

Reports and Commentaries of Six Cases
treated in Ward 32 of the
Royal Infirmary, Edinburgh.

by
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Submitted for the Wightman Prize in Clinical Medicine.

Book.....No.....

Disease Disseminated Sclerosis. Result.....

Name of Patient John. B. Shoemith Age 32.

Usual Postal Address 26 Baird Drive.

Date of Admission 19th September 1928 Date of Dismissal 18th October 1928

Case taken 16th & 17th October 1928. Case read.....

Synopsis—
Symptoms—General and Special

Treatment—
General and Special



Signature of Clerks.....

Signature of Resident Physician.....

Name John B. Shoemith (Married).

Age 32.

Occupation Lecturer.

Birth place Burnley, Lancashire.

Admitted. 19th Sept 1928. Examined 16th + 17th October 1928.

Complaint. A peculiar feeling of numbness and tingling in the legs
loss of power in the legs, affecting his gait.

Duration Three months.

History.

Personal. About the middle of July the patient began to notice a peculiar sensation, as of numbness, in his right leg, and a tingling sensation whenever the leg was touched. He had no pain in the leg, and did not notice anything else except that he felt very sleepy and tired. Two or three weeks later he thought that his gait was becoming affected, and he consulted Professor Bramwell, who did not at that time detect anything abnormal in his gait. About a fortnight later his left leg began to show similar symptoms to those which had been present in his right leg. He then found that he was losing power in this leg, and within a day or two he was unable to lift his foot from the ground. He states that this was the only movement (i.e. lifting

the foot) which was affected, and that he could swing his leg, both backwards and forwards and out to one side. His memory, however, seems to be a little vague for this period. He consulted a doctor, who gave him "sunlight treatment", and in about a fortnight he recovered. Early in September the symptoms returned in his right leg, and in a short time he could not lift his foot from the ground, and he was unable to walk at all. At the same time he was conscious of the tingling sensation in his hands, and for about a week he was unable to write. He thinks that he also lost his sense of taste for about a week. Within the last week or two he has gradually been recovering power in his legs, and is now able to walk better. The tingling sensation has almost, if not quite, disappeared.

Previous Illnesses: About a year ago he remembers having a similar tingling feeling in one leg, but is quite sure that his gait was not then affected.

Three years ago he began to lose the sight of his left eye, and he developed an internal squint.

Previous to this he was quite healthy, and does not remember any illness. He used to suffer from growing pains as a child.

General surroundings. Good.

Habits. He does not take any alcohol, and has given up smoking, as it disagrees with him.

Family. living members

Father	Age	63
Mother		61
Sister		36
Brother		27

All are in good health.

Dead members Two children died in infancy. Cause unknown.

State on Examination

Intelligence Above the average of hospital patients.

Height 6ft. 2 ins. Weight 12 stone.

The patient is well developed and of average muscularity.

He has an internal squint of the left eye, but otherwise there are no obvious morbid appearances nor evidences of previous disease.

Nervous System.

Higher Cerebral and Mental Functions.

Intelligence is above the average, as already noted. His emotional state is quiet and controlled, though he may be inclined to worry over his symptoms. His memory is unaffected. He has no hallucinations nor delusions. He sleeps well and does not dream. He has no delirium, drowsiness nor coma. His speech is unaffected.

Cranial Nerves

I His sense of smell is good. He correctly named peppermint, whisky and camphor after smelling them.

II The visual acuity of his right eye is good, but that of the left is poor. The field of vision is not diminished in either eye, but in the left eye he can see only hazily in the centre of the field. He is also colour blind in the centre of the field of vision of this eye. With the ophthalmoscope the whole of the left optic disc is seen to be very pale.

III, IV, & VI There is no ptosis. There is an internal squint in the left eye. Diplopia is present. The ocular movements are not impaired. There is no nystagmus.

The pupils are equal in size, not unduly dilated or contracted, and circular in shape. They react to light and to accommodation.

V The masseters, temporals and pterygoids ~~are~~^{act} strongly and equally on the two sides. There is no loss of sensation in the face, nor is the sense of taste impaired.

VII There is no evidence of paralysis or of paresis in the facial muscles.

VIII The hearing is good. There is no tinnitus or vertigo.

IX The sense of taste in the posterior third of the tongue is good. There is no anaesthesia of the pharynx and no dysphagia.

X The palate moves equally on both sides.

XI The movements of the sterno-mastoid and trapezius are good on each side.

XII The tongue is protruded straight out, and there is no tremor or twitching.

Cervical Sympathetic: The pupils dilate to shade. The cilio-spinal reflex is present. There is no proptosis, no ex- or en-ophthalmos and no retraction of the upper lid. There is no pseudoptosis, and no flushing or sweating of the face, neck or upper extremities.

Motor functions

There are no abnormal movements, and no intention tremor.

At the time of the examination there was no paralysis or weakness of any of the muscles of the head, upper or lower limb, or trunk. There is no atrophy of any muscles, and the tone of the muscles is good. There is slight, but definite, spasticity in both lower limbs.

Co-ordination is good. The patient can touch the tip of his ~~fe~~ nose with his fore finger without any difficulty, and similarly he can place one heel on the opposite knee or great toe. He still walks a little unsteadily and jerkily and on a rather wider basis than normal. Romberg's sign is absent.

Reflexes: The conjunctival, pharyngeal and palatal reflexes are all present.

The abdominal reflex is diminished on both sides.

The cremasteric reflex is present on both sides.

The plantar reflex is extensor on both sides.

Deep reflexes: The wrist and ~~ankle~~^{elbow} jerks are active and equal in both arms

The knee and ankle jerks are brisk and equal in both legs.

Ankle clonus is present in both feet.

Organic reflexes. The patient has no difficulty in micturition or defaecation at present, but he thinks that some weeks ago he had slight retention of urine.

Sensory Functions.

The patient had numbness and tingling in the legs, and to a slight extent in the arms and hands, but this is disappearing.

Tactile sensibility is unimpaired at any point. Over both legs he cannot distinguish correctly between the blunt and sharp ends of a pin. He has no pressure pain anywhere. He has also some impairment of the vibration sense in the legs. No astereognosis.

Cerebro-spinal Fluid.

Cells 1 per c. mm.

Globulin reaction negative Wassermann reaction negative
No curve with the colloidal gold test. (0000000000)

Alimentary System.

No subjective phenomena.

No eruption or ~~marks~~^{signs} of scaling about the lips. The mucous surfaces are a healthy colour, not pale and anaemic. The teeth and gums look healthy. There has been no vomiting.

Abdomen.

On inspection there is no prominence or retraction and no ~~fluctuation~~^{indue fluctuation}.

flaccidity.

On palpation there is no tenderness, or resistance, or fluctuation.
Percussion shows that the liver does not protrude below the costal margin, ~~but~~ is. The lower border of the stomach is just above the umbilicus. There is no abnormal dullness.

Haemopoietic System

No subjective phenomena.

No enlarged lymphatic glands.

The thyroid gland is not enlarged. The spleen is not palpable.

Wassermann reaction is negative.

Circulatory System.

No subjective phenomena.

Pulse: The wall is soft and not easily felt. Frequency 75 per min.

Rhythm regular. Pulse wave: The impact is neither abrupt nor very gradual; it is fairly well sustained and its fall is gradual but not very tardy. No diastolic pressure. Systolic pressure about 110 mm and diastolic about 70 mm.

Heart. There is neither prominence nor flattening of the praecordia, nor are there any visible pulsations in the praecordial and extra-cardiac regions.

Palpation confirms inspection as regards the form of the praecordial region. The apex beat is just ~~left~~ felt within the mid-clavicular line in the 5th interspace. The impulse is not heaving or slapping. There is no thrill.

Percussion. The apex of the heart is situated just within the mid-clavicular line in the 5th interspace, and the left border curves inwards from here to the 2nd interspace, just to the left of the sternum. The right border lies just under the ^{right} edge of the sternum.

Auscultation. The heart sounds are clear in all areas. They are regular in time and force. There are no murmurs.

Respiratory System

No subjective phenomena.

Breathing is regular, and mainly abdominal in type. Respirations are about 20 per minute.

Thorax. The chest is symmetrical and of a normal shape.

Palpation confirms inspection as regards shape. The two sides of the chest move equally and there are no vibrations.

Percussion gives a good resonant note in all areas.

Auscultation. The breathing is vesicular in type in all areas and there are no accompaniments.

Integumentary System

No subjective phenomena, except those already noted under the Nervous System.

There is a slight rash on the chest where the patient has been rubbing on mercury ointment.

Urinary System.

No subjective phenomena at the time of examination. As already noted he thinks that he had a little retention some weeks ago.

He does not have to pass water at night.

The urine does not contain any abnormal constituents.

Provisional Diagnosis: Disseminated Sclerosis.

Commentary.

Differential Diagnosis.

The salient features of the case upon which the diagnosis is based are (1) The history. The onset of the disease appears to have been three years ago with the occurrence of paralytic strabismus in the left eye, associated with diplopia and the development of a central scotoma for colour. At that time the patient was aged 29, an age at which disseminated sclerosis quite commonly develops. Two years later the patient had a transient attack of paraesthesia in the legs, and within the present year he has had ~~sudden~~^{transient} attacks of weakness, and possibly of paralysis, judging from his own account, in his lower limbs. This history of sudden attacks followed by remissions is highly suspicious. (2) His gait is that of a spastic paraplegia. He still drags his feet a little, is a trifle unsteady and walks with difficulty on a wider basis than normal. (3) The alteration of the reflexes. The deep reflexes are increased. Ankle clonus is present. The plantar response is extensor (Babinski's sign) The superficial abdominal reflexes are greatly diminished. (4) The ocular phenomena. As already noted the patient has paralytic strabismus of the left eye, diplopia and a central scotoma for colour. The pallor of the disc, shown by the ophthalmoscope, is indicative of primary optic atrophy. This has affected

the vision, but has not led to complete blindness. The pupil reactions are normal.

An interesting feature of the case is the absence (at the time of the examination at least) of the typical Charcot triad — nystagmus, scanning speech and intention tremor. These three signs, while characteristic when present, may in some cases be absent throughout the disease, and therefore, ^{this} does not exclude the diagnosis of disseminated sclerosis, and the association of the symptoms and signs already mentioned make the diagnosis reasonably certain.

Other confirmatory phenomena are:— (1) There is a suggestion that there has been some interference with the sphincters. The patient thinks he had some retention of urine for a time. (2) The sensory changes. Sensations of numbness and tingling ~~are common in this~~ and only slight or indefinite sensory changes, as in this case, are common in disseminated sclerosis. (3) The mental condition shows no change.

The disease must be differentiated from the following conditions:
I Spastic Paraplegia

A pure spastic paraplegia is due to lesions of upper motor neurones without any affection of other tracts. In disseminated sclerosis all the signs ^{and} symptoms of spastic paraplegia occur, and also certain additional symptoms due to the fact that the lesions are not confined to the pyramidal tracts, but are scattered throughout the brain and spinal cord.

Thus in this case the weakness and spasticity of the legs, the increased reflexes, the absence of wasting, the absence of sensory changes and Babinski's extensor plantar reflex are all characteristic of an upper motor neurone lesion, but the ocular phenomena show that other lesions are also present.

II Syphilis of the Central Nervous System.

All forms of this are almost certainly excluded by the facts that the Wassermann reaction of the serum and of the cerebro-spinal fluid is negative. The different forms will each be discussed in turn

(1) Tabes Dorsalis.

In this disease the W.R. ^{of the serum} is positive in over 50 per cent of cases, and that of the C.S.F. often positive. The signs and symptoms are very numerous, but the most important are (i) lightning pains (ii) loss of knee jerks and ^{other} deep reflexes. (iii) Argyll-Robertson pupils. (iv) Optic atrophy which usually progresses to total blindness in three or four years. (v) Ataxia which may advance to ~~the~~ typical ataxic gait (vi) Romberg's sign is present. None of these are present in this case, except the optic atrophy, and this has not resulted in total blindness, even after three years.

(2) General Paralysis of the Insane.

The Wassermann reaction of the blood and cerebrospinal fluid are almost invariably positive. Mental changes occur early, and become marked. Increased knee jerks occur, as in disseminated sclerosis, but the other physical signs which are found are different. The pupils, for

instance, are, ^{usually} unequal, irregular and sluggish, or may be of the Argyll Robertson type. The tongue becomes tremulous. The speech is slow and slurred and syllables are often repeated. Weakness of the limbs gradually advances to paralysis. The picture is therefore quite different from that of disseminated sclerosis.

(3) Interstitial Syphilis.

There are several varieties or clinical groups of this, but in all of them the Wassermann reaction of the blood and C.S.F. are nearly always positive, and the characters of the C.S.F. are altered. In this case the number of cells in the C.S.F. is not positive, the amount of globulin is not increased, and there is not the typical curve with the colloidal gold test.

III Hysteria.

Early disseminated sclerosis is often diagnosed as hysteria, but in this case it is certainly excluded by the presence of optic atrophy and of the extensor plantar response.

IV Subacute Combined Degeneration of the Spinal Cord.

In the early stages this gives rise to symptoms closely resembling disseminated sclerosis. Numbness and tingling occur in the legs. Then weakness and inco-ordination develop. The knee jerks are increased. Ankle clonus is present, and extensor plantar reflex. After several months this goes on to paralysis and anaesthesia of the legs.

The distinction from disseminated sclerosis by its occurrence at a

later age — it is rare under 40 years —, by the profound anaemia which characterises it, and by the development of anaesthesia. In the present case the man is 32 years old and shows no signs of any anaemia.

V Friedrich's Ataxia.

This might be suggested by the unsteady gait and by the occurrence of tremors and nystagmus in a typical case of disseminated sclerosis. This disease, however, rarely develops after puberty, and in it the knee jerks are lost and deformities of the feet especially occur early.

VI Spino-Cerebellar Ataxia

This is a rare disease, which has many symptoms similar to those of disseminated sclerosis. There is inco-ordination, the gait is affected, the knee jerks are increased, the plantar reflex is extensor and optic atrophy occurs. No deformities occur as in Friedrich's Ataxia. The disease, however, is familial and hereditary, of which there is no suggestion in this case. The gait is reeling, rather than unsteady. The speech is slow and slurred.

VII Diseases of the Cerebellum.

In these there is alteration of the gait, paresis, nystagmus, and there may be tremors. The gait in these cases, however, is reeling and lurching. Vertigo is present. Sensation is unaffected. The plantar reflex is flexor.

VIII Transverse Myelitis.

The initial symptoms may resemble those of disseminated sclerosis viz. weakness and stiffness in the legs and sensations of numbness or tingling. Later spastic paraplegia develops. The knee jerks are increased, and ankle clonus and Babinski's sign are present. ~~Also~~ The disease, however, is usually of acute onset, and anaesthesia develops usually to the level of the lesion, and often with a definite upper limit. The sphincters are also usually affected.

