ON MYXOEDEMA

AND

THE FUNCTIONS OF THE THYROID GLAND,

With Notes on the Treatment of Certain Cases of Insanity by Thyroid Preparations.

BY

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During a period that might be called the crowning stage of myxoedema - from July 1891 [1] till now - much light has been thrown on this disease. Some points, however, have either been omitted, or left in obscurity, or still form the subject of debate, not so much in the clinical aspects, but rather with reference to the causation of myxoedema, its physiology, its morbid anatomy, and to its treatment by thyroid preparations. To these points I will specially draw attention. My remarks are based on six cases of myxoedema that have been under my care and observation. The clinical records of two of these cases are fully embodied. To prevent repetition one would have been sufficient to record were clinical phenomena only to be considered: the second case, however, is both interesting and instructive, - it was the only fatal one and allowed of a post-mortem examination being made.

Mrs. Jane Kelly or Donelly [2] A.e. 51, housewife, was admitted into Woodilee Asylum on 24th. March 1888.

History. Patient, who had been complaining of bodily weakness ever since the menopause, that is for four years, took to

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(1) Murray. Note on the treatment of Myxoedema by Hypodermic Injections." Brit. Med. Assoc. at Bournemouth.

(2) Partially Reported in Glasgow Med. Journal Aug. 1893.

to bed about Christmas of 1887 on account of this failure of strength. It was at this time that symptoms of mental aberration first shewed themselves. Her mental condition was, according to her son's statement, bad only at night: she was quite well mentally throughout the day. On March 18th. 1888, feeling herself a little stronger she went out alone to chapel. - While in chapel she fainted, was carried to the Northern Police Station near by, and from the Police Station to the Royal Infirmary. The following is an extract from the case books of the Royal Infirmary about her condition at this time. "Her face looks puffy: it does not pit on pressure: her legs are swollen: the skin is dry and scaly: she speaks with a slow monotonous articulation. The heart and lungs are normal: the urine is non-albuminous." Her mental condition necessitated her transference to Woodilee Asylum on 24th. March 1888. On admission she was very excited and violent in her behaviour to those around her. Her language was incoherent and she had delusions. Thus, she accused the nurses in the Hospital of stealing a bag of gold and other valuable things belonging to her. Her bodily health was very feeble. She was so weak as to require support when she walked: the tongue was slightly furred: the pupils unequal: speech slow and with a slight drawl and slur. Round about the eyes there was oedema: the face was swollen and the complexion/

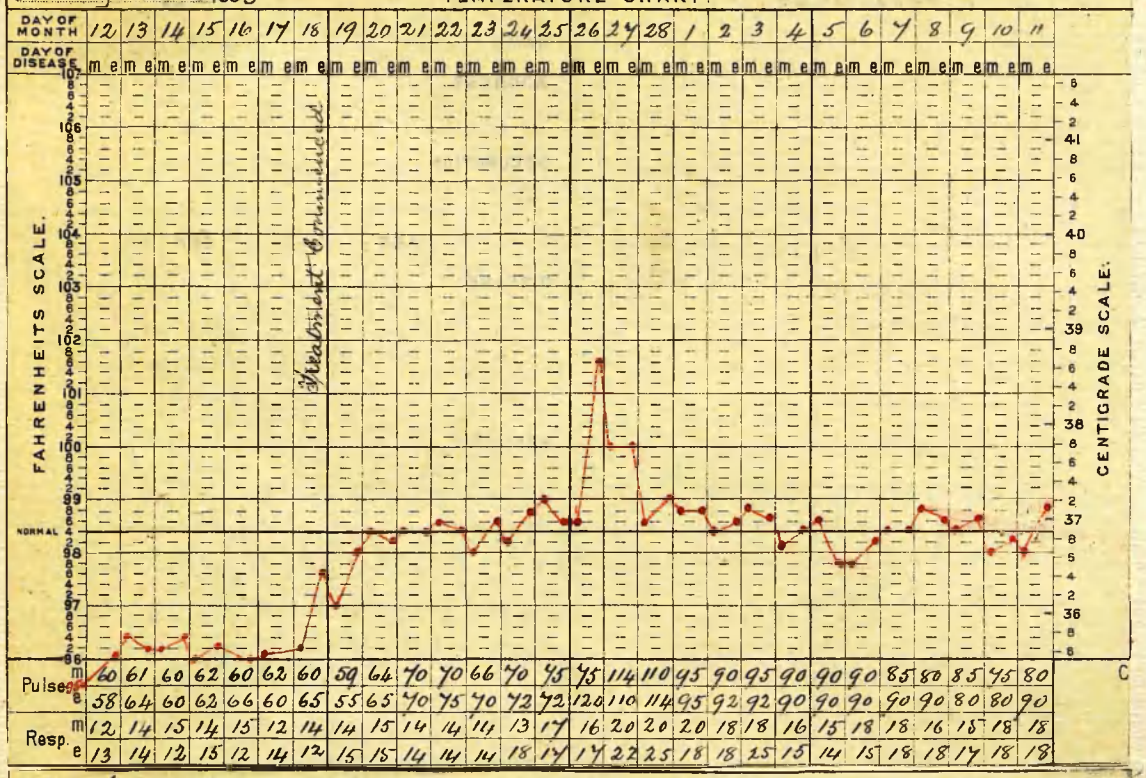
complexion white and waxy looking: the urine contained no albumen. She was recognised as a case of myxoedema. From admission till now (17th. February 1893) the myxoedematous condition has progressed slowly. Periods of maniacal excitement were very frequent. In one of these.— Shortly after admission she got very excited, tore her bedding, and refusing food, required to be fed by the stomach tube. In the intervals between the fits of excitement the patient was very dull, would sit on a chair near the fire and speak to no one. She was liable to attacks of sickness during which her appetite got very bad, and she would vomit any food given to her. Immediately after one of these sick turns on 31st. August 1888 she went into an apparently unconscious state and was insensible to slight degrees of pain. As the bodily illness increased the fits of excitement were not so violent, and the intervals of dulness between them considerably prolonged. About the end of last year these excited fits gave place to periods of greater depression than usual during which the patient only got angry when irritated in some way by any person. Just before treatment commenced she had to take to bed altogether on account of the increased bodily weakness.

Previous Health. Beyond what was evidently an attack of chlorosis at eighteen years of age, the patient states that she has had no previous illness.

Case 1. Mrs D.

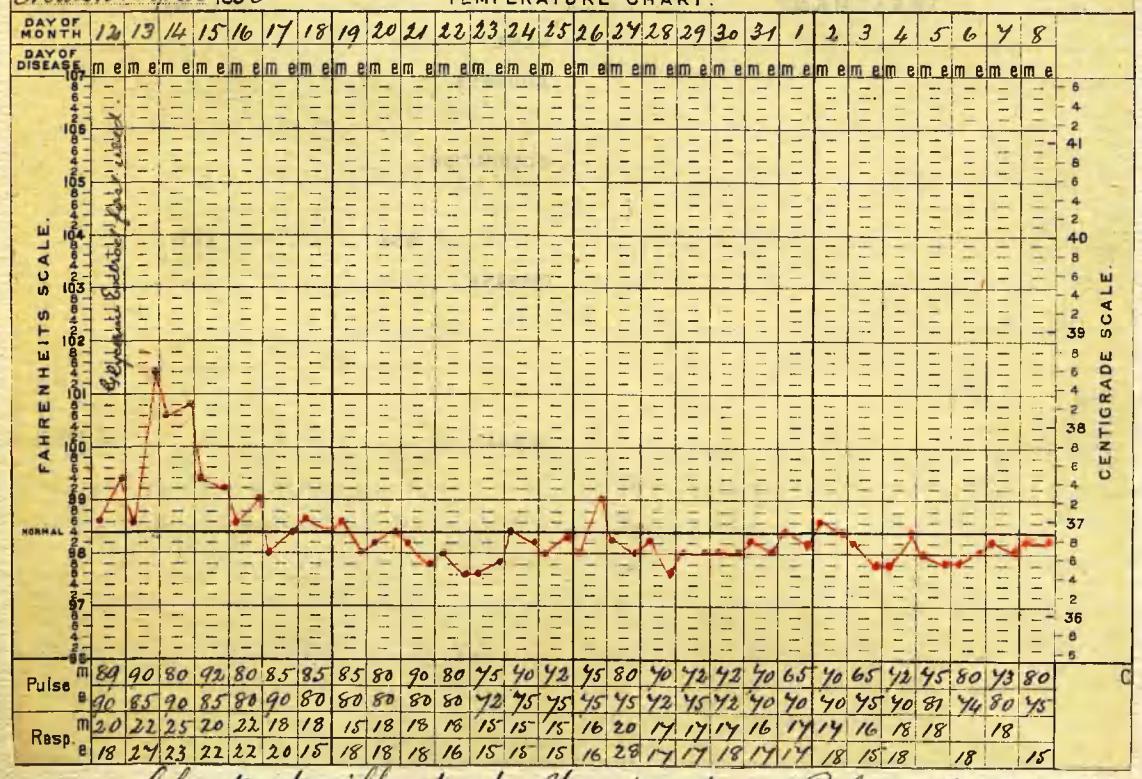
February & March 1893

TEMPERATURE CHART.



