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THE TICS AND ALLIED CONDITIONS.*

OPENING PAPERS.

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CONFUSION still lingers round the unwieldy and heterogeneous group of 'involuntary movements' or 'movements of the nerves.' A host of ill-differentiated, sometimes contradictory and far from mutually exclusive expressions—electric, fibrillary, variable and habit choreas; choreic epilepsy, electrolepsy; habit-spasm, myospasm, myokymia; myoclonus, monoclonus, polyclonus, paramyotonus, paramyoclonus, myoclonotonus—bewilder the student, yet some of them, bad though they are, stand for clinical entities, and will scarcely now be abandoned. The first duty of the clinician is to separate such classes of movement as appear to have distinctive characters and to insist on the adoption of an unvarying terminology for each, which may in some measure convey an idea of its nature.

In the course of the last two or three decades the word 'tic' has come into vogue in England for a particular type of involuntary movement. Current in popular usage in France for three hundred years, as a term for a habitual, unpleasant gesture, its aptness, brevity, and non-committal character have ensured it a place in the vocabulary of the neurologist, notwithstanding its unscientific form. Overcharitable use of it, however, is in danger of covering a multitude of diagnostic sins.

DEFINITION.

The distinctive features of tic are embodied in Meige and Feindel's definition:

"A tic is a co-ordinated purposive act, provoked in the first instance by some external cause or by an idea; repetition leads to its becoming habitual, and finally to its involuntary reproduction without cause and for no purpose,

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at the same time as its form, intensity, and frequency are exaggerated ; it thus assumes the characters of a convulsive movement, inopportune and excessive ; its execution is often preceded by an irresistible impulse, its suppression associated with malaise. The effect of distraction or of volitional effort is to diminish its activity ; in sleep it disappears. It occurs in predisposed individuals, who usually show other indications of mental instability."

In addition to varieties of a clonic kind, as most are, the occurrence of slower, more tonic, movements is accepted by these authors as one of the manifestations of the processes underlying tic.

Tic is not synonymous with convulsion, although we must not lose sight of the element of exaggeration implied in the conception ; nor is it a spasm, a term to be reserved for motor phenomena the result of irritation on a reflex arc ; nor, again, is it a stereotyped act, or stereotypy, by which is signified an unexaggerated normal movement repeated involuntarily only at certain times ; the tip of the tongue is sometimes protruded during laborious writing ; a ' face ' is made when a hard service is given or taken at tennis, or when the golfer hits a mighty drive. A famous neurologist used invariably to pout his lips in a to-and-fro movement while examining the optic discs by the indirect method, and at no other time.

The important points to grasp are the psychical origin of tic ; the existence of a psychical defect in impairment of volition, and of a motor defect in the disfigurement or caricature of a normal movement, repeated in season and out of season, but usually containing the recognizable germ of what was once a purposive act of cortical birth ; the malaise that accompanies its repression and the relief succeeding its performance ; its painless nature and its disappearance in sleep.

Cruchet's definition is in the following terms :

" Tic consists in the execution—short, abrupt, sudden, irresistible, involuntary, inapposite, and repeated at irregular but frequent intervals—of a simple isolated or complex movement which represents objectively an act intended for a particular purpose."

In his affirmation that a tic, to be a tic, must be clonic, Cruchet disagrees with the tenets of Meige and Feindel. However much his definition emphasizes the clonic element in tic, Cruchet makes a subdivision into " habit tics " and " convulsive tics," of which the former are exactly comparable to normal movements, except that they are involuntary at the moment of their execution, are performed for no reason or purpose, and their frequency is unusual. Their difference from convulsive tics is merely one of degree ; a habit tic may become a convulsive tic, and some are convulsive from the beginning. A habit tic, if the movement be a slow one, is closely allied to the " tonic tic " ; and it is not always practicable to draw a distinction between them. Thus Cruchet admits that the clonic element in tic may be minimal, so that the differences between his and Meige's views are by no means so insuperable as might be imagined.

What he calls a habit tic is equivalent to the stereotyped act of the others, who hold, as we have seen, that the movement of tic differs from the normal movement not merely by being involuntary, irresistible, inapposite, and so on, but also by being exaggerated.

It cannot be denied that in many cases of tic this exaggeration of the normal movement is anything but obvious; many conform absolutely to the definition of Meige and Feindel, except that the movements are not violent, or grotesque, or 'caricatures.' To withhold the term 'tic' on this account would be rather unfortunate, especially as no standard exists whereby to estimate exaggeration. Enough has been said, however, to demonstrate how insignificant are the discrepancies between the rival definitions. Cruchet has also adduced evidence in favour of the occasional persistence of tic during sleep, which has been accepted, as far as tics of the neck are concerned, by Meige.

Sex, age, and race are without special influence on the development of tic, except that it is unknown in infancy. The frequency of a hereditary psychopathic diathesis emphasizes the kinship of tic with the psychoses and psychoneuroses generally, and although tics abound in degenerates of all sorts a combination of mental instability and intellectual superiority has been repeatedly observed in the families of tiqueurs. Many figures celebrated in history had their tic.