IX Compression of the Spinal Cord.

This also may give rise to symptoms in the lower limbs similar to those of ~~the~~ disseminated sclerosis viz:- Weakness of the legs, increased knee jerks and deep reflexes, & Babinski's sign. Careful examination, however, is likely to reveal some cause of compression such as tuberculous caries, fracture dislocation of the spine, tumours of the vertebrae, or meninges or cord, or aneurysm of the aorta. No indication of any of these was found in the present case.

X Peripheral Neuritis.

Sensations of tingling and numbness occur in this condition, but the disease has the characteristics of a lower motor neurone lesion — flaccid paralysis and wasting of muscles, loss of deep reflexes, no ankle clonus and plantar reflex flexor. There is also tenderness of the muscles.

Prognosis.

The disease is a chronic one, and almost invariably the patient progresses steadily downhill. In the present case the probability is that he will have recurrent attacks alternating with periods of temporary improvement. Each successive attack is likely to be worse and to leave the patient worse, while the periods of remission are usually short. It is, however, possible that a remission may last for a long period, even a few years, but it is highly improbable that the disease will be arrested, and symptoms are almost certain to recur. The patient may live for another 10 to 15 years, possibly even longer, but death may be hastened by exhaustion, or bed-sores, or cystitis or intercurrent disease.

Treatment.

The disease is incurable, and treatment is simply palliative. The patient should have good food, plenty of fresh air and should be kept out of bed as long as possible. All fatigue should be avoided. *Liquor arsenicalis* is beneficial (dose 5 mins. t.i.d. after meals). Inunction with mercury ointment twice daily is also helpful. Massage and passive movements of the spastic limbs may be given, but electricity is contra-indicated.

Condition on Discharge

When the patient left hospital on the 18th October, he was walking very well and had lost the feeling of numbness of which he had previously complained. He was very hopeful that his condition would still further improve.

THE ROYAL INFIRMARY OF EDINBURGH.

Misc. 22

Book.....No.....

Disease Diabetes Mellitus

Result.....

Name of Patient Douglas Marshall Age 16½

Usual Postal Address.....

Date of Admission 19th October 1928 Date of Dismissal 24th November 1928

Case taken 24th October 1928 Case read.....

Synopsis—

Symptoms—General and Special

Treatment—

General and Special



Signature of Clerks.....

Signature of Resident Physician.....

Name: Douglas Marshall Age: 16½ years.
Occupation: Hall-boy. Single.
Birth place: St Helens.

Admitted 19/10/28. Recommended by Dr. Kerr.
Examined 23/10/28 & 24/10/28.

Complaint: A very tired feeling.
Lack of appetite and loss of weight
Great thirst
Very sore tongue.
Passing large amount of urine
Numbness and tingling in the hands.

Duration. Eighteen months.

History.

Personal. Two or three days before Christmas 1927 the patient began to notice that he seemed to be abnormally thirsty, and that he was drinking large quantities of water. He also found that he had to get up two or three times during the night in order to get a drink. Previous to this he had never noticed anything wrong, and had always been keen on games,

and able to play football with other boys. After dinner on Christmas Day he felt giddy and vomited. All that week he was off his food, and felt giddy and weak at his work. He noticed a tingling sensation, which was often present, in the tips of his fingers, and he also realised that he was getting very thin. He passed large quantities of urine each day. At the end of the week he saw his doctor, who tested his urine, and sent him to the Royal Infirmary, Ward 31. He was there for a month, and during that time he gained about a stone in weight, and his urine became sugar free. While in the ward he learned to test his urine for sugar, and to give himself injections of insulin, and after leaving he used to have two injections a day. (20 units total)

He kept quite well until the end of June, when he left home to go to a new situation. After this he could not always get suitable food, and he had to work very long hours. He tried to ~~keep to~~ diet himself as much as possible, and avoided sweets and puddings. He continued giving himself two injections a day.

By the middle of July he was getting very tired again, and any extra exertion, such as carrying coal upstairs made him very short of breath. The excessive thirst and polyuria returned.

His tongue began to get sore, and cracked and was very dirty. He had a bad taste in his mouth on waking in the mornings.

There was no tingling, but a peculiar numb sensation in his hands, and his hands and feet used to get very cold. About this time people began to remark that he was very thin and pinched-looking. He went home on the 11th August, and began to pick up a little. Three weeks or a month later he got a severe wetting in the rain, and a bad "cold" resulted. Following upon this all his symptoms were aggravated. His doctor advised that he should be under proper supervision for a time, and he came to the Infirmary on the 19th September.

Previous Illnesses: Measles when he was between 6 and 7 years old. He had a lot of boils on his legs when he was 7 years old, but they healed up without difficulty, and he has had none since.

He has had no trouble with his eyes. He has never been unconscious. He is often very tired and sleepy.

General Surroundings: Previous to last May the family was living in an old farmhouse, which was very cold and draughty. Their present home is more comfortable, is well lighted and ventilated, and has plenty of space round it.

Since July he has had to work very long hours, sometimes from 5 a.m. to 11 p.m., and he has had very little time off. He has had his meals regularly, but could not always get suitable food, though he tried to avoid sweet things. He got very few vegetables with his meals. He does not drink or smoke.

Family History: Father, aged about 50, alive and well.
 Mother, aged about 50, suffers from "rheumatics"
 Brother, aged 15, has had pneumonia three times.
 Sister, aged 12, is very healthy
 Brother, aged 8, is very healthy.
 There is no history of diabetes in the family.

State on Examination

Intelligence Average

Height 5 ft. 5 ins. Weight 8 st. 0½ lb.

Development is average. Muscularity is rather poor.

He has a rather thin, somewhat pinched-looking face, but there are no morbid appearances and no evidences of previous disease or injury.

Physical Examination.

The Urinary System.

He has no pain or discomfort in his loins or bladder, but is occasionally troubled with a slight itching round the urinary meatus and along the urethra.

He usually has to pass water 4 or 5 times a day and twice at night.

The Urine (24/10/28)

The urine was very pale in colour. The total quantity passed in 24 hours was 98 oz. Its specific gravity was 1028 and its reaction was acid. It contained no albumin, blood, pus or bile. It contained 3.8% of sugar, and acetone was definitely present in it. There was a deposit of mucus.

Alimentary System.

The appetite is improving, but has been very poor. The patient complains of great thirst, as noted in the history. This is also improving. He has no pain or discomfort after meals, and no feeling of weight or distension. He has no heart-burn, nausea or pain, and no acidity, flatulence, eructations or water brash. He often has a bad taste in his mouth in the morning.

The lips are red, and have no ulcers, fissures or cracks on them. The teeth are good, but one back upper molar is missing. The gums are red and appear healthy. There are no ulcers or haemorrhages. The tongue is very red, and is unduly smooth especially at the edges. It is covered with a fairly thick, dirty fur on the dorsum in the posterior two thirds. There is a definite, shallow crack in the centre. The tongue and mouth used to get very dry, but are less troublesome now. The tonsils are not enlarged. He has no difficulty in swallowing.

There has not been any vomiting since last Christmas.

The Abdomen.

Inspection: The abdomen is bilaterally symmetrical with no undue prominence or retraction. The abdominal walls move well ~~on~~ ^{with} respiration. There are no distended veins on the walls.

Palpation: There is no tenderness, and no undue resistance and no fluctuation.

Percussion. The lower border of the liver is just under the costal margin. The lower border of the stomach is just above the ~~stomach~~ umbilicus. There is no evidence of any free fluid being present in the abdomen.

The Nervous System.

The intelligence is average. The patient is not unduly excitable or emotional. His memory is good. He has no hallucinations or delusions. He sleeps well and has never been delirious. His speech is unaffected. He has never been comatose.

Cranial Nerves.

I His sense of smell is good. He correctly named whisky, camphor and peppermint after smelling them.

II His visual acuity is good. His fields of vision are not contracted. ~~The~~ Both optic discs are circular, and have well defined edges. Both fundi are within normal physiological limits.

- III, IV, VI There is no ptosis, squint or diplopia and no nystagmus.
- III, IV, VI The pupils are of average size, equal and circular in shape. They react both to light (direct and consensual) and to accommodation.
- V The masseters, temporals and pterygoids act strongly and equally on the two sides. There is no loss of sensation in the face, nor is the sense of taste impaired.
- VII There is no evidence of any paralysis or paresis of the facial muscles. The sense of taste in the anterior two-thirds of the tongue is good, as he can distinguish correctly between "sweet", "salt" and "bitter".
- VIII The hearing is good. There is no tinnitus or vertigo.
- IX Taste is somewhat impaired in the posterior third of the tongue probably owing to the thick furry coating over it. There is no anaesthesia of the pharynx and no dysphagia.
- X The palate moves equally on both sides.
- XI The sterno-mastoids and trapezoids act strongly and equally on the two sides.
- XII The tongue is protruded straight out, and there is no tremor or twitching.

Cervical Sympathetic: The pupils dilate to shade. The cilio-spinal reflex is present. There is no proptosis, no ex- or en-ophthalmos, no retraction of the upper lid, no pseudoptosis and no flushing or sweating of the face, neck

or upper extremity.

Motor Functions.

There are no abnormal movements.

There is no paralysis or weakness of any of the muscles of the head, upper or lower limb, or trunk. There is no atrophy of the muscles and the muscle tone is fair. There is no spasticity and no ataxia.

Reflexes: The conjunctival, pharyngeal and palatal reflexes are all present.

The abdominal reflexes are present and equal on the two sides.

The cremasteric reflex is present on both sides.

The plantar reflex is flexor on both sides.

Deep reflexes: The wrist and ~~ankle~~^{elbow} jerks are active and equal in both arms.

The knee jerk is absent in the left leg, ~~and~~^{it} can only be elicited on reinforcing in the right leg.

Ankle clonus is not present in either leg.

Organic reflexes: These are unimpaired.

Sensory Functions.

There is a sensation of numbness and tingling in the hands, and the hands and feet often feel cold.

Tactile sensibility is unimpaired at any point. He distinguishes correctly between the blunt and sharp ends of a pin, and between heat and cold in all areas. He has no pressure pain anywhere. Vibration sense is unimpaired. There is no astereognosis.

The Circulatory System.

There are no subjective phenomena.

The Pulse: The arterial wall is not palpable. The pulse is regular in time and force. Its frequency is 60 per minute. The impact of the up-stroke is neither abrupt nor ~~the~~ very gradual. It is well sustained, and its fall is gradual, but not tardy. The systolic pressure is 105, the diastolic is 75.

The Heart:

Inspection: There is no undue prominence or retraction over the praecordial region. There are no unduly prominent veins. The apex beat is just visible in the fifth interspace just within the mid clavicular line. There are no other pulsations in the praecordium or in any extra praecordial regions.

Palpation. The apex beat can be felt in the fifth interspace. There are no other pulsations and no thrills.

Percussion. The right border of the heart is just outside the right margin of the sternum. The following are the distances of the left border from the middle line:— 5th space 3 1/2", 4th space 2 1/4" and 3rd space 1 1/2".

Auscultation: Both sounds are closed in all areas and there are no murmurs.

The Respiratory System.

There are no subjective phenomena.

The breathing is mainly abdominal, regular and 20 per minute.

The Thorax.

Inspection: The chest is bilaterally symmetrical with no abnormal prominence or retraction. It is fairly well clothed, but the lower ribs are rather prominent. The movements are equal on both sides.

Palpation confirms the above findings as to the shape and movement. The vocal fremitus is equal on both sides.

Percussion: There is a good resonant note, which is similar at corresponding points on the two sides. Tidal percussion gives an expansion of $1\frac{1}{2}$ " at the bases.

Auscultation. The breath sounds are vesicular at all points. There are no accompaniments. Vocal resonance is not increased at any point, and is equal at corresponding points on the two sides.

The Haemopoietic System.

There are no subjective phenomena.

There are no enlarged lymph glands.

The thyroid gland is not enlarged.

The spleen is not palpable.

The following table is a record of the daily examination of the urine:-

Date.	Quantity (24 hrs)	Colour.	Specific gravity.	Sugar	Acetone.
19/10/28	84 $\frac{3}{4}$	Very pale	1032	++	++
20/10/28	124	do	1029	4.5%	++
21/10/28	92	do	-	5.5%	++
22/10/28	98	do	1028	++	++
23/10/28	42	do	1019	3.8%	+
24/10/28	40	Amber	1023	0.6%	+
25/10/28	42	Pale	-	1.3%	+
26/10/28	50	Amber	-	+	+
27/10/28	58	do	1026	+	+
28/10/28	60	do	1026	1.4%	+
29/10/28	62	hemon	-	+	+
30/10/28	40	hemon	1026	Trace.	Trace
31/10/28	38	hemon	-	Free	Free.

A trace of sugar returned on the following dates 2/11/28, 3/11/28, and 5/11/28, and was found to be due to the boy breaking his diet.

The following is a record of his weight:-

19/10/28. 8 st. $\frac{1}{2}$ lb.

29/10/28 8 st. 1 lb.

5/11/28 8 st. $2\frac{1}{2}$ lb.

12/11/28 8 st. $2\frac{1}{2}$ lb.

19/11/28 8 st. $1\frac{1}{2}$ lb.

The following table summarises the treatment given to the patient:-

Date.	Diet.	Carbohydrate	Protein	Fat.	Total calories	Ratio G : F.A.	Insulin.
19/10/28	B.15	78	60	106.5	1510	1 : 1.	27 units
20/10/28	B.15.						37 { 15 10 12.
22/10/28	B.15.						45 { 15 15
29/10/28	B.15.						55 { 20 15 20
The urine became sugar free on the 31 st /10/28.							
31/10/28	C.19	61	57.5	158	1896	1 : 1.5	50 { 20 15
2/11/28	C.20	65.5	60.5	167	2007	1 : 1.5	50
7/11/28	C.21	70	66	172	2094	1 : 1.5	50
8/11/28	C.22	73.5	68	182	2204	1 : 1.5	50
9/11/28	C.23	75.	66	192	2292	1 : 1.5	50
11/11/28	C.24	80.5	70.5	201	2413	1 : 1.5	45 { 15 15 15
12/11/28	C.25	85	71.5	210	2516	1 : 1.5	45
13/11/28	C.26	91.8	74.7	223	2673	1 : 1.5.	45
14/11/28	C.26						45 { 25 20
15/11/28	C.26						40 { 22 18
16/11/28	C.26						35 { 18 17
17/11/28	C.26						33 { 18 15
18/11/28	C.26						30 { 15 15
19/11/28	C.26						27 { 15 12
20/11/28.	C.26.						24 { 12 12

Commentary.

Diagnosis.

