal, superior and inferior recti, the inferior oblique, the levator palpebræ superioris, the ciliary fibres of the iris and the ciliary muscle, the symptoms vary very much according to the degree and extent of the affection. If the paralysis is complete, ptosis of the upper eyelid, and for the most part, too, a slight prominence and eversion of the bulbus become apparent. The mobility of the eyeball is normal in the horizontal equator, on account of the healthy externus, and outwards and downwards in the path of the sound trochlear muscle, but in all other directions either restrained or wholly lost. With the exception of the regions just named, diplopia takes place in all parts of the visual field; crossed double images—the illusory higher—which converge upwards and appear with the upper end nearer to the eye. The lateral distance of separation of the images increases with the amount of deviation of the object towards the healthy eye, but the difference in their attitudes augments with the movement of the object above the horizontal equator, and decreases as it descends below it. The obliqueness of the images is greater above than below, and reaches its maximum when the eye is directed upwards and outwards. The rigidity, immobility, and moderate dilatation of the pupil point to a paralytic condition of the sphincter, or circular fibres of the iris, while the impairment or loss of accommodation indicates that the ciliary muscle, or tensor choroideæ, is also implicated.

With the loss of their contractile power and the cessation of their functions, mydriasis and paralysis of the accommodation ensue; the range of the latter indicates to what extent the tensor choroideæ, as Brücke has styled it, is involved, and the smaller it is found the more developed is the paralysis. Another quite frequent and distressing symptom in paralysis of the muscles, supplied by the third nerve, is vertigo, which patients try to avoid by looking and leaning the head to the non-affected side.

Paralysis of the ocular muscles, almost always a mere symptom in various morbid conditions, originates from causes that are either of central or peripheral, of constitutional or local nature. Basilar meningitis, cerebral neoplasms, cranial periostitis, intraorbital abscesses and tumors, spinal disease, rheumatic inflammation of the nerve-

sheaths, syphilitic cachexia, circulatory disorders, mechanical lesions of the motor nerves, &c., are among its chief causes; but it would lead us too far, to dwell at length on the various combinations of that complex affection, their characteristics and differential diagnosis, and this bare enumeration must therefore suffice—with a few accompanying remarks only.

The paralytic disease may be confined to a single muscle, or may attack several, more or less completely, at the same time; it may furthermore be limited to the boundaries of the nerves, supplying the muscles of the eyeball, or be complicated with a similar affection of the facialis, trigeminus, &c., and it is obvious that all these various conditions depend solely on the relative seat and extent of the primary cause. A complete paralysis is usually peripheral, and although partial ones may be also of the same character, they are much oftener of central origin—in that case not all the nerve-fibres becoming involved. Those forms, therefore, which precede or accompany cerebral and spinal disease, are easily distinguished from the simple rheumatic and traumatic by the fact that the latter are invariably more constant and complete. Among the former deserves especial mention the palsy attending locomotor ataxia, of which it forms one of the first and most essential symptoms. The later stages of that insidious malady are marked by a total paralysis of the third pair, in consequence of degeneration of the nerve-fibres; but this grave complication must be distinguished from the ephemeral paralytic affection of the abducens in the initiatory stage. It appears at first as pure diplopia only, which vanishes sometimes very rapidly, and is later followed by symptoms of a more decided palsy.

The course and termination of any paralytic disease involving the muscular apparatus of the eye depend chiefly on the nature of the pathogenetic cause, on the presence or absence of complications and the degree and duration of the affection. Peripheral cases, due to rheumatic inflammation of the nerve-sheaths and other acute morbid processes, arise suddenly and develop often in the course of a few hours; while those of central origin, owing to organic disease of the brain and spine, to constitutional cachexia and disorders of the circulation, progress slowly and insidiously, and are usually marked by a periodical, intermittent type of symptoms, which exhibit a continuous succession of paroxysms and remissions, until they assume at last a

stationary character. Recent attacks, or such as have lasted but a short time and are uncomplicated with organic disease and secondary affections—strabismus, atrophy, &c.—allow a favorable prognosis, and we often notice in such cases not only a speedy improvement after proper treatment, but also a spontaneous *restitutio ad integrum*. In the chronic forms, on the contrary, the prognosis is altogether unfavorable; for, not to speak of the incurability of the originating affection, the paralysis itself, bound to morbid conditions that have become inveterate and intractable, evinces very little inclination to retrograde, and leads most frequently to serious secondary troubles and changes, such as diplopia, vertigo, strabismus, amblyopia ex anopsia and total degeneration of the implicated nerves and muscles.

