CLINICAL LECTURE

ON CASES OF

MYASTHENIA GRAVIS PSEUDO-PARALYTICA,

*Delivered at the National Hospital for the Paralyzed and Epileptic.*By THOMAS BUZZARD, M.D., F.R.C.P.,
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It was in 1877 that Dr. (now Sir Samuel) Wilks published in the *Guy's Hospital Reports* an account of a case of "Bulbar Paralysis without Anatomical Changes."

A girl had come to the hospital complaining of general weakness; she could scarcely move about, spoke slowly, and showed slight strabismus. For a month she remained in this state, the movements of her limbs and her speech being so slow and deliberate that the case appeared to be rather one of lethargy from want of will than a condition of actual paralysis. At the end of this period all the symptoms became aggravated, and in three days they had assumed well marked characters of bulbar paralysis. She spoke most indistinctly, swallowed with great difficulty, and was quite unable to cough. She was still able to get out of bed. Shortly afterwards there was increasing difficulty in respiration, and in a few hours she died. The bulb, *post mortem*, appeared quite healthy to the naked eye, as well as to microscopical examination. This important observation was followed next year by a description by Erb of three cases in which the principal symptoms consisted in striking paresis of muscles, especially of mastication, of the neck, and of the eyes (ptosis), less in those of deglutition, the tongue, and extremities.

As time passed on there came accounts from other observers of cases manifestly belonging to the same category, which had terminated fatally, and, with one or two doubtful exceptions, had shown no anatomical lesions. By all the earlier observers the symptoms in the district of muscles innervated from the bulb attracted most attention, as was likely to be the case from the fact that they appeal most directly to the eye, and the condition was thought to be a peculiar disease of the medulla oblongata.

A very characteristic example was published in 1890 by Dr. Shaw.¹ In this case, however, particular notice was taken of the patient's weakness, not only in the localities innervated by the bulb, but in the extremities. The patient would often fall and was quite unable to walk downstairs alone. When sitting he could not cross one leg over the other without lifting it with his hand. He died asphyxiated after repeated attacks of dyspnoea, due apparently to a powerless condition of the respiratory muscles. During recent years this symptom of weakness and early exhaustibility of the muscular system generally has come to take a place at least as important in the symptomatology of the disease as that previously occupied preferentially by the bulbar symptoms.

Amongst those who have contributed to our knowledge of the subject, Goldflam,² Jolly,³ and Strümpell,⁴ may, perhaps, be especially mentioned. In this country only four cases, so far as I am aware, have been published: those by Wilks and Shaw, to which I have already referred, one by Dreschfeld,⁵ and another by Harry Campbell. I shall refer later to Dreschfeld's case. According to Toby Cohn no fewer than 70 cases have been described.

I have the opportunity to-day of showing you two patients under my care affected with this remarkable disease. The first, a male patient, had been in the hospital a few weeks when, by a strange coincidence, the second, a female, presented herself, and was also admitted. Dr. Campbell has been so good as to permit me likewise to show his patient—a characteristic example of the disease—a description of which will be found in the *Clinical Society's Transactions*, 1899.

CASE I.

H. B., aged 40, married, was admitted under my care in October, 1899. He complained of general weakness, and early exhaustion after various forms of muscular exertion, walking, writing, speaking, eating, etc. There was diplopia.

(My house-physician, Dr. Edwin Bramwell, having seen two examples of this disease in a foreign clinic, at once recognised the nature of the case, and drew my attention to the symptoms, which will be presently described. I should like to express here my indebtedness to Dr. Bramwell

for the great help which he has given me in investigating the case, and also in looking up the literature on the subject. The following notes the case were taken by him.)

Family History.

The patient's mother died of phthisis. His father, who is alive, aged 63, has suffered from muscular rheumatism. The grandparents on both sides are long-lived. The patient had four brothers and sisters, of whom a brother three years younger than himself is alive and strong; a sister died of scarlatina, two died in infancy. He has three children, aged 14, 10, and 8, all of whom are fairly strong, and there have been no deaths, no miscarriages. No similar condition to the patient's is known to exist among his relations. There is a rheumatic tendency in his father's family. A paternal uncle died in a lunatic asylum; a paternal aunt, aged 60, of "creeping paralysis."