March & April 1893

TEMPERATURE CHART.



Charts to illustrate Temperature, Pulse & Respiration rates in Case I (Mrs D) previous to & during Treatment

Family History, reveals nothing important. - She married at nineteen, had twelve of a family, nine boys and three girls - She had one miscarriage.

Present Condition. The temperature was taken for one week thrice daily previous to beginning treatment. With the pulse rate and number of respirations it is recorded in the accompanying chart. The lowest temperature was 95.2 Fahr. - the highest 96.4 F. The face is pale in colour and waxy looking. It is devoid of expression, wrinkles are absent from it. - Transverse wrinkles only are present on the brow. There are venous stigmata on the cheeks. The nostrils are much thickened and swollen - the lips large, drooping, and slightly livid. The whole body is swollen. This swelling is specially noticeable on the face and hands: it does not pit on pressure. There is slight oedema round the eyes, and at the ankles which pit on pressure. The thyroid gland cannot be felt, nor is there pain complained of in this region. The skin is dry, and roughened by large epidermic scales. Perspiration is absent from all parts of the body but the head. The patient says that the sweat here is cold and bad-smelling. The hair is very scanty - it is present only on parts of both frontal and temporal regions. It is short there and brittle, owing to bodily weakness. - She can only get up out of bed a few hours during the day. When up she can

Case 1 Mrs D.	Before Treatment	During Treatment Tonic (Iron) given from 4th March 1893				
Year & Month	1893 February	February		1893 March		April
Date	15	21	28	4	14	8
1. Percentage proportion of red blood corpuscles to that of health	75	75	77	80	85	Normal
2. Percentage proportion of white blood corpuscles to that of health	103	103	102	103	102	Normal
3. Percentage proportion of Haema-globin to that of health	55	54	56	56	70	85

Chart to illustrate the state of the blood previous to & during treatment Case 1 Mrs D.

1893 Month	Date	Urine in 24 hours	Spec. Grav.	Urea in Grains	Body Weight in pounds	Albumen	Sugar or Bile	Other abnormal urinary constituents	Remarks
February	16	32 oz	1023	180	146	nil	nil	nothing of import.	3½ grains of
	17	38	1021	244					urea per
	18	35	1021	232					pound weight
	19	45	1015						of the body
	20	44	1018	480					is the normal
	21	43	1023						estimate ✻
	22	43	1025	750	140½	nil	nil		
	23	44	1014						
	24	43	1021						
	25	45	1021						
	26	46	1021	650					
	27	50	1014		133½	nil	nil		
	28	47	1019						✻ McKendrick
March	1	44	1019						Spec. Physiology
	2	44	1023	675					p. 401.
	3	46	1022						
	4	52	1017		123	nil	nil		
	5	47	1019	580					
	6	49	1014						
	7	52	1017	570					
	8	47	1015						
	9	50	1017	468	116				

Chart to illustrate the state of the Urine previous to and during treatment Case 1. Mrs D

can do no work. Walking across the ward is sufficient to fatigue her. She sits close to the fire even in hot weather and in a warm room, as "she always feels cold." She appears to take no interest in anyone or anything around her, only gazes stupidly at the fire. When spoken to, she either becomes angry and strikes at the person speaking to her, or she answers questions in monosyllables. She still has delusions about her wealth, and states that everybody robs her of valuables. The heart's action is slow and weak: pulse beats sixty per minute, is moderately full and easily compressible. Hearing is dull, she must be spoken to loudly. Speech slow, monotonous + blurred. Reflexes equal - but blunted, Common Sensation slightly depressed - Pain blunted

Respiratory System, normal.

Digestive. The gums are swollen and overlap the teeth in some parts. The teeth are loose. The inside of the cheeks is swollen. Tongue is large, flabby, and shows the marks of teeth. It is covered behind and in the centre by a slight white fur. The saliva is thick and tough. Appetite bad. She is liable to attacks of sickness, when she vomits any food she may have taken previous to the attacks. Bowels slightly costive, motions normal. Urine 1017 acid contains no albumen. The amount secreted in the 24 hours, with the quantity of urea in the same period is given in the accompanying chart.

TREATMENT AND PROGRESS OF THE CASE.

Notes/

Notes were taken daily, and the following is a synopsis of the more important results.

Preparations of Thyroid were first given on the 18th. of February. One quarter of a Thyroid gland taken from a sheep just after it had been killed was given daily, mixed up with some bread crumbs and two ounces of sherry. It may here be noted that the sherry was given daily for some time before the treatment commenced, and had not the slightest effect on the temperature.

18th. February. Towards evening became a little restless and uneasy. - Temp. slightly elevated. Urine for 24 hours 45 oz. Has slight headache.

19th. Temperature normal: pulse quicker and somewhat stronger. Is taking her food and sleeping well

20th. Temperature normal, feels weak. This weakness is most pronounced when she gets up out of bed.

24th. To-day felt faint, and was sent to bed immediately: then she recovered in a short time. Pulse of moderate size, compressible. Weight 140½ lbs.

26th. Temperature in the evening 100.6° F. Pulse quick and strong. Perspirations slightly increased. Patient is restless, uneasy and excited by hearing strange voices. People she says are constantly speaking to her.

27th. Complains of severe pain all over the body. This pain is relieved by pressure. Severe frontal

frontal headache is complained of. The appetite is not so good as usual to-day.

7th. March. Downy hair is appearing on the bald parts of the head. The scales are coming off the skin, and the patient is sweating all over, but chiefly in the arm-pits and palms of the hands.

10th. Weight 123 lbs. Is able to be up out of bed from 6 a.m. till 6 p.m. Is much more sensible and talks in a bright cheery way, and does a little work.

12th. The treatment by fresh glands had to be discontinued. It was difficult to get them. A glycerine extract of Thyroid prepared by Thomson, chemist, Hillhead, was then used. This preparation was examined microscopically by Dr. Fred Pollock. Two ounces of the glycerine extract contained one whole sheep's thyroid, and the dose given was one drachm daily. At night the patient was very weak and complained of muscular pains all over the body.

13th. Feels better this morning. After dinner she became sick and vomited her dinner. Temperature in evening 101.4° F. Pulse strong and a little quickened. Respirations increased. She felt very faint on attempting to get up out of bed at night.

14th. Is feeling very well this morning: sweating profusely: able to get up out of bed for about 3 hours.

17th. Weight 116 lbs. Hair is now about 1 inch

inch long: is smooth and healthy looking. Skin smooth and moist. Freckles have come out on the face and hands. She is bright and intelligent, anxious to help, and works well.

24th. Is up all day now, and works well. Appetite good.

15th. April. Is now feeling much stronger. Is able to walk about in the grounds a great part of the day, - assists the nurses in their daily work. Is able to sew and read. She can converse quite intelligently, is very cheerful in disposition and is anxious to get home to her family about whom she could give no account before she was submitted to treatment. She is now able to answer all questions about her relations fully.

21st. September. Discharged as recovered.

Catherine Anderson or McIntosh, A.E. 52, widowed, domestic, was admitted to Woodilee Asylum on 19th. February 1895.