In congenital paralysis of any ocular muscle, owing to innate central disease, hereditary syphilis, &c., the prognosis is also very unfavorable, for even after the primary, constitutional disorder be no longer in operation and wholly obliterated, the morbid changes in the affected parts will strenuously oppose all efforts to remedy the resulting paralysis.

The treatment must in all cases be directed, first and foremost, against the originating disease—that has produced the paralysis and is maintaining it—and only after the pathogenetic causes have been removed, or their injurious influence reduced, and the paralytic symptoms still prevail, the direct, mechanical and operative methods of treatment are indicated.

In cases of recent origin, topical abstractions of blood, antiphlogistic, emollient, derivative and revulsive remedies may be employed with advantage against the exciting cause still in operation. When they are more advanced, alteratives, such as mercury, especially in the form of inunctions, and iodide of potassium, are apt to aid in the resorption of exudations, even though not of a specific character, and to exert a favorable influence upon the course and termination of the affection. If all these remedies prove of no avail, and the paralysis remains unyielding, the application of electricity, either in the form of Faradization or the galvanic current, is advisable; the latter is by far the more preferable, and proves of decided value in a great number of cases. Always beneficial in paralysis with a rheumatic basis, it produces often a curative action even in cases where the primary, intracranial affection still exists, and is beyond the reach of any improvement. But in or-

der that the greatest possible benefit be obtained, the galvanic current should be applied to the trigeminus, and not directly to the nerves supplying the muscles themselves, as, generally speaking, the best and speediest results are effected by reflex excitation through the fifth pair. The current used for that purpose must be relatively weak, not strong enough to produce muscular contraction, and its proper strength determined in each special case by the sensitiveness of the nerve operated upon, and the irritability of the patient. The excitation should continue only a very short time, from half a minute to one minute, at most—longer and more powerful application being apt to aggravate the original paralysis. In the greater number of cases indicating electrical treatment, the improvement takes place instantaneously (Benedikt), and is chiefly shown by an increased mobility of the eye and a diminution of the field, in which double images arise. When, however, the paralysis has been unaffected by a galvanic treatment of two weeks' duration, it should be desisted from, as no benefit is to be expected from its longer continuance (Benedikt).

In connection with the treatment just indicated, it is further of great importance to exercise and strengthen the paretic muscle, by covering the healthy eye at intervals during the day, and compelling the affected one alone to exert its visual function, especially in the direction of the diseased parts. For the purpose of improving the innervation of the muscle at fault, the eye should be adjusted for near or distant objects in accordance with the correction, that is attempted by the exercise—adduction or abduction—and if necessary, spherical glasses should be used, either to diminish or to increase the refractive power of the eyes.

In paralytic affections of less degree, the systematic treatment with prismatic glasses has been warmly recommended, and some ophthalmic surgeons of note have employed them in even more decided cases of paralysis with consequent strabismus. "Prisms with the base turned in the direction opposite to that of the squint have the power of causing a deviation of rays of light incident on their base, which may thus be used to deflect the rays proceeding from objects looked at, so that they may, in the case of the squinting eye, be made to fall upon a part of the retina congruous to that which receives them in the normal eye." Prisms may, in fact, be used thus to fuse and destroy double images and to

restore binocular vision. But apart from that optical function which has a temporary effect only, and leaves the material cause of the paralytic strabismus still in operation, they perform also a truly gymnastic one, by exercising and strengthening the paretic muscles and exciting them to a more uniform and synergic action. Unfortunately though, the practical results of that method of treatment do not correspond to the expectations which might theoretically be entertained, and the correction of the trouble by prismatic glasses is either not practicable in the majority of cases or aptly prepared for by the preliminary performance of tenotomy.