Personal History.

Although never robust, he was quite healthy till 1892. Twenty-eight years ago he had scarlatina, otherwise he has never had a day's illness until the present trouble. Syphilis can with certainty be excluded. There is no history of injury. He has not had a distinct attack of influenza. He is a total abstainer from alcohol, and not a heavy smoker. His work as a schoolmaster is hard, and involves much speaking. His recreations have been chiefly of a sedentary nature, although he is fond of walking. He has had considerable worry during the last year or two.

Present Illness.

Until 1892 he enjoyed good health. He then began to take a cold bath every morning, and is disposed to attribute his illness to this. About Christmas, 1892, after sawing wood, his little and ring fingers felt weak, but speedily recovered. The weakness recurred after playing the organ, and his right index would occasionally droop. In 1893 he occasionally saw double, and this trouble recurred in 1894. About this time his voice, after speaking a few minutes, would acquire a nasal character. His right eyelid, too, tended to droop. The weakness in fingers and eyelids occasionally recurred, but not in a very marked form, during the three following years. In the summer of 1897 he felt weakness in the lips and tongue, and spoke through his nose. After speaking some time the voice would become feeble. He again saw double. In the vacation he walked eight or ten miles a day without fatigue for several days. After this his right thigh became weak. He found that he had frequently to stop and rest it for a few minutes, after which he could go on walking. He had never noticed this difficulty before. In the winter of 1897-98 both arms and hands were easily fatigued, and the right leg felt weak. In July, 1898, his speech was again affected, especially in the evenings. He walked sixteen miles in one day during the vacation, and although he found difficulty in accomplishing the last few miles, this was due rather to trouble with his breathing than with his legs. At times he would suffer from palpitation, which was new to him. In October, 1898, whilst suffering from catarrh, he had difficulty in coughing and clearing his throat, and also in swallowing. This cold seems to have pulled him down very much, and he has never recovered the strength which he had before. In January, 1899, his right arm was so weak that he could not brush his hair or write upon the blackboard, but after two days' rest he was able to move the arm quite well. At this time there was dull, aching pain in the right arm and leg, especially after exertion, but also sometimes whilst lying still in bed. Last Easter (1899) he again had ptosis of the right lid, which has persisted in varying degree since. In June he gave up work. Diplopia and masticatory difficulty were then his chief troubles, but from time to time he would also suffer from dyspnoea, especially after exertion or emotion. Since August he has again improved, but has been subject to recurrence of all his troubles, especially in very hot or very cold weather. After a considerable rest his symptoms have almost entirely disappeared.

Condition on Admission.

His face is somewhat expressionless, and there is right-sided ptosis. Intelligence is not impaired. After speaking a little his speech becomes slower, laboured, and indistinct, and the voice is nasal in character and gradually fails. He describes the lips and tongue as feeling tired. It is noticeable that the chest expands less and less with each succeeding breath. The change in speech would appear to depend upon weakness of respiratory muscles as well as those of articulation. Diplopia is only present on extreme lateral deviation to the right and then only if the eyes are maintained for some considerable time in this position. The optic discs are normal. Hearing, taste, smell, and the viscera are normal. The ptosis is more marked in the evening, and is present to a slight extent also in the left eyelid; it is not always present. Two days after admission, when examined in the morning before rising, instead of ptosis there was actually retraction of the upper lids, so that a portion of the sclerotic was exposed above the cornea. Directly this condition was remarked upon the lid began to droop, illustrating what he says is one of the most characteristic features of his complaint—namely, that when his attention is drawn to any particular symptom, it will become exaggerated. He cannot voluntarily open his eyes widely, but when interested in conversation the lid moves upwards to a greater extent than he is capable of producing by any act of the will.

Ophthalmological Examination.

Mr. Gunn during his examination remarked this incident and attributed it to the action of Müller's muscle. Not only is he unable to open the eyes widely, but if he looks steadily upwards at an object held above his line of vision the upper lids gradually droop lower and lower until the eyes are almost closed. Mr. Gunn reports: "Downward movement and convergence are good; upward movement defective; both external recti are weak. The pupils are equal, of moderate size, and react perfectly to light and on convergence; they dilate upon appealing to the patient's emotions, and occasionally upon mental concentration after prolonged convergence they show a great tendency to oscillatory movements."