History. The present illness is about 2 years duration. It commenced in January of 1893. The patient then complained to her friends of general weakness. This feeling of weakness, which did not prevent her conducting the business of a small shop she had, continued for about a year, when,

when, in addition she noticed that she was becoming much stouter, and that her eyes and feet were a little swollen. She never consulted a medical man at any time during her present illness, and previous to her admission here. About six months ago her neighbours found her unconscious in a chair in her shop. The patient herself says she often had attacks of giddiness and "fainting turns" and has for the past year had a general feeling of coldness.

In the beginning of February of this year her peculiar conduct excited the attention of her neighbours. She would not sleep in bed, but always under it. She did this, she said, because there were men in the house. She became restless and excitable. When excited she talked in a rambling and disconnected manner, and had delusions of suspicion and fear: thus, people were persecuting and annoying her. Her restlessness became greater at night, and latterly she has suffered from sleeplessness. She would not take food, as she thought it was poisoned.

Family History. Her father died of rheumatism, A.E 60: her mother of some unknown cause A.E. 40. One brother died of"diabetes" between thirty and forty years of age. Another had a "shock" - he is still living. She has two other brothers, and one sister alive and well. The patient has spent all her life in the Barony Parish of Glasgow, and had no vicious habits, nor previous illness. There is no

Case VI Mrs M'J.

March & April 1895

TEMPERATURE CHART.

DAY OF MONTH	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5
DAY OF DISEASE	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e	m e
Pulse	62	63	87	80	81	84	82	80	82	88	90	90	90	98	98	96	94	94	88	88	84							
	63	78	84	90	90	88	94	88	94	99	98	98	100	98	100	98	98	96	94	90	84							
Resp.	9	8	8	12	10	10	12	10	10	13	15	14	13	16	16	18	17	16	16	18	22							
	10	10	12	10	8	12	10	10	9	10	9	10	12	14	14	15	15	15	15	16	16	16	18	18	16	17	18	20
Motions Pulse	60/61	64/62	63/59	62/65	60/63	52/60	58/63																					

FAHRENHEITS SCALE. 107 106 105 104 103 102 101 100 99 NORMAL 98 97 96

CENTIGRADE SCALE. 41 40 39 38 37 36

M Pulse E

REMARKS.

On 6th April the Evening Temp. was 98·6° Fahr and the morning Temp. on the 7th was 102·2° Fahr.

Chart to illustrate Temperature, Pulse & Respiration rates in Case VI Mrs M'J previous to and during Treatment

no history of rheumatism or syphilis.

Present Condition. The following chart shows the temperature of the patient taken twice-a-day for a week previous to under-going treatment, with the pulse rate, and number of respirations. Her face was devoid of expression, and pale and waxy in colour. It was much swollen, especially about the eyelids. Only the swelling round about the eyelids pitted on pressure. The lips were thick, the lower lip drooped slightly: the nose was broadened and cretinoid, slight transient flushing of the cheeks is noticeable. The body is swollen generally. This swelling does not pit on pressure. On those parts of the skin which have been most exposed, the backs of the hands and wrists, the face and the neck ~~behind~~, the skin is rough and scaly. The skin is very dry, perspiration is quite absent. The hair is rough, dry, short, and scanty, especially on the vertex. Nails thick and tough. The fingers are broad and oblong shaped, fitting closely to each other, forming a spade-like hand. She has a skin affection involving the inner half of the forelegs and thighs, part of the hypogastric region of the abdomen, and the backs of the hands and wrists. This eruption is copper coloured in the background, ~~morphous,~~ and has sharply defined but regular edges. On this background are ridges of leathery consistence of a dark red colour and fissured, covered with scales in some places. These ridges

ridges at certain places united to form large patches of leathery consistence on which were numerous large flakes of silvery whiteness. In some parts where the eruption is not well marked the white skin appearing in the dark copper-coloured background gave the parts a mottled appearance. The skin affection is dry and symmetrical. The skin has a yellowish tinge, conjunctivae yellow and jaundiced in appearance. The pupils are equal and an ophthalmascopic examination reveals nothing important. She is dull of hearing, and can hear a watch tick only when it is placed close to the ear on both sides. Speech is slow, monotonous and blurred. She has a tendency to slur words, especially the last syllable of long words. Patient complains of cold shiverings and numbness and tingling of the hands and feet, which she says "have no blood in them." Her gait is feeble and staggering, especially after any little exercise. Her grasp is feeble. Common sensation is dull: very hot bodies she feels "kind of warm" and cold bodies are more readily appreciated. She can localise fairly well. Deep reflexes are absent. Superficial reflexes are present and equal. She is facile, easily pleased, and of a playful disposition. She is easily irritated, will not *at times* speak, and sulks for a few hours. She sleeps a great deal and heavily (often complains of giddiness.) She talks coherently, but cannot sustain a conversation for any length

length of time without feeling wearied. She takes stupid turns when she sometimes hears voices speaking to her. These voices make her get up out of bed, and get angry with the nurses. The area of cardiac dulness is not increased the apex beat is slightly higher than usual, and underneath the fifth rib. The heart sounds are ~~fuller~~ feeble and with difficulty heard. A slight ventricular systolic musical murmur is heard over the apex, and limited to an area of one sq. inch. Pulse is easily compressed Slow 72 of moderate size. An examination of the blood was made with some difficulty, as it was almost impossible to get a sufficient quantity. This examination showed:-

Red corpuseles per haemic unit, (i.e, two squares) ~~1,550,000~~ 31

White Corpuseles do .3

Haemaglobin 43%

Respiratory murmur healthy: respirations slow, 12 per minute.

The upper teeth are false, and so firmly fixed that they will not come out. Tongue swollen and flabby, slightly coated, and covered with the marks of the teeth, breath foul, appetite poor, bowels costive, motions costive in appearance, and clay coloured, with an offensive odour. Liver, dulness (superficial) increased: the lower edge is about ¼ inch below the border of the ribs in the nipple line. Pain is complained of on pressure in this region. The

Case of Mrs M'J (N.W.)	Before Treatment	During Treatment	
Year & Month	1895 March	1895 March	
Date	14	23	29
1. Percentage proportion of red blood corpuscles to that of health	31	31	30
2. Percentage proportion of white blood corpuscles to that of health	110	110	110
3. Percentage proportion of Haemaglobin to that of health	43	43	42

Chart to illustrate the state of the blood previous to & during Treatment Case VI

1895 Month	Date	Urine in 24 hours	Specific Gravity	Urea in Grains	Body Weight in Pounds	Albumen	Sugar or Bile	Other abnormal urinary Constituents	Remarks
March	12	26 oz	1018	198	168	Nil	Sug. Nil	Nothing	Treatment
	13	32	1020	204	168			important	Stopped on
	14	30	1015	165	168		Bile in quantity		30th Mar. 1895.
	15	43	1012						Urine frequently
	16	56	1014	840					passed in bed
	17	36	1013	546	163	Nil	Sug. Nil		or lost with
	18	40	1011	580					motions after
	19	42	1014	661			Bile in slight quantity		this date till
	20	42	1015	504					7th April date
	21	36	1010	558	155	Nil	Sug. Nil		of death.
	22	48	1012				Bile in quantity		
	23	—	—						3½ grains urea
	24	42	1018						per pound
	25	40	1011	644	152	Nil	Sug. Nil		weight of body
	26	38	1012	592					is the normal
	27	34	1014	639½					estimate See
	28	38	1013	544					McKendrick
	29	36	1011	511			Bile were marked		Phys. Physiology
	30	42	1012	632	149	Nil	Sug. Nil		p. 401.

Chart to illustrate the state of the Urine previous to & during Treatment Case VI Mrs McJ.

The urine was collected for three days successively, previous to beginning treatment. The amounts in the 24 hours of each of these days, ~~was~~ were 30oz: 31 oz: 22 oz: and the amount of urea excreted in the same periods was 198 grains, - 204 grains, - 145 grains. The urine was acid 1018 Spec: grav: of a deep yellow colour: it contained no albumen, but a large amount of bile was present. There was ~~no~~ neither sugar nor blood, a slight deposit of amorphous urates and epithelial debris was present. The chlorides were normal.

Menstruation ceased A.E. 44.

Treatment and progress of the Case.