This operation, first performed by Dieffenbach on the living body, and after a period of apparent oblivion revived and brought to universal recognition by Graefe, takes foremost rank in the treatment of all forms of strabismus—pure and paralytic—and is indicated when all other curative methods have failed, and the affection threatens to cause severe secondary disorders, such as luscitas, amblyopia, &c.

Previous to undertaking an operation for the cure of paralytic strabismus, it is essential to ascertain, 1st, whether there is a sufficient capacity and breadth of fusion; and 2d, whether the paralysis has assumed a stationary character: these are conditions *sine qua non*, and their presence is indispensable to the successful treatment of the affection. The act of fusion of double images is a purely cerebral, not a sensorial function, and therefore does its loss or impairment clearly indicate the existence of an active, intra-cranial disorder, and the central origin of the paralysis (Graefe); although the latitude of fusion may also decrease with advancing years, after the visual power of one eye has been lost for a long time. If double images can be made to coalesce by means of prisms, the breadth of fusion is proved to be normal, the intuitive desire for binocular vision preserved and readily obeyed, and the scope perfect. While, therefore, a total loss of capacity and breadth of fusion will render all curative efforts unavailing, the cure of paralytic strabismus and diplopia will be—*ceteris paribus*—the simpler and easier, the more they are developed.

When the pathogenetic cause is no longer active, the affection has become stationary, the paralysis of the one or the other muscle remains unyielding, or secondary contraction of the antagonist has taken place, tenotomy should be at once performed; and it is obvious, that the extent

of the operation has to be regulated according to the degree of the affection. A few remarks on the leading principles of tenotomy, or, to speak more accurately, of strabotomy, may not be out of place.

Slight strabismic deviations, from 1 to $1\frac{1}{2}$ line, demand a partial tenotomy only,* but if they amount to from $1\frac{1}{2}$ to $2\frac{1}{2}$ lines, the tendon must be completely divided; and the greater the deviation, the larger must be the hook employed, and the more freely the cellular tissues incised. Operations performed on one eye only, correct deviations amounting to $2\frac{1}{2}$ lines; if the strabismus exceeds that amount, both eyes must be operated upon. Either a complete tenotomy should be performed in the squinting eye, and a partial one in the other, or the tendon should be completely divided in both eyes—a point to be decided by the amount of strabismus left, after the affected eye has been operated upon. It is a proper rule not to operate on both eyes in one sitting, especially in convergent strabismus—except, perhaps, in cases where the deviation exceeds 5 lines—for if both muscles have been divided at the same time, the accommodative movements directly after the operation cannot be accurately tested, and the only clue to the permanent effect is thus lost. The better and safer plan, and the one adopted by most ophthalmic surgeons, is to operate first on the squinting eye, and then, after the divided muscle has again re-united with the sclerotica, and the degree of the remaining deviation has been ascertained, to perform an operation on the healthy eye, the extent of which will depend upon the amount of strabismus still left. Any excessive effect of the operation can be reduced by a suture, the object of which is to re-advance the tendon, which is closely connected with the conjunctiva and subconjunctival tissue, to approximate more closely the divided ends, and to diminish the retraction of the muscle. The greater or less effect depends upon its position and the amount of conjunctiva embraced in it; it is greatest if inserted in a diagonal direction, and least, answering merely a cosmetic purpose, if inserted above. When the operative effect is too slight, it can be increased by the excision of a semi-lunar portion of the sheath and conjunctiva in the direction of the opposite side. In every operation for strabismus the effect is more variable than constant (Graefe).