Laryngological Examination.

Sir Felix Semon, who was so good as to examine the palate and larynx, reports as follows:—"The condition of the motor movements of the palate

corresponds to what has been observed in the other voluntary muscles upon voluntary exertion. At first the palate is fairly well and symmetrically raised on phonating the letter A; gradually, however, as he repeats phonating the movements become less and less marked, and finally hardly any raising of the palate is observed.

"On laryngoscopic examination, at first the larynx appears perfectly normal, except perhaps that on deep inspiration the vocal cords do not separate quite as much as in the ordinary condition; but as the patient previous to the commencement of the examination complained spontaneously of shortness of breath, this might have been due to his general inability to take a long breath. Closure of the glottis on phonation was and remained perfect; on repeating his endeavours at breathing deeply, the glottis certainly finally opened less than at first. It is very probable, however, that this phenomenon was only part and parcel of the general exhaustion."

Muscular System.

He is quite unable to raise the eyebrows and wrinkle the forehead, and can only frown slightly. He can close his eyes, but cannot screw them up firmly. He can whistle and show his teeth, but the movement of the upper lip is feeble. Contraction of masseters, temporals, and pterygoids is feeble. He says that the jaw will frequently drop, the muscles apparently being unable to support it. The masticatory muscles become tired in the act of eating. The lips feel weak after talking, and at night saliva will dribble from his mouth. Occasionally he feels twitching sensations about the face, though no movements have been noticed, but he is awakened sometimes by a champing movement of the lower jaw. There is at present no difficulty in swallowing. The tongue is protruded straight, promptly, and to its full extent. It is symmetrical, and the movements are good but easily exhausted.

The muscular power of this patient is subject to great diurnal variations. Towards evening he often sits with his hands clasped behind his neck, supporting his head as though the neck were weak. There is a tendency for the head to fall backwards. He cannot sit up for very long without feeling the back weak. He cannot sit up in bed without using his hands. He has some difficulty in turning in bed.

The rapidity with which the respiratory muscles are fatigued is demonstrated when he reads. Respiration is abdominal in type. During respiration there is almost no thoracic expansion, the difference in circumference of the chest between extreme voluntary inspiration and expiration amounting to less than half an inch. No weakness of the diaphragm can be detected.

The movements of the upper extremities are feeble, the right more so than the left; the dynamometer, grasp R. 45, L. 50 (average man 160). The ready way in which the muscles of the hand become fatigued is demonstrated by asking him to button and unbutton his waistcoat repeatedly. As regards his writing, he begins to write rapidly, forming his letters well. After a few lines the writing becomes slower and laboured, and the letters are not so well formed. Finally he comes to a stop more or less suddenly, unable to write further. After a minute or two's rest he is able to write again as well as at first.

He can raise his arms above his head, but cannot maintain them in this position for more than half a minute. They gradually fall; he feels as if heavy weights were attached to them. Again after a short rest he performs the movement quite well. If requested to lift his arms quickly above his head several times in succession he will do this, but at each effort the arms are lifted less high, and after doing this seven or eight times they cannot be lifted at all, but hang by his sides. After a rest of from thirty to sixty seconds they can be lifted nearly as high as they were at first. All movements of the lower extremities are well and powerfully performed, but the right leg especially is easily fatigued. There is no muscular atrophy, nor are there any fibrillary twitchings. The muscles respond fairly well to direct stimulation with a percussion hammer and no diminution in the activity of the response results from repeated blows.

Sensation.—A dull aching in the neck, back, arms, and right leg, occurring particularly after exertion, but also when lying in bed, is sometimes present. No disturbances of cutaneous sensibility can be ascertained.

Reflexes.—The arm-jerks are present, feeble. The knee-jerks are present and equal, usually a little more active than the average. There is no depressed patella-jerk. Repeated attempts were made to determine whether the knee-jerk diminished after frequent tapping. On one occasion the tendon was tapped continuously for a quarter of an hour, but at the end of that time quite as good a knee-jerk was obtained as at first. No ankle clonus is present. No abdominal reflex was obtained. The plantar reflex is present, with sluggish flexor response.

