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Certain features in the Symptomatology &c. of Tabes.

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I N D E X.

CERTAIN FEATURES IN THE SYMPTOMATOLOGY &c., OF TABES.

INTRODUCTORY REMARKS.

The following cases personally examined were drawn from the Seamen's Hospital, Greenwich, the late "Dreadnought", and the Greenwich and Lewisham Unions and Workhouse Infirmaries.

The period of observation extended in most cases over a period of several months.

Of late years scientific interest in Tabes has almost centred itself in the assistance which this disease gives to the difficult task of anatomically unravelling the sensory nerve roots in the cord, and tracking centripetal nervous impulses to their destination. Nevertheless, Tabes is still of very great interest to the general practitioner, by reason of the subtlety of its symptoms, its erratic course, and difficult treatment, and also on account of the intricate problems which it presents in examination for life assurance.

A.C. He gets slight pains occasionally in the lower regions of the left calf, and these are nearly always accompanied with fibrillary contractions in the corresponding gastrocnemius muscle.

A.E. The legs become very "trembly" towards night, and shake or "quiver" violently after getting into bed at times.

A.F. After several days duration of cystitis, intermittent temperature and great pain, the patient became very exhausted, and developed a well marked constant slow tremor of the hands and arms.

A.H. When the "lightning pains" are severe, the whole body "shivers", the teeth are set, and the legs undergo frequent spasmodic contractions.

A.K. In addition to vaso-motor constriction in the hands, at times spasm of the interossei muscles occurs, the left hand being the most affected.

A.M. His legs are subject to sudden spasmodic contractions at night, which startle him from sleep.

A.N. He has noticed fine fibrillary contractions in the calf and thigh muscles for many months, especially during an attack of "lightning pains", at which time the irregular flickering contractions suggest to him the plucking of harp-strings. The pains pick out the area over the ant. tibial muscle principally. The underlying muscle, contracts and forms a lump "as hard as iron"; at the same

time the foot is tonically inverted. At different times various muscles are similarly affected. The foot and great toe may be extended when either active or passive flexion is impossible; or the foot may be rigidly extended and the smaller toes turned towards the sole.

The thigh muscles moreover, are not exempt from similar muscle cramps. A hardening of the upper portion of the left abdominal rectus muscle with cramp-like pains, occurs also occasionally. Indeed even the sphincter-ani muscles undergo tonic contraction, giving the feeling of "tight screwing up" of the parts. At such times defaccation is very difficult. The motions "pass down so far, but will go no further", and he is obliged to force the anus open digitally. At one time his hands were the subjects of a fine tremor. He occasionally gets tremor of the lips.

A.P. During an attack of "lightening pains" in the back of the thigh, he has frequently noticed active "quivering" of the hamstring tendons and muscles. At these times flexion of the leg was the easiest position. Pains in the calf of the leg are frequently "cramp-like" in character. For a considerable time after subsidence of the swelling consequent on the disorganisation of the right shoulder-joint, five of six years ago, the scapular and other muscles on the right side of the back seemed to be constantly undergoing tonic contraction or "being

pulled on". During the past two or three years, this shoulder has taken on a constant involuntary rotatory movement, much exaggerated after an attack of pain locally, and returning immediately on being released from voluntary control, though absent in sleep.

A.R. He is occasionally subject to attacks of very severe pains in the lower extremities. In no case are involuntary tonic and spasmodic muscular contractions better exemplified than at such times. The great-toe is either rigidly flexed, or hyperextended; the little toes are similarly affected, but indiscriminately of the flexion or extension in the great toe: indeed tonic or temporary rotatory flexion, and extension or inversion and eversion of the foot itself are striking features. Spasmodic contraction of the thigh and calf muscles are at times so violent, that in order to prevent his falling out of bed, boards have to be placed along the sides. For some days after such an attack of pain the foot undergoes slow movements of inversion, eversion, flexion and extension, and the corresponding tendons stand out prominently; fibrillary contractions occur in the thighs and calves, and in the interosseal spaces, which latter are not infrequently accompanied with abduction and adduction of the toes; also fibrillary contraction in the abdominal wall, lasting some seconds can be easily evoked by mechanical stimulation.

A.R. (continued).

Similar flexion and extention movements occur, though to a less degree, at the elbow-joint, when the arm is the seat of pain.

A.S. The arms are the commonest sites of "lightning pains". He states that he has observed fibrillary muscular twitches here at times.

A.U. "Lightning pains" attack the legs periodically. At such times the knee-joints are frequently forcibly flexed, and the ankle-joints dorsi flexed;while the foot is forcibly everted or inverted and the toes "cramped up like a chicken's foot". Hard painful lumps form in the hamstrings, and in the calves of the legs, which cannot be dispersed by manipulation. On one occasion he states that his limbs and body were so cramped, and the pain so great that he could only move his limbs with great difficulty.

A.W. The left thumb habitually undergoes slight involuntary, somewhat spasmodic movements. By drawing the finger along the abdominal wall, fibrillary contractions lasting a few seconds are set up in the external oblique muscle. The same can be evoked in the serratus magnus muscle.

DISCUSSION (INVOLUNTARY MOTOR SYMPTOMS).

These convulsive movements of the legs during an attack of pain (see cases A.R, A.N., etc.,) are also exemplified by the case, commented on by Rosenbach, of a female tabetic who presented similar movements of the legs during the "crisis douloureuses", which were followed by some involuntary contractions of the toes.

Ataxia of the hands, when present very closely resembles ordinary athetotic movements. But such ataxic movements are commonly only induced by voluntary action, though involuntary and true athetotic movements of the fingers do occur in some cases. In A.H. for example the left hand would undergo typical athetotic movements, when the right hand was attempting to fasten a coat button. In many instances one or the other hand would rotate or involuntarily move otherwise, when the attention was concentrated on some other subject, as for example careful response to delicate tactile examination of the skin of the back. This same condition has been commented on by Cruveilhier, Trousseau, Hutin, and Leyden. Hirschberg writes "Dans le tabes dorsalis nous avons souvent rencontré des mouvements associés dans les organes qui n'étaient nullement atteints d'ataxie".

Berger also says "J'ai observé plusiers annees après l'apparition des symptômes spinaux, s'étaient installés

des mouvements involuntaires continuels des pieds et des orteils". (Real. Encyclop. der gesam. Heilk, 1880). ⟵⟶ Ivan Oggnianoff recommends the term "jeu des doigts" as descriptive of the condition. Rosenbach considered that these movements were "a form of athetosis", but Oulmont thought that Rosenbach confounded athetosis with a form of tremor peciliar to tabes. Their athetotic nature nevertheless, was bourne out by Oppenheim (Sitz.D. Charité Gesellsch, 20 Mars. 1884); and Strümpell (Neurol. Centralbl., 1887, vi. 1.): while Stern held that these movements were pre-eminently a cause of motor inco-ordination (Arch. f. Psych., in Nervenkr, t.xvii, 1886.p. 514). Among other involuntary movements are the tremors. Tremor of the hands and arms was well marked in A.F. during the period of extreme exhaustion consequent on cystitis and severe crises. A similar condition is reported in the notes from the Seamen's Hospital on M.A. who was admitted in 1902. The developement of Cystitis was followed immediately by fine tremor of the hands and tongue, and later on by mental disturbances. Another case is quoted in the Lancet of November 18th, 1905., of a Tabetic who had only shown definite symptoms for a few months, but who had had tremors of the head for 10 years. Now Undoubtedly "lightning pains" pick out not only the cutaneous surface, but the substance of the muscles themselves also. Witness the cramp-like nature of the pains at times. Hyperaestheria of the muscles, similar to that observed in the skin when the latter is the centre of pain, does certainly occur at such times.

For instance A.N. dared not straighten his legs when the pains were on, and reflex or otherwise involuntarily induced contraction of the erector-spinal muscles on the right side of the lower dorsal vertebrae was exceedingly painful at any time. Again, A.S., an intelligent man, was confident that the pains were muscular, and not cutaneous (pectoral muscles). In the case of A.W. pains in the adductor regions of the thighs were very definately associated with a feeling of forcible adduction. In A.R., and A.N., the seat of the pains was undoubtedly the tendon extremities in many instances. Therefore those muscular movements, (fibrillary, spasmodic, tonic or otherwise) mentioned above, which occur in the immediate neighbourhood of the seat of pain, often the actual muscles themselves (see A.N., A.R., etc,), are undoubtedly dependent on disturbances in the motor-roots, induced secondarily therein by disturbances in the sensory roots either cutaneous or muscular, (which latter Sherrington and Head have shown to run with the motor nerves immediately after their origin in their Paecinian-like muscle -organs). Furthermore, the reflex multiple contractions on cutaneous stimulation (e.g. in A.W.,) argue a condition of instability in the motor-roots. So that, to summarise the foregoing remarks, one would say that most of the involuntary movements (spasms, tonic, clonic, and fibrillary contractions etc.,) met with in Tabes are induced by the passage of sensory impulses in the immediate neighbourhood, across the disorganised sensory nerve radicles, to the motor-cells in the ant. cornua governing the muscles concerned. In other words most of these involuntary movements are reflexes, analogous to the true reflexes which occur in the various crises of Tabes.

For example, the nasal crisis which is accompanied by sneezing; in this condition a reflex motor stimulation of the nerve-cells of the intercostal, long thoracic, phrenic, and other nerves, has been secondarily induced by sensory impulses in the sensory radicles in close juxtaposition passing from the nasal mucous membrane; or perhaps more exemplary still—the coughing reflex associated with a laryngeal crisis etc,.

The athetotic movements and involuntary fibrillary contractions, tremors etc., witnessed,however, demand more than a reflex interpretation: undoubted pathological changes must be present in the motor-nerve system.

PARESIS, PAROXYSMAL EXHAUSTION AND FATIGUE.

Case Notes.

A.F. At the onset of the disease there occured a temporary general muscular exhaustion and prostration, induced suddenly by stepping into cold sea-water in which he was about to bathe. The patient was perfectly conscious but quite helpless and had to be carried home, where he remained in this helpless condition for several hours.

A.G. He had been affected with Tabes for two years, when on walking to the Hospital one day, he suddenly collapsed by the roadside, and was unable to move his legs at all for about ten minites. As his feet and hands were swollen, and as he had just returned from Calcutta, Beri-beri was provisionally diagnosed. The oedema was a chronic tabetic vaso-motor manifestation however. At the present time, six years after the onset of the disease he habitually suffers from early fatigue, his back and head "droop", and attempts to voluntarily straighten his shoulders are painful.

A.H. He suffers habitually from early exhaustion. His left knee suddenly gives way under him at times, but he has never actually fallen.

A.K. Two years after the onset of the disease he took Enteric Fever. Convalescence was peculiar by reason of the extreme weakness of the erector-spinal muscles. The head and neck drooped so that he required to peer forwards "under his eyebrows". This condition lasted several weeks,

& attempts at forcible correction were painful.

Four years after this he was suddenly taken with an acute paralytic condition of the lower limbs, which lasted twenty-four hours, and was accompanied with very decided vaso-motor disturbances. Two years later drooping of the head recurred. For one week walking and standing were difficult and tedious, and he required to support his head under the chin when sitting. Attempts at active elevation of the head were attended with pain.

A.L. Very early in the disease, and before any ataxia had shown itself in the gait, the patient fell from a sudden collapse of the knee-joint. He at present is habitually soon fatigued, and confesses that the tired drooping of the head is very different from his usual erect military attitude.

A.M. The drooping of the back is quite marked, and makes him look much more aged than he is.

A.N. One year prior to the developement of the ataxic gait or any marked symptom of Tabes, the patient's left hand became suddenly weak, and he was obliged to give up work.

From the history it is clear that the condition was not due to a teno-synovitis, or any similar condition.

The hand has remained weak since, and was also at one time recently the seat of a fine intention tremor.

Two years afterwards sudden collapse of the knee-joints precipitated him on the ground on many occasions.

About the same time the hand-grip began to relax involuntary at awkward moments so that articles being carried were let drop. The head tends to droop, and is supported under the chin when he sits. Excessive fatigue in the lower limbs on some days entirely prevents him from walking.

A.p. The disease was ushered in by early fatigue of the right arm while painting at the easel in his studio.

Later on the occurrence of stiffness of the muscles of the lower limbs after resting from exertion struck him as being unusual. At the present time (ten years after the onset of the disease) the leg muscles, especially those of the left are very weak and flabby.

A.Q. One year after the onset of symptoms his legs began to be "as heavy as lead" and he was obliged to lift the leg with his hands in the popliteal spaces in order to laboriously ascend a small flight of stairs. Some years after this he began to be occasionly completely exhausted when halfway up the stairs, and quite unable to reach the top, or, if this latter was eventually done, at times it was attended with great breathlessness and exhaustion threatening collapse. So sudden, extreme, and unaccountable were these attacks that he mentions them as being very extraordinary occurrences.

At the present time (ten years later) his head tends to droop early in the day, and his back almost invariably aches towards night.

A.U. A marine fireman. On one occasion his lower limbs collapsed suddenly when working inside a large engine boiler, and his legs were sat on. No fracture occured, but his legs swelled enormously and were much discoloured.

A.W. Fracture of the left tibia resulted from a fall on his legs in the sitting posture due to collapse of the knees.

DISCUSSION (paresis, paroxysmal exhaustion and fatigue).