Slight strabismic deviations require only the more or less complete division of the

* We are informed that partial tenotomy has been abandoned by oculists generally.—Ed.

tendinous insertion of the muscle at fault, which loses power by its posterior attachment to the sclerótica, and causes, therefore, a smaller angle of squinting, the more the excursion of the globe is lessened in its path. Greater deviations, on the contrary, necessitate the distribution of the operation over both eyes, or render it, at least, far preferable to the immediate result of one operation only—and indicate the complete section of the affected muscle, together with a less complete division of its associate of the other side. The same operative principles which obtain in the treatment of pure strabismus, are also admissible in paralytic squint with deviations not exceeding 1 to 2 lines; but if the paralysis is more decided, the insertion of the paretic muscle must be *advanced* by means of the suture, or in extreme cases by the "thread-operation," and at the same time the antagonist divided more or less completely. This method is equally applicable to primary strabismus, with an excessive angle of squinting and greatly impaired mobility in the path of the affected muscle, as to secondary squint, where the mobility in the course of the retracted muscle is nearly lost, and its connection with the eyeball totally suspended. Very rigid inquiry into the behavior of the various muscles, no less after than before the operation, and in near as well as in distant vision, is the indispensable condition of success in all operations. The frequently difficult question, whether parallelism is restored, or whether there exists yet some deviation from it in one or the other direction, must be decided by means of a prism, with its base downwards, and the dynamic latent preponderance must always be measured—these conditions determine the effect of the operation and the further course to be pursued. (If after an operation for convergent strabismus divergent squint develops in the course of time, it is owing to the fact that the dynamic deviation, already existing, has steadily increased, and at last can be no longer suppressed by the latitude of fusion.—Graefe.)

Just as in all other tenotomical or myotomical operations, so also in the operation for strabismus, the orthopædic after-treatment is of the utmost importance, and on the manner in which it is conducted depends to a great extent the permanency of success. The chief agents employed in that period are: stereoscopic exercises, suitably adapted glasses, prisms, and spectacles, by which the patient is compelled to direct the eye—in order to see—exclusively towards the right or the left side, just as the special case may require.

To sum up:—Tenotomy is able to effect in all forms of strabismus, whatsoever, an essentially improved, if not a perfectly normal position of the eyeball; it does further effect, in all cases in which the resulting amblyopia has not yet attained a very marked development, an improvement of projection, accommodation and distinctness of vision. The operation is not contra-indicated by incongruence of the two retinæ—although the disorder in question has to be remedied by a special after-treatment—and if in consequence of extensive corneal opacities, an aberration of the visual axes has already ensued, which prevents the recovery of better vision, it may at least fulfil a cosmetic indication. (Berliner D. Klinik. Report of commission.)

It remains yet to say a few words on mydriasis, paralysis of the accommodation, and their mutual relations.

According to Graefe and other observers, it is more than probable that the iris exerts no direct influence whatever upon the act of accommodation, as the perfect integrity of the latter has been proved in cases of an artificial pupil, traumatic loss and congenital absence of the former; but its auxiliary and indirect influence can hardly be denied, when the facts are taken into consideration, that a considerable impairment of accommodative power becomes manifest by extensive posterior synechiæ—and to some extent also after the performance of iridectomy (Stellwag)—and that in almost all cases of congenital irideremia a deficient development of the ciliary muscle is complicated with it. Simple mydriasis leads not necessarily to a paralysis of the accommodation, since it depends on a variety of causes, which affect the ciliary fibres of the iris only, either temporarily, as in the ephemeral form, or more constantly, as in the spasmodic, in which the dilatation of the pupil is undoubtedly owing to a spastic contraction of the radiating sympathetic fibres overpowering the action of the sphincter. But in the paralytic form, that occurs most frequently, paralysis of the accommodation is almost always present, for the reason that the same pathogenetic cause implicates the sphincter of the pupil and the ciliary muscle, intimately connected and supplied by the same nerve as they are. In cases of pure, uncomplicated paralysis of the ciliary muscle—and sphincter of the pupil—the originating disorder may exceptionally be seated in the cerebrum, but is almost invariably located in the lenticular ganglion or its radix brevis. Paresis of the accommodation and mydriasis

sis, on the contrary, which are combined with and in part symptoms of extensive functional disorders involving several muscles of the eyeball, are either due to morbid processes in the sheaths or trunks of the motor nerves, or oftener yet to affections in the central organs themselves. These primary affections are not always strictly material ones, consisting in marked changes of the organic tissue, but often unaccompanied by any manifest alterations, and then the expression of certain dyscrasies and intoxications only, such as mania a potu, diabetes, uræmia, &c.