Thyroid preparations were used in this case in the form of tabloids procured from Burroughs, Welcome & Co. The tabloids each represented 5 grains by weight of a healthy sheep's gland, and the dose varied from one tabloid twice or thrice daily to 2, and on one or two occasions 3 tabloids thrice daily. The variation in dose was regulated by the effects produced. An accurate daily report of the patient's condition was kept, and the incidents recorded therein are stated below.

15th. March. One tabloid thrice daily in a draught of milk To-day patient complains of cold feet. She is confined to

to bed. She is sweating a little in the armpits, but the sweat is sticky as ascertained by the nurse, who, neglecting to cleanse out the armpit before introducing the thermometer found it sticking there when she came to take it out.

16th. March. Was restless during the night. When asked what was troubling her, she said she heard music and people dancing. She thought the night-nurse was the doctor. The pulse is quicker, regular, of moderate size.

17th. March. Slept a good deal and heavily. Jaundiced condition slightly aggravated: pulse good. Tension moderate

18th. March. During the night heard people calling to her and got up out of bed, and walked out of the room. Motion to-day slightly yellow.

19th. March. Two tabloids thrice daily were ordered. To-day she is well and bright in manner and conduct.

20th. March. Bathed to-day: felt faint after the bath.

21st. March. Is very restless. Pulse 88 regular of moderate size and strength.

22nd. March. To-day she got three tabloids thrice. She complains of frontal headache. Wanted to rise, and was allowed to stand up, but felt so weak that she had to go back to bed again. Part of the urine was lost with the motion to-day.

23rd. March. Had three tabloids thrice to-day.

24th. March. Two tabloids thrice daily. Is sweating a little in the palms of the hands. The rough scales are disappearing from the back of the hands. The hair is falling off, in some parts, and downy hair is appearing in others. Over the shins slight pitting is produced on pressure.

25th. March. Sick and vomiting after second dose of tabloids. Pulse regular, of moderate tension and size.

26th. March. Takes very little food. Her memory is bad: is still confused at times, and mistakes the identity of those about her.

27th. March. Felt very weak to-day, pulse regular, of good tension and size.

28th. March. Has the delusion that there is a man in the room. Is very restless.

29th. March. Was very restless during the night. The nurse sent for me this morning, as she said she could not keep the patient in bed, she was so restless, and her breathing so changed. On seeing her I immediately stopped treatment. She was excited in appearance and standing up in bed. Her respirations were quickened. There was slight cough. No pain was complained of. Chest movements were symmetrical. No dulness was discoverable. The respiration sounds were harsh, and slight mucous rales were audible at both apices. Pulse was quick, regular and

and somewhat bounding in character.

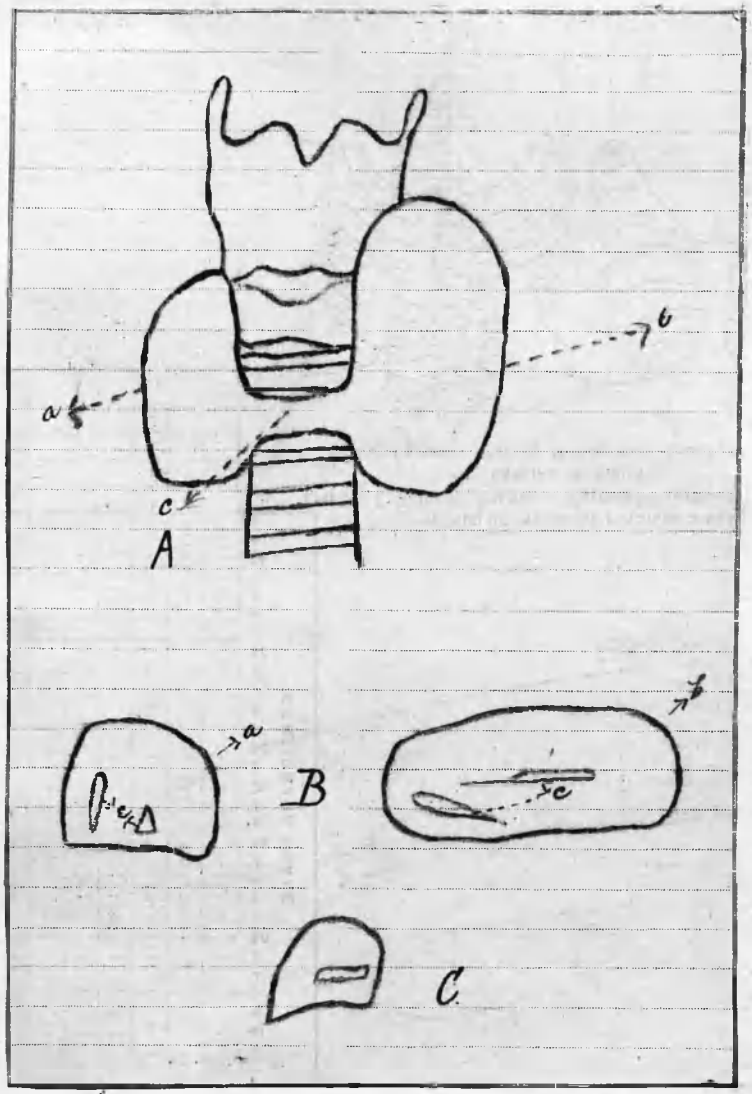
30th. March. Is very weak to-day, and talking a great deal of nonsense. There is suspicion of dulness at base of left lung: muco-crepitant rales are audible in this situation. The pulse is still quick, slightly irregular, and easily compressed.

1st. April. Is sick and vomiting. Too weak to allow of a satisfactory examination of chest.

2nd. April. Sick and vomiting. Is delirious at night.

3rd. April. Bowels moved to-day. She fainted after the exertion.

4th. April. Is a little brighter to-day, but very weak. Is able to feed herself. Motion clay-coloured. After this her condition gradually got worse. She died on the morning of the 7th. April.



A Thyroid Gland in Case VI M^r M^c I – drawn to natural size a. Rt Lobe b. Left Lobe c. Isthmus
B Left lobe longitudinal & transverse sections c glandular remains C Transverse section Right Lobe – all natural size.

natural?

In Case VI A post-mortem examination was made 24 hours after death. The temperature of the room was 50° Fahr: (1)

Macroscopic Appearances.

General Appearances. The body is swollen generally. A copper-coloured pigmentation involves the inner halves of both forelegs, the inside of the knees, the deeper and inner half of both thighs, it extends into the pubic region, and is visible for 5" above the pubis. A general yellowish tinge of the skin was noticeable especially on the face.

The Thyroid Gland. The Thyroid presents the following appearances. The rough sketch in the accompanying diagram shows the exact size of the gland, and its outline. The left lobe is slightly larger than normal. Its anterior and external surfaces are smooth and rounded in outline. It is very hard to the touch, and when cut is almost cartilaginous in appearance. Here and there as shown in the diagram slight flesh coloured streaks, not wider than ¼ of an inch are present representative of the original gland tissue.

(1) In making microscopical preparations by Bevan Lewis' Fresh method the temperature of the room should not be above 60 degrees Fahr: See Goodall "The Human Brain."

tissue. The right lobe is about one third of the size of the left lobe. It presents similar characteristics to those already depicted in the right. The isthmus of the gland is barely visible as a thin strip of cartilaginous-looking tissue. The weight of the left lobe is 250 grains, that of the right, 110 grains (1)

Scalp. The scalp is half-an-inch thick. This increased thickness is due to the large amount of fat present. It is soft and loosely attached to the periosteum.

Scull Cap. The scull cap is of normal thickness and appearance. The diploe is pale in colour, but the meshes are well filled. Pacchionian indentations are few in number and of small size.

Meninges of the Brain and their spaces. The Dura mater is wrinkled and flaccid over the vertex, but otherwise presents no abnormalities. A large amount of watery fluid acid in reaction (2) is present in the arachnoid cavity. The pia arachnoid shows milky patches over the Sulci (3) and Sinuses. The veins are markedly injected, a semi-

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(1) The normal weight of the Thyroid is from 480 to 960 grains. Quain, vol: II 359.

(2) Cerebro-spinal fluid is alkaline.