SYMPTOMATOLOGY.

1. *General Symptomatological Characters.*

(a) The student should familiarize himself at the outset with the marked *variability in the type of motor reaction* seen in tic. It may be slow or rapid, deliberate or abrupt; it may recur at long or short intervals; it may be simple or complex, single or multiple. Notwithstanding the general impression of the 'convulsive' or 'clonic' nature of tics, stress is laid on the importance of recognizing an occasional 'tonic' or 'attitude' variety, more commonly, perhaps, in the form of torticollis than in any other. A blinking tic, also, is apt to become 'tonic.' Again, the intensity of the muscular contraction ranges through all degrees of mildness or severity, feebleness or violence. Actual muscular hypertrophy may result. A patient will sit quietly outside the consulting room door, but his entry is heralded by a perfect riot of tic movements, as though all were struggling for simultaneous expression.

Rarely is the motor reaction localized in a muscle group possessing functional independence; usually groups are implicated, often unilaterally, corresponding to motor aptitudes of one or other side. Tic, especially in young persons, is frequently multiple and migratory; a patient naively said she supposed "it gets tired of being always in one place"—the impersonal "it" incidentally illustrating the real nature of the affection. Some youthful tiqueurs have a large repertory, and give quite a variety performance. Often enough, however, a monosymptomatic, unvarying tic is encountered,

(b) Tic is grafted on an *abnormal mental state* characterized by volitional instability, and in not a few instances by a degree of mental infantilism. However high the general level of intellectual attainment, mental instability stands revealed in the fickle and unsustained volition that permits the development of the psychomotor defect. In many cases the general intellectual level is not notably advanced, while in other instances there is mental inferiority or gross mental defect. This unstable, capricious will has its counterpart in general inhibitory imperfection. Some people find irksome the active inhibition necessary during the operation of getting their hair cut; but the classical tiqueur flits from one subject or object to another with the restlessness and volatility of a Miss Mowcher.

During my examination of a tiqueuse she kept rolling and unrolling a magazine in her hands till I called her attention to the fact, when she at once said she had not noticed what she was doing. Throwing it away she began to finger the top button of her nightdress and twisted it violently enough to get it off.

(c) No feature is more prominent in tic than its *irresistibility*. The strain in holding the movement back is as great as the relief in letting go. A patient said, "You can't help it any more than you can help sneezing." The element of compulsion links the condition intimately to the vast group of obsessions and fixed ideas. Many tiqueurs complain of feeling pent up, and of seeking an outlet somehow.

A patient was consumed with a desire to strike her hips with her closed fists, or her sides with her elbows; the movements became involuntary and almost unwitting, yet the relief was always pleasant; as she said, "any jerking movement seems to relieve my feelings."

Arising out of this, it should be clear that no case of the disease has been properly investigated in which the possibility of the particular tic or tics furnishing a clue to the underlying mental state is ignored. They are the exteriorization of some impelling idea whose origin, lost though it may be to the patient's consciousness, can by suitable methods be discovered. A few tics are of sexual significance; the great mass of them have other meanings. Thus the wild swinging and bending movements of a patient's head were ascertained to be an almost unbelievable exaggeration of an original side-to-side motion of the chin to soften the stiffness of the collar of a policeman's tunic worn years previously. Mention should also be made of the *efficacious antagonistic gesture* (Meige) elaborated by many to cheat their tic; unfortunately this gesture often turns into a tic itself. Others with misplaced ingenuity invent some mechanical arrangement to counteract the unpleasant movement, and in the end become slaves of thier apparatus.

A patient with a retrocollic tic used to hook his head into the vertical position with a crook-handled walking-stick, which worked marvellously for a time, but in the end it became a moot point whether the tic or the bizarre appearance of leading himself forward by the neck was the more conspicuous.

2. *Localization and Varieties.*

The varieties of tics are limited only by the number of functional acts of which they may be the caricature, and that number is legion.

Facial tics are perhaps commonest of all, and often are cast in the mould of the mimic expressions. Blinking, winking, licking, biting, nibbling, pouting, smiling, grinning tics—all these are usual enough. Absurd they frequently are, and even liable to lead to misunderstanding, as in the case of an old lady who embellished a serious narration of her son's illness by constantly winking her left eye and immediately afterwards protruding her tongue. Tics of the neck and head are also very common—nodding, rolling, shaking, tossing head movements, tics of affirmation and negation, bowing and salutation tics. The salaam movement reaches its height in the mentally defective, and as it contains a rhythmic element foreign to most ordinary tics, it does not quite come into this category. With neck tics are frequently associated shrugging and other tics of the shoulders.

Tics involving the trunk musculature are not, in my experience, so uncommon as is supposed.

In one case more or less constant, irregular contractions of the recti abdominis led to considerable hypertrophy. They could be inhibited for a short time by an effort of the will, and disappeared on a deep inspiration, always becoming more pronounced as volitional movement came to an end.