Fatigue is an interesting feature of Tabes. The general tone of the muscular system may be fair at the commencement of the day, but not many hours elapse as a rule, before lassitude sets in. This is especially well marked after any disturbances of the general health such as indigestion, or a crisis.

Drooping of the head in well marked cases was often complained of as being very different from the usual vigorous, erect, attitude in which the patient took considerable pride when well. It is more marked towards night. In the case of A.K. it partook very much of the nature of a temporary paralysis. In A.N. a decided dorsal curvature resulted therefrom.

[In this connection the cases of true spinal curvature in Tabeties recorded in the "Nouvelle Iconoge. de la Salpêtrière"., Nos,2,3,4,5. March-October 1900, by Jean Abadie are interesting. In 1884 Kroenig described a condition of spondilo-listhesis in Tabes also (Zeitschrift für Klin. Medicin.); and in 1886 Pitres and Vaillard published two cases of spinal curvature in Tabeties]. Various opinions are held as to the cause of this general fatigue. The idea that it is due to excessive muscular action is incorrect inasmuch as the ataxia of the limbs has been shown to be due to absence of muscular contraction in the co-ordinating group of muscles, and not to excessive muscular action. Mental fatigue is very intimately related to physical fatigue, as fully pointed out by Sir Lauder Brunton in his paper "On Being Tired"., and is also a characteristic of the Tabetic.

It is well known that Normal fatigue may be artifically induced in a muscle by feeding it on a weak solution of lactic acid, and that it may be then removed by washing out the muscle with salt solution, containing a minute trace of alkali; whilst the old timed but important Curare experiment clearly demonstrates that fatigue in the motor-end-plates occurs much sooner than in the nerve. But recently by means of Mossos' ergograph (or Waller's dynamograph) it has been shown also that the state of the brain and central nervous system generally, is a most important factor in fatigue, and that the brain is the first to be fatigued. That this is due to toxic bodies in the circulation has been shown by Mosso in the fatigue produced in a normal animal by introducing the blood of a fatigued animal into its circulation.

The blood of the fatigued animal contains the products of activity of its muscles, but still remains alkaline; the poisonous substances therefore cannot be free lactic acid, and lactates do not produce the effect, so that the fatigue toxin remains still undetected. Such toxic bodies if found in Tabes would amply account for the frequency of mental and muscular fatigue.

Some importance must also be attatched however, to the generally accepted belief in muscular trophic disturbances.

Conceivably, if the normal sarco-lactic acid and other muscular products are allowed to remain in the muscle abnormally long as a result of trophic disturbances, a feeling of stiffness, and a correspondingly early fatigue is bound to ensue. And "Stiffness" of the muscles is not uncommonly complained of in the early stages of Tabes. A low state of vitality and a condition of relative instability of the motor centres of the cords themselves, also seems to contribute a not altogether

unimportant element to the occurrence of early fatigue. The peculiar swaying sensations occasionly observed, and which patients describe as conveying the idea that the lower limbs are being slowly and rythmically worked on by strings, or are swaying to and fro etc., are analogous to the similar states observed in the vaso-motor and respiratory centres when these are exhausted (e.g. Cheyne-Stokes respiration; Pulsus paradoxus etc), and also in the states observed before the normal motor -centres accustom themselves to the movements of a new exercise e.g. horse-back riding, skating etc, and even such common-place occurrences as the rolling of a vessel, and the ascent and decent of electric lifts etc.

But more radical still are the changes which are accountable for the peculiar states embraced in the term "paroxysmal exhaustion". In several of the cases examined, notes were made on the occasional sudden unaccountable onset of complete exhaustion, often tantamount to a temporary general paralysis.

In A.F. it seemed to have resulted from a sudden sensory stimulation of possibly a hyperaesthetic area. Similar conditions have been described by Dr.A.Pitres in an article headed "Courbature musculaire", in which he says "Chez un certain nombre de malades, tout a fait au debut de l'ataxie locomotrice progressive, on peut observer de veritables accès de courbature musculaire qui survierment brusquement sans cause appreciable, persistent pendant quelques heures ou quelques jours et se dissipent sans laisser apres eux aucune fatigue persistante".

And, further, he states that there is no accompanying pain, and that these attacks leave the patient suddenly and without after affects. He also says that it may occur alone, and that in one case it preceeded any other signs by ten years. In the Lancet, March 7th, 1908, there is also an account of a case of heriditary tabes in a child aet. two years, in whom at the age of three months there occured an attack of stridor with laryngeal spasm and general paralysis. The child could neither sit, stand, nor move its head. Further consideration of this subject might throw some light on the close relationship between Tabes, in which general paralysis occurs in occasional paroxysms, and General Paralysis of the Insane in which it is permanent and more tardy in its developement.

Referring next to the occurrence of occasional sudden involuntary collapse of the knees, which sometimes lands the patient so violently on the folded legs as to produce severe bruising, or even a compound fracture, and which has been recognised as a symptom of Tabes for some time. In A. it was the only symptom complained of: and indeed such a complaint should always suggest the presence of Tabes. Ross says it is always associated with the lancinating pains but from experience with the cases mentioned one would feel inclined to seriously doubt this. Buzzard states that it is fear of this undesirable calamity that is the most potent factor in the production of hyperextension at the knee-joint. It is most possibly dependent on the perversion of muscle-sense and the lack of knowledge of the relative positions of the various

parts of the limb. The normally contracted quadriceps extensor femoris in response to false sensory information is suddenly relaxed in the belief that it is over contracted. false impression This, superimposed as it is on the absence of joint-sense, results in a total collapse of the knee without even the normal reflex contraction of the extensor femoris muscle on sudden extention(Note in this connection also the loss of the knee-jerk reflex). A somewhat similarly unstable condition in the infant, of two or three years of age, is undoubtedly accountable for the frequent collapse of the knees and falling backwards in the sitting posture witnessed when the child suddenly bends to pick up an object on the ground.

It is now quite an established law that the cutaneous reflexes are always more active in a cutaneous hyperaesthetic area.

In the cases examined it was noticed that the cremasteric reflex was commonly very active where the testicle was not atrophied or anaesthetic, and vice-versa. A response would be given under the former circumstances from a wide cutaneous area extending well down on to the inside of the thigh, and as far out as the great trochanter at times.

The same held good for the abdominal reflexes. (A.N.)

On one or two occasions a recoil contraction occurred, and rarely, fibrillary muscular contractions(A.W).

The scapular reflexes were usually active also. In A.K. stimulation over the left rhomboid area was followed by a contraction of both the right and left rhomboid muscles.

Gentle pinching of the muscles bounding the axillary fossa could seldom be made to produce reflex laughter.

Percussion of the muscles gave active fibrillary contraction usually. Well marked 'myoidema' responses were present in A.K. Pinching the scrotum invariably evinced active contraction of the dartos. The involuntary muscles of the small intestine gave evidence of preserved active reflexes in visible peristalsis on mechanical stimulation through the abdominal-wall in some instances; and as a general rule the bowels responded actively to ordinary purgatives, even in those who were subject to constipation, thereby confirming the presence of at least normal excitability of the small ,

and possibly also the greater part of the large intestine.

Irritation of the pharynx and fauces not infrequently met with no response. Among other peculiar pharyngeal and laryngeal disturbances in a case of tabes, Sir Felix Semon mentions this diminution in the reflex on irritation of the soft palate (Laryngoscope, April 1900,p.217).

Irritation of the nasal mucous membrane by a thin fold of paper often produced no attempt at sneezing or even 'stillicidium epiphora' or any discomfort at all.

Similar irritation of the external auditory meatus which, as a rule, normally produces a screwing up of the face, and even perhaps a few short and sharp coughs, was also in many cases little more or less than "merely unpleasant".

Sudden depression of the abdominal wall on to the viscera by means of the finger-tips, not infrequently left the abdominal-rectus muscle quite passive (As far as the writer is aware, this absence of an important abdominal reflex has not been commented on before). Irritation of the mucous membrance of the larynx and trachea by the inhalation of vapour of Eucalyptus-Oil poured on to a piece of lint and placed over the open mouth in some cases failed to produce coughing for a considerable time in many instances. Coughing was not a marked symptom in one of the patients with phthisis. The sensibility of the mucous membrance in the ultimate brouchioles, and the infundibula of the lung lobules, is difficult to ascertain, as neither inhalation of irritant vapours nor such mechanical stimulation as the familiar mode of producing coughing by

smacking the thorax are altogether reliable. It may be mentioned however that the latter form of stimulation met with no response in several instances.

VASO-MOTOR DISTURBANCES.

Case-notes.

A.A. Slight tramua (resulting from somewhat excessive walking) on the left knee-joint which had given evidence of pathological changes for eight months, produced extensive painless oedema of the leg from the ankle to the middle of the thigh. The left knee-joint measured $17\frac{1}{2}$" in circumference against 14" in the right. With rest the oedema disappeared in three days.

A.B. He suffers great discomfort from constant coldness of the feet and legs, and habitually feels cold even when covered with many blankets. His sensitive skin cannot tolerate hot-water bottles. On streaking the skin of the abdomen with one's finger-nail, vaso-motor dilatation ensued in five seconds and lasted seven minutes.

A.C. Enormous oedema of the left thigh, buttocks and groin, was suddenly discovered one morning on the patient's awaking. It did not materially prevent him from walking, but its serious aspect led to a provisional diagnonis by the Surgeon of a ruptured gluteal aneurysm.

It was eventually found to be solely attributable to framentary fracture of the head or great trochanter of the femur, or of an osteophytic growth, in a Charcot's joint. It subsided within three days with rest.

Cutaneous irritation of the legs and abdomen evoked hyperaemia in five seconds which lasted one minute.

A.E. He has suffered from cold feet for years.

A.F. He is subject to cold feet; this even after walking some distance, when also his feet perspire profusely.

Occasionly when warming his feet at the fire he has noticed that the skin "pitted" on digital pressure over the shins. Streaking the abdomen with the finger-nail gives rise to a broad red band in ten seconds, which lasts about twenty-three minutes. On the legs the redness takes one and a half minutes to appear.

After compression of the soft tissues of the great-toe sudden release evokes a rapid hyperaemia, with slight but definate oscillation of the circulation.

A.G. There has been more or less constant oedema of the feet, ankles and lower part of the legs for months now.

There is no sign of cardiac weakness whatever.

The toes become very hot at times, and on several occasions the skin of the leg, as also of the forearms and hands, has been noticed to be universally hyperaemia, as if they had been steeped in hot water. He has also noticed perculiar persistent circular blanched patches in the skin of the limbs about the size of a shilling-piece, especially on the forearm after pressure from the handle of a basket. Stroking the skin with the finger-nail produces a persistant broad, blanched, area which gradually fades away after many minutes. This occurs on the forearms, abdomen, and legs.

A.H. From an early date in the history of his disease the left-hand has been almost constantly stone cold, "even in warm weather", and frequently blue. He suffers considerably from cold feet and is compelled to sleep between blankets with hot-water bottles. At the present time, eighteen months after the onset of the disease, the left hand is redder and warmer than the right, Sometimes it is very cold, & When its warmth recovers the hand feels full and distended. Pressure with the thumb at such times leaves a peculiar persistant white mark due to anaemic blanching of the skin. The right foot is almost equally as often and similarly affected.

A.K. He is subject habitually to cold feet and general coldness at night, and often cannot keep warm even when in the tropics and covered with blankets. For the past year he has had "cold shivering sensations" in the back and legs. On one occasion six years after the onset of the disease the legs underwent most alarming vaso-motor and sensory disturbances. While sitting at the breakfast-table he noticed a "numb feeling" in the toes which slowly spread up the legs to midway between the pubes and umbilicus. The lower limbs were absolutely paralysed and he fancies anaesthetic. When undressed and placed in bed his legs were seen to be of a diffuse pale bluish colour "as if mortification had set in".

There was no feeling of either cold or warmth, he states, and the limbs were not swollen. The discolour-

ation lasted two days: on the first day he could not move the legs at all. On several occasions the legs, one or both, have been very swollen, even as far up as the thighs, leaving "pitting" on digital compression. The oedema more or less subsided during the night, though it recurred daily for weeks. It was most marked when the ulcers in his feet were most active. He came for treatment on the present occasion on account of inability to walk, with extensive oedema and hyperaemia around a deep ulcer on the sole of the right foot.

The presence of deep pus was confidently diagnosed, but in response to fomentations and rest the condition rapidly subsided without any discharge. Finger-nail streaks on the skin of the chest gave rise in thirty seconds to a broad deeply hyperaemic band, slightly elevated and wheal-like in the centre, with a pale anaemic margin externally, which disappeared in three minutes.

Merely roughly stroking the skin of the abdomen with the palm of the hand gave rise to a diffuse hyperaemic blush.

A.L. Coldness of the feet and legs require relief by hot-water bottles and blankets at night-time. He states that on several occasions he has noticed transient red spots on the chest, and on the flexor surface of the left wrist of the size of a threepenny piece. Finger-nail streaks produce a narrow red band with a broad white (anaemic) margin on each side, in fifteen seconds lasting about half a minute.

A.M. Two years after the onset of the disease a spontaneous intracapsular fracture of the neck of the femur occured.

The limb which had been slightly puffy before the accident then became enormously oedematous and bruised.