Sphincters.—The bowels are regular. There is no trouble in commencing micturition and the stream is well maintained.

Cranium and Spinal Column.—There is no abnormality. The gait is natural. After walking several times up and down the ward nothing abnormal is noticed. No vasomotor or trophic changes have been discovered.

THE MYASTHENIC REACTION.

Of great importance and interest are the results obtained by electrical examination. The muscles respond to faradism in varying degree on different occasions. For instance, if an electrode be placed upon the motor point of the biceps a prompt and good contraction is obtained except when the muscle has been fatigued by voluntary exertion. The initial contraction in certain muscles is very much poorer than in others, and some muscles tire very much more easily than others. As the result of faradic stimulation, voluntary power of contracting the muscle stimulated is much diminished and a feeling of fatigue induced. As regards galvanism, after repeated stimulation, the muscular contractions become less, but the muscle cannot be tired to the same extent as is the case with the faradic current. No polar change can be demonstrated.

(The patient being seated, with his right forearm resting easily on a table and the hand prone, the biceps was stimulated by faradic currents. Strong and rapid supination movement of the forearm was produced, with some amount of flexion at the elbow-joint. Gradually, as the applications were rapidly repeated, the movements declined in extent and force after a minute or so till none were visible. The currents were then cut off, and after thirty seconds of rest vigorous movements were again induced by faradism.)

The term "myasthenic reaction" has been applied to this remarkable behaviour of the muscles under the influence of electrical stimuli. So far as I am aware Jolly was the first to describe this peculiarity. It is well marked also in the second of my cases, the notes of which were also taken by Dr. Edwin Bramwell.

CASE II.

A. P., aged 24, housemaid, single, was admitted in November, 1899, complaining of loss of voice and nasal speech, with difficulty in seeing on account of drooping of the upper eyelids, most noticeable towards evening, and weakness in arms and legs after exertion.

Duration.

Rather more than a year.

Family History.

Her father died, aged 52, of heart disease; he suffered much from rheumatism and gout. Her mother is alive and healthy, aged 56. There was no consanguinity. She has six brothers and two sisters; three older and five younger than herself. One brother has had rheumatic fever, and is never well; another brother has suffered slightly from rheumatism. All the others are particularly strong. No similar condition to that presented by the patient exists among her relations. No brothers or sisters have died. A strong rheumatic tendency exists in the father's family, but there is no family history of consumption, paralysis, fits, or insanity.

Previous Health.

She has enjoyed perfect health until this illness began. Has been a housemaid for the last eighteen months, and has had a good deal of stair-work. Prior to this she lived at home. She has been a total abstainer until last year, but now takes occasionally a glass of beer at dinner. She drinks a great deal of tea. She has never been nervous. No facts were elicited suggesting syphilis.

Present Illness.

About a year ago she was walking upstairs when the legs felt weak and gave way suddenly, so that she fell down. She had noticed no weakness in the legs before this. From this day up to the present time the legs have been growing gradually weaker, especially towards evening. The right leg has always been worse than the left. On several occasions when tired the legs have suddenly given way, and she has fallen. After walking for about half an hour or so the legs begin to feel weak, especially the thighs, so that she has to stop and rest. After resting a few minutes she can go on walking, but cannot walk so far as before. Until a year ago she was a very good walker. Since the beginning of her illness she has never been able to run. A short time after the onset the arms became affected; one day she was carrying a tray when a curious feeling came down into the hands from the shoulders; before she could reach a table she had dropped the tray. Her hands and arms became gradually weaker, and she found herself unable to scrub. She soon became unable even to write, for after a few lines the fatigue in her hand obliged her to stop. When sewing she would frequently drop the needle. Lately the hands and arms have been so weak that she has only been able to dress with the greatest difficulty. Both arms appear to have been equally affected from the commencement.

On account of the weakness in the arms and legs she gave up her work three weeks ago. For a month or two before doing so, after any exertion she would shake all over, and had a "sinking feeling as if she were hungry," even though she had just finished a meal.

A month or so after noticing the first weakness in the legs, she began to speak "through her nose," particularly when tired. Some two or three months ago she found that, particularly towards evening, her voice would gradually become weaker, until she became quite unable to speak for a minute or two, and her upper lip used to quiver.