Protean tics of arms and hands are seen—scratching, rubbing, scraping, stroking, tapping, beating, pounding, pulling, pressing tics. A psychasthenic patient incessantly ran his fingers through the hair over and behind his left ear; a girl was for ever brushing an imaginary fly off her face.

Tics of the lower extremities are, on the whole, not very common, but leaping, jumping, kicking, and other interferences with walking rhythm are described. Some of the walking tics are peculiarly complex. Genuflexion tics are not rare.

Tics of the respiratory and articulatory apparatus are extremely frequent; snoring, sniffing, blowing, grunting, snorting, whistling, coughing, sobbing, hiccuping tics all occur. Actual tics of speech are met with. Conformably to our definition, we cannot consider stammering as a tic; it occurs only when speech is intentionally commenced; the tic of speech is constituted by the escape of words or phrases, irresistibly and unexpectedly, at moments of silence. (See the next paragraph.)

The *maladie des tics convulsifs* of Gilles de la Tourette is characterized by progressive evolution of multiple tics, eventual development of echolalia and coprolalia, and an unsatisfactory prognosis. Whether the syndrome should be regarded as a clinical entity is open to considerable doubt; coprolalia has been seen in individuals not exhibiting any variety of tic, while many severe tic cases are unaccompanied either by it or by echolalia. The latter, moreover, occurs with other symptoms in a special form of aphasic disorder (so-called

'transcortical sensory aphasia'). Yet a fair number of cases conforming to Tourette's original description are on record, exhibiting in particular that progressive evolution on which he laid stress, and that eventual generalization of convulsive movements which may be regarded as the tic's apogee. Further, this development not infrequently culminates in actual insanity. The majority of reported instances are characterized by the onset of tic movements in early years, the additional clinical features following much later, and by the practically constant component of a wretched family history of mental instability and degeneration.

I have seen one striking example, in a girl of 20, with head, face, neck, and arm tics, whose symptoms began at the age of 8, who repeats "b—y s—d" *ad lib.*, in a low monotone, or interlards her conversation with an explosive "d—d b—r," repeated three times rapidly; echolalic also, and afflicted with a *délire de toucher*, she has become socially impossible, as evidenced by the fact of her being reported to the police by her neighbours.

In no clinical class are tics more rampant than in idiots and mental defectives of all sorts; they assume frequently a highly complex and elaborate character, such as balancing, whirling, dancing, rocking, rumping, self-striking, -beating, or -pounding (so-called krouomania), and so forth.

3. *Tic-like Movements following Epidemic Encephalitis.*

It is convenient here to allude in passing to the development of tics apparently on a basis of previous encephalitis. In the course of the last few years many examples of somewhat elaborate involuntary movements, exhibiting the tic-like characters of irresistibility, repetition, 'convulsive' or clonic manifestation, rapidity and exaggeration, have come under notice in the subjects of epidemic encephalitis; ranging in degree from a very simple motor reaction, belonging rather to the group of spasm or of myoclonus, to one of much complexity and extensity, it becomes a matter of no little difficulty to assign them a nosographical position. For example, the numerous disorders of the respiratory mechanism (using the term in its widest sense) which every neurologist has seen, might be reckoned with the tics in possibly a majority of instances, yet others are apt to overflow into intricate manifestations somewhat closely resembling lowest level fits. Other varieties, especially such as embody movements largely of the torticollis kind, recall the picture of tics as ordinarily understood.

So many instances have come under notice that it seems superfluous to illustrate, but I may cite one case, that of a boy of 10, who ever since his encephalitis died down has suffered from a sudden, rapid, torticollis movement to the right, at the same moment lifting his eyebrows and opening his mouth; if unusually severe, an abrupt elevation of the right shoulder and movement backward of the right arm accompanies it. It has persisted unchanged for three years.

Explanation of the genesis of these and similar motor phenomena of a postencephalitic kind is beset with difficulties, and, while it is natural to attribute them to the disease, we must not lose sight of the psychopathic soil in which they may be sprouting, for they are neither universal nor invariable as a sequela; and it is equally certain they do not all pass comfortably into the category of tics.

ETIOLOGY AND PATHOGENESIS.

(1) Behind all tic phenomena lies a *psychical predisposition*. In their classical treatise Meige and Feindel were resolute in their reference of tic pathogenesis to a mental process, and in their differentiation of it from muscular spasm effected by sensory or motor excitation on a reflex arc. Later observers have done no more than substantiate this general conclusion. The common association of tics with mental defect and imbecility, with such psychoses as paranoia and schizophrenia, with katatonic states, and, more widely, with mentalities of an unstable quality, effectually precludes any other view. A varying degree of mental infantilism, as already mentioned, stigmatizes the tiqueur; in the language of psychoanalysis, he is narcissistically fixed (Ferenczi).