This condition did not subside for two or three weeks, and bony union did not occur. Finger-nail strokes on the skin of the abdomen and legs at the present time produce a faint pink hyperaemic reaction with an anaemic margin on each side of the line after one minute.

The hyperaemia intensifies after ten minutes and still another hyperaemic band developes outside the anaemic band again and on each side, the different areas alternating.

A.N. He is subject to an unpleasant feeling of coldness down the spine, causing him to shiver, and which is unrelieved by enveloping himself in blankets. While under observation it was noticed that a deep-red mottled discolouration of the skin of the dorsum of the foot and great-toe preceeded the onset of pain in these regions by some hours. Pain in the heel was followed within a few hours by deep red bruise-like mottling. In the temporary intervals of pain the feet became universally red on his assuming the erect posture.

At times the legs take on a "deadly yellowish" colour and feel lifeless; at other times when the pains are severe the calf "swells, becomes shiny and looks as if it would burst".

A.O. His feet are habitually cold (his age is 64 years).

Two months prior to the present examination, and a few months after the onset of the disease an attack of "shooting"pains accompanied with hyperaesthesia on the the inner side of the right calf occurred in conjunction with considerable oedema of the leg. On stroking the skin with the finger nail a red line appears in one minute, which in two minutes becomes oedematous, developing finally into a dermatographic promminence on a hyperaemic base. The whole lasts about a quarter of an hour and is most marked on the chest and abdomen. It is not present above the clavicular regions.

A.P. One of the earliest symptoms was a sudden extensive painless and unaccountable swelling of the whole of the right arm from the wrist to the root of the neck. It was variously diagnosed by the surgeons who examined it (phlebitis, acute inflammatory changes etc.): but it was given rest and gradually subsided in about three or four months. Within a few months thereafter, the condition recurred. In a half an hour the limb became enormously swollen, and this time of a "greenish-lemon colour" (the patient is a colour artist and states that this discription is as nearly accurate as possible) ,

varying in intensity at different places, and darker on the outside of the arm. This condition lasted several weeks, and left the shoulder disorganised and dislocated. On the other hand he sustained an intra-capsular fracture of the right femur some years afterwards as a result of slight violence, with which there was comparatively little swelling. Both joints have remained permanently disorganised. Although he affirms that hs does not suffer from cold feet, yet his feet are obviously of subnormal temperature. At times however they become so warm that he is obliged to put them outside the bedclothes. At such times they are uncomfortably swollen and feel as if enveloped in tight socks.

The feet being habitually inclined to swell when sitting, he is obliged to wear his boots unlaced.

There is no evidence of cardiac insufficiency.

The right hand is often considerably redder and warmer than the left. A few greenish-yellow patches about the size of a shilling-piece and strongly resembling old bruises are present in the skin on the outside of the left knee-joint. Though there have been occasional "lightning pains" in the legs during the past few weeks, there is no evidence to establish an intimate relationship between the two.

On stroking the skin of the leg with one's finger-nail a faint hyperaesmic line only, results in a few seconds and lasts about three minutes. The pale anaemic band normally present on each side of the hyperaemic

streak, becomes hyperaemic itself before eventually fading.

A.R. For the past seven years he has frequently resorted to placing the feet outside the bedclothes in order to cool himself. At different times the feet undergo strange discolouration lasting several days. Extensive dark-red hyperaemic mottling of the insteps and heels occurs simulating a senile peripheral endarteritis. These changes commonly herald an attack of lightning-pains which usually makes its appearance within a few hours.

The skin is yellow, thin, smooth, and unusually transparent. This is also the case with the hands.

A circular greenish-yellow persistent cutaneous patch of discolouration about the size of a shilling-piece and resembling an old bruise is present on the inner side of the right knee. Generalised cutis-anserina is readily induced by exposure to slight cold.

A.U. Persistent cutaneous yellow circular patches of staining suggesting old bruises are present in the legs.

Stroking the skin with the finger-nail gives rise to a sensation of coldness in the part, which is soon followed by a feeling of burning heat.

A.V. One of the earliest symptoms was great swelling of the legs from the ankle to the knee, subsequent to a slight injury, so that he feared the "skin would burst".

The part was also extensively bruised. The feet at present frequently become red and swollen. Of late years a recurring swelling at intervals of weeks or months with

bluish bruise-like discolouration and lasting one or two days has affected the skin over the calf or shin of the left leg.

A.W. On occasions the hands and feet get hot and the latter swell. The hands not infrequently become "quite white".

On stroking the skin of the forearm with one's finger-nail a slightly oedematous streak results in a few minutes.

VASO-MOTOR DISTURBANCES).

DISCUSSION.

The pathological conditions embraced under this heading are dependent on :-

(1) excititant changes in the central Vaso-motor centres — sympathetic system, (analagous to the condition of irritation in the lateral tracts in such cerebro-spinal affections as primary lateral sclerosis, whereby purposeless spasmodic, tonic or clonic etc., actions are produced).

(2) increased excitability of the peripheral vaso-motor centres, secondary to excitant changes in the higher vaso-motor nerve tracts whereby normal reflexes are exaggerated, — (corresponding to the same excitable state of the motor cells in the ant. cornua in primary lateral sclerosis).

In addition one may perhaps add (3) instability of the pontine vaso-motor centre, in which case the area of disturbance would be more generalised than in the two foregoing.

[Professor Pal claims that the gastric crises of Tabes are vaso-motor phenomena, ? pontine "They are invariably associated with a rise of arterial tension due to spasm of the peripheal vessels of the visera. The heart also beats rapidly".(Münch. Med. Woch., December 8th, 1903.p. 2135).

Another most remarkable instance of generalised vaso-motor disturbances is the case of generalised capillary extravasation of blood in a tabetic described in the Bull. et Mem. Soc. Méd, d'hôp de Par., 1909. 3. s.xxvl. 747.]

Expansion of 1:- "Excitant changes in the central vaso-motor centres-(sympathetic system)- analagous to the same condition of irritability in the lateral tracts in such cerebro-spinal affections as 'primary lateral sclerosis' whereby purposeless spasmodic, tonic, or clonic etc., actions are produced:-"

As would be expected the areas implicated in this way are extensive. Purposeless spasmodic, tonic, clonic etc., vaso-motor occurrences manifest themselves in:-

(a). Oedema,

(b). Extravasations and capillary stagnation,

(c). Anaemia or lividity.

(a). Oedema commonly affects the extremities, and that either symmetrically or asymmetrically. When the former, it strongly suggests renal or cardiac disturbance, but neither of these are necessarily present. It is often of very short duration, but may recur in the mornings after disappearing at night, for weeks. (see A.G., A.K., A.N.)

One named R. Birnbaum writes on a case in which enormous oedema of the lower limbs and vulva with extreme distention of the bladder (175 ounces) complicated a four months pregnancy without any obvious reason to account for it, until Tabes was discovered.

That the origin of these disturbances is not peripheral is shown by their close relationship to the frequent occurrence of pain synchronously in the same situation, from which it is

obvious that they, in company with the sensory disturbances are spinal in origin.

(b) Extravasation of blood.

The bruise-like marks observed, of spontaneous origin, and mostly of greenish-yellow colour and about the size of a shilling-piece, were probably of the same nature as those described by Straus, beginning with a "bright red colour, passing through the various shades of brown, green and yellow until, they finally faded" (Des Ecehymose Tabetique à la suite des crises de douleurs fulgurantes" Archiv. de Neurologie Tome 1. 1880). If the extravasation were immediately subcutaneous, one would expect this sequence, but not always so, if deeper.

(c) Vaso-constriction as evidenced by anaemia, or "blanching" of the part may affect merely the extremity of the limb as for example the condition of "dead fingers" etc. (A.H.etc)., or the whole limb, as in the case of A.K. and A.N. in whom the condition was truly alarming. The feeling of coldness in a part and the "shiverings down the back" indicate the presence of vaso-motor constriction, as heat-and cold-sense disturbances themselves are not common in tabes, and were not present in these cases.

~~common in Tabes~~. "Shivering appears to be a response to the cooling of the sensory nerve-endings produced by the marked constriction of the cutaneous arterioles, for external heat will abolish it" (M.S.Pembrey M.D. "Allbutt's system of Medicine). Shivering was frequent in A.N. as a result of "coldness down the spine," while coldness of the extremities again was common to many.

Capillary stasis, strongly resembling senile peripheral endarteritis, preceded the occurrence of lightning pains in the vicinity in the cases of A.N., and A.R. In this connection may be quoted the remarkable case mentioned by M.M. Georges Guillan et Jean Troisier in which practically the whole surface of the body was affected in a similar congestion and stasis resembling "une facon typique des lividites cadaveriques." The case was a hereditary tabetic without crises, but with other cardinal symptoms. Compression of the affected cutaneous areas induced a zone "d'asphyxie blanche" and the circulation returned but slowly. Gravity exerted a marked influence. The patient suffered constantly from cold extremities (Bull. et Mem. Soc. Méd. d'hôp. de Par. 1909. 3. s. xxvl. 747). In the case of A.H. coldness of the hands and lividity were common occurrences.

or the condition of termed Erythromelalgia

Expansion of 2:-

"Increased excitability of the peripheral vaso-motor centres secondary to excitant changes in the higher vaso-motor nerve tracts (discussed in No1) whereby normal reflexes are exaggerated (corresponding to the same excitable state of the motor-cells in the anterior cornua in primary lateral sclerosis)":-

(a) The application of warmth peripherally, as by merely enveloping in bed-clothes, was in some instances (A.P.,A.U., A.W., A.G.), sufficient to produce a high degree of vaso-dilatation, and a feeling of heat and distension in certain parts. It was hence common at night-time when the patient was in bed.

In others immersion in a warm bath would produce a red suffusion of the whole skin.

(b) The application of cold produced the opposite effect.

Merely exposing the chest would often induce an extensive CUTIS ANSERINA. (A.R.,A.K.)

(c) Mechanical stimulation as by stroking the skin with one's finger-nail, is ordinarily followed if not immediately yet within ten seconds by the developement of a hyperaemic band along the stimulated area. Usually in from five to fifteen seconds, this band is enclosed by a pale anaemia area lasting from a quarter to two minutes, the whole fading in three to five minutes depending on the vascularity of the part at the time, being more marked in reaction and of longer duration in

warmth and febrile conditions. Since the reaction is thus normally somewhat indefinite, it is unsafe to attribute any but the most striking results to a pathological condition.

Such outstanding exceptions, were witnessed in A.G. in whom even digital compression produced, not a hyperiaemic area, but a persistant intensely anaemic and blanched condition of the part, either on the forearms, abdomen or legs.

Merely gently passing the palm of the hand across the surface of the abdominal wall in A.K. produced a diffuse hyperaemia of the part in a few seconds. A slight degree of dermatographia was present in A.K. and A.W. while in A.O. it was well marked. CUTIS ANSERINA was evoked by simple mechanical stimulation in A.K. In A.F. the normal regular hyperaemic return of blood after compression of the soft tissues of the great-toe was replaced by a decided oscillatory flow. In A.M. and A.P., several alternating bands of hyperaemia and anaemia resulted from stimulating the skin by drawing along the finger nail. In connection with these vaso-motor cutaneous reactions it is interesting to compare the similar occurrences in Addison's disease discussed at the meeting of the SOCIETE MEDICALE DES HÔPITAX DE PARIS, on Feb. 8th, 09. M.C.Tinel called attention to the phenomenon known to French clinicians as the "white line" in the diagnosis of pathological conditions of the suprarenal bodies. M.Sergent who first described it in 1903, found it also in septicaemia, the specific fevers, influenza etc,. It was evidently considered to be a reflex spasm of the capillaries provoked in conditions of low vascular tension and vaso-dilatation.

The effect of trauma on the peripheral vaso-motor system is well illustrated in those cases of spontaneous fracture, or fragmentation in a Charcot's-joint (A.A.,A.M.,A.G.,A.P.,&c).

The cutaneous hyperaemia, and the almost unaccountably extensive oedema strongly suggest acute inflammatory changes; but the part is not hot, neither is the patient's temperature elevated. A case is quoted by M.Touche of early spontaneous fracture of the femur in a tabetic. "The thigh became extremely red and swollen, and the condition resembled cellulitis. A large incision was made but no pus could be obtained" (Soc. méd. des Hôp., Paris. December 15th, 1899).

(d) Toxic effects on the peripheral vaso-motor system:-

Those observed were all organismal. The inflammatory reaction connected with a small perforating ulcer of the sole of the foot was so extensive in the case of A.K. that a deep and free incision into the dorsum of the foot was strongly urged. The condition however, subsided in two or three days without any discharge.

DISCUSSION ON ATAXIA.