Quite singular and characteristic is the paresis of accommodation, which is frequently met with in diphtheria, complicated with paralytic disease of the palatine and pharyngeal muscles. The unknown morbid cause seems to affect the ciliary muscle only, and to leave the circular fibres of the iris wholly intact; for, although one or more of the ocular muscles innervated by the third pair may at the same time be implicated in the diphtheritic paralysis, yet mydriasis is but very seldom observed. (When the two pupils present a different pathological appearance—mydriasis in the one eye being complicated with myosis in the other—the difficult problem, which of them comes nearer the normal condition, is decided by observing which possesses the greater excursive capacity and accommodative power.) The treatment of mydriasis and paralysis of the accommodation must, of course, be directed first and foremost against the pathogenetic cause, whenever such is practicable and promises any success. If the primary affection has been removed, and the mydriasis still exists as an independent disease, due to material, morbid changes in the nerve or muscle, remedies must be employed calculated to incite the sphincter papillæ to vigorous contractions, and for that purpose the direct excitation of the paralyzed parts by tincture of opium, the preparations of the Calabar bean (*phyostigma venenosum*), vapors of ammonia, and electricity is indicated. forcible and methodically repeated contractions of the orbicular muscle—anti-mydriatic exercises—have been recommended by Graefe. The cure of paralysis of the accommodation requires a combination of remedial agents, general and local, which are apt to impart more vigor and vitality to the whole system as well as to the affected parts. Cautious exercise of the accommodative apparatus by suitably adapted convex glasses—varying as to degree, according to the particular circumstances—cold douches, gene-

rous diet, a hygienic regimen, and the internal use of quinia, ferrum and other tonics, are chiefly capable of restoring the impaired ciliary muscle to its proper functions and of improving the power of accommodation.—(Donders.)

The artificial mydriasis and paresis of accommodation, produced by belladonna, hyoscyamus, stramonium, &c., and their alkaloids, differ from the natural forms only as to cause and duration. If the application of the remedies just mentioned is moderate, mydriasis only ensues, but with their increase in strength and dose, the ciliary muscle, too, becomes paralyzed and the accommodation is temporarily annulled. In spastic contractions of the muscles, which execute the movements of the eyeball and are innervated by the third pair, especially in such as are produced by direct lesions, mydriatics have been employed with signal success; and the singular observation has been made, that the same agents which give rise to a thorough paralysis of the accommodation, if excessively used, restore the accommodative functions, suspended by the spasm, even before they have a chance to effect a dilatation of the pupil. (Graefe.) This antispasmodic effect of the mydriatics explains pretty satisfactorily the favorable influence they exert in the treatment of keratitis, iritis, iridochoroiditis, ulcerative processes, &c., for by reducing the irritation and hyperæsthesia of the sensory ciliary nerves, which usually attend inflammatory conditions of the eye, and by decreasing the intraocular tension, they act as truly sedative and antiphlogistic remedies. Ophthalmic practice is indeed vastly indebted to these invaluable remedial agencies, and no less a man than Graefe is authority for the sentence:—Atropia is the staff of ophthalmology.