The presence of sugar in the urine together with definite symptoms of great thirst, polyuria and emaciation and weakness make the diagnosis of diabetes mellitus quite certain in this case. Glycosuria may, however, occur in certain conditions in the absence of true diabetes mellitus and the causes of this may be briefly considered in relation to the present case.

True "renal glycosuria" is probably a very rare condition. It is due to an abnormally low "renal threshold" for sugar, so that sugar appears in the urine, even though the blood sugar is low. In such a case there are none of the typical diabetic symptoms, and the glycosuria does not yield even to strict dieting and insulin treatment. The condition cannot be diagnosed without careful and repeated blood sugar estimations. These show that although there is glycosuria, this is not due to hyperglycaemia. In the present case the blood sugar was estimated last January, and found to be 190 mgs of glucose - a definite hyperglycaemia. The symptoms in this case are so definite that there can be doubt whatever of it being a true diabetes mellitus, and not simply a renal glycosuria.

Glycosuria may also occur as a result of hyperthyroidism, which

produces hyperglycaemia, and this may eventually develop into true diabetes. In this case, however, there ~~are~~ is no enlargement of the thyroid gland and no other symptoms of hyperthyroidism.

The symptoms of diabetes insipidus somewhat resemble those of diabetes mellitus in so far that in both diseases there are polyuria and thirst. The diagnosis of diabetes mellitus, however, is based upon the presence of sugar in the urine. In diabetes insipidus there is no hyperglycaemia and therefore no glycosuria.

In this case there are some symptoms and signs of a slight involvement of the nervous system. The tingling sensations and the numbness in the hands and feet and the diminution of one knee jerk and the absence of the other are almost certainly due to a slight peripheral neuritis, which is quite a common complication of diabetes mellitus.

Treatment.

In an ordinary case of diabetes mellitus the main objects of treatment are two in number:— (1) To get the urine sugar free and (2) to maintain it sugar free. In this case, however, there is a much more important indication for treatment than the presence of sugar in the urine, and that is the presence of acetone. Its presence in the urine means that the boy's metabolism is so disordered that fats are being incompletely oxidised, and dangerous ketone bodies are being formed in consequence and are circulating in the blood and

being excreted by the kidney as acetone. So long as this state of affairs is allowed to continue, the patient is in danger of developing urgent symptoms of acidosis, a condition which demands immediate and active treatment, if it is not to prove fatal. The symptoms of acidosis are very varied, and may take the form of confusion deepening into stupor and finally coma, or dyspnoea may be the prominent symptom, or heart failure may occur. In this case none of these symptoms are prominent, but the boy had noticed prior to admission that exertion was making him unduly short of breath. The presence of acetone in the urine must, however, be regarded as a warning, and the first indication for treatment, therefore, is to get the urine acetone-free. Fortunately this can be accomplished by the same form of treatment as is required to get the urine sugar free, but that treatment must be more intensive.

The two main lines of treatment employed for diabetes are (1) Dietetic and (2) Insulin treatment. In many cases the condition can be controlled by dietetic measures alone, but in the presence of acetonuria these must be supplemented by the use of insulin. Prior to his admission to hospital this boy was getting 20 units of insulin daily, and it was probably due to this that he did not develop much more definite symptoms of acidosis. On the day of admission he was given 27 units. On the next two days he was given 37 units daily. For the next 7 days he received 45 units daily, but even this failed

to free the urine from acetone, and for two days the dose was increased to 55 units daily, and this resulted in the urine becoming free of acetone and sugar. (See tables of urine and treatment) Throughout this period the patient was kept on a B.15 diet, the construction of which will be discussed below.

The modern dietetic treatment of diabetes depends upon the recognition of certain principles in the construction of the standard diets which are used. In the first place the diet must supply at least a sufficient number of calories to enable the patient to maintain his basal metabolism. If this is not done, the patient ~~gets~~ has to obtain his calorie requirement by "consuming his own fats", and as these are imperfectly oxidised a condition of acidosis may rapidly develop. In the second place we have to recognise the very close relationship between carbohydrate metabolism and fat metabolism. The complete oxidation of fats requires the oxidation at the same time of a certain quantity of carbohydrate. Experimentally it is found that the body can oxidise 1.5 Gm of fat for every 1 Gm of carbohydrate. The optimum diet, therefore, is one in which the ratio between the total carbohydrate (glucose) and the total fat (fatty acid) is 1:1.5.

In the treatment of an actual case such as this, one begins by keeping the patient in bed and giving a diet which supplies 1500 calories, and contains ~~some~~ ~~or~~ a proportionately large amount of

carbohydrate. The carbohydrate-fat ratio is 1:1. Such a diet is known as a B.15 diet. It supplies barely sufficient calories to maintain basal metabolism, but in order to get the urine sugar free it is necessary to starve the patient partially, and cause him to use some of his reserve fat. The extra quantity of carbohydrate in the diet provides for the complete oxidation of this reserve fat. In some cases the patient will sooner or later become sugar free on this diet alone, but as we have seen it required to be supplemented in this case by 55 units of insulin daily for two days.

Once the urine is free from sugar, it must be maintained so, but at the same time an attempt is made to improve the diet so as to supply sufficient calories for the patient's ordinary requirements, and also, if possible, to reduce the amount of insulin needed. This is done by starting the patient on a diet, in which the optimum ratio between carbohydrates and fats is ^{secured} maintained, and then day by day increasing the number of calories in the diet, at the same time maintaining the required proportions between carbohydrates and fats. These diets are known as C diets, and are numbered according to the number of calories they supply. Thus in this case the patient was put on to a C19 diet which supplies 1896 calories. From this he was advanced up a "dietary ladder," at the rate of one diet a day. The urine is tested every day, and if sugar reappears the diet is

lowered for a day or two. In any case it is advisable to have a "fasting day" once a week. In this case a trace of sugar did reappear on one or two occasions, but was found to be due to the boy breaking his diet, and it did not prove necessary to return to a lower diet. He was able to advance rapidly to a C26 diet, which supplies 2673 calories, and was kept on this diet till he left hospital.

It was possible also to reduce the amount of insulin required from 50 units a day to 24 units (see table). The insulin should not of course be given all in one dose. As a rule if only 15 units a day are required, it is given as one dose, from 20-50 units a day are given in two doses, and anything more is given in three doses. The actual procedure followed in this case is shown in the table summarising the treatment.

Where insulin is being given regularly, a careful watch has to be kept for the onset of any symptoms of hypoglycaemia. The early symptoms of this are sweating, and a feeling of great anxiety and fear. The patient becomes tremulous and may even be dizzy. In more pronounced degrees, it leads to coma. Should the early symptoms appear the patient should at once be given glucose by the mouth. This is most conveniently done by giving him barley sugar to suck.

Future Treatment and Control.

The patient must, of course, be given full and careful

instructions as to his diet and the use of insulin. The insulin should be given in two doses, one in the morning and one in the evening. A dose should be given two hours before a meal, and the diet should be so arranged that the bulk of the carbohydrate is in the two meals which are "protected" by insulin. The patient must test his urine each day, and as soon as sugar appears in it, he must automatically ^{lower} ~~drop~~ his diet. As already mentioned he should in any case have one "low day" every week.

The patient should weigh himself on the same machine each week, and should keep his weight a little below the standard for his height and age. If he puts on too much weight sugar will return, and his diet should be reduced. If he loses weight, the diet should be increased, and, if necessary, the insulin also.

Prognosis.

Prior to the introduction of insulin the prognosis in a case such as this would have been extremely poor. The youth of the patient, and the severity of the disease, as evidenced by the high percentage of sugar and the presence of acetone in the urine, would have made one take a very serious view. No dietetic measures ~~by~~ themselves would have been likely to control the disease, and the probability is that in a comparatively short time diabetic coma would have supervened and led to death. Formerly coma was the cause of death in 40-50%

of cases, and in an ~~an~~ ^{even} greater percentage of young patients.

The use of insulin has made the prognosis in such cases much more favourable, though it is too early as yet to be dogmatic as to the full extent of the improvement. It is, however, of very great interest in the present case to find that, although there has been a marked acetonaemia, the patient, who has been using insulin regularly, has never shown any signs of coma. If the use of insulin enables one to ~~to~~ keep off the onset of coma, it would seem that the expectation of life in such a patient has been definitely increased.

Insulin, however, does not cure diabetes. It simply replaces the deficient secretion of the islets of Langerhans in the pancreas, and so enables us to control the hyperglycaemia and glycosuria which result from that deficiency. The final prognosis therefore depends upon whether the disease is a progressive one or not. In the former case ~~an~~ increasingly large doses of insulin will be needed, until finally the disease can no longer be controlled. Evidence seems, however, to be accumulating to show that this does not as a rule occur, and in the opinion of some physicians at least, once the hyperglycaemia and glycosuria are controlled, the disease becomes stationary, and may even improve, either by regeneration of the affected islet tissue or by compensatory hypertrophy of the unaffected tissue, so that the dose of insulin may be progressively decreased, and finally even stopped altogether.

In the present case, therefore, provided the boy adheres strictly to the dietetic regime prescribed for him, and continues the use of insulin, one may reasonably give him a very favourable prognosis. At the same time we must remember that the boy's circumstances are not of the most favourable. He has already been placed in a situation where he was unable to carry out his instructions as to diet with the result that the disease has definitely become worse, and that he now requires ~~used~~ ^{slightly} larger doses of insulin than formerly. It will, therefore, be necessary to impress upon the boy's parents and himself the importance of perseverance with the treatment over a long period. If this is ~~done~~ ~~the~~ carried out faithfully the subsequent history of the case will be of the very greatest interest.

Progress Notes:

31/10/28 The urine became sugar and acetone free.

22/11/28 The feelings of tingling and numbness had disappeared.
The knee jerks were active and equal.

24/11/28. The patient was discharged very much improved, having gained 1 lb in weight while in hospital.

THE ROYAL INFIRMARY OF EDINBURGH.

Misc. 22

Book.....No.....

Disease *Chronic Interstitial Pneumonia* Result.....

Name of Patient..... *Thomas Clelland* Age *38*

Usual Postal Address..... *Tyne South Row, Fife*

Date of Admission..... *30th October 1928* Date of Dismissal..... *15th November 1928*

Case taken..... *5th November 1928* Case read.....

Synopsis—
Symptoms—General and Special {
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Treatment—
General and Special {
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Signature of Clerks.....

Signature of Resident Physician.....

Name : Thomas Clelland.

Age : 38

Occupation : Miner.

Place of birth : Lanarkshire.

Married

Address : Tyne South Row, Fife.

Recommended by Dr Khambarra.

Admitted : 30/10/28. Examined : 5/10/28.

Complaint : Pain in the small of the back and on both sides of the trunk.

Duration : Seven months.

History.

Personal : Seven months ago the patient had pneumonia. This began with a sudden severe pain in his right side. It was so bad that for a moment or two he could not get his breath. Then the pain eased off, and he managed to continue at his work. He felt feverish and out of sorts, but kept on at his work for nearly a week. The pain was always present, and one night it became so severe that he fell to the ground after rising from ~~the~~ his chair. He then sent for his doctor, who told him that he had

pneumonia, and sent him to bed. He remained in bed for three or four weeks, and then was allowed to get up for one day. That night he "took a shivering", and the pain in his right side returned. About a week later he began to be troubled with pain in the left side also, and the doctor said that the pneumonia had spread to that side. He was very seriously ill, and at one time the doctor gave up hope of his life. He was in bed altogether for four months, but he does not remember when the doctor pronounced him out of danger or past the crisis. As the pain in his back and sides did not appear to be improving, he was recommended to the Infirmary.

During the time that he was in bed, but after the acute stage of the illness had passed, he had some trouble with his stomach. Pains used to come on in the stomach about half-an-hour after a meal, and occasionally he brought up a few sour mouthfuls of food. The doctor put him on a special diet, telling him particularly to avoid all fried and greasy articles of food, and gave him some medicine, and this helped him considerably. He has no trouble now except when he eats any greasy food.

Previous History: He was wounded by a bullet in the right foot during the war. He usually gets an attack of hay fever every year in the spring. Otherwise he cannot remember any illness.

General Surroundings: He lives with his wife and two daughters in a house, consisting of one room and a kitchen. He says that it is a large room, well lighted

and ventilated. He works in the pits where it is very damp and the air is very bad. He used to have a good appetite, and was able to get his meals fairly regularly. He has, of course, been on light diet ever since his illness. He is a moderate drinker, and smokes about five cigarettes a day. He has not had any venereal disease.

Family History:

- (1) living members.
- | | |
|---|----------------------------------|
| Brother aged 49. | Healthy |
| Brother aged 42 | Healthy |
| Wife aged 37 | Healthy; has had no miscarriages |
| Daughter aged 14 | Healthy |
| Daughter aged 12 ¹² | Healthy. |
- (2) Dead members.
- | | |
|-----------------|-------------------------------------|
| Father. aged 57 | Accident. |
| Mother | died when patient was 4 months old. |
| Sister. aged 30 | Accident. |
| Sister | died in child birth. |

State on Examination

Intelligence average. Height 5ft 6 inches. Weight 8 st. 7 $\frac{3}{4}$ lbs.
 Development average. Muscles rather flabby and lacking tone.
 No unusual appearances. No evidence of previous disease or injury.

Respiratory System.

No cough or haemoptysis. He complains of pain on both sides of the chest, worse on the right side. The least exertion makes the pain worse, and, when it is very bad, he gets breathless. So long as he is resting in bed, the pain does not trouble him very much.

Respirations average 20 to 24 to the minute. The breathing is regular and thoraco-abdominal in type.

He has no difficulty in breathing through his nose, and has never been troubled with nasal catarrh. He has never had any hoarseness or sore throat.

Thorax. There is a very pronounced flattening of the left side of the chest in front. There is distinct hollowing above the left clavicle, and this is even more marked below the clavicle. The fossa between pectoralis major and the deltoid is unusually deep. It is very difficult to detect any movements at all on the left side, except when the patient takes very deep breaths. The following measurements were taken at the level of the nipple on each side from the mid-sternal line ^{in front} to the vertebral column behind :-

Right side	Full inspiration	$17\frac{3}{4}$ "	Left side	Full inspiration	$15\frac{1}{4}$ "
	Full expiration	$16\frac{3}{4}$ "		Full expiration	15"

There are no unduly prominent veins anywhere on the chest wall. Viewing the chest from behind, one finds a definite scoliosis, convex

to the right, at the lower end of the thoracic spine.

Palpation confirms the marked flattening of the chest on the left side, and the extreme deficiency of movement on that side. The flattening is not due to atrophy of the muscles of the chest wall, which are about equal on the two sides. The ribs feel more closely set together on the left side. On this side vocal fremitus is absent below the clavicle in front. It is slightly increased at the level of the median angle of the scapula behind, ^{but is absent at the base.} On the right side vocal fremitus is neither increased nor diminished.