One of the recent questions in connection with the ataxia gait of the Tabetic, concerns the dorsiflexion of the foot. It is this movement together with the over-flexion of the knee-joint which gives the advancing leg its peculiar composite right-angled appearance, and which Thompson holds

Normal gait

Tabetic gait.

to be voluntarily adopted in order to recompense the paresis of the Tibialis anticus muscle. But the right-angled condition of the foot, and indeed the heel-thumping gait also in the tabetic, are characteristic features in the "toddling" and more especially the running of the two or three year old infant. In both gaits elevation of the body is performed chiefly by extension of the flexed knee-joint, while the ankle-joint remains more or less fixed. Normally, tip-toe balancing requires a high degree of perfection in co-ordination and precision in movement, hence its absence in the infant and the tabetic. It is absence of this which is the cause of many of the INFRA-DIG backward falls in the sitting posture frequently witnessed in children at this age attempting to grasp an object on the floor. It is the prime difficulty of skipping, and the crowning success of dancing; while many adult parlour-tricks owe to it their interest and amusement. Muscular inco-ordination is held to be the essential feature in the causation of the ataxia in Tabes,

whether its origin be spinal or cerebellar. As against the latter is the fact that the gait is not of the cerebellar variety as a rule, (though A.Q. gave a very definite account of a tendency to wheel a handcart to the left, to walk to the left, and to fall to the left, and a similar condition was reported in the case of F.S., admitted to the Seamen's Hospital, May, 1895, who felt at times as if he were falling to the left). Whilst if spinal in origin it must be said that this is as yet only a surmise, in as much as no definite tract of nerves has yet been settled on as being always implicated when ataxia is present. So far it is known that Ataxia may exist, as concluded by Thompson and Head, "without any change in the sense of passive position or movement, and without loss of cutaneous sensibility, (so that) it must be due to the interruption of non-sensory afferent impulses. On the other hand, loss of the sense of passive position is always accompanied by a greater or less degree of ataxia".

Other factors which may be mentioned as playing a part in the production of the ataxic gait are:-

(1) Athetosis. This is dealt with somewhat fully under the subject "Involuntary motor symptoms". Stern held that athetotic movements of the foot were pre-emmintly a cause of the muscular inco-ordination. (Arch. f. Psych., in Nervenkr. t. xvll. 1886 p.514)

(2) Loss of the tendon reflexes, i.e. loss of contraction on suddenly extending the muscle. This is one cause of deficiency in the antagonist-muscles, and hence partly accounts for the excessive muscular actions witnessed in Tabes.

But loss of K.J. is not necessarily associated with ataxia as shown in the two cases reported on by Long ("The pains of Tabes" B.Med.Jour. 1905,i,1.)

(3) Instability of the ankle-joint.

A strong tendency to inversion and eversion secondary to the laxity of the ligament, not uncommon in Tabes, must undoubtedly tend to aggravate difficulties, especially if accompanied with paresis of the Tib.Antic. or other muscles of the leg. Indeed A.G. volunteered the statement that this condition handicapped him considerably.

(4) Vertigo. This symptom often occurs PER SE, but perhaps more commonly accompanies nausea and pain in the gastric crises resulting from acute active changes in the visceral nerve-fibres of the cord. Is it not conceivable that less active and chronic changes might produce VERTIGO and thus affect the stability of the centres of equilibrium without necessairly producing nausea?

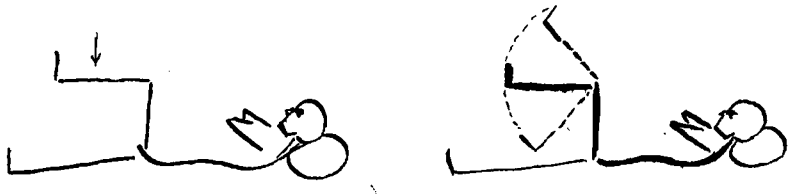
(5) Lack of mental concentration on the gait either from fatigue, laziness or indifference. It also results from the stuporose condition produced by taking beer (merely small quantities) and occasionly tobacco and absinthe.

(6) Slight ocular ataxia. Marked mystagmus was not induceable in any of the cases. In many cases patients evinced great difficulty in fixing the head while following the object under inspection. The eye commonly overshot the mark on suddenly stopping the moving object, and on many occasions oscillated once or twice again before finally attaining visual fixation.

Tardiness in following the moving object was also frequently noticed. Mental fixation, as tested by covering the eyes for a variable number of seconds(two or three) after allowing fixation of a small distant object placed laterally in the field of vision, and then uncovering the eyes and noticing how far the mentally fixed object differed from the actual, gave no conclusive evidence of abnormality.

The antagonistic muscles which are most at fault can roughly be tested by getting the patient to voluntarily fix the limb in a definite (but variable) position and noticing the amount of unsteadiness or oscillation which results when he attempts to maintain the position, after suddenly imparting a flexion, extension, abduction or adduction movement with one's hand.

Thus:-



DISTURBANCES OF THE BLADDER.

Case-notes.

A.A. For the past twelve months he has micturated five or six times nightly. The desire is controllable in the day time when necessary by "grinding the teeth", after which the urine can be retained for an hour or two.

For the past few months he has had slight nocturnal incontinuence, and in the day time the urine has occasionally run from him before he has been able to get below deck.

A.B. Although the first definite symptom of Tabes dates from three years ago, he gives a history of bladder disturbance thirteen years earlier, and which resulted from his falling heavily on his abdomen across an iron bar. He urinated normally three hours afterwards, but there was slight incontinuence for three weeks.

For the past few months there has been frequent micturation and slight incontinuence. At times he has experienced a sudden desire with compulsory micturition.

Now that he is bedridden he often requires to place his body in various positions before the flow will commence. The passage of a catheter recently was followed by the developement of a mild attack of cystitis, and more or less distention of the bladder from residual urine, so that the daily passage of a catheter became necessary. From the slowness, but full size of the

stream and inability to voluntarily assist its expulsion it became evident that the retention was due to temporary paralysis of the bladder. Also on irrigation no feeling of discomfort ensued after rapidly running one pint of lotion into the bladder. Additional lotion would have entered readily, but the bladder was felt through the abdominal wall to be well distended, and discretion forbade its continuance.

A.C. Duration of the disease about five years. Eighteen months ago the urine suddenly began to drip incontinently, and that apparently apart from any over-distention; at least he felt no desire to micturate at the time.

This condition ceased almost entirely after a few weeks. Now he has perfect control, and a good stream, but he cannot micturate in the sitting posture.

A.D. He has had Tabes for fifteen years. For some time, prior to five years ago he was troubled with precipitant micturition immediately on perceiving the desire, at the end of which time he developed absolute incontinuence of faeces and urine. This eventually improved remarkably, and he was comparatively free from trouble for some years. He then again became bedridden for two years, and suffered from precipitant micturition, which required a urine-bottle always in readiness. At first it was frequent, later on it alternated with incontinence, and often insensibly. Recently the urine has been periodically discharging in a dribbling stream. He cannot micturate voluntarily at present.

At no time has a catheter been passed, yet the urine has been alkaline and has contained pus for over twelve months without any apparent interference resulting to his general health, other than an occasional rise of temperature towards night.

A.F. Duration of the disease about six years. There was no urinary trouble prior to an occasion three years ago, when he was compelled to retain his urine to the end of an hour's railway journey, at the end of which he was quite unable to pass it. Being alarmed and in pain, he resorted to a glass of gin as a remedial measure, and obtained relief in three minutes; but incontinuence set in one hour afterwards, and for some months thereafter, while able to pass water voluntarily, he remained nevertheless subject to partial incontinuence commencing about one and a half hours after mictuition. During the past six months the flow did not start without much straning, but the stream would then come quite naturally.

He was unable to void small amounts only, but had of necessity to wait until the bladder was fairly full.

At times precipitant urination occured both at night and day. He was occasionally quite unable to micturate in recumbency. Finally a temporary retention of urine demanded catherisation. There was no difficulty with this, but within a few hours a severe attack of cystitis, with incontinent polyuria, and some retention ensued. Irrigation became impossible on account of the extreme hyperaesthesia of the parts and in a few days

the patient died from cystitis and pyelitis.

That more or less complete cystic paralysis was present at this time was evident from the ease with which the catheter entered the bladder on the few occasions in which irrigation was performed, and the inertia of the urine which was syphoned off.

A.G. During the past six years he has had several occasions of frequent nocturnal micturition, and also of precipitant urination. The urine merely drops from the urethra at some periods, and requires a good deal of straining.

A.S. Duration of the disease—eight years.

For many months he has been unable to retain his urine except for a few moments only, on perceiving the desire to micturate.

A.T. Abdominal examination after a prolonged period of incontinence of urine and faeces, reveals the presence of an habitually over-distended bladder.

A.U. Duration of the disease about nine years.

About four years after the commencement he noticed that a drink of water induced incontinence in a few minutes. This condition lasted several weeks. For the past few years he has required to strain very forcibly.

A.V. Duration of the disease about five years. For many months the stream has been very slow; it practically merely drops when left to itself.

A.W. Duration of the disease about seven years.

From an early date he was for some years subject to incontinence, subsequent to an attack of "lightning pains" in the lower limbs.

He recovered from this, but recently the incontinence has returned.

DISCUSSION on BLADDER DISTURBANCES.

oOo

The final state of urinary incontinence (i.e. uncontrollable persistent dribbling) may be reached through a series of progressive steps, or it may occur as a sudden developement, due to an acute sphincter paresis, usually consequent on a severe attack of gastric, cystic, or other crisis. The former is the more frequent course. In any case not only may the incontinence be merely a transitory occurrence, but return to the normal or an earlier stage may take place at any time, provided that irreparable destructive changes have not occured. Loss of muscular tone in participation with the general muscular hypotonicity is commonly of early occurence. The laxity of the perineal tissues, sphincteres-ani &c, is PRIMA FACIE evidence for the presence of a similar condition in the bladder-sphincter and bladder-tissues. And the ease with which this organ may be over-distended with fluid, and its softness and plasticity when so distended in well marked cases of Tabes (A.B.) serves to strengthen this view. It is in consequence of this condition (together with the low intra-abdominal pressure often present as a result of hypotonicity of the abdominal muscles) that more straining than usual is so often exerted. The difficulty in starting the flow and the necessity of finding some definite attitude when in recumbency can but be explained by the occurrence of a kinking of the neck of the bladder or some portion of the urethra, by virtue of their extraordinary laxity. Rectal examination reveals no enlarged prostate, and the passage of bougies is unattended with any difficulty beyond an occasional

peculiar but troublesome obstruction from folding of the urethra in front of the instrument. Such laxity thus of itself leads to partial retention, and therefore finally to overdistention and incontinence.

But more serious still is the pathological implication of the visceral afferent nerves of the bladder in the destructive changes taking place in the spinal-cord. The presence of early excitant activities in the afferent nerves is indicated by the occurrence of frequent desire to micturite apart from the existence of any full distention of the bladder. And Sooner or later, lowering of nervous irritability permits of painless overdistention, either consciously or unconsciously. At this stage some patients congratulate themselves on their ability to restrain the desire to micturate, and later on they notice that the desire itself is postponed longer than formerly; whilst in further nerve involvement the sense of distention is completely lost and the desire to micturate is only perceived by the nervous impulses set up from the sudden relaxation of the sphincter, under force of overdistention, which of course is attended with a compulsory voidance of urine forthwith. Even the sphincter impulses fail at last, so that micturition comes to depend solely on the reflex contraction of the bladder consequent on the overdistention of its involuntary muscle-fibres. Eventually, in consequence of the annihilation of even the direct muscular response, (analogous to the loss of "tendon" reflexes in the voluntary muscles), chronic distention and overflow set in.

Gradual or even sudden developement of a true nervous paresis or even paralysis of the sphincter, (and possibly of the bladder) *is common*. . That such does occur with the rectum is indisputable. And temporary paresis of the bladder- sphincter at least, is indicated by the sudden onset of incontinence in some cases (such as A.C. &c); while great loss of tone in the bladder itself, in the many cases of voluntary micturition in which the stream merely drops perpendicularly from the urethra (or is intermittent, and solely dependent upon abdominal strain) certainly suggests serious nerve implication. Acute paralysis of the bladder may be so severe as to simulate mechanical obstruction. This was thought to be the case in a tabetic (reported in the New York Med. Journ. of May 30th, 1908, by Benthy Squier) on whom the operation of prostatectomy was performed for the relief of complete retention, with the result however that complete incontinence ensued. The Tabetic nature of the case was recognised afterwards.

RECTAL AND INTESTINAL DISTURBANCES.

Case-notes.

A.B. Since confinement to bed (i.e. during the past year) he has been habitually constipated, and has invariably passed hard marble-like motions. About seven months ago the bowels acted incontinently with micturition for a few days. This condition has recurred recently; occasionally he has had ineffectual desires to defaecate. During the past eight months the desire has been commonly absent and an action has only been forced from a feeling of fullness in the pelvis, and the sense of duty. He often only knows that the bowels have acted by inspection.

Expulsion is so weak that he has frequently to evacuate the rectum digitally. He has haemorrhoids badly.

A.C. Occasionally he has ineffectural desires to defaecate.

At times the bowels move incontinently on micturating.

A.D. For many years the bowels have discharged quickly after the desire has been perceived, so that all haste has to be made. For the past two years he has had ineffectual desires to defaecate to the number of four or five times daily, and is therefore a source of considerable trouble in nursing. Complete rectal incontinence was present for some weeks several years ago, but it has not recurred. The motions are generally hard and lumpy and take a very long time to pass.

A.F. He occasionally has ineffectual desires to defaecate. The sphincter is very lax, and piles are present. Digital examination of the rectum is uncomfortable but is neither attended nor followed by any desire to defaecate. He cannot get the bowels to act in recumbency, and often requires to move the hardened faeces digitally.

A.G. From an early date in his disease he has been subject to frequent impulsive defaecation (i.e. immediately on perceiving the desire). He is more or less habitually constipated.

A.H. The bowels occasionally act involuntarily on micturition. He has also at times had ineffectual desires to defaecate.