(2) Grafted on a constitutional basis, tic makes its appearance in some cases (possibly in the majority) as the expression or outward manifestation of an *unconscious desire*—or better, as I am fully convinced, of a desire that is often but half-hidden from consciousness. In respect of actual hysteria, my experience confirms that of Meige and of Cruchet, that tics rarely accompany that psychoneurosis, yet in its egocentricity and its failure to govern the emotions the temperament of the tiqueur undoubtedly recalls that of the hysteric. From the psychoanalytic viewpoint, as sketched by Ferenczi, tic formation is facilitated by a need or desire to draw attention and feeling to certain parts of the body which belong to the group of erotogenic zones, and by their “genitalization” (excitation, tendency to rhythmical movement) through the tic satisfaction is obtained. Regarded as a form of autoeroticism, tic by no means always assumes such fairly definite qualities, and the stimuli arousing it, especially in the constitutional narcissist, can be of a more incidental or less specific character.

Experience leads me to emphasize the feature of *seeking a pleasurable sensation* in the genesis of innumerable tics. If the normal individual finds it hard to prevent his tongue exploring the edge of a loose tooth or the space left by a recent extraction, how much harder is it for the potential tiqueur to relinquish the particular movement whose execution awakens some “sweet” or even “bitter-sweet” sensation. No one who watches a tic in the making can fail to be impressed by this incessant search for the pleasure-giving feeling in many clinical instances, and it explains largely the vast group of complex semi-rhythmical tics in those of low mental calibre. Mere repetition, however, mere habit-mongering, does not constitute its subject a tiqueur; to the

repetitive element must be added a pathological component comprising defective inhibition and an abnormal susceptibility to stimuli heavily charged with pleasurable feeling-tone. As Charcot said, not all who would may tic.

(3) Any purposive co-ordinated act passes by dint of *repetition* into a *habit*, an acquired automatism ; nor does its character of necessity change if its *raison d'être* disappears. Should the now purposeless habit assume an exaggerated form and a haphazard incidence, it has degenerated into a tic. Cortical activity initiates the embryonic tic ; cortical intervention determines its continuance when removal or disappearance of the cause would otherwise occasion its death from inanition. Once this state in its turn is passed, the motor phenomena persist independently of volition. In many commonplace tics no more recondite origin than this can be traced ; no conscious pleasurable element accompanies them, still less any suggestion of a hidden sexual conflict between the ego and repression. Not a few of the simple and limited tics of youthful subjects arise in this fashion : making faces across the nursery table in a wet-day competition, experimentation with the phonatory capacities of the larynx, visual or auditory mimicry of the habits of others, are exemplars of the initiatory mechanisms for habit-tic formation. In a sense, these habits constitute a kind of reflex cortical activity, and illustrate the escape of function of cortical arcs.

(4) Once more, *movements of defence* against a source of irritation suffice in some instances to set in motion the processes leading to tic. By way of ridding the organism of a local irritant or annoyance the predisposed individual will be found to have in due course elaborated a reaction disproportionately calculated to produce that effect. A pathogenesis of this kind is responsible for numerous uncomplicated and monosymptomatic varieties (sniffing, clearing the throat, and so on). I well remember a curious case of spasmodic torticollis in which the incessant movement of the patient's arm to hold his head straight eventually itself changed into a tic, and persisted after operation effected a cure of the neck condition.

(5) Finally, I must direct attention to the possibility of a tic being engendered on the basis of *pre-existing involuntary movements* of another class, of which the passing of choreic into tic reactions is probably the best known example. To determine when a choreic gesture becomes perpetuated as a tic by alteration of its pathogeny can scarcely be an easy matter, but of the genuineness of the transformation in certain clinical cases there is no room for doubt. The role played by volition therein consists of the temporary reproduction of the choreic movement after the disappearance of the organic basis on which at first it is erected ; given an appropriate cortical instability, the stage of habit rapidly blends with that of tic formation.

Whatever be the precise pathogenesis in a given case, the motor reaction, simple or composite, exhibits a tendency to increasing physiological isolation and descends to the level of a meaningless automatism ; a deeply ingrained pattern, its momentary inhibition by a cortical effort merely emphasizes its

independent existence as a cortical reflex—in this sense, therefore, ultimately allied to spasm—which lives a life of and on its own. Yet it is not, as a fact, as completely independent as might appear. Devoid of meaning, as empty as many swear words repeated absentmindedly, the tic cannot be dissociated in any absolute sense from the influence of other cerebral (intellectual or emotional) activities. An element of apprehension or fear seems to be an important factor in not a few instances, and the emotion tends to excite the tic as a sort of fear psychosis. Where the circumstances are such as to render it desirable the tiqueur should not “make an exhibition of himself,” anxiety and apprehension lead to the very explosion that he would avoid. Consciousness that he can be seen or heard acts as an excitant.

PROGNOSIS AND TREATMENT.

Prognosis is dependent on the degree of volitional impairment of the patient. In children some tics are purely transient and never recur; in some adults persistent treatment may certainly effect a cure. On the whole I have seen fair results in the majority that have been under my care. The older the patient, and his tics, the less favourable are the chances of relief. In any case the adoption of an encouraging attitude and confident demeanour will go far to give the physician that start in the fight which is half the battle.