The percussion note is definitely dull at the apex on the left side, and right down the back of the thorax to the base of the lung, where the dullness becomes more marked. On the right side the note is unpaired at the apex and just below it behind, and below the clavicle in front. Elsewhere on this side the note is quite resonant.

Auscultation. On the left side the breath sounds are very faint all over, and are inaudible at the base of the lung. At the apex and in front of the chest the sounds are vesicular without accompaniments. At the back at the level of the median angle of the scapula expiration is somewhat prolonged, and vocal resonance is slightly increased at this point. At the base of the lung the vocal resonance is diminished.

On the right side the breathing is harsh vesicular at the

apex. Elsewhere it is vesicular without accompaniments. Vocal resonance is neither increased nor diminished.

X ray Examination. There is a marked scoliosis of the spine convex to the right. The ribs on the right side are well separated, while those on the left side are closely set together. The trachea is slightly displaced to the right. There is considerable obscurity in the lower half of the left chest, the shadow merging into that of the diaphragm, and making it almost impossible to see the shadow of the heart. The appearances are said to be consistent with consolidation, and the presence of a little fluid in the pleural sac. There is also deficient air entry at the right apex.

Haemopoietic System.

There are no subjective phenomena.

No enlarged glands could be felt in any part of the body.

There is no enlargement of any of the ductless glands.

The Circulatory System.

There are no subjective phenomena apart from the breathlessness when the pain is very severe.

Pulse. The rate averages 80-84 per minute. The pulse is regular in time and force. The upstroke of the wave is neither abrupt nor very gradual. The wave is well sustained and the downstroke is gradual, but not unduly slow. The passage of the wave is rather easily arrested. Systolic pressure is 90 and diastolic 70 mm. of mercury. The arterial wall is not thickened, nor is the artery tortuous.

Heart. The flattening of the left side already described includes the praecordial region. Apart from this there are no changes in the form of this region. The apex beat can not ~~easily~~ be seen, even when the patient is sitting up. There are no other pulsations to be seen in the praecordial or extra-cardiac regions.

On palpation the apex beat is felt in the 5th space ~~at~~ 3 inches from the middle line. It can be felt only with difficulty. There are no other impulses felt and no thrills.

Percussion indicates that the right border of the heart is just beyond the right margin of the sternum. Owing to the dullness all over the left side it is extremely difficult to percuss out the left border of the heart, but it is just possible to detect a change in the note as one passes from lung to heart, and thus to obtain the following measure-

ments as the distance of the left border of the heart from the middle line:-
 5th space 3 in. 4th space 2½" 3rd space 2¼".

On auscultation both sounds are closed in all areas and there are no murmurs.

Alimentary System.

The patient's appetite has been improving lately. He sometimes has a little discomfort about half-an-hour after taking food, but this soon passes off. Occasionally he has a slight pain just below the umbilicus. He is troubled with a little flatulence now and again.

The lips are a fairly good colour, and show no scarring or other signs of disease. The gums appear to be fairly healthy. He has lost all his upper teeth, and has a complete upper denture. In the lower jaw he has only 3 molars, 2 bicuspids and 2 canines left, and these all show evidence of decay. The tongue is only slightly furred. The secretions are neither increased nor diminished. He has no difficulty in swallowing.

Abdomen. There is no undue prominence or retraction or flaccidity. The movements are normal. There are no dilated veins.

On palpation there is very slight tenderness in both iliac fossae, but no resistance.

The liver is not enlarged. The lower border of the stomach is

half-an-inch below the umbilicus.

Nervous System.

The intelligence is average. The emotional state is quiet and natural. His memory is good. He has no hallucinations or delusions. The patient says that he sleeps poorly and has been worse these last seven months. He is inclined to be rather drowsy during the day. His speech is clear.

Cranial Nerves.

I The patient can distinguish the difference between such substances as "camphor", "peppermint" and "whisky", when he smells them, but cannot name the substances correctly.

II The visual acuity is good. The fields of vision are not contracted in any way. The optic discs are circular with well defined edges.

III, IV, VI The ocular movements are all good. There is no ptosis, squint or diplopia. There is no nystagmus.

The pupils are circular and equal in size. The direct reaction to light is somewhat sluggish, and the consensual reaction is absent. They both react to accommodation.

V The masseters, temporals and pterygoids act strongly and equally on the two sides. There is no loss of sensation in the face, nor is the sense of taste impaired.

VII There is no loss of power in the facial muscles. Taste in the anterior two

thirds of the tongue is unimpaired.

VIII The hearing is good. There is no tinnitus or vertigo.

IX The sense of taste in the posterior third of the tongue is good. There is no anaesthesia of the pharynx and no dysphagia.

X The palate moves well and equally on the two sides.

XI The sternomastoids and trapezoids act strongly and equally on both sides.

XII The tongue is protruded straight out, and there is no tremor or twitching.

Cervical lymphathetic: The pupils dilate to shade. The cilio-spinal reflex is absent. There is no proptosis, ex- or ex-ophthalmos, and no retraction of the upper lid. There is no pseudoptosis and no flushing or sweating of the face, neck or arms.

Motor functions: There are no abnormal movements, and no paralysis of any of the muscles. The leg muscles, however, are somewhat atrophied and are very flaccid. There is an old wound in the right foot and the movement of dorsi flexion is weak in that foot. There is no inco-ordination.

Reflexes: The conjunctival, pharyngeal and palatal reflexes are all present.

The abdominal reflexes are present but are very slight

The cremasteric reflex is present on both sides

The plantar reflex is flexor on both sides.

The wrist and ^{elbow} ~~ankle~~ jerks are active and equal on both sides. The knee and ankle jerks are active and equal on both sides. No ankle clonus.

The organic reflexes are not altered.

Sensory functions: There are no disturbances, either subjective or objective

Urinary System.

There are no ~~dis~~ subjective phenomena. Micturition is not unduly frequent.

The Urine. Amber colour. Quantity in 24 hours. 400 gr. Sp. gr. 1023
 Reaction - Acid. No abnormal constituents.

Commentary

Diagnosis: Fibrosis of left lung, following incomplete resolution of pneumonic consolidation.

In considering a case such as this, there are certain conditions which at once suggest themselves, and which have to be carefully excluded before settling the diagnosis. The first of these is undoubtedly tuberculosis of the lung, next pleurisy with effusion and finally new growths in the lung or mediastinum.

1. Tuberculosis. The gross changes in the left chest, which are immediately seen on inspection, and confirmed by further examination, are highly suggestive of tuberculosis, but there are several points both in the history and the examination which render this diagnosis improbable. In the first place, there is no history of any disease prior to the attack of pneumonia seven months ago. We have to remember of course that pneumonia may often mask an underlying tuberculous infection, but we may certainly

question whether a patient with an acute ~~upper~~ lobar pneumonia superadded to an underlying tuberculosis would have recovered from the illness. On the other hand it might be argued that the pneumonia has "lit up" a latent tuberculous infection and rendered it active. In view, however, of the gross changes which have been produced, ~~in~~ ⁱⁿ seven months, one would expect the tuberculosis to be of an acute and rapidly progressive type, and to cause ~~the~~ patient considerable systemic disturbance. This, however, is not the case in this patient. He looks and feels quite well, he has not been losing weight, he has shown no temperature disturbance, and he is not troubled with sweating or loss of appetite. Further, he has no cough and no expectoration, such as one would expect in a patient with advanced phthisis. Another point against tuberculosis is that he has no enlarged cervical or supraclavicular glands. On the whole, therefore, the evidence would seem to be against tuberculosis. At the same time one should remember the possibility that in such a seriously damaged lung as this, tuberculosis may very well develop later, and the patient should be kept under observation for this.

2. Pleurisy with effusion. This is suggested by the immobility of the left side, by the absence of vocal fremitus at the base of the lung, by the dull percussion note, the diminished breath sounds and vocal resonance. Here again, however, one would expect considerably more constitutional disturbance than is actually present. The pain in the side should

have disappeared with the onset of effusion. One would expect some cough at least and also more marked dyspnoea, and some degree of fever. Further the percussion note has not quite the absolute wooden dullness which one associates with the presence of fluid. Other points to remember are that effusion would be more likely to cause bulging of the chest wall rather than retraction, which is such a marked feature here. There is no aegophony such as is usually present towards the upper border of the dullness. The X ray appearances are not suggestive of the presence of much fluid.

3. New Growths in the lung or Mediastinum. These might account for some of the changes in the chest, but here again one would expect these changes to be associated with much more prominent symptoms. There would almost certainly be severe, and progressive emaciation, with marked loss of weight. There might also be extreme dyspnoea from pressure on the trachea and bronchi, and there would certainly be enlarged and hardened glands above the clavicle. In the absence of these symptoms and signs this condition can also be excluded.

Having excluded these three conditions we are almost bound to conclude that the condition here is one of fibrosis of the lung (or chronic interstitial pneumonia). The history of a severe attack of acute lobar pneumonia evidently with delayed resolution suggests that following the failure of the consolidation to clear up, organisation has taken place with the production of fibrous tissue throughout the lung. In this case the history of severe pain, and also the X ray appearances suggest that there has been

a considerable involvement of the pleura, and that the fibrotic process has spread from the base of the pleura into the lung in strands. Possibly it is this involvement of the pleura which accounts for the continuance of the pain of which the patient complains. The signs at the back of the left chest at the level of the median angle of the scapula rather suggest the presence of some dilated bronchi, but are not definite enough to indicate the presence of any bronchiectasis, such as may sometimes be present in this condition. The possibility of it developing, as the fibrous tissue contracts, must however be kept in mind.

Prognosis. The prognosis as to life is fairly good, provided reasonable care is taken. There is no bronchiectasis present and the heart shows no signs of embarrassment. The patient seems in quite good health apart from his damaged lung. He has no associated bronchitis or emphysema in the sound lung, and there seems no reason why he should not live for many years yet. Bronchitis and emphysema are, however, likely to develop and an increasing strain to be placed on the right heart, so that eventually death is likely to occur from cardiac failure.

The prognosis as to recovery is bad. Nothing can be done to restore the fibrotic lung, and the patient is not likely to be fit for anything more than light work in future.

Treatment No treatment will of course effect anything to the restoration of the left lung, and ⁱⁿ the absence of any urgent symptoms no treatment is called for. The patient must in future lead a careful life, guarding especially against colds and chills, as being likely to lead to bronchitis and throw extra strain on the heart. He will have to find out from experience what work he is capable of doing, and not attempt heavy work which bumps on the pain and causes dyspnoea.

THE ROYAL INFIRMARY OF EDINBURGH.

Misc. 22

Book.....No.....

Disease *Chronic Parenchymatous Nephritis* Result.....

Name of Patient..... *Adam Anderson* Age *60*

Usual Postal Address..... *8 Grassmarket, Edinburgh.*

Date of Admission..... *22nd November 1928* Date of Dismissal..... *2nd January 1929*

Case taken..... *5th December 1928* Case read.....

Synopsis—

Symptoms—General and Special

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Treatment—

General and Special

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Signature of Clerks.....

Signature of Resident Physician.....

Adam Anderson. 8 Grassmarket.

Age: 60 Occupation: Housepainter, but has been unemployed
for the last three years.

Birthplace: Moffat. Married.

Admitted. 22nd November 1928.

Recommended by M. O. P. D.

Examined 4th & 5th December 1928.

Complaint: Urine was getting very red and was becoming darker.
Swelling of legs and face.
Severe headache.

A tight feeling in the chest and across the epigastrium.
Duration of Illness: One month (up to date of examination).

History.

Personal. Ten years ago the patient was in Ward 23 with kidney trouble, but says that he was not so bad then as at present, and that he had no swelling then. Ever since then he has had occasional headaches, and slight pains in the kidney region, but has never noticed any swelling of his face or legs. About a month before his admission to the Infirmary he had a cold, which was accompanied by severe headache and aching pains in his back. He says that he

came up to M.O.P.D. then, and was told that he had lumbago. He got a blister and put it on his back, and this relieved him of the pain a little. His cold got worse, and he also developed a nasty cough. He thinks that he got his feet very wet several times. Four days before admission he noticed that his water was getting very dark, and this got worse each day. He himself thought the dark colour was due to blood. Then he noticed that his feet were getting swollen. His attention was first drawn to this by the fact that his "lassie" was unable to fasten his boots for him one morning. The next day his wife noticed that his face was very swollen, and that his eyes were nearly closed, when he got out of bed. For the three days previous to his admission to hospital he felt a little nausea after his meals, but never vomited. He came up to ~~the~~ M.O.P.D. on the 22nd November, and was immediately admitted to the ward.

Previous Illnesses and Accidents. He states that when he was a boy of about 7 or 8 years old, he had great difficulty in passing water. He was given hot baths several times to help him pass water, and apparently he was catheterised on several occasions. He used sometimes to pass what he describes as "yellow sand".

He had typhoid fever as a boy. As far as he can remember he never had scarlet fever. He has never been troubled with sore throats.

Ten years ago (as already mentioned) he had kidney trouble.

Three years ago he fell over 20 feet from a scaffolding and fractured his left thigh. His left leg is now 3 inches shorter than the right in consequence.

General Surroundings: He lives with his wife, three sons and a daughter in a room and kitchen. He has not been working for the last three years on account of the accident to his leg. He is in very poor circumstances and often has to take what he can get in the way of food, which is sometimes very little. He is a moderate drinker, taking about a glass of beer a week. Non smoker.

Family. Father dead. Cause & age unknown, but he was asthmatic. Mother died when he was a boy. Cause unknown. Three brothers and three sisters all alive and healthy, as far as he knows. He cannot remember their ages.

Wife. Age 48. She is being treated for "stomach trouble" at present.

Son Age 18. He has disappeared from Edinburgh.

Son Age 16

Daughter Age 13

Son Age 11.

Son Age 10

} All alive and healthy.

He has never had any venereal disease.

State on Examination.

Intelligence is rather below the average. Development is fair. Muscularity is rather poor for his size. The face is heavy and somewhat flabby in appearance. There is some swelling under his eyes, but not very much. His eyes look rather red and watery. His nose is large and distinctly reddened. His temperature is $97^{\circ}.2$.

Note on temperature. On admission the patient's temperature was 99° and this rose in the evening to 100° . On the 24th November it rose to $101^{\circ}.2$. Next morning it was down to $98^{\circ}.4$ but rose again to $101^{\circ}.8$ in the evening. For the following four days it was $98^{\circ}.4$ in the morning and $99^{\circ}.6$ at night. After this it remained more or less steady at $97^{\circ}.4$.

The Urinary System.

Subjective phenomena: The patient had severe pains in his loins before admission, but this is much easier now. He also had pain in the bladder region, but this is also easier. He still has a little pain in the ureters both before and after passing water. He has to pass water frequently during the day and once or twice at night, but he does not think that there is much change in the total quantity of water passed.