A.L. He is habitually constipated, purgatives have to be continually resorted to.

A.N. Ineffectual desires to defaecate are common. Purgatives act freely. Defaecation is usually attempted twice or thrice daily, but small quantities of hard faecal matter only are passed. He requires to assist their passage digitally, or by manual compression of the perinaeum.

A.O. He was a surgical in-patient for three weeks on account of a severe attack of constipation.

A.P. The bowels sometimes move involuntarily with micturition. He is more or less habitually constipated. Haemorrhoids are present.

A.R. He resorts to purgatives habitually. Early in the disease he was on one occasion constipated for nine days, and

required drastic treatment. He has haemorrhoids, these bleed at times.

A.S. Duration of the disease about eight years. The bowels move once in two days as a rule. For the past four years he has had a slight but more or less constant desire to defaecate, which is all the more annoying because seldom physiologically accurate. He is frequently ignorant of the passage of the motions, and also occasionally finds it necessary to aid their expulsion by manual compression of the perinaeum.

A.V. Haemorrhage from piles occurs occasionally.

A.W. During the past nine months he has had incontinence of faeces on one or two occasions. Recently the desire has preceded the ocurrence sufficiently long to avoid this. He is subject to constipation; on one occasion this lasted several days, after which hard faecal masses were passed. He has often to assist expulsion of the faeces digitally.

A.Y. The bowels move once in two or three days as a rule. He is subject to ineffectual desires to defaecate.

DISCUSSION (OF DISTURBANCES OF THE RECTUM & INTESTINES).

The same introductory remarks apply here as are used in discussing the bladder disturbances, namely; that muscular laxity locally (the rectum, and descending colon) and in the abdominal wall are present in participation with the general hypotonicity of the muscular system, and even PER SE evoke a series of symptoms indicative of incipient pathological changes which may eventually terminate in complete incontinence. Here again, however, the progression need not necessarily be regular or continuous. Complete incontinence even may be transitory, and indeed at any point the symptoms may subside to a less degree of implication or even to complete recovery. The presence of loss of tone and weakness of the sphincter is revealed by digital examination, and also by the occasional accidental passage of marble-like balls of faeces on micturition. Hypotonicity of the rectum means tedious and difficult defaecation, which in turn causes more or less avoidance of the act, and hence is apt to give rise sooner or later to chronic overdistention. In addition, irritative changes in the afferent visceral nerves from the rectum (in participation with the general implication of the afferent nerve-tracts in the cord) produces frequent ineffectual desires to defaecate. Later on actual destructive changes in these parts give rise to abolition of the rectal sense, and, in consequence, defaecation is only performed from the sense of duty or perhaps from the partial involuntary distention of the sphincter immediately preceding the occurrence of a

threatening involuntary act of defaecation. The sphincter sense at this stage being still more or less normal, knowledge of the passage of the faeces is quite good, but eventually even this sense is implicated and such information is only ascertained by direct inspection. Actual nerve-paresis, if not paralysis, of the rectum apparently occurs in those not uncommon cases in which the faeces pass into the rectum but no further, and have therefore to be removed digitally, or by manual perineal compression. Arthur Hertz M.D. in working on the subject of Constipation by means of Bismuth and the X-rays, demonstrated that in Tabes, peristalsis was very slow in the terminal portion of the Colon, and still more so in the rectum. "After the rectum is reached" he states "no further advance occurs in twenty four hours." (Proc. Royal Soc. of Med. 1908).

Indeed the presence of a more or less temporary paresis or paralysis probably accounts for the occasional occurrence of severe, persistent attacks of constipation, not uncommon in Tabes, which at times require very drastic treatment for relief. Persistent and unaccountable constipation in an adult should always suggest Tabes in a case presenting difficulty in diagnosis. Such a case is quoted in the Revue Neurologique Mars 4th, 1909 of a female aet. twenty-nine years, in whom an artificial anus was made in the abdominal-wall on account of vomiting and constipation, which eventually turned out to have been Tabetic in origin. ‖ Chart-records of the daily action of the bowels are untrustworthy, inasmuch as false desires are frequent, and the passage of small marble-like masses of faeces so common, is far from being regardable

as a healthy action. except in these severe attacks of constipation mentioned above.

Purgatives act well in tabes. The musculature and nervous control of the small intestines seem quite normal in this respect. But it has not yet been shown that afferent nerves play an important part even normally in the movements of the small intestine.

Associated with the constipation in Tabes is the frequent presence of haemorrhoids, which is not to be wondered at.

SENSATIONS & SENSIBILITY OF THE DEEPER ORGANS.

The sense of hunger was not materially perverted in the cases examined, but Anorexia was common, and in one or two cases a sense of insufficiency was experienced after a full meal. The feeling of starvation was more frequent; it was accompanied with a "sinking sensation in the pit of the stomach." The avoidance of hot drinks or food by some of the patients suggested a certain amount of gastric hyper-aesthesia. The absence of griping after such drugs as senna &c, was also noteworthy, while the freedom with which the abdominal cavity could be explored and the contents manually examined and rolled about was certainly abnormal.

In some cases artificial distention of the bladder or distention from acute retention were little complained of, and produced no desire to micturate. The latter condition marked the onset of incontinent overflow in certain of the patients. The forefinger could commonly be thrust into the external abdominal ring, and then allowed to forcibly distend this opening without any complaint of pain. A.E. who was operated on for inguinal hemia complained of no discomfort, but required the radical cure on account of the workman's compensation act. Sensibility of the lung substance was attempted to be determined by the deep inhalation of Eucalyptus-oil vapour.

This however was too liable to irritate the larynx and so mask results. Heavily smacking the back and chest produced coughing readily in some, but not at all in others. Hence the frequency of unconscious trauma from compression in the bed-ridden. Absolute insensibility of the testicles was not uncommon. In these cases also the testicles were often soft and shrivelled, and the cremasteric reflex was absent.

Cases of painless parturition in Tabes are not unknown, the outstanding cases are:- the case quoted by Mirabeau of Munich (Ceutralb. f. Gyn., Feb,i p. 125). that in a woman aet fortythree years quoted by Zacharias (Muenchener medizinische wochenschrift. Feb, 12th,07)., and another by R.P. Ranken Lyle M.D(Journal of Obstetrics and Gynaec. Sep. 02. p.289).

The absence of bone-pain on heavily rapping with a ruler or similar body, was very marked in the lower extremities in many instances. Spontaneous and painless fracture occurred in A.B., A.C., A.M., A.P., and A.W. In the case of A.C. it was accompanied with a feeling of "faintness and chilliness."

Torsion of the joints was possible to a high degree without any complaint of pain in many cases, indicating thereby the loss of ligament pain-sense, an important feature in the traumatic influence on the production of Charcot's-joints.

Firm compression of the eyeball was not complained of in A.S., who had had double optic atrophy for some years.

It is open to doubt for this reason whether the elevated intra-ocular tension of glaucoma would be attended by the usual symptoms in such instances. Venous engorgement of a limb by constriction of the circulation above, produced the normal

sense of formication with numbness in those cases where no nerve anaesthesia was present, but not otherwise. The feeling of distention of the part was commonly present in the former.

SOME INTERESTING CRISES.

A.B. September 1909.- A severe attack of bilious vomiting, with nausea and persistent vertigo lasting several days, and accompanied with a sense of uneasiness in the epigastruim and "numbness" and formication of the palms of both hands, followed immediately on the developement of a mild attack of cystitis.

A.D. On occasions he has had severe attacks of vertigo while sitting, being compelled to hold on firmly to the arms of the chair. At such times he would occasionally be nauseated, and experience "pains all through the body, especially around the waist" for several hours.

A.F. An attack of cystitis was followed by violent lightning pains in the legs, which picked out the inner aspects of both calves, or began at the foot and ended with colicy pains in the abdomen. Abdominal tenderness, pain on coughing and excessive flatulence, were also present, the latter being an unusually prominent feature and giving rise to continual noisy eructations, and the passage of large amounts of flatus PER RECTUM. Extreme hyperaesthesia of the bladder to catheterisation set in, with increased abdominal tenderness, and great abdominal pain after taking even a small dose of Magnesium Sulphate. (℥ii 4 hourly). In addition to these conditions polyuria was present to a striking degree. Irrigation of the bladder with Quin. Sulph.(gr. viij ad ℥i). was followed by "excruciating burning pain" in the hypogastruim and along

the urethra to the tip of the penis and lasting for many hours. Physiological doses of Tinct. Hyoscyami produced severe colic and diarrhoea.

A.K. On rising in the morning he at times feels faint as if from prolonged starvation. After swallowing some liquid "the wrong way" some time ago he suddenly became livid and unconscious with respiration fixed in an extreme involuntary inspiratory effort. This condition lasted for some minutes, and seriously alarmed him. afterwards.

A.M. During the first year of his tabetic affection he was subject to "gnawing and aching" abdominal pains, which tended to "draw him up". He was simultaneously much troubled with flatulency.

A.N. A peculiar characteristic of his lightning pains is their concentration at tendon insertions. Such parts as the terminal portion of the TENDO-ACHILLES, the QUADRICEPS EXTENSOR FEMORIS tendon, and the terminal portion of the EXTENSOR HALLUCIS tendon are picked out. In some situations as in the latter for example a noteworthy spasmodic contraction of the muscle corresponding to the tendon occurs. An attack of such pains in the leg terminates at times with a feeling of nausea, vertigo and abdominal discomforture, described in his words "as if the inside were being tied in knots." Polyuria also occurs at times on these occasions.

A.P. He sometimes gets unpleasant "pushing pains" in the abdomen accompanied by vertigo.

A.Q. He is subject to a distressing abdommo-thoracic(? cardiac) crisis often induced by excitement in conversation, or eating too quickly. It consists in a sense of great constriction around the waist, accompanied with pains in the left side of the abdomen (the iliac and lumbar regions chiefly, though including the hypogastric).

The pain works up to the left side of the chest, and is soon followed by a sense of suffocation; he feels also as if he "cannot breathe on this side."

The heart palpitates, and a low sinking sensation in the pit of the stomach, comes over him as if he had "had no food for many days." He is also more or less periodically visited by a rectal crisis. A strong desire to defaecate,with a feeling of exhaustion, faintness and "sinking" in the epigastrium seizes him, and is accompanied with profuse hot sweating. His extreme weakness on these occasions has often demanded urgent medical treatment. He has at times been found unconsious in the lavatory.

A.R. This patient while carrying a heavy article in each hand on one occasion was suddenly seized by a violent "squeezing pain in the heart," which prostrated him immediately.

He was treated for "heart-strain" and resumed work in a few days. Such attacks have recurred several times, on each occasion he has been temporary confined to bed.

He occasionally gets great pain in the testicles, with vomiting. At times also he is taken with a severe abdominal pain and nausea.

At other times vertigo, and a sinking sensation in the epigastrium as if from prolonged starvation, attacks him.

A.V. He states that on one occasion whilst drinking a small quantity of spirits, he had a sudden alarming attack of vomiting and diarrhoea. Both the vomitus and motions contained bright blood.

A.W. There is a history of sudden vertigo, and falling on the roadside on two or three occasions. At times he has had alarming attacks of croup lasting two or three minutes induced by merely sucking sweets &c., and of such intensity as to make him fear immiment death. Sometimes the irritation is slighter being simply similar to the coughing and other reflex effects so common on swallowing something "the wrong way."

A.L. On several occasions he has suddenly awaked at night with alarming and violent fits of hard, dry coughing due to irritation in the throat (? larynx).

COMMENTATION ON THE CRISES.

The association of vertigo and vomiting with visceral disturbances in the cases mentioned agrees with the common sequence of events in truly pathological affections of the same organs. They are no doubt dependent on radicular changes in the visceral nerves in the spinal cord (comma tract), from which false sensory impulses are transmitted to the correlated vomiting and body-equilibrium centres (cochlear nucleus &c) in juxtaposition with each other in the Medulla oblongata.

M.M. Paul Sainton et Camille Tronc de Paris (Gaz. des Hopitaux 1908. 183) divide the Gastric crisis into:-

(1) Formes legère

(2) Formes frustes.

"The former are rare, and are characterised by few pains or vomitings, but excessive formation of gas in the digestive tube which Vulpian attributes to a "deglutition of air." It coinsides and alternates more often with lightning pains. —→ In the FORMES FRUSTES there is absence of pains and general symptoms but there is vomiting with vertigo, cramps, and coldness. There is no pain except from the effort to vomit. It is characterised also by a remarkable periodicity."

But it is doubtful whether any classification of the symptoms of Tabes either in their order of developement (c.f. the THREE STAGES of earlier days) or in their association with each other, can be adopted, except in a few limited instances, (such as the relationship between the proto-pathic and epicritic fibres emphasised by Thompson and Head, and Laehr), and only

so with the allowance at present of a considerable margin for exceptions thereto. Indeed the dividing line between Tabes and General paralysis is itself very obscure, both as regards the occurrence of paralysis and of mental derangements also. Concerning the excessive formation of gas (attributed by Vulpian to a "deglutition d'air,") and which was present to a remarkable degree in A.F. and to a less extent in A.M. ⟵ One thing is obviously apparent, namely, the nervous origin of this condition, whether acting by the inhibition of certain *secretions* which normally check the proliferation of ferment-tation-bacilli or otherwise. ‖ In accordance with the rule occasionally witnessed in the crisis of the limbs and other parts viz:- that the seat of pain or other form of sensory disturbance is frequently hyperaesthetic (especially if some anaesthesia has characterised the part previously) and also that reflexes are hyper-active in these regions (c.f. the abdominal cutaneous reflexes), such also is commonly the case with the visceral crises. The abdominal organs were extremely tender in A.F. at the crises, and unusually active reflexes followed on the administration of gentle laxitives. In A.K. the entrance of a small quantity of fluid into the larynx induced an attack of laryngeal ictus. ‖ Polyuria was a not uncommon concomitant of certain of the abdominal crises. (A.F., A.M., &c.) It argues a vaso-dilatation of the renal vessels at least, and in this respect contraindicates the view of Prof. Pal who claims that the gastric crises are a vaso-motor phenomenon associated with a rise of arterial tension due to spasm of the peripheral vessels of the viscera.