Relapses are unfortunately anything but rare, for the predisposition remains though its expression in a given tic may be checked. The life-history of Meige and Feindel's patient O.—one unending series of new tics for old—is as depressing therapeutically as it is entertaining clinically. No prognostic significance attaches to the simplicity, complexity, or multiplicity of the tics in a given case; it is the patient's volition which counts.

1. *General Hygienic Measures.*—Many tiqueurs require management as much as treatment. Only too sensitive to their infirmity, after a time they relinquish hope and sink into an unhealthy valetudinarianism. Give such patients an aim in life, side-step their self-consciousness by assigning some daily task, congenial and not fatiguing, and they may work out their own salvation. The association of fond parents and a spoilt child is too frequent an antecedent to the development of tic in the latter to be a mere coincidence. Sometimes one glance at the mother or father of the youthful tiqueur suffices to explain all. In such an atmosphere the patient stands little chance of material improvement, hence change of environment must be stipulated for unhesitatingly. Further, much can be done by disciplinary régime calculated to recreate or develop his self-control in matters not directly concerning his tic, thus exercising an indirect effect on it. Apart, however, from general supervision and regulation of the patient's mode of life, simple hygienic measures should be undertaken in cases where tics reach their maximum when he is ‘run down.’ Further, simple and obvious though the tic or tics are, the physician cannot afford to dispense with a careful routine examination of teeth, throat, ears, eyes, nose, etc., according to the localization, nor should the question of clothing and headgear be overlooked.

2. I am far from depreciating the good every now and then obtained in cases of tic by general *sedative medicinal treatment*. Many cases in out-patient practice have undoubtedly been benefited by a course of bromides in comparatively small doses, administered over a considerable time. It should be remembered that the association of tic and epilepsy is not infrequent, and the possibility of their symptoms being to some extent interchangeable not to be ignored. Further, success achieved in this way may not always be attributable merely to suggestion. The effect of bromide on pavor nocturnus, on convulsive and spasmophilic conditions generally, on the motor restlessness of some forms of idiocy, and so on, warrants its occasional application in cases of tic where the pathological habit is so engrained in the nervous system as to have shed altogether its psychical element. Isolation of the patient after the Weir Mitchell fashion is not as a rule advisable. Many hail the chance of seclusion with equanimity, and tic away behind screens to their heart's content.

3. A fair number of cases are on record in which *hypnotic* or other *suggestion treatment* proved beneficial; my own experience has not been reassuring. The best results have been obtained in hysterical cases, and such are undoubtedly rare, as we have seen. The methods of psychoanalysis serve in some instances, and enduring results have been occasionally claimed, but in my experience psychological technique generally is of no great avail. Tic may be, in some instances, a form of conversion hysteria, but in the great majority of cases the origin of the symptom does not lie in the realm of the unconscious.

4. *Treatment by Re-education*.—The principle of treating tic by muscular drill—a method known to the French school for the better part of a century—has thoroughly justified the confidence that has been reposed in it. Brissaud's scheme is a combination of "immobilization of movements" with "movements of immobilization." As an illustration of the former procedure the patient is first of all required to sit still, literally, for as long a time as possible. In a bad case this may not extend beyond a second or two; nevertheless these seconds are seized, and after an interval of a minute a fresh attempt is made. Perhaps by an effort he will now keep still for several seconds—say ten. Treatment is carried out with rigid regularity at certain hours, three or four or five times a day; all efforts are timed, and in the presence of and under the encouragement of the physician every endeavour is made to prolong the actual duration of successive sésances of immobilization. By gentle gradations each day the seconds will be found to grow into minutes and the minutes into hours. Once the patient's intelligent co-operation is successfully elicited, it is advisable to vary the attitude of immobility which he adopts. Special attention must be directed to the musculature involved in the tic, with this object ever in view—namely, to increase the degree of volitional control over the rebellious muscles.

The reverse of this method of procedure is actually to make the patient innervate the tic groups, but in ways contrary to those executed involuntarily.

If the arm is involved, say, then the patient is taught to perform slow regular movements with the arm, with the utmost deliberation. Although, as will happen, the tic every now and then intervenes, he nevertheless perseveres, simply for a minute or two at a time, always avoiding fatigue, three or four or five times a day. If the face is the seat of the mischief, he is made to innervate the facial groups individually, by whistling, showing the teeth, closing the eyes, wrinkling the forehead, pouting the lips, blowing out the cheeks, etc., always deliberately and according to schedule, but only for a minute or two to begin with. Thus from day to day the patient is encouraged to find that he is executing voluntarily what he thought had passed beyond his control, and is correspondingly elated.

It is a good plan to see that the programme is carried out in front of a mirror. By this simple means the patient can judge of the degree of control obtained, and visual stimuli can be utilized to strengthen his will.