On the day the patient was examined the urine had a distinctly smoky colour. The total quantity passed in 24 hours was 48 ozs.

Its specific gravity was 1012. Its reaction was acid. Chemical tests showed the presence in the urine of albumin and blood, and the absence from it of sugar and bile. The deposit examined under the microscope was found to contain mucus, numerous red blood corpuscles and blood casts. The albumin content was found to be 0.9%, and the total urea excreted in 24 hours was 357 grms.

The Circulatory System

Subjective phenomena: Slight pain all over the chest. There is no palpitation or faintness. There is slight dyspnoea and cough.

The Pulse: The arterial wall is just palpable and the artery is slightly tortuous. The pulse is regular in time and force. Its frequency is 56 beats per minute. The upstroke comes up sharply and strongly, the wave is well maintained, and the downstroke is rather quick. There is no diastolic murmur. It is a typical high tension pulse, and the pressure was estimated by the finger at about 170 mm. of mercury. The pressure recorded by the sphygmomanometer was Systolic 180 and Diastolic 80 (Note: The blood pressure on admission two weeks ago was ¹⁶⁸/70)

The Heart.

Inspection: There are no changes to note in the form of the praecordial region. A slight diffuse pulsation can be seen in the 4th, 5th and 6th spaces. There is also a definite pulsation in the neck, but none in

the epigastrium.

Palpation: A diffuse pulsation can be felt in the 4th, 5th and 6th spaces. The apex beat is distinctly felt in the 6th space just outside the midclavicular line.

Percussion: The right border of the heart is situated about $\frac{1}{2}$ " to the right of the right border of the sternum. The apex beat is in the 6th space 5" from the middle line. The following are the distances of the left border of the heart from the middle line:-

5th space, $4\frac{1}{2}$ " ; 4th space, $3\frac{1}{2}$ " ; 3rd space, $2\frac{1}{2}$ "

Auscultation: Both sounds are closed in all areas, and there are no murmurs. The aortic second sound is slightly accentuated.

The Integumentary System.

The skin feels rather dry and hot. There is marked subcutaneous oedema in the legs and feet and a little in the face under the eyes.

The Respiratory System.

The patient has a slight cough, which however has become much easier since admission. He thinks that just prior to admission his sputum was stained a reddish colour. He still has a little dyspnoea and slight pain in the chest especially behind the sternum.

The breathing is regular, about 20 per minute and thoraco-

abdominal in type. The sputum is rather scanty and somewhat dirty looking.

Thorax. The chest is bilaterally symmetrical, and rather poorly clothed. It moves equally on both sides.

Palpation confirms the symmetry in the form of the chest and the equality of the movements on the two sides. The vocal fremitus is equal on both sides.

The percussion note at the apices, and in front and behind is a good, unimpaired, resonant note.

Auscultation: At the apices and just below the clavicles in front, inspiration is of a blowing character, expiration is prolonged and blowing, & rather high pitched. A few sibilant rhonchi can also be heard on expiration. Elsewhere in front expiration is slightly prolonged, but not blowing, and a few rhonchi can be heard. At the back of the chest the breathing is high-pitched bronchial just below the apices. At the bases it is broncho-vesicular in character.

Alimentary System.

The patient says that his appetite is fairly good. He often gets very thirsty. Occasionally he is troubled with a feeling of tightness in the epigastrium after taking food. He sometimes feels a little nausea. He suffers a good deal from flatulence and occasionally from the return

of sour mouthfuls of food.

His lips are a good colour and show no sign of previous disease. He has only four teeth left, one incisor in the upper jaw, and three in the lower jaw. His gums are fairly healthy except round the roots of the four teeth, where they bleed easily and some pus can be expressed. The tongue is only slightly furred. The fauces are rather congested.

The abdomen appears to be rather full in the flanks, but otherwise there is no undue prominence or retraction. On palpation the patient complains of tenderness in the epigastrium and both iliac fossae. There is no resistance and no fluctuation.

On percussion the note in the middle line is definitely tympanic, while that in the flanks is dull. When the patient turns on his side the dullness extends further up towards the middle line, while a more tympanic note is obtained in the side which is uppermost. There is therefore some fluid present in the abdomen.

The lower border of the stomach is just below the umbilicus, as confirmed by auscultatory percussion. The liver is not enlarged.

Nervous System.

Intelligence rather below average. There is no undue emotional disturbance. Memory is good. He has no hallucinations or delusions. He says that he does not sleep well, but that he is rather

drowsy during the day. There are no signs of coma, and he does not have any fits. His speech is rather thick, but not abnormally so.

Cranial Nerves.

I His sense of smell is rather poor. He can distinguish between different smells such as "camphor", "peppermint" and "whisky", but he cannot name them.

II His visual acuity is fairly good. His fields of vision are not contracted at all. On ophthalmoscopic examination the discs are neither abnormally pale, nor unduly congested. The margins of the discs are clear and sharply defined. There are no alterations in the vessels and no haemorrhages in the fundi.

^{III, IV, V, VI}
III There is no ptosis, squint or diplopia. The ocular movements are all good. There is no nystagmus.

At the time of examination the right pupil was much larger than the left, but the patient stated that he had had "drops" in that eye (homatropin presumably). The pupils are circular and react to light, both direct and consensual, and to accommodation.

V There is no weakness of the masseters, temporals or pterygoids and there are no sensory changes in the face.

VII There is no weakness of the facial muscles; the lips can be drawn back equally and the cheeks blown out equally on each side. Taste in the anterior two thirds of the tongue is good.

VIII The patient has a little difficulty in hearing the ordinary spoken

voice. He cannot hear a watch ticking, if it is more than 8 or 9 inches away from either ear. He occasionally has a little tinnitus, but no vertigo.

IX Taste in the posterior two thirds of the tongue is good. There is no anaesthesia of the pharynx and no dysphagia.

X The palate moves well and equally on both sides.

XI The sterno mastoids and trapezoids act strongly and equally on the two sides.

XII The tongue is protruded well, but diverges very slightly to the left.

Cervical Sympathetic: The pupils dilate to shade. There is no proptosis, ex- or en-ophthalmos, no retraction of the upper lid, no pseudoptosis and no flushing or sweating of the face, neck or arms.

Motor Functions: There are no abnormal movements. There is no weakness of the muscles of the upper and lower limbs or of the trunk. There is no paralysis and no atrophy of any muscles, but the general muscle tone is poor. There is no inco-ordination.

Reflexes: The conjunctival and palatal reflexes are present

The abdominal reflexes are present and equal on both sides.

The cremasteric reflex is present on both sides.

The plantar reflex is flexor on both sides.

The wrist and elbow jerks are active and equal on both sides.

The knee and ankle jerks are active and equal on both sides.

There is no ankle clonus.

The organic reflexes are unaffected.

Sensory Functions: There are no subjective sensations and no objective disturbances.

Haemopoietic System.

There are no enlarged lymphatic glands.

The thyroid gland is not enlarged.

The spleen is not palpable.

Locomotory System.

The left leg is $2\frac{1}{2}$ -3 inches shorter than the right.

Reproductive System

The prostate gland examined per rectum is large and firm, but not tender. There are no evidences of present or past venereal disease on the external genitals.

Commentary.

Diagnosis. The combination in this case of dropsy, albuminuria, haematuria and casts in the urine makes the diagnosis of some form of nephritis practically certain. The only other condition which might give rise to this combination of signs and symptoms is heart failure. Oedema and albuminuria are frequent accompaniments of the latter, and haematuria may occur and casts be found in the urine. Haematuria is ~~not~~ very common however in heart failure, and the casts in the urine are as a rule hyaline and fatty, not blood casts, such as were found in this case. The oedema of heart failure is also somewhat different from that of nephritis. In the former it usually appears first of all in the feet and spreads gradually upwards. In the latter the swelling is often noticed first of all in the face, as the oedema appears early in the eyelids. Actually in this case the patient noticed the swelling first of all in his feet, but the following day his wife commented on the swelling in his face.

More important in this case is the entire absence of any other evidence of cardiac failure. Dyspnoea is an invariable accompaniment of heart failure, and would have been a pronounced feature of a case with such a degree of oedema as this. The heart is certainly somewhat enlarged, but the heart sounds are distinct,

not feeble, and there are no murmurs. The pulse is rather slow, but is strong and quite regular in time and force. The blood pressure is distinctly raised. The liver is not enlarged. In short there is no evidence of any cardiac lesion, or to support the view that the oedema is due to cardiac failure.

Haematuria was a prominent symptom in this case, and we may briefly review its possible causes, although the majority of these can very quickly and obviously be excluded in the present case. Blood may be present in the urine as a result of (1) Renal causes or (2) Affections of the Urinary Passages. It may also occur in certain general diseases such as malaria, purpura, leukaemia, scurvy and syphilis, but there is nothing in this case to suggest any of these. In cases where the blood comes from the lower urinary passages it is usually bright red in colour, and appears chiefly at the end of the act of micturition, not intimately mixed with the whole of the urine passed. Further in these cases the haematuria is not accompanied by oedema nor does the urine contain albumin in greater quantity than can be accounted for by the blood present in it.

Apart from nephritis the most common renal causes of haematuria are renal calculus and new growth of the kidney. The history, however, is totally unlike that of a stone in the

kidney, in which one would expect acute attacks of renal colic to be prominent and pain to be more constant and severe.

A new growth of the kidney usually gives rise to very profuse haematuria, but casts are not found in the urine and there is no oedema. A renal infarct causes pain in the back and haematuria, but is associated with endocarditis, and there is no oedema unless this results from heart failure. In this case, however, the combination of signs and symptoms is such that it obviously excludes all these possible causes of haematuria and makes the diagnosis of nephritis certain.

There are three principal forms of nephritis which we have to consider. They are (1) Acute Nephritis. (2) Chronic Parenchymatous Nephritis and (3) Chronic Interstitial Nephritis.

In the last of these the most marked changes are not in the urinary system, but in the cardio-vascular system. The arteries are thickened, the blood pressure is high (180-250 mm of mercury) and the heart is usually markedly hypertrophied. The patient passes large quantities of urine (often 100 oz. in 24 hours) of low specific gravity and pale colour. There is as a rule only a trace of albumin and a few hyaline or granular casts in the urine. Oedema is rare except with cardiac failure.

Parenchymatous nephritis on the other hand, whether

acute or chronic, is ^{characterized} ~~marked~~ by marked oedema, scanty urine of rather high specific gravity, containing large quantities of albumin and casts. Cardio-vascular changes are slight and may be absent altogether, except that the blood pressure is usually increased. Quite clearly then this case is one of parenchymatous nephritis, not one of chronic interstitial nephritis.

The main difficulty here is to decide whether we are dealing with an acute or chronic process. The somewhat profuse haematuria and the presence of blood casts in the urine ~~are~~ ^{are} usually associated with the acute form of nephritis. On the other hand in this case, there is a history of kidney disease ten years ago and of occasional headaches and slight pain in the kidney region ever since then. This, and the slight cardiac hypertrophy, are more in favour of chronic parenchymatous nephritis which frequently develops as a sequel to an attack of acute nephritis. At the time of his admission to the Infirmary the patient was suffering from an acute exacerbation of ~~the~~ chronic disease which has almost certainly been present for the last ten years at least. This acute exacerbation was in all probability due to the "feverish cold" from which he was apparently suffering for several weeks prior to ~~its~~ ~~onset~~ his admission to hospital.

Prognosis. The prospects of the patient's recovery from the immediate acute phase of the disease are fairly good. At the time the report was written, he had been under observation for several days. During that time the oedema had diminished appreciably, and the blood pressure had increased. The albumin content of the urine was still high, but the blood ~~had~~ was less in quantity and a few days later had diminished appreciably. There seems good reason to expect, therefore, that the acute phase will gradually subside, and the patient be much improved.

The outlook for the future is, however, very grave. There is practically no hope now of actually curing the condition and the present acute exacerbation is bound to have damaged the kidney still further. Life is scarcely likely to be prolonged more than a few years. The patient's surroundings and mode of life evidently expose him to the risk of secondary infections, and even a slight cold or a mild bronchitis is likely to cause an exacerbation of the renal condition, and may lead on to death from pneumonia, or pleurisy or pericarditis. The renal condition may become steadily worse, and the oedema more persistent and obstinate. It may spread and lead to general anasarca and oedema of the lungs and death from cardiac failure. Death may occur from uraemia, but this is not so likely in chronic parenchy-

matous nephritis as in chronic interstitial.

Treatment. The patient must be confined to bed until his urine is free from blood, and there is a marked diminution in the albuminuria and oedema. In a chronic condition such as this the albumin is not likely to disappear altogether. Special care is needed to protect the patient against any chill owing to the risk of pneumonia complicating the condition and leading to a fatal termination. This is specially necessary in this case where the patient is already suffering from bronchitis. This is almost certain to keep up the acute phase of the nephritis, and should be treated by maintaining the warmth of the patient, and giving an expectorant cough mixture, such as the following:-

R. Ammon Carb. gr. XVI
 Chloroform m XVIII
 Vin. Ipecac. $\text{ʒ} \text{II}$
 Infus. Quill. ad $\text{ʒ} \text{VI}$

Sig: $\text{ʒ} \text{ss}$ every four hours until the cough is easier, when it may be taken three times a day.

The ~~secretory~~ reduction in the secretion of urine is apt to lead to the accumulation of poisonous waste products in the system and elimination by every possible channel should be encouraged. Every effort should be made to get the skin

acting vigorously. This can often be effected by keeping the patient constantly warm. He should lie between blankets, and have 6 or 8 hot water bottles in the bed. In urgent cases a hot pack or hot air bath may be used, but these measures are scarcely needed in the present case. The use of diaphoretics such as jaborandi or pilocarpin is unwise on account of the danger of their producing oedema of the lung.

~~The bowels~~ It is essential to encourage free elimination by the bowel. A dose of magnesium sulphate (3 ss) should be given at first. To keep the bowels acting, Pulv. Jalap. Co. ~~xxx~~ grms should be given every second or third day.

The question of diet in the treatment of chronic parenchymatous nephritis is a somewhat vexed one, different views being held according to the theory accepted of the pathology of the oedema. Thus Epstein, who regards the oedema as being ~~due~~ to the ~~to~~ connected with the low protein content of the blood, which he has demonstrated in this condition, recommends a high protein diet. The usually accepted principles in the construction of a diet for this type of case are (1) to restrict proteins and (2) to reduce salt intake.