The eyelids were first noticed to droop some ten months ago; now they constantly droop, especially towards evening. For six months she has occasionally seen double. For about the same time the jaws have become tired after eating, especially at supper time. Lately when brushing her teeth she has had difficulty in spitting; she has also been unable to cough and clear her throat properly. For a month swallowing has been difficult, fluids she has no difficulty with, but solid food seems to stick in the throat. On only one occasion have fluids come through her nose while drinking. She has had no attacks of breathlessness or palpitation. She has never had any definite pains in arms or legs, but after lying in bed the legs and arms ache. The hands and legs from the knee downwards have often been cold. There has never been any twitchings in the arms, legs, or face; no numbness, "pins and needles," or cramps.

About a month ago for a week she had frequent micturition, having to pass water every few minutes. With this exception she has never had any trouble with the bladder or rectum. When excited all the symptoms are exaggerated. Neither cold nor warm weather seem to affect the severity of her symptoms, nor does there seem to be any tendency for them to be more pronounced at the menstrual period.

Condition on Admission.

A tall, well-developed, well-nourished, but rather anæmic girl. Her face is immobile and expressionless, the mouth is kept slightly open, and the eyes half closed. The temperature is 97.6° to 99°, the pulse 80 to 85, and the respirations 16 to 22.

Mental State.

A very intelligent girl, with no sign of any mental defect. She has a good memory, and is of a cheerful disposition.

Speech.

She speaks usually with a more or less pronounced nasal twang. Given a book to read, after five minutes the nasal speech becomes much more evident, and the words indistinct, while her voice becomes gradually weaker.

Special Senses.

Vision.—R. $\frac{3}{4}$, J. 2, L. $\frac{1}{2}$, J. 4. She has always been short-sighted. Fields showed no alteration except that resulting from the ptosis. No diplopia. Discs normal.

Hearing, Taste, and Smell.—Acute, accurate and equal, both right and left.

Cranial Nerves.—Double ptosis is usually, although not always, present. This morning the edge of the upper lid comes down to the upper border of the pupil on the left side; a shade lower on the right. Towards evening the ptosis is more marked. She is able to widen the palpebral fissure only to a very slight extent, and cannot do so at all when she looks downward. Whilst fixing an object held above her head the lids gradually droop until the eyes are almost closed. Whenever the lids come down over the pupil she feels sleepy.

Ophthalmological Examination.

Mr. Gunn was kind enough to give the following report: "The pupils are unequal, the left larger than the right; the reactions are normal. Movements of the eyes in all directions are good. On extreme lateral deviation nystagmoid jerks are noticed, chiefly in the eye of which the external rectus is acting. This is a sign of general muscular asthenia, the external rectus being a weaker muscle than the internal, and the condition is frequently met with in persons suffering from severe general debility. No such jerks are seen on looking up or down. Convergence is fair, but seems to tire soon. There is entire inability to close the eyes against the least resistance, and to 'screw them up.'"

Sir Felix Semon reports that the larynx is normal.

Muscular System.

The jaws, as already mentioned, become tired after chewing, but never to a marked degree. When she smiles there is very little movement about the mouth. She cannot whistle, and has difficulty in raising her upper lip. The lips feel constantly dry. There is no tendency to pyralism. When she drinks she has to raise the lower lip with her fingers to prevent fluids coming out of the mouth. The difficulty in swallowing solids, already referred to, is now constantly present. The palate moves well and symmetrically but after repeated phonation the word "rub" is sounded "rum," and the palate movements become visibly less. The tongue is protruded straight and in the middle line; its movements are well performed; when an attempt is made to keep it fully protruded it soon sinks back into the mouth.

Laryngological Examination.

All movements are well performed, with a considerable degree of force. No obvious weakness of the neck muscles. The head never tends to fall backward or forward. The arms can be raised above the head and kept there for half a minute, when they begin to fall gradually. Her grasp is not so good as one would expect from her muscular development. When asked to grasp one's hand, and continue grasping as powerfully as she can, the repeated efforts which she makes to maintain the grasp are noticeable. She has great difficulty in raising herself into a sitting position without using her hands. Her back becomes weak and tired after sitting up for a short time. Respiration is thoracic, abdominal in type; the chest expands well. The movements of the lower extremities are powerful. There is no wasting. No inco-ordination or loss of the sense of position; no fibrillary tremors are present.