In addition to exercises of the above sort, for individual tics, another method of re-educating the patient's will is to utilize respiratory exercises, as advocated more especially by Pitres, Cruchet, and others. With a deep and regular respiratory rhythm tics tend to diminish or die away. The patient is placed upright against some support, his heels together and his arms by his side. He then makes a series of deep inspirations and expirations, elevating his arms synchronously with the former, and depressing them with the latter. The exercises may advantageously be repeated every three hours to begin with, then their duration may be increased and the intervals lengthened, until the séances are extended to fifteen minutes three times a day. Respiratory drill may be carried out as the patient lies full length on the floor.

Still another form of general exercise has been called by Meige and Feindel "mirror drill." This has no reference to performances in front of a looking-glass, but signifies the simultaneous employment of bilateral identical muscular groups in the execution of various prescribed movements. It takes advantage of the physiological fact that the simultaneous contraction of two symmetrical muscles is more readily attained than that of two asymmetrical muscles. The physician should set the patient daily exercises in writing, drawing, tracing, and so on, the unaffected limb leading, and the other following simultaneously. The movements may be made simply in the air, or on a wall, or on paper, as is found convenient. The method is obviously elastic, and this is one of its great advantages. Its essence is the re-education of the uncontrolled limb by its synchronous innervation with the limb over which the patient still has good voluntary control.

Finally, a technique practised with success by Oppenheim is directed to strengthening the tiqueur's power of inhibition by insistence on his checking his reflex responses to threatening movements or to painful stimuli, for which purpose the tickling reflex, the eyelid reflex, etc., are utilized. This sort of inhibition gymnastic deserves trial in inveterate cases.

II.—PROFESSOR G. GUILLAIN, PARIS.

I consider there is little to add to the clear and complete exposition of the opener of this discussion, and I propose to confine my observations to spasmodic torticollis.

Twenty-five years ago, when Brissaud and Meige called attention to spasmodic torticollis, nearly all neurologists admitted its functional origin. Since 1902, however, both Professor Pierre Marie and I have failed to be impressed with the applicability of the psychogenic theory in many cases. We have seen torticollis exist with definite pyramidal syndromes, and also in association with organic familial spastic paraplegia. More recently, with my assistant, Dr. Thérénard, I have observed numerous cases of the condition in patients suffering from postencephalitic disorders, and occasionally as the only result of a mild encephalitis. From the point of view of general etiology it is interesting to note that hyperkinesia and disorders of posture, seen after epidemic encephalitis, present certain characteristics resembling those of functional or hysterical affections. Torticollis, glossolabial spasm, and so forth, may resemble those which have a hysterical basis. In several cases of torticollis following encephalitis I have noticed the occurrence of Brissaud's "antagonistic gesture," to all appearance as irrational and paradoxical as in hysterical states. This imitation, however, does not allow us to conclude, any more than eventual improvement by psychotherapeutic methods, that the origin of such manifestations is in the mental sphere.

It is undeniable that emotion can exaggerate or modify postencephalitic dyskinesias, just as it can and does exaggerate many organic conditions, such as pyramidal and cerebellar syndromes. It has appeared to me, further, that the modifying effect of psychotherapy on various postencephalitic syndromes resembling clonic or tonic tics has been very slight, nor have I ever observed, in postencephalitic cases, any example of contagion or imitation. Further, in such cases I have never been able to obtain evidence of the existence of the essential mental constitution peculiar to tiqueurs. I consider that the functional element is of little importance in postencephalitic syndromes; the predominating feature is disorder of the tonic mechanisms of attitude or of simple motor automatisms.

III.—PROFESSOR RÉNÉ CRUCHET, BORDEAUX.

I agree with Dr. Kinnier Wilson as to the necessity for putting some order into the existing confusion of involuntary movements. This I¹ tried to do as long ago as 1901-2, and I am grateful to him for having quoted my views on this subject and especially for his ingenious endeavour to correlate them with those of Meige and Feindel.

The opinion that a tic, to be a tic, must be clonic is not a specific French idea, since Sir Charles Bell,² in 1830, in his famous work, used the term "spasmodic twitching" which is equivalent to tic. Marshall Hall,³ in 1852, also

described "muscular tic," and gave examples of several types, *e.g.*, violent frowning and winking, nasal tic, rolling of the tongue, continual and violent grinding of the teeth, distortion of the face, protrusion of the chin to one side, shaking of the head, biting of the nails. One person hitched up the trousers continually; another pressed the knuckle of the forefinger on the upper teeth until a corn formed upon it.

To show the importance of the clonic movement of tic, Marshall Hall added: "There is another form of muscular condition, which consists, not in *tic* or movement, but in *constant* contraction, voluntary in its essence. This affection obtains in some cases of paralysis agitans; the hand is perpetually closed, the arms rigid, and when the patient rises from his seat, it is without movement or flexion at the various joints. He is all 'of one piece' as it were. Yet there *is the power* of opening the hand, flexing the limbs, etc., that is, of relaxing the muscular effort which bound his limbs in rigidity."