In the present case the patient should be restricted ~~for the~~ to a fluid diet until the acute symptoms subside. For the first

48 hours he should have nothing but arrow root water, and for the next few days the diet should be restricted to milk. As the condition improves green vegetables and fruit may be added, then bread and farinaceous foods, butter and cream. Later still he may have fish and eggs. Meat, except white meat such as chicken, should be forbidden. The salt content of the food should be reduced to a minimum. Salt can be replaced by lemon juice. For the future the diet should be largely lacto-farinaceous. Fluids should be given freely at all times.

The possibility of reducing the oedema by the use of diuretics has to be considered, but the results are usually disappointing in this type of disease. In chronic nephritis the kidneys are already damaged and it is therefore unwise to use stimulating diuretics such as caffeine, theobromine or diuretin. In this case the blood pressure is already high, and therefore there is little to be gained by endeavouring to raise the pressure further and force more blood through the kidney. The other method of producing diuresis is to increase the quantity of the circulating fluid by giving the patient large quantities of fluid to drink, and by increasing the osmotic pressure of the blood by giving urea or one of the saline diuretics such as potassium citrate or acetate. In this case as the oedema is subsiding and the output of urine increasing, there

is little indication for the use of any diuretic, but improvement might be hastened by giving 45 grms of urea three times a day.

For the future the patient must be warned to take life very quietly and avoid any mental or physical strain. His diet should be largely lacto-farinaceous, and he should specially avoid red meat. He ought not to take any salt with his food, nor have any cooked in it. His consumption of alcohol should be strictly moderate. He should exercise special care to avoid colds and chills, and would be well advised to wear a cholera belt round his loins.

THE ROYAL INFIRMARY OF EDINBURGH.

Misc. 22

Book.....No.....

Disease *Acute Rheumatism.*

Result.....

Name of Patient *John Dowling.* Age.....

Usual Postal Address.....

Date of Admission *18th February 1929.* Date of Dismissal *18th April 1929*

Case taken *10th April 1929.* Case read.....

Synopsis—

Symptoms—General and Special

Four horizontal dotted lines for notes, grouped by a large right-facing curly bracket.

Treatment—

General and Special

Four horizontal dotted lines for notes, grouped by a large right-facing curly bracket.



Signature of Clerks.....

Signature of Resident Physician.....

John Dowling

West Craig Quarry, Blackridge, West Lothian.

Age: 46 Occupation: Carter. Single.

Admitted: 18/2/29

Recommended by M.O.P.D.

Examined 10/4/29.

Complaint: Pains in the shoulders, arms and knees.
Swelling of wrists and knees.

Duration of illness: Two months from onset to date of examination.

History.

Personal. About a week before his admission to the Infirmary the patient felt cold and shivery while at his work and later in the day ~~noticed~~ ~~a~~ was troubled by ~~a~~ severe pain in the back accompanied by stiffness. He states that he was able to continue at work that day, but thinking it was influenza, which was prevalent at the time, he took some hot rum before going to bed that night. During the night he woke, and found that the pain had left his back and was now in his wrists. He remained in bed for two days, but the pain got worse, and he could not use his arms. He also felt feverish and very weak. He sent for his doctor who gave him

some powders, and after this he sweated very profusely. Later in the week he was given some medicine, and the pain eased off considerably. The doctor advised him to come to the Infirmary.

Previous Illnesses: He has had three previous attacks of rheumatic fever. The first was when he was 18 years old (1901) He was in bed then for 6 or 7 weeks, but cannot remember whether he was told that his heart was affected then. After his recovery he was able to do his work as usual. The next attack was 7 or 8 years later (about 1908). He was in hospital then for over 3 months, and thinks that he was told then that his heart was affected. He took a long time to regain his strength after this, but eventually he was able to do his work as usual. The third attack was in 1918, when he was in hospital for about 5 or 6 weeks. He has been free from severe attacks since then, but has had occasional pains in the arms and sides. These have never been severe enough to keep him off his work. Occasionally after a day of extra heavy work he has felt very tired and done up, but has quickly recovered on resting. He has always been able to do a full day's work, and has never suffered from breathlessness. He has never been troubled with sore throats.

The only other illness he has had was typhoid fever which he had when he was 25 years old. He states that he has not had any venereal disease.

General Surroundings: He lives in a hut with 7 or 8 other men at the quarry. The quarry in which he works is very damp, and he has to be at his work in all weathers.

Habits: He is a heavy smoker, sometimes using as much as 4-5 ozs of tobacco a week. He often drinks a good deal at the weekends.

Family: living members

Two brothers are in America and believed to be alive and well.
Three sisters, ~~who~~, he thinks, are alive and well.

Dead members.

Father died at about 46. Cause unknown, but patient was told that he used to "spit blood".

Mother died in child-birth at about the same age as the father.

State on Examination.

Intelligence average. Development is fair. Muscularity is rather poor and flabby. He has a somewhat reddish complexion with hair which was evidently fair to reddish, but is now turning somewhat grey. There are no obvious morbid appearances, nor evidence of previous disease or injury. His temperature is $97^{\circ}2$.

Note re Temperature: On admission the patient's temperature was

99:6. It came down to normal a day or two later and remained subnormal from the 20th February until the 23rd March when it rose to 100°. On the three following days the temperature rose each evening to between 101° and 102° but fell in the mornings to 99:5. It became normal again on the 27th March, and has remained so since then.)

Locomotor System.

Right Upper Extremity.

Hand There is ulnar deviation of the fingers. The 2nd and 3rd fingers are ~~flexed~~ slightly flexed at the metacarpo-phalangeal joints, and cannot be straightened, a condition very suggestive of an early Dupuytren's contracture. Abduction of the fingers is very limited, and so is extension especially of the 2nd and 3rd fingers. There is slight wasting of the interossei muscles. The hypothenar and thenar eminences show slight atrophy.

Wrist. There is limitation of flexion and extension and passive movements cause a little pain. The muscles of the forearm are hypotonic.

Elbow There is no limitation of movement and no pain on movement. The muscles of the arm are hypotonic.

Shoulder There is no limitation of movement, and passive movement causes no pain.

Left Upper Extremity

Hand. Abduction of the fingers is limited, but not so much as in the right hand. There is atrophy of the interossei muscles and also of the thenar and hypothenar eminences.

Wrist. Flexion is rather limited. Passive movement causes no pain except when an attempt is made to increase flexion. The muscles of the forearm are hypotonic. The distal ends of the radius and ulna appear to be ~~very~~ unduly large.

Elbow. There is no limitation of movement and no pain on passive movement. The muscles of the arm are hypotonic.

Shoulder. There is no limitation of movement, but the patient complains of slight pain and stiffness on ~~active~~ passive movement.

Right lower Extremity

Foot. There is very marked adduction of the great toe at the metatarsophalangeal joint — a pronounced hallux valgus. There is marked flexion of all the other toes at the interphalangeal joints — hammer toes. All the movements of the toes are somewhat limited.

Ankle. There is no limitation of movement and no pain on passive movement. The muscles of the leg are very hypotonic. Both the malleoli and the bones of the foot are very large.

Knee. The movements are stiff but not limited, and passive movement causes no pain. The muscles of the ^{thigh} leg are hypotonic.

Hip joint. There is slight limitation of flexion, and any attempt to increase flexion causes pain.

Left lower Extremity

Foot. As in the right foot there is a pronounced hallux valgus, but there are no hammer toes. There is a bunion over the outer side of the base of the great toe. Movement of the toes is limited.

Ankle There is no limitation of movement, and no pain on passive movement. The leg muscles are hypotonic. The malleoli and bones of the foot are very large.

Knee The movements are stiff but not limited, Passive movement causes no pain. The muscles of the thigh are hypotonic.

Hip joint There is slight limitation of flexion, and any attempt to increase this causes pain.

Circulatory System.

Subjective phenomena He has had a slight pain in the praecordial region, which has been constantly present for many years. He occasionally suffers from palpitation, especially after he has taken much drink or has been frightened or excited. At such times he thinks his heart beats very rapidly indeed. He has never suffered from faintness, or dyspnoea, and is not troubled with any cough.

Pulse: The arterial wall is not palpable. The pulse is regular in time and force. Its frequency is 60 per minute. The up-stroke of the wave is neither abrupt nor very gradual. The wave is well sustained, and the down stroke is gradual but not unduly slow. The vessel is rather easily compressed and the wave arrested. The blood pressure is $114/60$.

Heart The chest is fairly well covered. There is no undue flattening or prominence in the praecordial area. A somewhat forcible pulsation can be seen in the 7th interspace near the anterior axillary line. Above and medial to this is a large area of diffuse pulsation. There is also slight pulsation in the vessels of the neck and in the epigastrium.

Palpation confirms the existence of a forcible thrusting beat in the 7th interspace $6\frac{1}{2}$ " from the middle line. There is a less forcible pulsation felt in the 5th and 6th spaces also. There is no thrill.

Percussion gives the following as the position of the borders of the heart:-

Left border	Aper beat in	7 th space	$6\frac{1}{2}$ "	from middle line
		6 th space	$5\frac{1}{2}$	
		5 th	$4\frac{3}{4}$	
		4 th	3	

3rd space 2"
2nd 1"

Right border is 1" outside the margin of the sternum.

Auscultation.

Mitral Area The first sound is preceded by a loud, rough murmur, which is not propagated outside the mitral area. This is immediately followed by a loud, blowing murmur, which completely replaces the first sound, and is propagated well up towards the axilla. The second sound is closed.

Aortic Area. A rather faint blowing murmur is heard during diastole and is propagated down the sternum.

Tricuspid and Pulmonary Areas Both sounds are closed.

Haemopoietic System

There is no enlargement of the spleen or of the lymphatic glands. The Wassermann reaction is negative.

Alimentary System

Subjective phenomena. The patient has a good appetite. He suffers no pain or discomfort after food and is not troubled

with heart-burn, nausea, pain, flatulence, eructations or water-brash.

His lips appear healthy and show no evidence of previous disease. He has no carious teeth, but his gums are unhealthy. Pus and blood were seen exuding round the base of several teeth. The fauces are not congested. The tonsils are small and healthy. There is no difficulty in deglutition.

He has no vomiting. His bowels are regular.

The Abdomen

Inspection It is symmetrical with no undue prominence or retraction. It is not unduly flaccid and the abdominal wall moves freely with respiration.

Palpation There is no tenderness, resistance or fluctuation.

Percussion. The lower edge of the liver is just below the costal margin. There is no abnormal dullness.

Urinary System

No subjective phenomena

Micturition For the last few years he has had to rise at night to pass water.

Urine: Colour is amber. Quantity passed in 24 hrs: 84 ozs. Specific gravity 1014. Reaction: acid. It does not contain any albumin, blood, bile, pus or sugar.

Respiratory System.

No subjective phenomena.

The breathing is regular, thoraco-abdominal in type and the frequency 20 per minute.

Thorax. The chest is well covered and is symmetrical, and moves equally on both sides.

Palpation confirms the symmetry and equality of the movement. Vocal fremitus is equal on both sides.

Percussion. There is an unimpaird, resonant note all over the chest, and it is of the same character at corresponding points on the two sides.

Auscultation. The breath sounds are vesicular in character all over, and are similar at corresponding points on the two sides. The vocal resonance is neither increased nor diminished. There are no accompaniments.

Integumentary System.

The skin is rather dry, but there are no eruptions. The skin of the feet is very hypertrophic and tends to form callosities. There is no oedema in the subcutaneous tissues.

Nervous System.

The intelligence is average. The emotional state is quiet. The memory is good. There are no hallucinations or delusions. He sleeps well. There is no delirium, drowsiness or coma. He does not suffer from fits. His speech is clear and distinct.

Cranial Nerves.

I His sense of smell is unaffected.

II His visual acuity is failing. He has difficulty in reading the small print in a newspaper. His fields of vision are not restricted. The optic discs are circular with well defined edges and are not unduly pale.

III, IV, VI. External ocular muscles. There is no ptosis or squint and no diplopia. The ocular movements are all full. There is no nystagmus.

Pupils. These are of average size, but the left is a little larger than the right. They are both circular. They react both to light (direct and consensual) and to accommodation.

V There is no weakness of the muscles of mastication, and no loss of sensation in the face.

VII There is no weakness of the facial muscles, and no loss of taste in the anterior two thirds of the tongue.

VIII. He is slightly deaf in the left ear which feels blocked.

- IX Taste in the posterior third of the tongue is unimpaired. There is no dysphagia.
- X The palate moves well and equally on both sides.
- XI The sternomastoid and trapezius muscles act strongly and equally on both sides.
- XII The tongue is protruded straight out in the middle line.

Cervical Sympathetic

The pupils dilate to shade. There is no proptosis, no ex- or enophthalmos, no retraction of the upper lid and no flushing or sweating of the face, neck or upper extremity.

Motor Functions.

There are no abnormal movements. None of the muscles are paralyzed. The muscles of the arms and legs particularly are somewhat wasted and hypotonic (see locomotory System) There is no ataxia.

Reflexes.

Superficial The conjunctival, abdominal and cremasteric reflexes are present and equal on both sides.

The plantar reflex is flexor on both sides.

Deep. The wrist, elbow, knee and ankle jerks are active and equal on both sides.

Ankle clonus and knee clonus are absent.

The organic reflexes are normal.

Sensory Functions.

There are no subjective sensations, except a slight feeling of numbness in the left leg and foot, and no objective disturbances.

Commentary.

Diagnosis.

In this case the diagnosis of acute rheumatic fever is fairly easily made. The history of the illness is quite typical. There was an attack of severe pain in the joints accompanied by ~~the~~ fever and profuse sweating, and the pain appears to have passed from one joint to another. The previous history of several similar attacks lends strong support to the diagnosis, especially when it is ~~combined~~ associated with the presence of obvious cardiac lesions, such as are present here. Further confirmation is found in the fact that the condition has subsided and left ^{comparatively} ~~very~~ little evidence of any changes in the joints, and also in the evidently rapid response of the condition to treatment with salicylates.

There are, however, certain other possibilities which may sometimes give rise to difficulty in arriving at a diagnosis. For instance in the

acute stage, the condition is sometimes mistaken for influenza. In this disease, however, catarrhal symptoms are as a rule more pronounced, headache is more severe, and the pain, of which the patient complains, is more of the nature of a generalised, aching, tired feeling, and is not localised in particular joints, and does not give rise to any swelling of the joints. In this case also the mistake could only be made in the first few days, as the long duration of the illness would ~~not~~ ^{rule out} influenza as a possibility.

There are a number of other diseases, in which pain and swelling of the joints may occur, and which have therefore to be taken into consideration.