(Munch. Med. Woch., December 8th, 03. p.2135)

Dr. Buzzard, observing that gastric crisis and joint disease frequently occur in the same subject suggests that both may be due to some lesion in the neighbourhood of the vagal nucleus, where may be placed centres which control the function of the stomach and preside over the nutrition of the bones and joints. *

From a consideration of the case-notes it will be evident that great importance must be attatched to the lowering of the vitality in the inducement of a crisis.

* It seems more probable to the writer that these joint dystrophies should be coupled with the osseous trophic changes induced most probably secondarily to pathological vaso-motor changes therein (See "Trophic changes in the skin and bones" page 84.)

THE FACIAL EXPRESSION.

Case-notes.

A.A. The brow when at rest presents stationary horizontal furrows, and elevated eyebrows. No ptosis is present.

On the contrary, a continuous white margin is present around the cornea. The wrinkles possibly indicate worry.

A.B. The forehead is almost persistently wrinkled horizontally and the eyebrows elevated. There is little or no suggestion of ptosis. He is of a decidedly melancholic temperament and worries almost continuously.

A.C. The forehead commonly presents stationary horizontal furrows, and elevated eyebrows, but staring (i.e. showing the white sclerotic around the cornea continuously), is possible without the assistance of the occipito-frontalis muscle. He is cheery and hopeful, but has suffered severely at different times recently from severe "lightning pains." He is moreover by no means indifferent to his domestic worries, hence possibly the wrinkles.

A.D. Although he has had Tabes for fifteen years the patient's forehead is smooth and clear. The eyebrows are slightly depressed and knit. He can stare quite well. The paralysis is detectable.

A.E. Nothing peculiar in his facial expression is noted.

A.F. There is decided and continuous elevation of the eyebrows, with horizontal wrinkling of the forehead; and a double partial ptosis, more marked in the left eye is present.

A.G. The forehead is only occasionally wrinkled and the eyebrows elevated when in recumbency, but when walking they are almost continuously so. He can stare without elevating the eyebrows.

A.H. There is no elevation except when walking. The sclerotic ring is more than usually visible. The patient's head droops considerably owing to weakness of the erector-spinae .

A.L. The eyebrows are elevated during conversation and walking, but not so in quiescence. No partial ptosis is detectable.

A.M. The eyebrows are almost constantly elevated. The eyelids droop over the cornea, especially on upward vision. ⟷ He wears a very worried expression and is rather despondent. The skin and subcutaneous tissues of the face are very flabby.

A.N. The forehead is normal; there is no partial ptosis.

A.O. No peculiarity is present: tabes is early.

A.P. There is occasional fixed elevation of the eyebrows, but frowning is equally as common. There is some drooping and weakness in elevation of the left upper eyelid.

A.Q. He is blind in both eyes; double partial ptosis is almost complete on the left side. The eyebrows are elevated, especially during conversation. Some paralysis of the facial muscles on the left side, as also of the tongue is present; the lower jaw droops and there is evidence of laryngeal implication.

A.R. He has a wrinkled worn appearance.

A.S. The eyebrows are always slightly elevated, especially when listening attentively. He is completely blind in both eyes. There is no paresis of the upper lids.

A.T. The eyebrows are elevated, and the forehead horizontally wrinkled: there is also partial ptosis of the left upper eyelid.

A.U. Some elevation of the forehead and wrinkling of the eyebrows is present, but there is no sign of partial ptosis.

A.V. There is nothing noteworthy in his facial appearance.

A.W. Some persistent elevation of the eyebrows is present. There is no sign of ptosis.

A.Y. There is nothing noteworthy in his facial expression.

DISCUSSION
ON THE FACIAL APPEARANCE.

In a well marked case of Tabes there is undoubtedly a more or less characteristic facial appearance. In many cases the eyebrows are decidedly elevated and the forehead is horizontally wrinkled, giving the patient a worried or troubled expression. While the slight drooping of the upper eyelid socommonly present gives an appearance of sadness or despondency. That such depressed mental conditions should be present could not be wondered at under the circumstances, although in the consideration of most writers, such is not usually the case, the tabetic person being "strange to say, remarkably bright and cheery." By many, such appearances as the above are attributed solely to a partial but true ptosis. But drooping of the upper eyelid apart from ptosis is common to old age as a result of loss of elasticity and tone in the subcutaneous tissues (which is also not uncommon in Tabes). And it also occurs in fatigue. Sir Lauder Brunton's remarks in his paper "On being tired" (The Practitioner Dec. 1909) may aptly be quoted here. He remarks, "The external manifestations of weariness appear both in the face and general attitude, more especially do the signs of weariness appear in the eyes which lose their lustre": "The eyes seem to sink in the head and the eyelids droop as to lessen the palpebral opening. The muscles of the face become relaxed so that the lower jaw tends to drop, and although it may not do so to such an extent as to open the mouth, it yet gives the face a drawn look...."

"Mental fatigue is evidenced externally to some extent by muscular weakness and mental fatigue like bodily weariness, will cause the eyelids to droop and the muscles to relax."

And early and generalised fatigue is undoubtedly an important feature in tabes. Drooping of the upper eyelid is also, not infrequently, an hereditary physiognomical trait.

To the artist indeed, it is the normal characteristic to the female eye, from which it derives its expression of sadness or pity.

Neither does the elevation of the eyebrows always result from the assistance of the occipito-frontalis muscle to a weak or paralysed levator superioris palpebrarum' muscle. Granted then that drooping of the eyelid arises from other causes merely than a partial true ptosis, elevation of the eyebrows can be explained as a normal concomitant in all such other cases. Witness their elevation in old age, also the normally elevated condition of the female eyebrow; and again in the numerous conditions either normal or pathological in which the upper eyelid is heavy, as from adeposity, myxoedema oedema &c., and fatigue. Furthermore, the ataxic gait requires constant visual fixation of the ground immediately in front, and consequently a lowering of the head.

And To include the area of vision otherwise cut off by the eyebrows in so doing, the eyebrows are necessarily elevated.

Indeed uncertainty of gait of itself is always attended with elevation of the eyebrows: as in the case of the blind person walking, or a normal individual groping in the dark, and the tight-rope walker &c,. And it need scarcely be mentioned that elevation of the eyebrows and horizontal furrowing of the forehead may often be accounted for by the mental condition of the patient, who is not infrequently very worried at his present state, downcast as to his future and often tormented by pains of the severest nature.

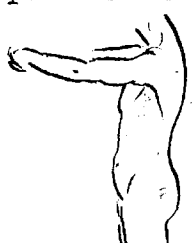
However this may be, the fact remains that the experienced eye can often obtain A PRIORI evidence of Tabes by its facial expression. And furthermore that the drooping of the upper eyelid with the accompanying elevation of the eyebrows is not necessarily due to ptosis.

LAXITY OF THE ABDOMEN & EXTERNAL GENITALS.

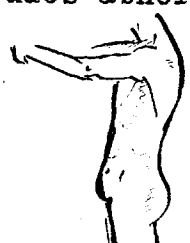
In participation of the general muscular hypotonicity in Tabes, the abdominal wall in a well marked case is nearly always remarkably lax and inelastic. With the ordinary movements of respiration the abdominal contents slide upwards and downwards so freely that breathing is purely diaphragmatic.

Lowering of the intra-abdominal tension can be physically demonstrated indeed by the diminished effect which the respiratory movements exert on a column of water in a glass tubing connected with the bladder contents. In A.M. who was a fair example, so unresistant was the abdominal wall that the circumference around the superior iliac spines expanded from twenty-nine to thirty-one inches on quiet respiration.

For the same reason the abdominal contents gravitate freely from side to side, or upwards and downwards according to the position of the patient. In the erect position the lower part of the abdomen protrudes abnormally.



Normal.



Tabes.

In no other condition can the abdominal contents be so freely examined. In some instances after depressing the hypogastrium to examine the pelvic contents, a deep fossa remains and lasts a considerable time if left undisturbed.

It was on account of this that A.B. was able to envelope

the distended bladder in the palm of the hand, and to describe it as being a soft tumour, varying in size from time to time and most often about the size of a tangerine orange. The tendency to herniae is very obvious in local bulgings. Among the surgical interferences met with in Tabes, operation for this complaint is not infrequent. No doubt it would be still more common were it not for the muscular disability which characterises the tabetic, and prevents intra-abdominal strain. It is either on account of the muscular hypotonicity, or else the insensibility of the deeper organs or possibly both , that the usual smart rectus abdominis reflex contraction and hardening of the abdominal wall when the finger tips are sharply depressed into the abdomen, is often absent. It would be interesting to observe whether rigidity of the abdominal wall is or is not present in abdominal inflammations in this connection.

Laxity of the perinaeum is demonstrated by the ease with which it can be bulged outwards from abdominal compression.

While laxity of the scrotum and testicles predisposes to traumatic scrotal haematomata by compression in the sitting posture. Such traumatic compression occurred in A.B., A.M., and A.F.

THE MENTAL CONDITION.

While tabetic patients may become contented and more or less bright-spirited when the disease is well established as held by some writers, yet this is by no means always the case(especially is it not so at the onset when a doubtful prognosis clouds the patient's prospects, and,as occurs not infrequently in the early stages,violent pains rack the limbs) as will be seen from the following case-notes. And,as in other instances, lowering of the physical vitality is concomitant with depression of the mental state, so is it in this.

A.A. This patient is habitually morbidly depressed, very irritable and exacting, and occasionally suicidal, though quite rational in conversation.

A.G. At the best of times this patient is far from being bright spirited, and is sometimes on the contrary very depressed and seized with a destructive passion, taking a delight in smashing medicine bottles &c. He is commonly easily offended, and very irritable, which conditions he voluntarily confesses are morbid.

A.H. When exhausted after a three miles walk at the commencement of his illness, he became very much depressed and wept for two hours.

A.M. When first pain and weakness manifested themselves he was very depressed and intensely irritable and nervous. He would fly into such passions of rage that he feared the commencement of insanity.

A.N. Shortly after the onset of his tabetic symptoms this patient became very nervous, was terrified at having to cross an ordinarly busy street and when alone would lock himself into his bedroom greatly depressed and often in despair. At these times he slept badly, and entertained delusions towards his wife of being secretly poisoned by her, and at times he felt homicidally inclined.

A.P. Though the disease has been present for many years he is at times unbearably irritable and cantankerous.

⟵ When subject to "lightning pains" he becomes completely indifferent to his wants and would welcome death.

A.Q. Mental symptoms were present at the onset chiefly. He became exceedingly nervous,(was startled by the military word of command when drilling), worried at his prospects, introspective, depressed, very irritable, and subject to terrifying nightmares. Later on he became emotional, bursting into tears, or thrilled with terror at the music of a church-organ, much disturbed at the sound of thunder, and scarcely able to resist screaming and the impulse to jump out when travelling in a tram-car. After some months in this state he gradually improved.

——— So marked were the mental symptoms in one or two cases that it was feared that General Paralysis of the Insane was indicated. But the symptoms otherwise were typically tabetic, and indeed no such developement occurred in any of them.

Nevertheless, taken in conjunction with the existence of a temporary general paralysis ("paroxysmal exhaustion") it is instructive to note the close relationship of Tabes with General Paralysis of the Insane.

DEFORMITIES OF THE FEET.

While prolonged pressure by the bed-clothes will ultimately produce extension of the feet and cramping of the toes, yet there is not uncommonly seen in Tabes a variety of deformities which are not explainable in this way.

The patients are not necessarily bedridden, though it must be granted usually so.

The occurrence of spasmodic and tonic contraction in the foot and leg as well as other regions has already been mentioned under the heading "Involuntary motor symptoms."

It is also quite conceivable that, owing to the perversion of the normal sense of position in space of an organ, an antagonistic muscle might often attempt a legitimate (though erratic) movement of restoration to the normal position in response to entirely false information. In this way, the position of hyper-extension of the great-toe, for example, may be falsely interpreted as the normal position of rest (or vice-versa) and may therefore be erroneously persisted in, and ~~in this way~~ so lead to a permanent deformity of hyper-extension. Further, the presence of paresis or actual paralysis occasionally met with in one or other muscle, will also materially determine the occurrence of deformities.

Such conditions were present in A.M., A.N., A.T., A.U., and A.W. ‖ A.N. may be taken as exemplary:-

The great-toe in both feet was hyper-extended and flatten-from above downwards. The right foot was over extended and inverted.

The left foot was in the normal position of recumbency, but the second toe was cramped, i.e, extended at the first joint, and flexed at the remainder.