(3) This appearance is almost always seen in the brains of middle life.

semi-gelatinous matter is present in the subarachnoid Cavity, especially in the region of the Sulci. The superior Cerebral veins are deeply injected.

Brain. The brain tissue is soft and pulpy, and the Capillaries are injected. The lateral ventricles are distended with fluid. All the above-noted conditions are symmetrical. The basal arteries are apparently healthy, the pons, medulla, and cerebellum have all soft and pulpy tissues, and their vessels veins and capillaries especially are injected. The brain weighed 48 ounces.

Respiratory System. The mucous membrane of the larynx is swollen and vascular, the vocal cords are thickened soft and vascular, the lining membrane of the trachea is soft, swollen and injected. The lumina of the bronchi and bronchioles are filled with frothy, slightly blood-stained mucus.

A large number of Strong fibrous adhesions bind the visceral pleura of the right lung to the parietes of the chest. The right lung is also bound down by similar adhesions firmly to the diaphragm. This lung is deeply conjested, its anterior and internal free edges are emphysematous. The left pleural cavity is almost obliterated by fibrous tissue binding the parietal to the visceral pleura. The lung is deeply conjested, and at the base of the lower lobe is a large patch about three inches square of

of consolidated lung tissue in the state of grey hepatisation. The visceral pericardium is adherent to the parietal for about one square inch anteriorly. The heart weighs 10¾ oz: the whole anterior surface is infiltrated with fat, the muscle substance is flabby but microscopically shows little evidence of degeneration.(1) All the valves are competent and show no traces of disease. The aorta has slight atheromatous patches. The spleen weighs 4¾ oz: and is deeply conjested. The great omentum is loaded with fat to the extent of half an inch. The liver weighs 2 lbs, 3¼ oz: On the surface of the right lobe marks of the ribs are visible. It is nutmeg in character and shows general biliary staining. The lining membrane of the ductus communis is swollen and fills the lumen of the duct.

The Kidneys to the naked eye present no abnormalities. The left weighs 3¾ oz: the right is 4 oz. The ovaries weigh 40 grains, the right being 22 grains in weight, the left 18 grains. The bone marrow is paler than usual.

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(1) Sims Woodhead, experimenting on rabbits with Thyroid extract, found degenative changes in the muscle substance.

Photo-micrograph to illustrate the state of the Thyroid Gland in Myxœdema x 90. Case VI Mss M. J.

Photo-micrograph to illustrate the fibrous tissue in the Thyroid Gland of Myxœdema x 420. Case VI Mss M. J.

Microscopic Appearances.

Microscopical examination was made of all the organs of the body, of the skin, and subcutaneous tissue. Changes were noted in the Thyroid gland, in the brain, in the skin and subcutaneous tissue, the lungs and the liver. Microscopical preparations from the Thyroid gland were made in the manner recommended by Lee.(1) The specimens were first fixed in 5% solution of corrosive sublimate for about eight hours, and sections cut from paraffin. Some were strained by the Biondi Ehrlich, some with Heidenhain haematoxylon, others with methylene blue(2) and carmine stains. The photo-micrographs which I have taken show vividly the following features. The field of the microscope is occupied almost wholly by white fibrous tissue in various stages of development. The fibrous tissue is well developed round the blood vessels, and around circular collections of epithelium and epithelial debris - the relics of the original gland tissue. In no section, even where some of the fleshy streaks already mentioned are included can the normal structure of the gland be recognised. In the brain a large

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(1) Bollis Lee: Anatomist's vade mecum.

(2) Methylene blue preparations do not keep unless prepared in a special manner.

Photo-micrograph × 420 – to illustrate fibrous tissue & clump of glandular remains in Thyroid Gland of Myxoedema case W. W.

large amount of mucin, demonstrated by methylene blue is present in the neuroglia: but beyond this in sections made both by fresh methods and Golgi-Cajal there is no other evidence of disease. A large amount of mucin is present in the skin and sub-cutaneous tissues, but in addition there is an excessive deposit of fat, in the skin accumulated chiefly in the region of the hair follicles and of the sweat and sebaceous glands. The hairs are thin and atrophied.

The lungs showed the usual microscopic appearances of acute pneumonia in the stage of gray hepatisation. The liver presents the microscopical appearances of nutmeg liver, the atrophied gland tissue having present in its cells fatty particles. In addition however, fat cells are also present in the circumlobular hypertrophied connective tissue.

History of Myxoedema.

Myxoedema or Mucin-oedema was the name applied by Dr. W.M. Ord to a peculiar group of symptons first described in 1873 as "a cretinoid state supervening in adult life in women," by Sir William Gull.(1) Ord(2) by observations on two post-mortem examinations of myxoedematous cases elucidated the subject much further and established the fact, that the

the swelling of the body was due greatly to mucin, and that the condition was invariably associated with more or less complete atrophy of the thyroid. The next important step in the history of myxoedema was the discovery by Kocher(3) in 1883 that excision of the thyroid gland was followed by "cachexia Strumipriva" or a train of symptoms similar to those of myxoedema. Kocher's observations were confirmed by Victor Horsley who in 1885 by removing the thyroid glands of monkeys produced in them myxoedema. The results attending successful thyrodectomy induced Horsley to suggest the transplantation of the thyroid gland into the peritoneal cavity. This suggestion of Horsley was put into effect by Lannelongue(a) who transplanted a sheep's thyroid into the subcutaneous tissue of the left breast of a myxoedematous cretin. So long as the transplanted thyroid retained its vitality, the myxoedematous state was arrested. The obvious difficulties of transplantation of the thyroid gland, namely its tendency to absorption in its new situation or to decay ere it could establish a vital relationship with the new tissues, not to speak of the difficulties of operation and its dangerous results, suggested to Dr. Murray the hypodermic injection of extract of the sheep's Thyroid, which served the purpose in view more effectually. From

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(1) Trans. Clin. Soc. London 1873-4
(2) Med. Chir. Trans 1877.
(3) Langenbecks Archives Vol 29, p 2 1883.
(a) Le Progrès Médecin p 209.1890.

From hypodermic injection to feeding - the present method of administering thyroid preparations - the transition was easy.

The Etiology of Myxoedema.

The relationship between the Thyroid gland and Myxoedema has thus been proved by the facts:-

(I) Complete removal of the gland is followed by myxoedema.

(II) The symptoms of myxoedema are mitigated, or do not appear, if some portion of the gland is left.

(III) Displacement of the normal gland tissue by abnormal strictures results in myxoedema.

(IV) The administration of normal glands cures the disease.

The causes of the disease then must be sought in anything that interferes with the normal gland, and prevents it~~s~~ functionating more or less, or anything affecting the functionating of the gland, and thus inducing atropy in it. Among the causes predisposing to myxoedema are age, sex, heredity, and perhaps habits of life, occupation, previous disease, and atmospheric conditions. The ages of the six cases under my observation ranged from 40 to 60, and thus occurred in

in middle life, and all after the menopause. But the disease is not confined to, though most prevalent in middle age, and cases have been recorded as happening at 22 on the one hand, and 72 on the other. Out of a table of 100 published cases [1] 16 only are under 40 years of age, while 10 are above 60. Sporadic Cretinism [2] which is now considered as practically the same disease as myxoedema is congenital. Like goitre, myxoedema is more prevalent amongst females than males. All my cases were of the female sex. The prevalence of myxoedema in middle-aged females bears a relationship to the cessation of menstruation and the nature of the relationship I shall try to explain when the function of the Thyroid gland is discussed. Hereditary causes prevail chiefly in cretins. It has been shown, that in many cretins the parents have had some affection of the thyroid gland: affections which in the parents have destroyed the gland would, one might surmise, be specially prone to take in the offspring the form of an atrophied state or complete absence of the thyroid gland.

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(1) Cecil Beadles. The treatment of Myxoedema and Cretinism. Journ. Ment. Science Oct. 1893.