Rheumatoid arthritis, for instance, may sometimes be very difficult to differentiate from rheumatic fever, although the distinction is fairly clear in this case. It may have an acute onset with pain and swelling in the joints and slight temperature. There is, however, marked limitation of movement as a rule, and muscular wasting and contractures develop early and very rapidly. Later the swelling diminishes, but the muscular wasting is extreme and the contractures marked, resulting in severe deformity, fixation and loss of function in the joints. In the present case, there is very little deformity, and only slight limitation and loss of function affecting chiefly the larger joints such as the shoulder and the hip, although there is fairly marked

muscular wasting. In rheumatoid arthritis it is chiefly the smaller joints which are affected. Other points are that this condition shows practically no response to salicylates, and is not accompanied by any signs of endocarditis.

The more chronic or osteo-arthritic type of arthritis is less likely to give rise to difficulty, because its onset is rarely acute. It also causes marked deformity of the joints due to thickening of the capsule, overgrowth of bone, alteration of the shape of the joint surfaces and angles of articulation and muscular contractures. As a result of these deformities, and from locking of the osteophytic overgrowths and fibrous adhesions there is marked limitation of movement, ^{and fibrocrepitus on movement.} There is very little evidence of these changes in this case, except the ulnar deviation of the fingers of the right hand which is said to be characteristic of osteo-arthritis. It is ~~possible~~ ^{likely} of course that some osteo-arthritic changes have occurred following upon the ~~act~~ ^{and} repeated attacks of acute rheumatic fever.

In any joint condition one has always to keep in mind the possibility of gonorrhoea as an underlying cause. In this case, however, there is no evidence of gonorrhoea in any form elsewhere, and the response to treatment with salicylates shows quite clearly that the condition is not gonococcal in origin.

There is very little likelihood in this case of the condition

being confused with gout or with Charcot's joint.

In gout the smaller joints, particularly the great toe and thumb, are usually affected, and the patient gives a history of being accustomed to a fairly rich diet. It is not associated with endocarditis.

Charcot's joint affects usually the shoulder or the hip, and forms a painless swelling with much effusion into the joint. There is evidence of associated syphilis or of ~~the~~ syringomyelia. There is nothing whatever in the present case to suggest it.

Having excluded these other possible joint conditions we may reasonably conclude from the history, the symptoms, the associated ^{cardiac} lesions, and the response to treatment that this is a case of acute rheumatic fever. This is a disease in which one attack definitely predisposes to another, and in this case the patient's occupation undoubtedly exposes him to the risk of recurrent attacks.

We have next to consider the type of cardiac lesion present in this case, especially as this will be of great importance in arriving at a prognosis for this ~~case~~ patient. Whatever the nature of the lesion, it has given rise to practically no symptoms except a little palpitation occasionally. There are no signs of any importance in the pulse and the blood pressure is surprisingly low for a man of 46. The heart, however, is markedly hypertrophied and dilated, and on auscultation the following signs are noticed. In

the mitral area there is a presystolic and a systolic murmur, and in the aortic area a rather faint diastolic murmur. These are the signs of mitral stenosis and incompetence and also of aortic incompetence. In cases of aortic incompetence, however, a presystolic murmur is sometimes heard in the mitral area, although there is no stenosis of the mitral valve found when these cases come to autopsy. It is probable, therefore, that the principal, and possibly, the only, lesion in this case is aortic incompetence. The hypertrophy and dilatation of the heart have been secondary to this, and have resulted in a degree of relative incompetence of the mitral valve. This accounts for the systolic murmur heard at the mitral area.

One is distinctly surprised, however, to find that although the heart is markedly hypertrophied, the blood pressure is quite low, and that the water hammer pulse so commonly associated with aortic incompetence is not present. This suggests that the incompetence is relatively slight, and that the hypertrophy of the heart has resulted in adequate compensation, a view which is supported by the almost complete absence of any symptoms of cardiac failure. The history of repeated attacks of rheumatic fever extending over a period of many years and the great enlargement of the heart indicate that the condition of the valves is a chronic and old standing one, and not due to an acute and recent endocarditis.

Prognosis: Acute rheumatic fever in itself is not associated with a high mortality, but the accompanying cardiac lesions are responsible for a great indirect mortality. In the present case the patient has recovered from the

acute attack, and is in no immediate danger. Each attack of rheumatic fever, however, definitely predisposes to others, and therefore we cannot hold out to this patient any prospect of freedom from future attacks, especially if he continues to work in exposed and damp situations.

Of much greater importance for prognosis is the condition of the heart and particularly of the myocardium. The extent to which it has been affected can be judged by the great enlargement and hypertrophy of the heart, but the complete absence of any signs of heart failure, and the fact that the pulse is practically normal shows that the capacity of the myocardium to neutralise the effects of the lesion in the aortic valve is good. It is interesting also to find that although the heart must have been affected for many years yet the patient has been able to continue leading a fairly active, and even strenuous, life up to the present. There seems every reason, therefore, to believe that the lesions which are present are to all intents and purposes stationary and not progressive. It is also worth noticing here that in acute rheumatism the coronary arteries often escape whereas in arterio-sclerosis and syphilis, which also lead to valvular lesions, the coronary arteries are invariably affected. The condition of the myocardium is therefore likely to be more satisfactory in rheumatic valvular disease than in any other form. Taking everything into consideration we may conclude that the myocardium is at present able to cope effectively with the disability imposed upon the heart by the valvular lesions, and that

so long as this condition is maintained the prognosis is reasonably good. There is, however, always the possibility of compensation breaking down and symptoms of heart failure becoming apparent. The principal lesion in this patient is aortic incompetence, which is the most serious of all valvular lesions from the point of view of prognosis. The present state of affairs may continue for some time without causing any symptoms, but death is almost certain to be premature. Cardiac failure may come on gradually or death may occur quite suddenly, possibly as a result of some slight extra exertion.

Treatment: At the onset of the acute attack the patient should be put to bed between blankets, and given an initial purge of half-an-ounce of Magnesium sulphate. He should be kept in bed for at least four weeks after the temperature is normal in order to protect the heart, and give it a chance to recover from any fresh damage which may have occurred during the attack. Until the temperature subsides the diet should be a milk diet, and later a light diet may be given.

The drug which is of special value in the treatment of such a case as this is sodium salicylate. It should be given with an equal quantity of sodium bicarbonate to neutralise any acid formed and prevent any irritation of the stomach. A suitable mixture which might be given is :-

R Sod. Salicyl. $\overline{\text{XXX}}$ grs
 Sod. Bicarb. $\overline{\text{XXX}}$ grs.
 Ir. Zingib. $\overline{\text{XX}}$ m
 Aq. Chlorof ad $\overline{\text{Zj}}$

Sig: $\overline{\text{Zj}}$ every four hours.

This mixture should be given every four hours until the temperature falls and then three times daily. One of the difficulties of treatment is to know when to stop the use of salicylates as recurrences are very apt to occur when the drug is discontinued. As a general rule they should be given for at least three weeks after the temperature falls to normal.

Very little treatment is needed for the joint condition, but, since there are some slight chronic changes in the joints in this case, massage may be given especially to restore the tone of the affected muscles.

The patient should have a prolonged period of convalescence, during which he should be under careful supervision. If at all possible, he should try to get lighter work in better surroundings.

Progress Notes: 18th April 1929. The patient had improved considerably and was sent to the Astley Ainslie Home to convalesce.

THE ROYAL INFIRMARY OF EDINBURGH.

Misc. 22

Book.....No.....

Disease Cerebral Thrombosis Result.....

Name of Patient Alexander Wood Age 43

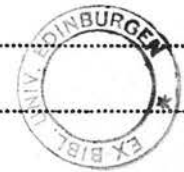
Usual Postal Address.....

Date of Admission 24th November 1928 Date of Dismissal 19th January 1929

Case taken 7th December 1928 Case read.....

Synopsis—
Symptoms—General and Special

Treatment—
General and Special



Signature of Clerks.....

Signature of Resident Physician.....

Alexander Wood.

Age 43.

Recommended by Dr. Keay, Kilty.

Admitted 24th November 1928

Examined 7th December 1928.

Complaint: loss of speech and paralysis of the right side.

History (as obtained from relatives)

The patient was perfectly well until two months ago, when just before going to bed one night he suddenly lost the power of speech. This lasted for about 5 to 10 minutes, and ^{speech} returned again quite quickly. He has had several similar attacks since then. About a month ago during one of these attacks he suddenly lost the power of his right hand, which recovered, but remained rather weak afterwards. Four days before admission the attacks of loss of speech became more frequent, and two days later the patient suddenly became paralysed down the right side, and lost the power of speech completely. He is now unable to move his right arm and leg, and is able to say only two words, "aye" and "no" in answer to questions. He has had pain in his right ear for four days, but has had no headache.

Previous Illnesses: He has been deaf in the right ear for years.

There is no history of venereal disease.

General Surroundings: He is a painter and works with lead.

Family: Wife is alive and well

Two sons and two daughters (eldest aet. 16) alive and well.

State on Examination.

His intelligence is difficult to estimate on account of the lack of speech. He appears to be of average development and good muscularity. The face is rather expressionless, but there are no obvious morbid appearances or evidences of previous disease. The patient lies with his right arm flexed at the ~~elt~~ elbow to rather less than a right angle. His temperature is $97^{\circ}8 F$.

Nervous System.

As already mentioned his intelligence is difficult to estimate owing to the absence of speech, but it would appear to be about average. Emotionally he is very unstable. For little or no reason he sometimes bursts into tears, while his face twitches and quivers very much, and then quite suddenly this ceases, and he becomes quite calm again. The aphasia makes it very difficult to judge his memory, or tell whether he has any hallucinations or delusions. He apparently sleeps very well.

Speech.

I Spoken Speech (i) Reception and interpretation. The patient's hearing is apparently quite good. If he is shown a watch, and asked whether he can hear it, he replies "Aye", no matter where the watch is held. When his eyes are closed, however, he says "Aye" when the watch is near him, and "No" when it is far away. Tested in this way his hearing seems reasonably good, in both ears.

He obeys commands to touch his nose, ear, eye, forehead and so on accurately and fairly quickly, showing that he is able to understand nouns. He also obeys commands to put out his tongue, shut his eyes, and to smile ~~and so on~~. When told to count, he touches his fingers one after another. His understanding of verbs is therefore good. When asked to use his right hand, he smiles and shakes his head, and points to it evidently to indicate that it is paralysed.

(ii) Production. The only words which he ~~uses~~ can say of his own accord are "Oh aye!" and "No". He says these in response to questions. When asked his name he tries to say it, but the ~~at~~ result is very indistinct and poor.

When asked to repeat words after the examiner, he makes an attempt and succeeds fairly well with ~~easy~~ words of one syllable such as "pen", "king", "one", "two". With longer words his attempt is unrecognisable.

When he is shown common objects such as a knife, a pencil, a watch, he seems to recognise them — he knows, for instance, that he should be able to hear a watch ticking — but he cannot say their names.

II Written Speech. (i) Reception and interpretation. There does not seem to be any defect in his vision. He obeyed the written command "Shut your eyes", and was able to point out and say the words "your" and "eyes". He failed to obey the command "Put out your tongue". When shown the question, "Can you say, 'No'?", he read it aloud as "Can you say, 'Yes'?" He was given a newspaper and was able to ~~pick~~^{point} out, and make a recognisable attempt to say words like "King", "Again", "Royal Family", "Edinburgh".

(ii) Production. When given pencil and paper and asked to write his name, he tried to do so, but produced only an unintelligible scrawl. He could not write words to dictation or copy. Part of his difficulty in trying to write is probably due to having to use his left hand.

III Phenomena associated with Speech. He understands pantomime. He shakes his head for "No", and nods for "Yes". He points to his right arm and shakes his head, when asked to move that arm.

He ~~so~~ recognises common objects and their use. Thus he tries to write when given a pencil. He can light a match, and blow it out when lit.

Cranial Nerve Functions.

I The power of smell cannot be estimated since the patient is unable to name the various substances used for the test. He says "Aye" when asked if there is any difference between them.

II The visual acuity is good. It is difficult to judge the fields of vision because the patient keeps saying "Aye", even when one's fingers are obviously outside his field. On ophthalmoscopic examination the discs are neither unduly pale nor hyperaemic. The discs are circular and the edges well defined. The fundi are within the limits of the normal.

III, IV, VI There is no ptosis or squint. There does not appear to be any diplopia, as the patient ^{says correctly} ~~is able~~ to recognize "one" or "two" according to which number of fingers is held up. The ocular movements are all good. There is no nystagmus.

The pupils are of average size, equal and circular. They react to light, both direct and consensual, and to accommodation.

V The masseters, temporals and pterygoids all act well and equally. Sensation in the face is unimpaired.

VII When he smiles, the right labial fold appears to be slightly deeper than the left. Otherwise, no weakness can be detected on blowing out the cheeks or wrinkling the forehead.

VIII The condition of his hearing, as already described in connection with the speech function, is good.

IX As in the case of smell the aphasia makes it difficult to judge his sense of taste. He is very apt to reply "Aye" to all questions.

X The palate moves well and equally on both sides.

XI The ~~the~~ left sternomastoid and trapezius ~~move~~^{act} well, but those on the right side are quite paralysed.

XII The tongue is protruded straight out.

Cervical Sympathetic. The pupils dilate to shade. There is no proptosis, no ex or en ophthalmus, no retraction of the upper lid, no pseudoptosis, and no sweating or flushing of the ~~the~~ face, neck or upper extremity.

Motor Functions.

There are no abnormal movements of any kind.

The Upper limbs. The left arm is strong and can execute all the usual movements well. There is no atrophy of the muscles and no inco-ordination. The right arm is completely paralysed. When lifted ~~round~~^{from} the bed and released, it ~~drops~~^{falls} back at once. The muscles are not atrophied. There is some spasticity at the elbow.

The lower limbs. The left leg is strong, and can execute all ^{movements} well. The right leg is paralysed, but less completely than the right arm. The patient can abduct and adduct the leg slightly, and can extend and flex the knee. Dorsiflexion of the foot is very weak. There is no atrophy of the muscles. There is definite spasticity at the knee and ankle.

Reflexes: The conjunctival and palatal reflexes are present.
 The plantar reflex is extensor in the right leg, flexor in the left leg.
 The cremasteric reflex is present on both sides.
 The wrist and elbow jerks are present in both arms, but are increased in the right arm.
 The knee and ankle jerks are present in both legs, but are more active in the right.
 Ankle clonus is present in the right leg.
 The organic reflexes are unimpaired.

Sensory Functions.

There is no loss of tactile sensation in any of the limbs or in the trunk. The right leg ~~is slightly~~ shows slight hyperaesthesia to pain such as the prick of a pin, and also to heat.

Cerebro-Spinal Fluid

Cells 1 per c.mm.

Globulin shows no increase

Colloidal gold curve: 0000000000

Wassermann reaction Negative.

In examining the other systems the aphasia made it impossible to obtain any satisfactory information as to the subjective phenomena and these are not included in the report.

The Circulatory System.