Electrical Examination.

The muscles all respond well to faradism. The "myasthenic reaction" was demonstrated in the right biceps muscle.

Gait.

She walks a little unsteadily, but not more so than one would expect to see in a person who had been confined to bed for three or four days.

Sensation.

Both legs and hands frequently feel cold. She has no pain anywhere, and no subjective sensations except sense of fatigue in muscles after exertion.

Reflexes.

No jaw jerk. Wrist and elbow-jerks present, active. Knee-jerks present, equal, rather active. Attempts to exhaust the knee-jerk were unsuccessful. There is no ankle clonus. An extremely brisk flexor reflex in all the toes results on tickling the soles of the feet.

Sphincters, spine, cranium, and organs generally normal.

The cases which I have brought forward, and which correspond strikingly with those previously published, are in many respects remarkable, and in none more so, perhaps, than in the rapid variations which may occur in the severity of the symptoms from time to time. I may mention, to illustrate this, that I had arranged to show the male patient at the Neurological Society at the end of October last, but was compelled to forego this as he was then suffering every evening from attacks of dyspnoea of a very alarming character. To-day he is bright and active, and, except for the "myasthenic reaction" which has been demonstrated, he would easily pass muster for a man in fair health. His bulbar symptoms are remarkably improved, though it is still possible to demonstrate them by means calculated to cause muscular fatigue. As the record of his case shows, a like variation in severity of symptoms from time to time has characterised his history for the last seven years.

On the other hand, A. P. has not displayed this very com-

mon feature of alternation. Her symptoms have only manifested themselves for about a year, and have become aggravated almost uninterruptedly up to the present time. In both instances the tendency commonly shown in this disease for the symptoms to become more marked in the evening is strikingly shown. They illustrate, too, the fact that different muscular districts may be affected with varying amount of severity in different cases. A. P., for example, exhibits at the present time the facial aspect which H. B. presented a little while ago—expressionless lips and drooping lids; she has not, however, shown the weakness of the neck muscles which was so notable in H. B., who had to sit supporting the weight of his head by his hand placed at the back of his neck. On the other hand, the female patient shows more marked loss of power in the muscles of the jaw. When I put my finger between her teeth and invite her to bite as hard as she can the result is a very faint pressure which is borne without the slightest inconvenience. When asked to put out her tongue she does so, but cannot keep it protruded. Successive efforts to maintain its position become rapidly weaker, and in less than half a minute it has ceased to appear beyond the lips. An interval of rest of thirty seconds suffices to enable her to protrude it again. In her case the attacks of dyspnoea which have been so alarming in H. B. have as yet not been witnessed.

The behaviour of the knee-jerks in these cases is very interesting. In strange contrast to what might have been expected from the phenomenal fatigability of the muscular system, repeated tapping on the patellar tendon—to the extent of a quarter of an hour on one occasion—failed to produce any diminution in the vigour of the response. Moreover, when the vastus internus muscle had been completely exhausted by the application of induced currents for about a minute, and the knee-jerk was then immediately tested, a vigorous response took place.

The question may be asked whether we have to do with a similar pathological condition in these two cases. I am disposed to think that the occurrence of the "myasthenic reaction" in each may be accepted as evidence of their essential identity. It is different, however, with no inconsiderable proportion of the cases which have been published. Many of these appeared before Jolly called attention to this remarkable reaction, and in the accounts of many which have since been published no reference is made to this point, and probably therefore the reaction was not tested. I am inclined to think that cases of multiple neuritis affecting the motor side preferentially and involving notably districts innervated from the bulb, have in some instances been erroneously classed with cases of the disease under consideration. So also it is open to question whether Dreschfeld's case, as well as some others which have appeared in Continental publications, characterised by the occurrence of muscular atrophy, should properly be included in examples of myasthenia gravis. Dr. Dreschfeld's case, indeed, although it has been included by writers in the category of myasthenia gravis, is described by himself as one of "polioencephalo-myelitis without any anatomical lesions."