(2) Hilton Fagge gave in 1871 the name of sporadic Cretinism to Congenital Cretins in whom there is atrophy or absence of the Thyroid Gland.

gland. Conditions ascertained by Curling in 1850 to be present in sporadic cretins. As predisposing and disturbing causes might be classed ~~is~~ inflammatory disturbance, simple or specific, due to such causes as cold, the specific fevers, tubercle carcinoma or sarcoma or abnormal growths of any kind. The inflammation may be acute, and then subside into a chronic form, or it may disappear, leaving weakened soil behind it. An example of the latter class of inflammatory disturbances was afforded during the recent epidemic of influenza: when I had an opportunity of seeing certain cases, where the thyroid gland had become suddenly enlarged, and acutely inflamed, the inflammation passing away with the subsidence of the disease, or shortly after it. An indoor and town life, such as all the patients led, with the dyspepsia attendant on all of them, and jaundice superadded in one, by reducing the bodily health may predispose to the disease. Myxoedema, in the sense that goitre is, so far as my observation goes, is not endemic or sporadic. I had under my care for over a year all of the insane poor from the southern Counties of Scotland (the goitrous district of Scotland on Sir Arthur Mitchell's showing,) and never saw a case of myxoedema from the district. On the other hand goitres by destroying the normal gland-tissue may induce myxoedema, and in this way myxoedema should prevail in a goitrous district.

The Functions of the Thyroid Gland.

To give a clear understanding of myxoedema something must be said on this heading. As regards the functions of the thyroid gland, there is no general concensus of opinion. Horsley advocates these views:-

I. It is directly a blood-forming organ.

II. It is indirectly a blood-forming organ.

III. It modifies or destroys substances in the blood harmful to the general economy.

IV. It secretes some substance useful to the general metabolism.

This fourth view is similar to Schiff's theory: it has been extended by Sanquirico and Canalis, who maintain that the gland secretes some material necessary for the nourishment of the central nervous system. There is not sufficient evidence to prove that these theories include the whole function of the thyroid gland, but they certainly include the opinions as to its function now generally accepted by physiologists. The first and second of Horsley's views, that the thyroid is directly and indirectly a blood-forming gland, are based on the facts that "bodies resembling blood plates have been found in that gland, that

"that the lymphoid tissue of the gland is haematogenous, and that disease or removal of the thyroid gland is followed by diminution in the number of the red corpuscles, and increase in the number of white corpuscles - by anaemia in short. The presence of the blood plates aforementioned has not been satisfactorily explained, but the presence of lymphoid tissue is ably shown by Gibson (1) not to have any blood-forming action. This tissue, he says is also evident in the lungs, and pancreas, and its mere presence does not justify the conclusion that it is blood-forming. At first sight clinical evidence might be brought forward to support the view that the thyroid is a blood-forming gland, because its removal is followed by anaemia. In all my cases blood examinations were made, and these examinations revealed that in myxoedema there is anaemia, more or less profound, in direct proportion to the seriousness of the symptoms. The anaemia however is due to, rather than the cause of the profound nutritional changes resulting from the disease of the thyroid. Gibson (1) by a series of experiments on dogs, has shown that as regards corpuscular elements, the thyroid has no blood-forming properties, and McKendrick (2) holds that there is almost no evidence in

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(1) Gibson Brit. Med. Journal 14th. June 1893.

(2) McKendrick "Special Physiology" p. 176.

in support of the view that the thyroid is a blood-forming gland.

The third view of Horsley, that the thyroid modifies or destroys substances in the blood harmful to the economy, arises from the presence of mucin principally in the fluids and tissues of the body in cases of myxoedema. For a long time it was supposed that the thyroid gland had special control over the mucin in the body: but this view appears to me to be swallowed up in the fourth conclusion of Horsley, and for this reason. - Mucin is largely found in the embryonic tissues (1) and indeed at an early period of development is the only form of connective tissue. Its presence in myxoedema is due to the reversion back from higher forms of tissue to more primitive forms, for is not fat also an ever increasing element in the later stages of myxoedema ? And this reversion of the type of connective tissue is more likely to be due to the loss of some substance which, when secreted is necessary for the general metabolism of the body.

This fourth conclusion of Horsley's is supported

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(1) According to Schafer in his address on "Physiology" at the recent meeting of the Brit. Med. Assoc. Semon has enunciated the theory to the effect that removal of the thyroid produced an interference with the full chemical development of the constituents of the connective tissues so that these tend to take on an embryonic character.

supported by other facts. The thyroid gland seems to bear a direct proportion to the amount of mucin in the body. In the new born infant Krause (1) has found that the weight of the thyroid gland in proportion to the weight of the body is one to 240 or 400. At the end of three weeks it becomes 1 to 1160 and in the adult 1 to 1800. The thyroid is therefore relatively larger in the foetus and in infancy when mucous tissue predominates. Again, the thyroid gland is relatively larger in females than males, and in many of the former it appears to undergo a periodical increase about the time of menstruation.(2) It is evident then that there is some connection between the gland and menstruation. During menstruation a large quantity of mucus is thrown out of the body. We have already seen that when a large quantity of mucous tissue is to be disposed of and its place taken by other forms of connective tissue the thyroid gland is increased in size. On the other hand the accumulation of mucous tissue in the body as in myxoedema is associated with atrophy of the thyroid gland. It is evident then that some substance is secreted by the thyroid gland necessary for the general metabolism of the body when this substance is increased in amount by increased function of the gland, mucin is thrown out of the body conversely when the necessity

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(1) Quain's Anatomy, Vol. II p. 539 9th. edition.

(2) Quain's Anatomy, Vol II 9th. edition. p. 538.

necessity for the action of the gland is slightly diminished, as, when menstruation ceases more or less atrophy [1] of the gland ensues, when the gland becomes too much atrophied the proper metabolism of the tissues is again upset and the presence of degenerative forms of tissue in the body as in myxoedema is demonstrated.

The substance secreted by the thyroid gland, and useful in the metabolism of the body is considered by Horsley to be a colloidal substance, and to be transmitted by the lymphatics into the circulation. Others hold that this substance is of the nature of a ferment, that it bears the same relation to thyroid juice as pepsin to the gastric and ptyalin to the Salivary fluids.

The extension of the fourth view of Horsley's as to the function of the thyroid gland by Sanquirico and Canalis that the secretion of the gland has a special action on the central nervous system finds its chief supporter in Dr. Gibson [2] Horsley holds that the nervous affection is only an expression of the general disturbance of metabolism caused by loss of the thyroid tissue. In a post-mortem examination of the Central nervous system the state

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(1) The thyroid glands of middle aged persons always show degenerative changes.

(2) Gibson "Trans. of the 3rd. Intercolonial Med. Congr. of Australia."

state of the tissues might be described as water-logged, and microscopical examination of the parts showed no alteration in the appearance of the nerve cells, not even the vacuolation one might have expected as the myxoedematous insanity in the case in question in many points resembled epilepsy where vacuolation [1] occurs. It is reasonable to suppose that if there is loss of a substance specially needed for the support of the central nervous system there would be present degeneration fuscous or other in the cells, and that this degeneration would be primary whereas if it appears it is only in the latest stages of myxoedema and as a result of the intersticial changes, the muscular tremors, spasms and convulsive attacks, the phenomena, on which Sanquirico and Canalis' theory is based, are more naturally explained by the shock to the organism on the performance of thyroidectomy rather than the withdrawal of a secretion specially required by the Central nervous system. In myxoedema these nervous symptoms appear in the very latest stages.

Morbid Anatomy and Pathology.

The general swollen condition of the body in the primary

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(1) Bevan Lewis "A text Book of Mental Disease" p. 524.

primary stages of myxoedema has been demonstrated chemically by Dr. Ord[1] and microscopically by later observers to be due to mucin.

The chemical composition of mucin is, according to Obolensky,[2] C. 52.31 per cent, H. 7.32 %, N. 11.84, O. 28.63. The excess of mucin present in myxoedema is found in all the connective tissues of the body, swelling out the connective tissue cells and filling the intercellular spaces. The neuroglia is affected similarly to the other connective tissues of the body and sections of the Central nervous system stained with methylene blue show this clearly. But mucous tissue is not the only form of reversion that connective tissues take, fat is deposited in large quantity especially in the latter stages of the disease. In the post-mortem examination made in case VI the amount of fat in the skin and subcutaneous tissue was very large as may be clearly seen from the following data.

Fat in the Neck.		6/16 of an inch deep.
" " "	Chest	1 9/16 inches.
" " "	Abdomen.	1 13/16 "

The fat had a yellowish oily appearance, and not the firm white appearance of health. To the above-noted changes in the connective tissue are due the clinical

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(1) Ord. Med. Chir. Transactions 1877.