CASE I.—*Paralysis of the left Abducens, complicated with Mydriasis, Loss of Accommodation and Partial Anæsthesia of the left Trigemini.*—The facial, trochlear and oculomotor nerves, with the exception of the pupillary branch and the motory fibres of the ciliary muscle, were in a perfectly normal condition. The near point of the healthy eye—Jaeger No. 1—was at five inches, the far point in infinite distance, consequently normal; in the affected eye, on the contrary, the near point was, with the aid of a convex 7, found at six inches, and the far point quite close somewhere between 8 and 9 inches—thus indicating an exceeding impairment of the range of accommodation and a diminished power of vision. (Was this complication solely owing to the

ciliary fibres of the third nerve, which was otherwise nearly intact, being involved, or was it, together with the mydriasis present, more intimately connected with the paralysis of the abducens? For, according to Graefe and other observers, it is highly probable that the abducens takes a more or less decided part in the complex accommodative processes and in the movements of the pupil.) There was no protrusion perceptible in the orbit, but on pressure upon a small, circumscribed spot, the patient exhibited considerable sensitiveness, which might have been occasioned by a gummous tumor. Cerebral symptoms, psychical and hemiplegic disorders were wanting; therefore the origin of the paralytic affection was not to be sought for in the brain itself. The partial, circumscribed anæsthesia on the left side, however, rendered the diagnosis of a purely orbital disease improbable, and induced Graefe to locate the pathogenetic cause in the basilar region of the cranium. The trouble had slowly and gradually developed after a severe cold, and was no doubt owing to a *syphilitic*, cranial process, as a specific ulcer had existed long ago, and the characteristic osteocopic pains had troubled the patient for some time past. Mercurial inunctions and iodide of potassium operated favorably upon the primary disease, and the performance of tenotomy, &c., corrected the convergent strabismus and diplopia, and improved considerably the visual power of the eye.

CASE II.—*Paralysis of the Fifth and Sixth Pair, uncomplicated with Neuro-paralytic Ophthalmia.*—The left abducens and several branches of the left trigeminus were completely paralyzed, the temporal and masseter muscles in a state of atrophy, and the bulbous, the eyelids and almost the entire half of the face, including the corresponding half of the nose and tongue, anæsthetic. The cranium was in some parts thickened, in others sunk in, and severe pain in the head, alopecia, intumescence of the glands and a profuse nasal catarrh further complicated the case. This group of symptoms was undoubtedly owing to lues, and the paralytic affection of the eye could only be explained by the existence of a specific, osseous disease in the basilar region of the cranium, which had extended to the origin of the implicated nerves. The diagnosis of cranial periostitis of a specific character, was corroborated by the speedy and favorable effect a rigorous antisiphilitic treatment produced upon the greater number of the morbid phenomena. Graefe thinks that paralysis of the fifth nerve is

usually complicated with neuro-paralytic ophthalmia, and originates most frequently from syphilis and its secondary manifestations. In connection with this case, in which softening of the eyeball was not noticeable, he took occasion to express his dissent from the view held by Donders, that trifacial anæsthesia had the tendency of rendering the globe more soft. He stated that in eight or ten cases which had come under his observation, he had failed to notice that connection, and attributed the fact of the globes becoming softer after section of the fifth nerves, in consequence of a decreased tension, to other causes, far more complicated and not yet cleared up.

CASE III.—*Paralysis of the left Abducens and Oculomotorius, with Secondary Strabismus in the Right Eye.*—The affected eye showed no mobility upwards, inwards and outwards, only the movement downwards was unrestrained on account of the perfect integrity of the trochlearis. The levator palpebræ superioris was impaired, but much less so than the rectus superior; the sphincter of the pupil and the ciliary muscle were also palsied, and in consequence mydriasis and loss of accommodation became apparent. The right eye revealed an excessive strabismic deviation upwards and outwards; although not primarily diseased, and having become affected with squint only on account of the paralytic condition of the other, it had lost, to a great extent, its visual power by being excluded from the common act of vision. Not participating in that, it revealed a secondary deviation whenever the other eye fixed any object; and the loss of correspondence in the direction and movements of the two eyes had gradually led to an affection of the optic, nervous apparatus in the weaker. The paralyzed eye, possessing stronger and distincter sight, performed exclusively the act of vision, and condemned the squinting one to remain—as far as its function of seeing was concerned—in a state of utter passivity, which gave rise to torpor of the retina and to optic anæsthesia. Amblyopia ex anopsia, arising under such circumstances, affords in most cases only a very insignificant, if not a negative ophthalmoscopic sign; whenever atrophy of the optic nerve is found in an optic amblyopia, it results not from exclusion alone, but from a complicated neuritis or other affections of the optic nervous organs. The history and appearance of the case rendered it highly probable that the morbus causans was a peripheral one, and of rheumatic character, yet having existed for a considerable time, and being complicated