In 1899 Risien Russell⁴ also compared a tic to a twitch or jerk. This is a clinical truth, which still remains; if I ask any member of my audience to reproduce a tic, he, I am sure, will not hesitate one second in making a rapid winking, some violent shrugging of the shoulders, or some frightful face.

Tic is a movement of action. It must not be confused with an attitude, which is a fixed movement, "in constant contraction," as Marshall Hall said. That is why the term 'tic' is not appropriate for spasmodic torticollis, because the torticollis evokes the idea of a more or less permanent attitude. The 'tonic tic' of Meige and Feindel does not mean anything to me, because tic is a short or sudden movement, that is to say the contrary of a tonic movement, which objectively corresponds to a fixed movement.

I know very well, indeed, as Kinnier Wilson says, that from rapid, quick and clonic movement one can insensibly arrive at tonic and slow movement, and even reach the absence of movement. But the engine of my motor car can also go very quickly or very slowly, with all gradations of speed, from the most exaggerated to a complete stop. However, the speed and the stopping are two terms entirely opposed, just as the terms 'tic' and 'attitude.' That is why I maintain that these words must be clinically separated.

However, if these two varieties of phenomena are objectively different, they have, at the same time, some common characters. Attitudes, as well as tics, can repeat themselves in an involuntary, intermittent and absurd manner at irregular intervals, with a variable intensity and an exaggerated frequency. Their execution is imperious and irresistible, because the subject cannot stop them; he can delay them for a certain time by a violent voluntary effort, but they always get the better of the will.

Attention, rhythmic respiratory exercises, horizontal decubitus, presence of the doctor, public places, attenuate tics and can stop them temporarily. I have kept tiqueurs in my consultation-room for more than an hour without having seen a single tic. All acts of ordinary life during their execution cause tics to cease; the subjects can eat and drink, dress themselves, do their hair,

speak, pick up a pin, write, etc., with perfect ease. One of my patients, a hairdresser, a great tiqueur, shaved his customers with consummate cleverness. An artist of Bordeaux painted on canvas with particular care; then, all at once, when his ties became irresistible, he made violent strokes with his brush on another canvas placed by precaution next to the first one; when the riot of tic movements ceased he began to paint again with perfect calm.

MENTAL STATE.

It is easy to observe in a great number of tiqueurs an abnormal mental state characterised by mental infantilism instability of ideas, inconstancy, carelessness, absence of will, impulsiveness, excessive emotivity, capricious affectivity, disorderly imagination, and loss of deliberation and judgment. On the contrary, some other tiqueurs are extremely intelligent and possess a strong will. Others again, belong to the mental group of those with obsessions and fixed ideas. Several of my tiqueurs cannot go into their rooms without touching the handle of the door three or four times: they cannot get into their bed without looking underneath it. One of them, as soon as he had a minute to spare, used to brush himself in getting up, going to school, coming home, before and after meals, and before going to bed, so that his clothes might be clean for the next morning. Certain tiqueurs exhibit neither mental heredity nor personal mental defect. I do not believe that a "habit-illness" is always a cause, for in certain cases tics are not executed in spite of the will of the patient, but quite independently of it: he is as if he were the spectator of them. The power of the will seems normal, yet incapable of restraining mental disorder.

One may compare this condition to that which occurs in the fixed state of postencephalitic Parkinsonism. At the beginning of an act the Parkinsonism subject can execute his movements normally, but little by little the will loses its effect, although local muscular resistance does not exist. The same applies to tiqueurs; the will can restrain muscular activity for a certain period, but its action lasts only for a short time, and the tics return. In both cases, the will is normal, but its action is as insufficient to reduce the fixed Parkinsonian state as to prevent the explosion of tic. The trouble is evidently of cerebral origin, but it is not necessarily a mental one.

TICS IN EPIDEMIC ENCEPHALITIS.

Most tics described by writers on epidemic encephalitis are not true tics. I believe, with Kinnier Wilson, that they should be placed in the group of 'spasm' or of 'myoclonus.' In particular, most of the respiratory postencephalitic muscular disorders are spasms and not tics. Nor are postencephalitic ocular spasms to be confounded with tics. These various spasms occur in attacks during which the action of the will is reduced practically to *nil*. Further, the cases of postencephalitic spasmodic torticollis which I have observed were all examples of spasm, and not tics. They belong to the group of 'diffuse spasmodic torticollis,' just as I described them in 1907. Then, I had already noticed the occurrence of Brissaud-Meige's 'efficacious

antagonistic gesture' in spasmodic states and without a mental origin. The same gesture I have seen recently, in several cases of torticollis following epidemic encephalomyelitis.

An opinion I⁶ expressed in 1917, and now generally admitted, is that the mental sequelæ of this affection are specially frequent in childhood; to quote my⁷ statement in 1920: "Children become unstable, agitated, tiqueurs, impulsive, almost dangerous; one cannot keep them in normal schools, where they create disorder and learn badly, not only on account of their instability but also owing to the poorness of their memory." In cases where encephalitis provokes by its diffusion mental disorders and spasmodic reactions, it is very difficult to separate the mental from the spasmodic cause. Tics, however, are fairly easily distinguished.