The patient, a girl aged 15, became affected with paralysis of external muscles of the eye which disappeared after some months, but reappeared after some years along with symptoms of bulbar paralysis. Whilst the eye muscles recovered power the bulbar symptoms persisted and were associated with weakness in some of the spinal muscles till some years later, when somewhat suddenly there again appeared complete ophthalmoplegia externa, with almost complete paralysis in the district of all the motor cranial nerves, along with atrophy of some of the affected muscles. The deltoids were atrophied and almost completely paralysed; the tongue somewhat atrophied, as also were the sterno-mastoid and trapezius muscles. There was no sensory disturbance. The diaphragm became involved. Death ensued after more and more laboured breathing.

It appears possible that there may be various conditions which are not separated by any strongly defined line of demarcation, but merge into each other. It is impossible to discuss this general question on the present occasion. The cases of which I show examples are usually marked by the following features: Symptoms of bulbar paralysis not usually very strongly marked, with ptosis—and sometimes ophthalmoplegia, weakness, and rapid fatigability of muscles of the trunk and extremities as well as of those innervated from the bulb; absence of muscular atrophy and fibrillary tremors; normal excitability by induced currents at the moment of application, provided that the muscle is not already fatigued by voluntary exertion, rapid decrease and disappearance of

contractility under application of electric currents, with restored excitability after a very short rest; the occurrence of remissions and exacerbations; almost complete absence of sensory troubles; immunity of the function of bladder and rectum; sensorium unaffected; negative results of necropsy. Oppenheim points out that in polioencephalo-myelitis the symptoms of "myasthenic reaction," remissions and fatigue phenomena are all absent.

Neither sex nor age appear to play any important part. The disease may be chronic (as in H. B.) or subacute (as in A. P.) and in the narration of published cases it appears that there is almost always a tendency to very sudden exacerbations.

Apparently, too, the symptoms may originate in various parts, and by no means necessarily in the bulbar district. I have recently been consulted by a gentleman who may very likely prove to be a case in point. His complaint was that "when tired he could not walk straight." That was all he had to mention. This was in May last, and he had experienced the difficulty for a couple of years. Tabes, general paralysis, muscular atrophy, and every known form of structural disease could be perfectly excluded. He is a total abstainer. A few days ago I found him worse on his legs, and his speech was laboured. In the morning he is all right, and when starting to walk there is nothing wrong, but after a few yards he is tired, and staggers like one intoxicated. He has seen people watching and pitying him "for being so drunk." The greatest distance he can walk now when he is at his best is about a hundred yards, and then he is staggering hopelessly. Of late his writing has become unsteady. After rest he is better. Except for the symptoms mentioned he has nothing to complain of. I have been hitherto prevented by circumstances from ascertaining whether he presents the "myasthenic reaction."

The absence of any facial symptoms in this patient is likely to interfere with the recognition of the case as belonging to the class. The ease with which early or aberrant examples of a certain disease of the nervous system are apt to be overlooked or erroneously referred is well known, and is conspicuously seen as regards cases of insular sclerosis, tabes, and general paralysis, amongst others. My impression is that, in the course of practice, I have seen with my eyes, though failed to appreciate the significance of not a few other examples of this disease.

Of the essential nature of the disease it is at present impossible to say anything definite. By some it has been supposed to depend upon the presence of a poison in connection, perhaps, with disordered metabolism, and certainly the remissions and exacerbations point in that direction. It is impossible to hazard more than a guess as to whether the higher or lower motor neurons are affected by the supposed toxin, but in my opinion the balance of probability points to the cells of the motor cortex as being the seat of the morbid process. The absence of constant lesions in cases hitherto examined is not conclusive, and it is quite possible that more recent methods of investigation may in the future reveal some important cell changes.

In the case of H. B., Dr. Bramwell tried the effect of employing massage of the biceps muscle when it was exhausted either by voluntary action or by electrical stimulation. The period of rest which was required for restoration of function was not diminished by this process. He considers this fact to militate strongly against the idea that the affection is myopathic and occasioned by accumulation of effete products in the muscular tissue.