with functional disorders, and most likely, too, with material changes in the affected nerves and muscles, the prognosis was considered unfavorable. Local depletions with Heurteloup's artificial leech were made, which gave considerable relief and freed the patient from the severe spontaneous headache and the great pain consequent upon knocking on the head; and to meet other indications mercurial inunctions and iodide of potassium were prescribed.

CASE IV.—*Paralysis of the Oculomotorius, Abducens, Trochlearis, upper branch of Trigemini and Infraorbitalis*, with perfect immobility of the eyeball, paralysis of sensibility, and anæsthesia of the cornea, without the slightest reaction on touch. All these symptoms were one-sided and complete, and on that account the primary cause of the paralysis could probably be a peripheral one only—central palsies of a similar character being of very rare occurrence. In this case the etiology aided, in combination with the symptoms present, in establishing a correct diagnosis and in determining the exact seat of the originating trouble. It had begun suddenly, after exposure and a severe cold, with excessive pain in the orbit, increased by pressure, and later rigidity and gradual protrusion of the eyeball had followed, together with the paralytic disorders in the various nerves implicated. The suddenness of the attack proved at once its rheumatic character, and excluded all direct and immediate connection with syphilis, &c.; it was a clear case of plastic inflammation of the orbital periosteum, with secondary neuritis, which had produced the paralysis. Periostitis of the orbit is owing to a great variety of causes, either of constitutional or local character, which modify considerably its course and termination. Vehement concussions, direct lesions and also causes not understood, give rise to it, and develop its symptoms sometimes very slowly; arthritis, mercurial cachexia and syphilis play an important part in its production, but it is chiefly scrophulosis that leads to the most torpid and protracted forms and complicates them with caries and necrosis. Among its indirect causes are orbital abscesses and tumors, phlegmonous dacryocystitis, and suppurative meningitis, the most frequent and usually leading to caries of the bones composing the walls of the orbit. The case under consideration being of a purely rheumatic character and of comparatively recent date, admitted at least of a doubtful prognosis—*vergens ad faustam*—and gave hope of yielding to proper curative measures.

Local abstractions of blood, a strict antiphlogistic and derivative treatment, later iodide of potassium, &c., were resorted to, and proved of decided benefit.

CASE V.—*Bilateral Paralysis of the third, fourth, and sixth Pair*, with paralytic ptosis, slight prominence and almost complete immobility of both globes; but perfect integrity of the circular muscular fibres of the two irides, and of the ciliary muscles, and consequently with a normal condition of the pupils and an unimpaired power of accommodation. This singular phenomenon—the perfect integrity of accommodation and pupillar contraction, contrasting with an absolute immobility of the eye (by the thorough paralysis of its entire motor apparatus)—has been repeatedly observed by Graefe, and he looks upon it as a characteristic symptom in such cases as the one under consideration. These observations were used as a striking and successful argument against those who had asserted that the accommodation was owing to the united action of the external muscles on the eyeball, and had denied the chief instrumentality of the ciliary muscle, in performing the accommodative function. The affection, which had suddenly arisen, was probably due to a speedily forming infiltration on the basis cerebri in consequence of periostitis in the dura mater; at first vehement pains had been present, but they had gradually ceased and returned only occasionally with greater intensity. These were all the anamnestic data that could be ascertained respecting the trouble, the patient having formerly enjoyed good health and being utterly unable to mention any cause which might have given rise to it. Etiological momenta, pointing to any morbid tendency, specific disease, &c., were also wanting, as far as the objective examination could disclose them; yet syphilis was suspected as the primary cause, and as more likely to have produced the paralysis than an idiopathic or rheumatic cranial affection. The absence of any diffuse cerebral symptoms, of paralytic disorders in other parts, and of serious complications with the optic and sensory nerves of the eye, proved sufficiently that the original trouble had not extended beyond its first seat, that the fierce, most intense stage of the intracranial disease had passed away, and that the latter's power for mischief had greatly decreased within its narrow, circumscribed limits. The prognosis in such cases depends, apart from the pathological cause, from constitutional or local complications and other less appreciable influences, chiefly on their course and