(2) Mc.Kendrick "General Physiology" p. 81

clinical phenomena of more or less blunting of common and special sensation and the similar changes in the neuroglia with the accumulated fluid in the Meningeal spaces and ventricles of the brain amply account for the mental phenomena accompanying myxoedema. The thyroid gland though as a rule diminished in size is not always so, and cases of myxoedema associated with goitre have been recorded. The usual changes in the thyroid as already detailed are those of chronic inflammation and the fibrous tissue seems to develop in the usual way from the connective tissue cells of the gland, and the inflammatory products. The increase of this fibrous tissue is followed by atrophy of the normal glan tissue.

Symptoms and Progress of Myxoedema.

Under this heading so much has already been written, and in clearer language than I can aspire to, that, to avoid reiteration I leave the cases as reported to speak for themselves, and will confine myself to idiosnycracies noticed in my series of cases, and the mental phenomena of myxoedema. 5

In four of the patients skin affections in one form or other were present, and notably in the case of Mrs. Mc.J. (V1) already reported. These eruptions were

were erythematous, or pigmentary staining such as is noticed in persons accustomed to toast their feet before a fire.

The skin affection in case VI puzzled me for some time. The opinion that it was due to the patient sitting before the fire with her clothes well drawn up was confirmed by one of the Commissioners of Lunacy, who had often in the far North of Scotland seen persons similarly affected, and by the cause already stated. In myxoedema a feeling of general coldness is always complained of, as evidenced by the fact that affected persons as a rule sit close to the fire. In case VI well-pronounced jaundice was present, due, as ascertained after death to cirrhosis of the liver. Whether the liver was affected previous to the onset of myxoedema, or whether the affection of the liver was induced by the myxoedema must remain a moot point. It is quite possible that the condition was a result of myxoedema as the case was a well-advanced one and at a stage when interstitial changes in the internal organs might have developed. Case III Mrs. W showed a moderate amount of albumen in the urine. This amount however never varied before and during treatment, and the patient made a good recovery from well pronounced myxoedema. Albuminuria [1] and ascites have been noticed in certain cases more especially as a fatal termination approached.

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(1) Bristowe "Theory and Practice of Medicine" 7th. Edit., p. 176.

To illustrate the facial expression & appearance of the face & hands in Myxoedema. Mrs M. Case VII

Myxoedema may develop in an insane patient and in one of my patients (Case V) M. Insanity had long been present ere symptoms of myxoedema showed themselves. Savage (1) was the first to point out the relationship of Myxoedema to Insanity, there is no longer any doubt that myxoedema causes Insanity.

This Insanity is peculiar to Myxoedema and takes the form of progressive dementia. The characteristic appearances of the face in the accompanying photographs shows that as there is want of expression externally, so there is more or less complete vacuity of mental phenomena. The facial aspect becomes Cretinoid. Among the first symptoms of mental alienation to appear are hallucinations of sight and hearing founded on a dulness of the perceptive faculties.

Associated with these symptoms are dullness and at times explosive maniacal outbursts as in Senile Insanity. At first there is a rise in subject consciousness shown in the prevalence of gloomy emotions, of irritability and of delusions of a melancholic type thus, ideas of persecution, of morbid fear, and of suspicion against people the patients come in contact with. This stage passes on into a gloomy introspective state, the patient lives a great deal in the past, dreams usually of a pleasant aspect are experienced throughout the day the patients are now less easily

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(1) Savage "Insanity" p. 416.

To illustrate the facial expression & appearance of the face & hands in Myxoedema Mrs M'I. Case VI

easily irritated, reaction time is greatly prolonged. It is now that the epileptiform symptoms develop first as simple giddiness then with more or less complete unconsciousness superadded and finally epileptic fits where the convulsions are general, though mere negation of mental phenomena may ensue without the intervention of an epileptiform or epileptic stage. Observations on the mental phenomena of all my cases have thus enabled me to divide Myxoedematous Insanity into three stages; not that there is any demarcating line between them, they all pass gradually into each other, and it is obvious that circumstances do occur to alter the current of these stages, the tendency that patients have to get almost better in bright sunny weather, the beneficial effects of such treatment as Jaborandi, and the stoppage so to speak of the Myxoedema, as if there were left protected from the inroads of disease sufficient Thyroid gland tissue to ward off the disease beyond a certain point. In a progressive case and excepting the above mentioned irregularities the description of three stages must be admitted to be fairly accurate. The mental phenomena above noted are primarily due to an interstitial nervous lesion, and as in the progress of the disease there is a combination of pressure irritative and degenerative symptoms, so there must be a corresponding combination of interstitial and parenchymatons

parenchymatous nervous lesions, that this is so is borne out by the records in some post mortem examinations of degenerative changes in the nerve cells. Such degenerative changes, however, it must be remembered, are all in advanced cases, in other words are never primary an argument which has already been adduced against the theory that the Thyroid Gland secretes a substance which has a specific action on the central nervous system.

Treatment of Myxoedema and Therapeutics of Thyroid Preparations.

The method of treatment in all the six cases of Myxoedema was this. The patients were put to bed under close supervision for a week previous to beginning treatment, and accurate observations of the temperature, pulse, and respiration rates, of the weight, of the corpuscular richness of, and the amount of haemaglobin in the blood, and the amount and character of the urine were taken. These observations were conducted daily until the myxoedematous symptoms disappeared, the diet was not changed in any way throughout treatment, and Thyroid preparations were administered. If during their treatment the patients could get up through the day they did so. Any unusual development

development was immediately reported and in the meantime if the patient was up she was put back to bed. Bad effects of treatment disappeared with rest, stimulation if necessary, and modification of the amount of thyroid given.

The treatment of myxoedema has now resolved itself into treatment by preparations in one form or other of Thyroid Extract. I have used preparations in three different ways.

(1) The normal sheep's gland minced and eaten raw.

(2) A preparation of the gland made with glycerine.

(3) Tabloids containing the extract of the gland.

The modes of preparing the Glycerine and powdered extracts have been detailed by Murray (1) and White (2) No matter what form of thyroid preparation is used the general results are always similar.

The glands of sheep are used in the preparation of Extract of Thyroid as according to Horsley (3) these glands most closely resemble the human gland. The most convenient mode of giving thyroid is in the form of tabloids. The tabloid in general use is made by Burroughs, Welcome & Co., and it contains five grains by weight of healthy sheeps' gland, it may be given in any form of liquid food. The

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(1) Murray "Brit. Med. Journal." 27th. Aug., 1892.

(2) White Brit. Med. Journal 11th. Feb., 1893.

(3) Horsley "The Brown Lectures" 1884.

The daily dose may vary from three to six tabloids. Nine tabloids have been given but great care must be exercised in giving a quantity like this. The dose that seems efficient and free from danger almost, is one tabloid thrice daily. In uncomplicated cases of Myxoedema the results of thyroid administration are eminently satisfactory, and a cure always results. At first care must be exercised as bad effects, a subject I will recur to, are frequently seen. The results of treatment are immediate, and show an increased metabolism in the tissues, the myxoedematous symptoms gradually disappear, the following results always follow.

(I) The temperature, pulse, and in some cases the respirations are affected. The temperature becomes normal, and where the treatment is pushed febrile, the pulse gets stronger and more rapid, and larger, and in some instances the respirations are increased.

(II) The weight of the body is diminished.

(III) The urine is increased in amount.

(IV) The quantity of urea is increased so long as the Myxoedema lasts.

(V) Insanity is a common symptom of Myxoedema, this insanity passes off gradually with the bodily symptoms of the disease.

(VI) Ord and White's observations [1] show that the nitrogen

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(1) Ord and White Brit. Med. Journal 27th. July 1893.

nitrogen in the urine exceeds the total quantity of Nitrogen in the food, and that the phosphoric and Chlorine elumination are practically unaffected. In myxoedema no matter how small the dose is, or on the other hand if as much as fifty grains of the Extract are given daily, the action of the thyroid is always diuretic, and the increased excretion of urea an invariable result, but as the Myxoedematous symptoms disappear and the normal state of health is reached the amount of urine and its contained urea approaches that found in normal circumstances. In Mrs. D. (I) this state of matters is present now two years from the date on which she was discharged as recovered. During these two years this patient has never experienced ill health of any kind, and has taken one tabloid only daily - this dose used now in all the other cases that have recovered, seems to preserve the metabolic equilibrium that has been disturbed by the atrophy of the thyroid gland.