TREATMENT.

As Kinnier Wilson has said, modern treatment has considerably improved the prognosis of tics. Marshall Hall said: "I have rarely known these tics to disappear." And he added: "It is a great question whether any notice should be taken of these tics; or whether they should be left to wear themselves out, if that event may be hoped for."

In general, one must remove tiqueurs, especially if children, from their environment. I always advise parents to allow me to admit the child into my hospital *service* for nervous and abnormal children at Bouscat, near Bordeaux, for a month or two. They are subjected to a maternal but firm discipline, and the moral effect of this medicopedagogic education is, I believe, quite essential. To cure a tiqueur it is necessary to follow the same medical rules as to cure a stammerer.

I do not disapprove of medical treatment; I allow antipyrin, potassium-boro-tartrate, gardenal, and occasionally bromide.

I remain faithful to respiratory gymnastics, which Pitres and I have long advocated.¹ It is especially successful in children, for it has a more automatic effect than Brissaud's scheme: it acts less on the will, which is always unstable and difficult to control. In some cases of tics with obsession, I have obtained good results by suggestion in normal or in prenarcoptic sleep. It is indispensable to prevent complete narcosis; one must leave the patient in the twilight-sleep which precedes the sleep of complete anæsthesia. This treatment has also been applied with success in certain persistent tics of the eyes which are frequently mistaken for epileptic spasms.

REFERENCES.

¹ CRUCHET, R., "Étude critique sur le tic convulsif et son traitement gymnastique," *Thèse de Bordeaux*, 1901-1902.

² BELL, CHARLES, *The Nervous System of the Human Body*, London, 1830.

³ HALL, MARSHALL, "On Muscular 'Tic,'" *The Lancet*, 1852, ii, 510.

⁴ RUSSELL, J. S. RISIEN, "The Tics," *Allbutt's System of Medicine*, London, 1899, vii, 868-71.

⁵ CRUCHET, R., *Traité des Torticollis Spasmodiques*, Paris, 1907.

⁶ CRUCHET, R., MOUTIER and CALMETTES, "Quarante cas d'encéphalomyélite subaiguë," *Soc. Med. Bordelais*, April 27, 1917.

⁷ CRUCHET, R., "L'encéphalomyélite à Bordeaux et dans les régions voisines," *Soc. de Méd. et de Chir. de Bordeaux*, 10 December, 1920.

DISCUSSION.

Dr. A. F. HURST, Ascot.—I agree with Professor Guillain that torticollis has frequently an organic basis. The worst case of spasmodic torticollis I have seen followed an attack of malaria and lasted three years; when the malaria relapsed, the torticollis disappeared. In severe cases the therapeutic effect of malarial infection might possibly be worthy of trial.

The question of visceral tics deserves a little attention. Aerophagy or air-swallowing is thought to be associated with flatulence, but in cases which I have seen there has been normal acidity and normal motility of the stomach, and fermentation or flatulence has been entirely non-existent. Owing to the alleged flatulence the patient attempts to relieve his epigastric discomfort with repetitions of belching, which result merely in the swallowing of more air. Simple explanation and persuasion in most cases results in cure.

Tics of coughing also occur, especially in association with asthma. A frothy expectoration accompanied by cough in this condition is always a symptom of a tic-like character.

Dr. B. SACHS, New York.—No one can be expected to add much to the opening paper. Tic is, after all, a generic term. There are many tics and many causes, and their frequent psychogenic basis is significant, as is the association of mental instability with tics. Yet in many instances of ordinary kinds of tic no marked mental disturbance is discoverable. Typical examples of Gilles de la Tourette's disease are distinctly rare, though tricks and tics of speech are common. Echolalia and coprolalia are in my experience always associated with marked psychical disorders, and are, therefore, different from ordinary tics.

It is important to trace the cause or causes that lead to the beginning of those disordered and impulsive movements. So many begin in early life that it is essential to attack them at that period. Many a tic that has been carried all through life might have been checked if at its beginning the physician had been a severe disciplinarian. Kindly but firmly the youthful tiqueur has to be told that the tic must stop, and that he is the one to stop it, with such further assistance as the neurologist may suggest.

Dr. STANLEY BARNES, Birmingham.—In my experience only those of a nervous temperament, mainly inherited, are liable to tics. I have been struck with the relative frequency of tics in Welsh as contrasted with Anglo-Saxon types, though I agree that no race can be regarded as exempt from them. In respect of treatment, I rely largely upon discipline, with which I occasionally combine a little drug treatment (bromide or hyoscine).

Dr. GRAINGER STEWART, London.—A tic can arise from a habit either of seeking a pleasurable sensation or of avoiding an unpleasant sensation. On the psychical side, an irresistible desire is usually in being, which becomes