Reference to the illustrations will obviate further descriptive information relatively to the other instances.

Joffroy describes a condition of club-foot in Tabes, produced apparently, he thinks, by a neuritis causing muscular paralysis, and partly by bed-clothes pressure. But the paralysis need not necessarily have been secondary to a neuritis. Such conditions undoubtedly result from spinal changes not infrequently (see discussion on paresis &c).

The most outstanding illustration of this condition was seen in A.K. He was occasionally subject to an extreme degree of sweating of the legs and abdomen. It usually lasted a few minutes only, but sometimes a half-an-hour, or even a whole day forming pools of water in the bed-clothes from time to time. Large beads of sweat could often be promptly evoked in the leg, beginning in the instep and spreading in an irregular sheet up the inner side of the leg chiefly, to the thigh, or even the abdomen, by suddenly exposing the warm leg to the cold air. The highest limit reached was a transverse line drawn through the umbilicus.

In A.F. also, coldness of the feet with profuse sweating when walking was one of the early troubles. Finally in this case when running an irregular but elevated temperature from advanced cystitis profuse sweating of the whole body occurred repeatedly.

A.C. also had sweating of the legs below the knees on the outside of the calf occasionally.

Recent cases of hyperidrosis are mentioned in the Glasg. Med. Journ. 1909. 72. 195. by G. Allen M.D. (Facial hyperidrosis), and by Lloyd in "Twentieth century prac. of Med. 1897. vol xi. p. 461. Other cases are quoted by Althaus, Marie and Gowers.

DISTURBANCES IN CUTANEOUS SENSIBILITY.

Loss of delicate tactile sense is earlier and much more frequent than loss of delicate painful impressions (eg. light pin-pricks). Absolute anaesthesia is relatively rare. In the former case large areas are involved, as a rule so that the segmentary distribution is not so well marked as in the case of the more localised hyperaesthetic areas, when these are present. The head and neck may be affected in the loss of delicate tactile and pain senses in addition to the trunk and limbs. At such times there is usually some impairment of the sensibility of the conjunctival and mucous membranes lining the external auditory meatus, and also the nasal and buccal cavities. When the trunk and limbs are affected to the exclusion of the head and neck, the upper limit is usually strictly segmental in outline. This was well marked in A.A. in whom a line could be drawn along the spines of the seapulae, to below the clavicles across the axillae. Considerable difficulty is at times experienced in determining whether ~~or not~~ to consider a certain cutaneous area as indifferent to stimulation or not, inasmuch as frequently a summation of similarly administered stimuli produces a positive result when a single stimulus would be negative. Again a great deal depends on the presence or absence of mental concentration by the patient on the part under examination, the positive and negative responses varying from time to time directly in accordance therewith. In reference to the question of delayed sensation not only is there a momentary pause in perception

and interpretation in areas giving positive results, but also parts with negative results occasionally after a pause of several hours give very painful sensory impressions from the earlier examination, especially if this has been conducted vigorously. As regards the sensation of heat and cold one would conclude from examination of the cases under observation that very marked disturbances were by no means common. One point of interest in this connection was the concern which many of the patients showed over the degree of warmth of the bath and the hesitating care with which they descended into the bath. Once under the water they became very comfortable as a rule. In spite of their feeling of general coldness, one or two patients could not tolerate hot-water bottles.

Allochiria was only detected in one case, and then only to a slight degree.

THE DIAGNOSIS OF TABES.

The diversity and polyvalency of the symptoms of this disease rightly accredit it with being one of the most difficult of detection in its early stages. In two of the writer's cases the only symptom complained of at first presentation for examination was :—

in (1) sudden collapse of the knee-joint.

in (2) severe constipation.

Both of these symptoms have been commented on already.

It therefore only remains for one to again lay emphasis on the importance of considering their possibly tabetic origin in diagnosis. Exclusion of Tabes in the differential diagnosis of abdominal pains, forms a part of the most elementary advice, but such an origin for certain of the other features might be pardonably overlooked; such as for example oedema of the legs which may be cardiac, or renal in origin, or even attributable to Beri-beri. The ease with which a tabetic may be needlessly subjected to a surgical operation and that for many other complaints than may be suspected merely from abdominal pains is shown in the following extracts from recent reports.

(1) A case reported on by Dr. Squier (N.Y. Med.Journ. May 30th, 1908)—the operation of prostatectomy was performed on a patient with complete incontinence. Tabes was only recognised as the cause of the trouble after operation.

(2) A case of spontaneous fracture of the thigh cited by M. Touche (Soc. Med. des Hop. Paris. Dec. 15th, 1889).

Such enormous oedema was present that an incision was made with the object of evacuating pus, but none was found.

(3) The patient A.K. presented such extensive inflammatory oedema of the foot in connection with a solar perforating ulcer that a deep incision was advised into the dorsum of the foot. The condition subsided, however, in a few days without it and with no ultimate evidence for the presence of pus.

(4) In the REVEU NEUROLOGIQUE MARS. 4th, 09., a case of tabes is mentioned as having been subjected to appendicectomy for the relief of what eventually was discovered to have been gastric crises, with no relief.

(5) Also in the same journal notes on the case of a female aet twenty-nine years in whom an artificial anus was made in the abdominal wall for the remedy of supposed obstruction, without benefit. The case was later diagnosed as tabetic.

(6) The writer has himself witnessed a case similar to that quoted by Debove (La Presse Med.) in which resection and immobilisation of a Charcot's-joint was followed by no attempt at osseous repair as shown by subsequent operation.

(7) Debove also cites a case in which a Charcot's knee-joint was operated on, became septic and finally required amputation.

⟷ Previously to his admission to the Seamen's Hospital, A.B's knee-joint had been tapped and irrigated, fortunately without the advent of sepsis but with no improvement.

⟷ Extensive scars were present at the time of admission.

(8) Prof. Verneil states that he himself has performed a negative operation for supposed fissure of the cystic sphincter in a case which eventually showed itself to be tabetic.

Nerve-anaesthesia when present, which is by no means invariably the case, is strongly diagnostic of tabes.

Disturbances of the tactile-sense, especially the loss of appreciation to light touches is so frequent that it should be ranked of greater importance than the nerve-anaesthesia test. Whilst examination of the cerebro-spinal fluid should always be conducted in a case of doubt, in view of the importance of anti-syphilitic treatment at the early stages. Interesting information would undoubtedly be derived from a careful investigation into the alteration in the symptoms of disease consequent on such changes in tabes as-local oedemas; areas of hyperaesthesia (cutaneous, and mucous-membrane) the latter especially in the differential diagnosis of abdominal symptoms; and loss of the abdominal-rectus-muscle reflex on sudden deep stimulation. In this connection it is interesting to notice the remark made in THE PRACTITIONER 08 p. 560 viz that "The abdominal reflex is lost on both sides in such abdominal diseases as enteric fever, appendicitis and peritonitis." Loss of pain on forcible compression of the eyeball occasionally met with(which would contraindicate the existance of glancoma). &c.,.

TROPHIC CHANGES IN THE SKIN AND BONES.

The skin in Tabes commonly becomes, sooner or later, inelastic, thin, dry and translucent.

In A.B. the sebaceous glands in the skin of the dorsum of the feet were conspicuous, and resembled the appearance of the glands of an orange-skin under transmitted light.

A tendency to readily induced pathological conditions of the skin under pressure and friction is revealed in the occurrence of "perforating" ulcers. And in A.G. in whom the left ankle-joint was very unstable and whose gait was very erratic, unusual large dry somewhat horny bursae developed on the left foot over the head of the meta-tarsal bone of the great toe ('hallux Valgus' was also present), over the distal joint of the small toe and over the middle joint of the second toe.

Slowness in the repair of wounds is amply illustrated in the indolency of the"perforating ulcer", and at times in surgical wounds (as in the radical cure for hermia in A.E. , in whom a PERFORATING ULCER was simultaneously present).

Spontaneous fracture of the bones, either in the joints or shafts, undoubtedly depends on trophic changes.

Local persistant vaso-constriction and similar vascular changes might account for most of the degenerative occurrences witnessed in Tabes. It has already been shown that pathological vaso-motor disturbances form a striking phenomenon in Tabes, complicating traumatic and inflammatory lesions, and exposing otherwise healthy parts to great risks from necrosis or gangrene, from extreme lowering of the vitality. (See "Vaso-motor disturbances, especially A.K., A.R. &c., in reference to

stasis of the circulation in the peripheral vessels.)

PERFORATING ULCERS are usually associated with vaso-motor disturbances. Local injury by inducing these pathological vaso-motor disturbances predisposes to degenerative changes.

This also holds good with osseous changes. Many cases of Charcot's -joints have a history of repeated joint trauma; take for example the following cases:-

A.A. aet. forty-nine years. Admitted to the Seamen's Hospital, Greenwich on June 12th, 1909, complaining of intermittent swelling and looseness of the left knee-joint of nine months duration. In October 1908, ie., nine months ago, a taut ship's chain "flirted" and struck the inside of the left knee so violently as to throw him down on the deck.

He walked below with great difficulty and with great pain in the knee, and cutting and stabbing sensations in the sole of the foot, "as if walking on knives." The pain lasted about ten minutes and then completely and permanently disappeared.

The joint became swollen and bruised. From that time to the present the condition has been getting worse. On examination he was found to have an enormously oedematous leg, with a very lax knee-joint.

A.B. aet. fifty-three years.

Admitted to the Seamen's Hospital on January 11th, 1909, complaining of deformity and swelling of the right knee-joint.

On Dec. 8th, 1907 he slid down a ladder, and on doing so felt something give way in the right knee-joint. The joint swelled thereafter. The swelling persisted and in spite of treatment the limb became so weak that he was ultimately permanently disabled.

On examination he was found to have a typical Charcot's-joint. Later on he developed similar conditions in the left-hip, and left knee-joint.

Previous history:-

Sixteen years ago he dislocated his right semilunar cartilage and was one week in hospital. Seven years ago he sustained an upward(?) fracture-dislocation of the left ankle from leaping from a gangway with a drunken passenger. (The left ankle is now one inch greater in circumference than the right).

Family history:-

His mother was troubled with a dislocated right patella. One of his two brothers died from G.P.I. which commenced in paralysis of the right leg two years after sustaining an injury to one of his knee-joints which required the wearing of a surgical appliance constantly.

A.C. aet. forty-eight years.

Admitted to the Seamen's Hospital in Feb. 1909, with Tabes. He eventually developed a Charcot's-condition in the right hip and left knee-joint and coarse crepitation also in the right knee-joint.

Previous history:-

Thirty years ago he dislocated the semilunar cartilage of the left knee, and was a hospital patient for some time. Eight years ago the right semilunar cartilage was dislocated.

As illustrative of the diversity in the distribution of osseous degenerative changes the following cases may be mentioned:- (1) Spontaneous fracture of the shaft of the Tibia (A).

(2) Spontaneous fracture of the patella (P.Ganthier Notes from the Salpêtrière 1909)

(3) Spontaneous fracture of the metatarsal bones (Sommaire-Lyon, Mèd., 1908, cxi 18, 21)

(4) Spontaneous fracture of the left femur. (M.Touche-Soc. Mèd. des Hôp. Paris, Dec. 15th, 1899)

(5) Resorption of the Superior maxillary bone (Lyon, Med. 1908. cxi. 1154). and also of the nasal cartilages in A.S..

As with cutaneous wounds, so with injuries to the bones, repair is often tardy and feeble. As a result of intracapsular fracture the limbs were left permanently flail-like in A.P., A.M., and A.B. In the case of fracture of the left femur previously mentioned and quoted by M.Touche, union did not occur. The writer has seen an excised Charcot's knee-joint reopened on account of non-union many months later. There was practically no attempt at repair, the surface of the bones being smooth and friable, brownish-red in colour.

In view of the connection established recently between pituitary extract administration and its vaso-motor effects in addition to its well established relationship to trophic changes in the osseous system it is interesting to note the occurrence of a condition suggesting Acromegaly in a case reported on by F.X.Dercum M.D. The patient was a well marked Tabetic who developed an enlarged and protruding chin, and enlargement of many of the terminal portions of the bones (wrists, knees &c.) Post-mortem operation revealed enlargement and decided pathological changes in the Hypophysis, and extensive sclerosis of the posterior columns of the cord. One could imagine that a reverse condition, namely atrophy or loss of function of the pituitary body, would be attended with vascular changes in, and

atrophy of, the Osseous system. Though this is a mere hypothesis, the association of pituitary function, vascular changes, and bony alterations is at least striking.

TREATMENT.

Now that precedence is being given to Syphilis more emphatically than ever, it becomes increasingly necessary to establish an early diagnosis in order to commence a rigorous anti-syphilitic treatment, which can only be expected to be of much value before irreparable tissue-changes have occurred.

Beyond this very important advance, chiefly attributable to the recent exhaustive serum-tests and cytological investigation of the cerebro-spinal fluid, very little has been superadded, and that little chiefly symptomatic.

The following remarks on the latter form of treatment, derived from personal experience with the cases mentioned, are few, but one would venture to say, are of some importance.