deration. Rapidly developing bilateral paralysis of the third, fourth and sixth pair admits usually of a favorable prognosis, and as the infiltration giving rise to it disappears, a speedy retrogression of all paralytic symptoms takes place simultaneously. Chronic cases, on the contrary, and such as arise slowly and insidiously, are unexplainable and far more unfavorable; for besides the severe cerebral disorders usually complicating them, the visual power, too, becomes greatly impaired, and amaurosis, more or less complete, supervenes. In the case under consideration an energetic antiphlogistic treatment, mercurial inunctions and iodide of potassium were consecutively employed with signal benefit.

CASE VI.—*Paralysis of the right Oculomotorius of traumatic Nature and long Duration.*—The first stages of the affection had been marked by intervals of complete improvement and an apparent *restitutio ad integrum*; at times very violent headaches had occurred, during which the paralytic symptoms intermitted, to return again after the cessation of the former. For the last two years, however, the paralysis had existed uninterruptedly, although the characteristic headaches still came on periodically and in paroxysms. They were owing to the residua of a probably periosteal affection, which produced continually fresh irritation, and gave rise to typical exacerbations, without any palpable cause becoming apparent. The paralysis itself was now dependent on pathological changes in the involved nerve and on secondary atrophy and fatty degeneration of the muscles supplied by it. The prognosis, under these circumstances, was highly unfavorable, and no benefit could be expected from a medical or operative treatment, even though the primary affection had been wholly removed. There was an interesting phenomenon connected with this paralysis, namely, the very slight ptosis; and Graefe tried to explain it, by pointing to the fact that chronic paralysis of the third nerve was usually attended with very slight ptosis, while in the acute form it developed rapidly and became more marked.

Medical and Surgical Journal.

BOSTON: THURSDAY, MAY 20, 1869.

ONE of the communicated articles of to-day is matter belonging to the Boston So-

ciety for Medical Improvement, which has a certain precedence. At all events, as extra pages are supplied, articles which have been waiting have not been thrust aside to make room for it.

AMERICAN MEDICAL ASSOCIATION.

(Continued from page 268.)

WE surrender the chief part of our Editorial space this week to a continuance of the report of the late session of the American Medical Association.

Dr. L. P. Yandell, Jr., of Kentucky, offered the following, which was adopted:—

Resolved, That private handbills, addressed to members of the medical profession, or by cards in medical journals, calling the attention of professional brethren to themselves as specialists, be declared in violation of the Code of Ethics of the American Medical Association.

The special order for one o'clock being the report on American Medical Library, Dr. Toner, chairman, read the report.

After some discussion, on motion of Dr. Hibberd, of Indiana, the report was accepted.

Dr. Davis, of Illinois, offered the following resolutions:—

Resolved, That the proposition of the Librarian of the Congressional Library be accepted.

Resolved, That a committee of one be appointed, residing at Washington, to render the Librarian of Congress such assistance as the interests of the Association may require. Adopted.

Report on Medical Education presented, and, on motion of Dr. Hibberd, of Indiana, it was made the special order for 10 o'clock to-morrow.

Committee on Prize Essays reported:—

The undersigned, appointed Committee on Prize Essays at the session of 1868, respectfully report:—

They have received but two essays—one upon "The Physiological Effects and Therapeutic Uses of Atropia and its Salts"; the other upon "Quinine as a Therapeutic Agent." They agree to present both of these essays to the Association, and to recommend the award of a prize of \$100 to each of them.

S. M. BEMISS, *Chairman*.

C. BEARD, M.D.

JOSEPH T. SCOTT, M.D.

S. A. SMITH.

The Secretary broke the seals, and announced that Dr. S. S. Herrick, of New