The Pulse: The arterial wall is not palpable. The rate is 60 per min. The pulse is regular in time and force. The upstroke is fairly sharp and is well maintained, and the down-stroke is gradual but not unduly slow. The blood pressure, estimated by the finger, is about 120 mm of mercury. The pressure estimated by the sphygmomanometer is systolic 115 and diastolic 70.

The Heart:

Inspection: The praecordial region is slightly more prominent than the rest of the thorax. There are no distended veins. The apex beat cannot be seen. There are no extra-cardiac pulsations.

Palpation: This confirms the slight prominence of the praecordial region. The apex beat can just be felt in the fifth intercostal space at the mid-clavicular line. There are no other impulses, and no thrills can be felt.

Percussion: The apex of the heart is just behind the 6th rib, 4 inches from the middle line. The following are the distances of the left border of the heart from the middle line in the ~~other~~ ^{other} spaces:—

5th space, 3½"; 4th space, 3"; 3rd space, 2½".

The right border of the heart is ½" outside the right margin of the sternum.

Auscultation: Both sounds are clear in all areas and there are no murmurs.

The Respiratory System

No subjective phenomena, such as cough or breathlessness, were observed, nor did the patient seem to be in any pain.

The breathing is regular, thoraco-abdominal in type and the rate is 20 to the minute.

The Thorax: ~~The~~

Inspection: The chest is well formed and well covered. It is symmetrical except for a very slight bulging of the praecordial region. The movements of the chest are good and equal on both sides.

Palpation: This confirms inspection as to the form and movements of the chest. Vocal fremitus is slight and is equal on both sides.

Percussion: A good resonant note is obtained at both apices, below the clavicles in front and right down the back on both sides to the bases of the lung. Tidal percussion shows a good expansion.

Auscultation: The breathing is vesicular at the apices and elsewhere. There are no accompaniments. The vocal resonance is equal at corresponding points on the two sides.

The Alimentary System.

The lips are a good colour, and show no sign of disease. The patient has a complete artificial upper denture. In the lower jaw he has only two incisors and two canines, all of which are fairly good. The gums are fairly

healthy, but a little pus can be expressed from them at the roots of the remaining four teeth. The tongue is slightly furred. The fauces appear healthy and the tonsils are not enlarged.

The Abdomen:

Inspection: The abdomen is symmetrical with no undue prominence or retraction. It moves well on respiration.

Palpation: There is no tenderness, no resistance and no fluctuation.

Percussion: The lower border of the stomach is at the level of the umbilicus. The liver is not enlarged. There is no evidence of any free fluid.

The Urinary System

The urine: The colour was amber. The quantity passed in 24 hours on the day of examination was 700 cc. The specific gravity was 1017 and the reaction was acid. It contained no blood, bile, pus, sugar or albumin. There was a deposit of mucus.

The Haemopoietic System

There are no enlarged glands

The thyroid gland is not enlarged

The spleen is not palpable

The Wassermann reaction is negative.

Commentary

Differential Diagnosis.

The outstanding symptoms in this case are the aphasia and the hemiplegia. The most common cause of these symptoms is vascular disease of the brain, usually cerebral thrombosis, less commonly embolism and in rare instances haemorrhage. Other possibilities, however, which require consideration are cerebral tumour, general paralysis of the insane, uraemia, epilepsy and migraine. Of these the last three can quickly be dismissed.

In some cases of epilepsy it is true that the epileptic convulsion may be followed by varying degrees of weakness in the affected muscles (Todd's paralysis) with transient signs of loss of function of the pyramidal system, such as loss of trunk reflexes, increase of jerks and extensor plantar response. There may even be severe paralysis lasting many hours. In this case, however, there is nothing in the history to suggest that the attacks, from which the patient suffered were of the nature of epileptiform seizures. There does not seem to have been any loss of consciousness, any twitchings or any local fits. Further the persistence of the hemiplegia and the aphasia and the definite localising signs of an ~~cerebral lesion~~ upper motor neurone lesion ~~for~~ and their presence three weeks after the actual attack puts

The diagnosis of post-epileptic paralysis quite out of court.

Similarly in migraine, aphasic and hemiplegic attacks may occur. Aphasia is not common, however, and the hemiplegia consists of a transient weakness of the limbs which lasts a few hours only, and is not accompanied by organic signs. The history also is in no way suggestive of migraine.

In uraemia hemiplegia and aphasia may occur, and are often due to small vascular lesions, but in this case none of the characteristic signs and symptoms of uraemia are present. There is no history of any drowsiness or coma, and there are none of the urinary or cardio-vascular signs of ~~chronic~~ acute or chronic nephritis.

Of the remaining possibilities there is very little evidence on which to base a diagnosis of cerebral tumour. None of the general symptoms due to increased intracranial pressure, that is headache, vomiting and optic neuritis are present. It is possible of course for a cerebral tumour to exist, and give rise to ~~no~~ focal symptoms alone without any evidence of increased pressure. Such a condition is, however, stated by ~~Collier and Adie~~ to be met with more often in advanced age, and when arterial disease is present. The tumours which ~~are~~ occur in the brain are most commonly gliomata. These are soft, rapidly growing, vascular tumours and in their vessels degenerative processes are very liable to occur causing thrombosis and

haemorrhage. These secondary vascular lesions ~~may~~ give rise to focal symptoms, and these may be the first and only signs of the presence of a tumour. Clearly in such a case the diagnosis in the first place is that of the vascular lesion, and the possibility of a pre-existing tumour is largely a matter of inference.

Before we can definitely diagnose a vascular lesion, however, another possibility ~~which~~ must be considered, and it is in this connection that the real interest of the case lies. Considered from a purely clinical standpoint there are many features which suggest general paralysis of the insane, and it is only when the laboratory findings are taken into account that the diagnosis can finally be settled. In general paralysis so-called "congestive" apoplectic attacks may occur. They usually appear late in the course of the disease, but may occur at any time, and may even be the first noticeable symptoms. In these attacks hemiplegia and ^(or) aphasia come on quite suddenly and then slowly pass off, in the course of a few days or weeks. These attacks are probably due to syphilitic thrombosis, which passes off rapidly and completely, but while the characteristic signs of general paralysis slowly develop.

In this case the age of the patient has to be taken into account. He is only 43, and therefore rather young to be the subject of a vascular lesion. His history is also very suggestive

In the course of a few months he has had a number of attacks of aphasia. The first of these came on quite suddenly, lasted 5 or 10 minutes, and then passed off completely. In one attack the aphasia was accompanied by paralysis of the right arm, but this too passed off, though the hand remained weak for some time. Another interesting feature is the patient's highly emotional condition, which was noticed on more than one occasion. This combination of comparatively early age and emotional instability with recurring attacks of aphasia and paralysis, from which recovery, except in the last attack, was rapid and complete, is very strongly suggestive of an early general paralysis of the insane.

One is, therefore, very surprised at the results of the examination of the blood and the cerebro-spinal fluid. The Wassermann reaction of the blood is negative, whereas in general paralysis it is almost invariably positive. As far as the cerebro-spinal fluid is concerned, each of the four tests applied to it is completely negative. We must, therefore, either accept this as completely disposing of the diagnosis of general paralysis, or we must question the correctness of the laboratory findings. It is easy to see how a mistake might be made in a large laboratory examining many specimens, and how the reports of two specimens might be confused. To make quite certain that this has not occurred, a second specimen of cerebro-spinal fluid should certainly be sent for examination. On the evidence at present available, however, we must conclude that the

patient is not suffering from general paralysis of the insane, and if this is ruled out the only possibility which will account for the symptoms is a vascular lesion of the brain.

Such a lesion may be thrombosis, embolism or haemorrhage. Of these embolism can almost certainly be ruled out, since no obvious cause for it, such as valvular disease of the heart, aortitis or pulmonary thrombosis is present. Thrombosis is a more common cause of apoplexy than haemorrhage and is more frequently survived. Haemorrhage is in the great majority of cases fatal within a few hours or days of its onset. It is nearly always associated with chronic interstitial nephritis, arterial degeneration and high blood pressure. The absence of these in this case and the history of recurrent attacks with complete recovery makes the diagnosis of cerebral thrombosis almost certain.

Thrombosis follows upon arterial degeneration and this may have resulted from one of several causes. In the first half of adult life syphilis is the commonest cause of thrombosis, but, as we have already seen, if syphilis had been present in this case, we should have expected to find certain positive evidences of it in the blood and cerebro-spinal fluid, and the character of the colloidal gold curve might have helped to differentiate between general paralysis of the insane and syphilitic thrombosis. In the absence of this evidence, as already mentioned in connection with general paralysis, the diagnosis of syphilitic thrombosis is not justified.

Atheroma is the commoner cause in the second half of adult life, and on the evidence available we must conclude that it is probably responsible for the thrombosis in this case. Other possible causes, which quite obviously do not apply to the present case, are renal disease, abnormal conditions of the blood as in the puerperal state and septicæmic conditions, inflammatory conditions such as lethargic encephalitis and poliomyelitis and traumatic lesions. The possibility of the thrombosis being associated with a ~~tumour~~ new growth of the brain cannot, however, be quite so summarily dismissed. A tumour may be present, but if so, it has not as yet given rise to any recognisable symptoms apart from the vascular lesion.

Aphasia is usually considered as being of three types according to the site of the lesion producing it. These are:-

1. Motor aphasia, which is characterised by loss of voluntary speech, the lesion being in Broca's area.
2. Sensory aphasia, in which there are defects in spoken or written speech, due to lesions in the auditory and visual centres.
3. Anarthria & Aphemica. in which there are disorders of articulation resulting from lesions of the paths conducting impulses from the motor centres to the muscles of the tongue, lips and larynx.

In the present case the power of voluntary speech is lost, but the understanding of speech is retained to a quite remarkable extent. There is also inability to write, and some loss of power to read, though

This is less than one might have expected. There is no evidence of any defective power of articulation, for there are a certain number of words which the patient is able to say reasonably well. Clearly then we have to deal here with a motor, and not a sensory, aphasia. In the latter the usual defects are "word deafness", in which sounds convey no meaning and speech is a mere jargon of words, and "word blindness" in which the patient is unable to read, though he understands speech and voluntary speech is little affected. Neither of these defects is present in this case.

To complete the diagnosis we must next consider the site of the lesion, which is responsible for the symptoms. The motor speech centre, or centre for the production of speech, is situated in a right handed person, such as the patient is, in "Broca's area", which is in the third left frontal convolution. The lesion responsible for the motor aphasia must, therefore, be one affecting this area.

The hemiplegia in this case was probably originally fairly complete, though at the time of examination there ~~was~~^{were} only very slight signs of any weakness in the face, and the leg was beginning to recover. The paralysis was of a spastic character, the deep reflexes were increased and the Babinski reaction on the right side was extensor. Therefore the paralysis is of the upper motor neurone type. The lesion must therefore affect either the motor area in the cortex (the ascending frontal gyrus) or the nerve fibres from this motor area on their way downwards to the spinal column.

Further since the paralysis is on the right side, the lesion must be on the left side of the brain. In a lesion situated in the cortex the paralysis is usually limited, whereas in ~~one~~ ^{a lesion} affecting the nerve fibres in the internal capsule it is much more wide spread. There are no special localising symptoms to suggest that the ~~paralysis~~ lesion is situated anywhere else than in the internal capsule.

Now the artery which is the commonest site of thrombosis is the middle cerebral artery. This artery passes laterally into the lateral fissure of the cerebrum, and ends in ^{cortical} branches, which supply the lateral surface of the hemisphere, and central branches, which supply the internal capsule. The lesion in this case, therefore, would seem to be thrombosis of certain of the branches of the left middle cerebral artery.

Prognosis: The immediate prognosis for the recovery of speech and function in the limbs is very good. In fact at the time that the patient was examined, three weeks after the seizure, there were already signs that the power of speech was slowly returning, and that the paralysis of the leg was passing off. There is every reason, therefore, to hope that in these respects there will be complete recovery in time. The fact that recovery has taken place after previous attacks bears this out. The affected muscles will remain very weak for some time, but ought, never the less, to recover.

Prognosis for the future must, however, be extremely guarded.

Arterial disease is undoubtedly present in the cerebral arteries and it is not amenable to any radical treatment. It is said that many cases of apoplexy due to atheromatous thrombosis may survive for years without any recurrence of thrombosis or occurrence of haemorrhage, but the risk is always present, and cannot be ignored. Careful regulation of the habits and diet may minimise this risk, but cannot entirely obviate it.

In this case the history of frequently recurring attacks within a few months does not encourage undue optimism. With successive attacks the effects have become more wide-spread. At first the only symptom was aphasia, later this was accompanied by paralysis of the right hand, and in the last attack by complete right-sided hemiplegia. This can only mean that the arterial lesion has become more extensive. It may continue to progress and involve the main stem of the middle cerebral artery, and if thrombosis occurs there, the resulting hemiplegia will most likely be permanent. One fears, therefore, that the future history of this patient is likely to be one of recurring attacks of thrombosis of increasing extent, eventually terminated by a rapidly fatal haemorrhage.

Treatment.

In this connection consideration must be given to treatment of the actual seizure and its sequelae; and treatment designed

to safe-guard the patient for the future.

As soon as symptoms appear, absolute rest is essential. The patient should be kept in bed, and, if conscious, should make as little effort as possible. His head and shoulders should be raised, care being taken to see that his neck is not bent, and that nothing interferes with the return of blood ^{from} ~~to~~ the head. A stimulant line of treatment is to be adopted, and all measures which tend to lower the blood pressure and diminish the heart's action must be avoided. It is as a rule a period of low blood pressure which has allowed ~~of the~~ of thrombosis. Alcohol, which is rapidly absorbed, may be given, and strychnine to improve the heart's action, ^{if it is feeble.} Restlessness should be combated with bromides. Free purging should be avoided, as it tends to lower the blood pressure, and the bowel should be relieved by occasional enemata. The diet should be restricted to fluids for a time.

If the patient survives the first few days, potassium iodide should be given, beginning with \bar{X} grs. t.i.d. and increasing to ~~XXX~~ grs. t.i.d. in the course of ~~a~~ two or three weeks. After the first few days passive movements should be used daily to all the joints of the affected side to prevent the formation of adhesions. With returning power, massage and passive movement should be given to the affected limbs. As soon as returning power allows of it the patient should be got on to his feet and encouraged to attempt to

walk.

For the future the patient must be enjoined to practise strict moderation in all things. Large, heavy meals ~~and~~ should be avoided and the use of meat be very restricted. Alcohol should be taken sparingly, if at all. Severe mental and physical exertion and all emotional disturbance should be carefully avoided. Careful regulation of the life in ~~this~~ along these lines may be successful in guarding the patient against a recurrence of the attacks.

Progress Notes: The patient slowly recovered the use of his right leg and arm, and his speech gradually improved. He was discharged on the 19th January very much improved.