I have been fortunate to obtain from Dr. Robert Hutchison, Demonstrator of Physiology at the London Hospital, an account of an examination which he was kind enough to make of a specimen of the male patient's urine. His report is as follows:

I estimated (1) total nitrogen, (2) ammonia, (3) creatin, and tested for lactic acid. The results were just as in a normal urine. No excess of any constituent, and no lactic acid present. I also injected the urine into frogs to see if it gave any curare effects, but found none. I do not think, therefore, that the urine is likely to help much in explaining the case.

I can quite understand these cases being mistaken (as so often happens with the unknown) for examples of hysteria. There ought, however, to be no such error, and the presence of the "myasthenic reaction" alone is amply sufficient to prevent so serious a mistake being committed. Let me

repeat that such a mistake would be extremely serious, because the prognosis in this disease is exceedingly grave, and death often occurs rapidly.

I have not been able to tabulate results of all published cases, but out of 19 of which I found mention in Laquer's lecture no fewer than 12 died. The importance of the recognition of the disease is therefore evident.

TREATMENT.

As regards treatment, in our ignorance of the pathogeny there is little or nothing to be said. My male patient improved whilst taking thyroid extract, which, however, had not the slightest effect upon the female.

The latter was also treated for some time with suprarenal gland—a therapeutic measure suggested by the profound myasthenia of Addison's disease—but without effect. The injection of strychnine has also been employed in these cases, but, as in Strumpell's experience, has proved of no value.

Apparently the best results are obtained by rest, removal from disturbing surroundings, and good food. There appears to be no objection to the use of galvanisation of the central nervous system, but the application of induced currents to the muscles of deglutition and respiration is strongly to be deprecated. Experience also shows that it is important to avoid feeding by tube, which, as is well known, is often of great service in bulbar paralysis of the ordinary type. It occurred to the medical attendant of a case of myasthenia gravis to try and spare his patient the alarming fatigue which was caused by the act of swallowing, and for this purpose he introduced an oesophageal tube, forgetting that the choking movements caused by its employment might exhaust the patient more than the natural swallowing movements. During the process of artificial feeding the patient died asphyxiated.

[At the time this lecture was delivered the four cases mentioned above were all that I had found described as having occurred in this country. Since the lecture has been in the printer's hands I have come across others which evidently belong to the same category. Dr. C. W. Suckling has published (BRITISH MEDICAL JOURNAL, March 25th, 1893) under the title Functional Ophthalmoplegia with General Paralysis and Implication of Cranial Nerves in Young Women, two very characteristic examples. In Dr. Beevor's article on Bulbar Paralysis (Allbutt's *System of Medicine*, vol. vii) the form of disease under consideration is described, and Dr. Clifford Allbutt in an editorial footnote refers to a case under his own observation which appears to have been one of the kind.]

REFERENCES.

1 *Brain*, 1890. 2 *Neurolog. Centralbl.*, 1894, p. 488. 3 *Neurolog. Centralbl.*, 1895, p. 35. 4 *Neurolog. Centralbl.*, 1894, p. 506. For excellent description and references see Leyden u. Goldscheider, *Die Erkrankungen des Rückenmarkes u. d. Medulla Oblongata*, 1897; H. Oppenheim, *Lehrbuch d. Nervenkrankheiten*, 1898; Leopold Laquer, *Sammlung klinische Vorträge*, No. 205, 1898, Ueber die allgemeine schwere Myasthenie. 5 BRITISH MEDICAL JOURNAL, 1893, vol. ii, p. 177. 6 *Neurolog. Centralbl.*, 1893, p. 33.

ABSTRACT OF AN ADDRESS ON SUICIDE IN SCOTLAND.

Delivered before the Royal Society of Edinburgh.

BY SIR JOHN SIBBALD, M.D., F.R.C.P. EDIN.,
Lately Commissioner in Lunacy of Scotland.

SIR JOHN SIBBALD said that the information given in the reports of the Registrar-General in regard to these statistics had not been hitherto, as they have been in most countries of Europe, digested and tabulated; and his first object was to lay on the table of the Society a series of statistical statements which he had prepared, and in which this information would be found collected and arranged. While presenting these statements, he should like to give a short account of the facts which appear to be revealed by them, and this would be most conveniently presented in a running commentary on the statistical tables.

The tables are arranged so as to show (1) the influence of sex and age upon suicide; (2) the comparative frequency with