Great stress must be laid firstly on the inadvisability of any excessive muscular action, or exhaustion of the nervous system on the part of the patient. It is a well recognised fact that impairment of the general health either by fatigue or disease &c., is accountable for numerous disorders of the nervous system, such as, for example, the neuralgias of females, and of pregnancy; neurasthenia; hysteria; melancholia &c., but in none of these does the rule hold more strongly than in tabes. Operative interference, quite apart from a fallacious diagnosis, often aggravates the condition by draining the nervous system. Debove mentions a case (La Presse Med. Jul. 1908.) in which an operation for supposed gastric stenosis, much accentuated the crises, and seriously interfered with the functions of the bladder and rectum; and another case

also, of a man in whom surgical fixation of a supposed floating kidney induced death from cachexia. Examples illustrative of the same principles viz, the evils of exhaustion and fatigue and worthy of notice, occurred in certain of the writer's cases. In A.H's case a long distance walk precipitated a decided increase in what was before, only a slightly ataxic gait, and this was accompanied with a severe attack of mental depression. Byrom Bramwell mentions the case of a man who had had slight lightning pains for six months, and who suddenly (within twenty-four hours) became ataxic after a walk of three miles. Again, the acute developement of cystitis in A.B. undoubtedly evoked an attack of gastric crises with vertigo, flatulency, vomiting, and anorexia. ⟷ Indeed, the occurrence of cystitis in A.F. was undoubtedly responsible for the extreme degree of exhaustion-(with pain, flatulency &c.)- which shortly terminated in death. Another point of interest in this last case, with the same bearing on the subject of discussion, was the developement for the first time of a fine tremor of both hands synchronously with the bladder disturbances. From this it is apparent that the motor system manifestly suffers as well as the sensory, in Tabes though later and perhaps to a less degree. Debove maintains that a persistently elevated temperature is capable of giving rise to persistent pains. Furthermore, in the case of A.B. an attack of gastric crisis itself so exhausted the nervous system that it induced numbness and formication of the hands and fingers,— quite a new feature in the symptoms. Even beneficial remedial measures if unwisely used may become wearisome, and exhaustive,

such as for instance, a frequent irrigation of a hyper-aesthetic bladder, indiscriminate perseverence in the Fraenkel- movements &c,.>

Indeed, surgical interference in tabes has an important medico-legal aspect. Prof. Reclus was on one occasion actually called to give evidence in a case where the patient accused the surgeon of having made his condition worse by operation. Gastro-jujenostomy was performed for the relief of what was discovered afterwards to be a tabetic sensory disturbance. Denslow is so struck with the ill effects of exhaustion in tabes, that he reaches the climax by actually attributing the disease to a persistent irritation of the sensory nerves, and especially those in the urethra (N.Y.Med. Journ, Nov. 21. 08). He says that the "Dystrophic changes that occur in the neurones of the posterior roots and their connections in tabes, are the result of continuous sensory impulses conveyed from some peripheral point to the sensory roots in the cord." Quoting from the MEDICAL RECORD Nov. 21. 08, one obtains the following comment on this theory.- "He claims to have treated with benefit some ten cases of tabes by local application through the urethroscope. But Mc Lane Hamilton (Jour.Amer. Med. Assoc. Dec. 5. 08) has never seen a case of tabes in which there were any urethral symptoms."

Denslow himself confesses, in the ANNALS OF SURGERY N.Y. June, 09, that careless interference with the bladder and urethra is likely to precipitate an attack of pain. Again, whilst being emphatic on the importance of fatigue in intensifying symptoms, neither would one endorse the above statement, nor that made by Purves Stewart that "Many tabetics when recognised as such

during the preataxic stage of the malady, if they attend to the avoidance of fatigue need never become ataxic".

Turning now to other features in treatment, one must impress on the patient the importance of, without fail, periodically and systematically, emptying the bladder, and the bowels also, as far as possible- in order to obviate overdistension and subsequent atony. In case of any difficulty with the bladder the physician should do everything possible to avoid the necessity of introducing a catheter, however thoroughly aseptic the performance may be intended to be kept. The liability to cystitis is too serious under such circumstances.

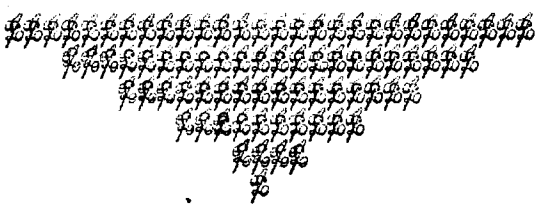
Intoxicating liquors should only be allowed in moderation of course, and in some cases tobacco ought to be avoided as it is apt to aggravate the ataxia. A gastric crisis should be treated with stomach sedatives, and, in addition, with Acetylsalieylic acid. The latter drug is very servicable also in attacks of LIGHTNING PAINS. In the enteric crises, purgatives or any irritating drug should be strennously avoided. Also in cases of cystitis where there is hyperaesthesia of the parts, irrigation should be performed with boric acid preferably to solutions of quinine sulphate, which is apt to irritate. For the feeling of general coldness, so often dependent merely on superficial vaso-motor disturbances,-(vaso-constriction)- one would recommend the use of nitrites and similar vaso-dilators, especially in those cases where hot-water bottles cannot be tolerated.

Before recommending the BRAILLE system of elevated types for reading to cases with double optic atrophy, one should first make sure that there is no ataxia of the hands, or

numbness of the fingers to contraindicate its use.

In cases of extremely ataxic gait with inability to walk, a wheel-chair will be found very serviceable.

It should be made preferably with a commode attatched to the seat where rectal incontinence is present.



SUMMARY OF CASES.

Special attention is paid to the earlier symptoms after which the old timed cardinal symptoms as far as they are ascertainable are used as mile-marks.

A.A. Fisherman, aet. forty-nine years.

Earliest symptoms- Frequency of micturition and other slight bladder disturbances. Three months later injury to the left knee-joint with permanent disablement, and about three months later still, slight nocturnal urinary incontinence. He came under observation two months later.—Disorganised knee-joint, no ataxia, but cutaneous tactile disturbances.

A.B. Seaman, aet. fifty-three years.

The disease commenced with permanent disablement following an injury to the right knee-joint. Six months later he developed slight ataxia of the legs, and five months later "lightning" pains and Romberg's sign were present. He came under observation six months later:- bedridden with multiple Charcot's joints in the lower limbs and occasional bladder trouble.

A.C. Seaman, aet. forty-eight years.

The disease commenced with severe rheumatic pains in the lower limbs and almost simultaneous developement of ataxic gait in the dark. Three years afterwards he developed a temporary but decidedly ataxic gait with severe lightining pains, and occasional incontinence of urine. Four months after this he ceased work on account of weakness of the legs. The patient came under observation six months

later - occasional "lightning"pains, Charcot's condition of hip-joint and incipient phthisis pulmonalis.

A.D. Seaman, aet. fifty years.

Symptoms commenced with weakness and pains in the lower limbs, and attacks of vertigo, which recurred for many years. Twelve years after the onset he became bedridden on account of extreme ataxia of the gait, and was shortly thereafter subject to rectal and bladder incontinence. One year later he was able to walk again. He came under observation one year later - bedridden again on account of extremely ataxic gait, and bowel and bladder disturbances.

A.E. Seaman, aet. fifty-eight years.

Symptoms commenced with a perforating-ulcer on the plantar surface of the left big toe. He came under observation three months later on account of a radical operation on an inguinal hermia. During chloroform anaesthesia the Argyll-Robertson pupil was detected. K.J. afterwards found to be much impaired: tactile disturbances present.

Delay in the healing of the wound occurred.

A.F. Seaman, aet. fifty-eight years.

Symptoms commenced with a temporary paroxysmal paralysis while sea-bathing. One year after, paraesthesia in the soles of the feet, and slight ataxic gait developed. Two years later occasional attacks of severe "lightning pains" with developement of a decidedly ataxic gait set in. He came under observation four years later:- very ataxic, weak, severe enteric crises, cystitis and finally

surgical kidney which ended fatally.

A.G. Seaman, aet. fifty-three years.

Symptoms commenced with weakness of the legs, and occasional impulsive urination. One year later "lightning pains" developed with increased difficulty in walking. One year later the gait was only slightly ataxic and the other conditions had much improved. He came under observation one year later with decidedly ataxic gait and occasional "lightning pains."

A.H. Seaman, aet. forty-six years.

Symptoms commenced with "lightning pains." Two or three months later he developed sensory disturbances in the soles of the feet and slightly ataxic arms and legs, and vaso-motor disturbances in the left hand and forearm.

He came under observation eighteen months afterwards with well marked ataxic gait, and occasional attacks of "lightning pains."

A.K. Seaman, aet. forty-one years.

Symptoms commenced with a perforating ulcer of the foot, this healed. Eight months afterwards another ulcer developed.

Four months later he had enteric fever with generalised "shooting pains;" complete recovery ensued.

One year later a perforating ulcer of the foot developed. He came under observation six years later- "lightning pains" in legs, with ataxic gait in darkness and perforating ulcer of the foot with extensive vaso-motor disturbances.

A.L. Soldier, aet. thirty-four years.

Symptoms commenced with stiffness of the legs (no ataxia). Two days later a peculiar sudden, temporary but decided ataxic gait developed. Two days later acute paralysis of the lower limbs occurred and he became bedridden.

A few weeks later bladder troubles set in, also some "lightning pains." A few months later he was able to walk again but was decidedly ataxic. He came under observation six months later:- gait very ataxic: occasional attacks of "lightning pains." He suffers from chronic constipation.

A.M. Wharf labourer, aet. sixty years.

Symptoms commenced with "lightning pains" and weakness. He ceased work after some months. Two years afterwards spontaneous intracapsular fracture of right hip-joint occurred. He came under observation one month later- bedridden on account of the injury, with bladder and cutaneous tactile disturbances.

A.N. Labourer, aet. fifty years.

Symptoms commenced with an epiliptiform fit: about the same time there developed weakness of the knees, and shortly afterwards the gait became ataxic and he ceased work.

Some weeks afterwards protracted mental depression set in. The ataxia persisted. He came under observation nine years afterwards- Gait decidedly ataxic: occasionally severe "lightning pains," and rectal and bladder disturbances at times.

A.O. Seaman, aet. sixty-four years.

Symptoms commenced with anaesthesia of the abdominal wall,

and some weeks later, a severe attack of constipation requiring drastic treatment. He came under observation about two years later- K.J. absent. No ataxic gait; slight pains in lower limbs; cutaneous tactile and vaso-motor disturbances.

A.P. Artist, aet. fifty-eight years.

Symptoms commenced with fatigue in the right arm while painting at the easel. Three years later slight ataxia of right arm developed. Some months later trophic changes set in in the right shoulder-joint, followed by dislocation. The Gait began to be slightly ataxic about the same time. Four years later, intracapsular fracture of right hip-joint occurred and permanently prevented from walking. He came under observation one year afterwards Quite unable to walk; peculiar rotatory movements of the right shoulder-joint: occasionally severe "lightning pains" in lower limbs.

A.Q. Soldier, aet. forty-two years.

Symptoms commenced with left ptosis and int. strabismus; left optic disc reported to be atrophying. Some months afterwards he became very nervous and irritable. Two years afterwards he developed a decidedly ataxic gait, with paresis of the lower extremities. He came under observation six years later- Lower limbs very ataxic; paralysis of several cranial nerves.

A.R. Labourer, aet. about sixty years.

Symptoms commenced with cordiac crises. Two years later he developed a decidedly ataxic gait.

Two years later the ataxia was worse, and he left off work. Two years later he became bedridden on account of ataxia and cardiac crises. The patient came under observation twelve or fifteen years later- Deformity of the feet with athetotic movements: occasional attacks of "lightning pains" and cardiac crises.

A.S. Shoemaker, aet. sixty years.

Symptoms commenced with ataxic gait quickly followed by a partial amblyopia which latter eventually became complete. Four years afterwards "rheumatic" pains in body and pectoral muscles developed. One year afterwards partial deafness occurred and was soon followed by ataxia of arms. The patient was bedridden on account of the amblyopia. He came under observation two or three years later:- Bedridden, but comparatively comfortable: uninary incontinence occasionally.

A.U. aet. fifty-seven years.

Symptoms commenced with three weeks constipation, requiring drastic treatment. About this time he also developed ataxic gait in the dark. A few months later he injured his left leg; much oedema followed.

Incontinence of urine commenced about the same time. The ataxia has progressed. Occasional "lightning pains" commenced shortly thereafter. He came under observation ten years later:- Considerably improved in gait but with slight bladder and sensory disturbances still.

A.V. aet. sixty years.

He first came under treatment for "giddiness" twelve months

ago. On recovery he resumed work as a waterman. There is no history of definite tabetic symptoms in the interval, but the patient is not intelligent or observant.

At the time of examination ataxia of the hands was well marked and other infallible signs were present.

A.W. aet. fifty-one years.

Symptoms commenced with "lightning pains", and about the same time bladder and rectal troubles. Three months after these conditions were much improved and he resumed work. Five years after, sudden tempoary unconsciousness, with collapse of legs occurred, and the ataxia returned. A few months later a painless fracture of left tibia occurred as a result of a slight fall. He came under observation a few weeks later:- cutaneous tactile, and some rectal disturbances, and ataxic gait.

A.Y. Seaman, aet. forty-four years.

The symptoms commenced five years ago with "lightning pains" in the legs. Ataxic gait has never been present, but recently there has been slight bladder disturbance.

Many of the cardinal signs are present now. His chief complaint at the present time is an occasional sudden unaccountable collapse of the knees.