This atrophy, or absence of glandular tissue necessitates the continuance of thyroid treatment throughout life. On several occasions and in almost all the patients, bad effects were noticed throughout the treatment and especially at the beginning of the treatment. These were general weakness approaching almost to faintness, pains in the limbs and back, chiefly muscular, frontal headache, giddiness, paresis in the lower extremities, nausea, sickness and

and vomiting, but all these bad symptoms disappeared, as has already been indicated with rest, stimulation, and modification in the dose of Thyroid Extract.

"Notes on the Treatment

of Certain Cases of Insanity

by Thyroid Preparations.

The contention that the thyroid gland secretes some substance useful in the general metabolism of the body, having been proved in the discussion of the functions of the thyroid gland it followed that in cases other than Myxoedema where there is an accumulation of material in the body that impedes normal activity the administration of thyroid preparations would by their effects on the tissues especially by increasing their activity work off this accumulated material and so induce a better bodily condition, and as often the bodily condition is reflected in the mind a corresponding improvement might be looked for in the mental phenomena. Since the beginning of 1893, I have used thyroid preparations with beneficial results in the following class of cases. Persons of both sexes, who after middle life tend to increase in bodily weight, whose temperature is usually slightly below normal and whose life is becoming more and more inactive. With these symptoms there is often a listless and apathetic manner, dulness of the perceptions tending to dulness of mind, the presence of dreamy mental states, work is no longer a pleasure, but becomes ever an increasing burden and is given up without effort, often there is loss of memory, lack of interest in/

in others and their doings, hallucinations of sight and hearing, and delusions such as that people are plotting against them. Professor Gairdner (1) says "That increase of fat to a notable degree beyond the term of middle life is always to be regarded with suspicion as implying a probability of vital and dynamic condition of nutrition tending to precipitate the process of decay" . The following case, one of many, is taken to illustrate my argument.

J.M.,A.E. 49, cleaner, was admitted into Woodilee Asylum on 22nd. June 1894.

History on Admission.

The patient cannot give any account of herself: she answers questions only in monosyllables.- As she has no friends a definite history previous to her admission into the Asylum cannot be obtained. She is listless, stupid in manner and conduct, and at times refuses to speak.- If pressed to give an answer she gets irritated and launches out into passionate abuse. She has the delusions that she is in danger of her life from the doctor, and is so wealthy that she is able to retire and live on her money. From admission till now (16th. June 1895) the mental condition of the patient has varied little, she is somewhat more confused and more stupid.

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(1) Finlayson's Clinical Mannual - 3rd. Edition p. 10.

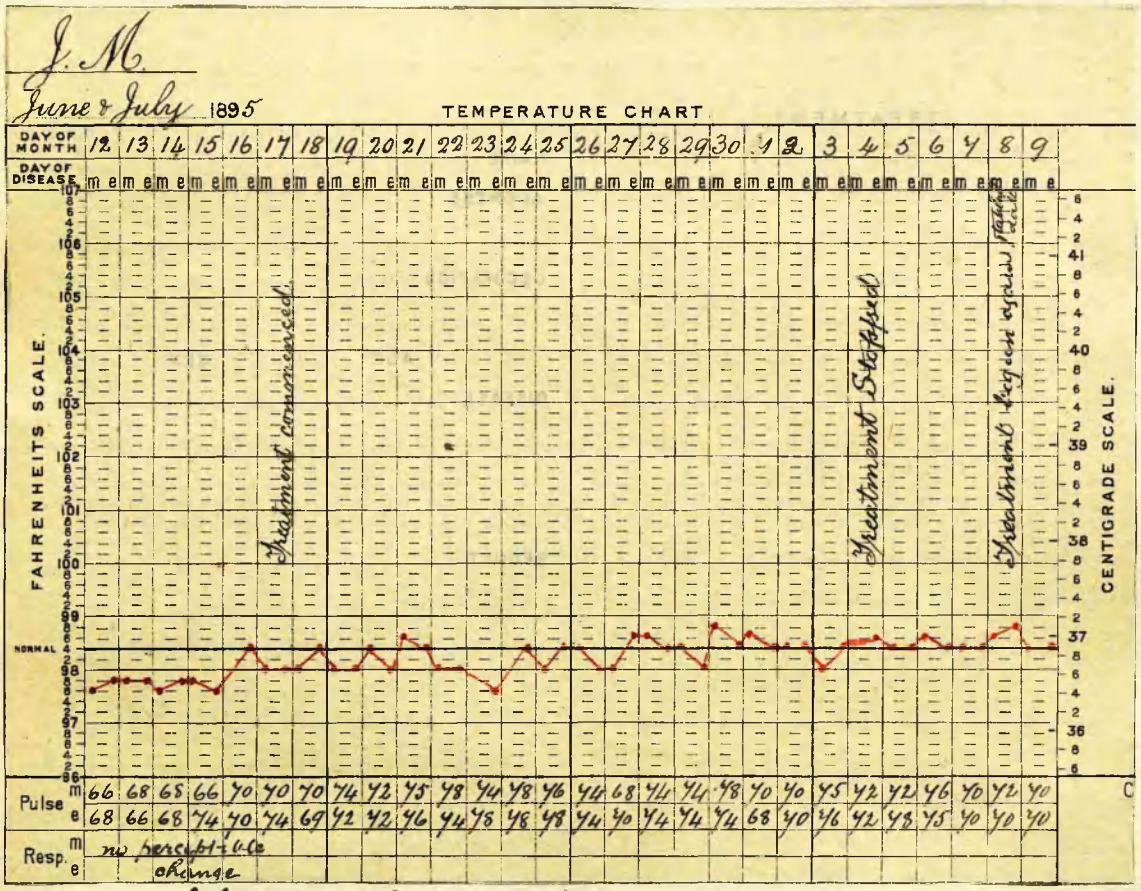

Chart to illustrate Temperature, Pulse & Respiration rates in I.M. (page 7) previous to & during Treatment

Her weight has greatly increased - on admission she weighed 10 st. 9 lb. She is now 12 st. 6 lb.

Present Condition

16th. June 1895. The temperature taken for a week previous to beginning treatment was on an average 97.8° Fahr. The face is pale in colour and stupid in expression. The patient is quite contented if allowed to sit gazing into vacancy all day and will do no work. Her mental state is as already noted.

The heart's action is slow and feeble, a ventricular systolic murmur is present, audible over mitral area, the pulse beats 60 per minute, is of moderate size, but weak. Blood examination shows that there are 4,240,000 red blood corpulses per c.cm. 52% of haemaglobin: there is no change in the number of white blood corpuscles. The deep reflexes are equal and normal. Common sensation is slightly blunted, and hearing somewhat defective. The tongue is coated with a slight white fur, and is moist, the bowels are costive. The urine has a spec. grav. 1024 is acid. No albumen is present and the daily amount excreted is about 43 ounces, and the amount of urea daily is 609 grains. Menstruation has ceased.

Treatment and Progress.

On the 15th. June thyroid tabloids in doses of one tabloid/

1895 Month	Date	Urine in 24 hours	Specific Gravity	Urea in Grains	Body Wt in pounds	Albumen	Sugar or Bile	Other abnormal urinary constituents	Remarks
June	14	44 oz	1019	609	12/4	nil	nil	nothing	In July the
	15	42	1025					important	daily av. amou
	16	44	1024						of urine was
	17	44	1020						52 oz & of urea
	18	56	1015						580 grains
	19	50	1014	620	143	nil	nil		
	20	56	1019						
	21	58	1012						
	22	58	1014						
	23	60	1015	580	169	nil	nil		
	24	46	1015						
	25	50	1020						
	26	52	1014						
	27	56	1012	620	164	nil	nil		
	28	56	1010						
	29	56	1014	550	163	nil	nil		
	30	56	1012						
July	1	58	1011						
	2	58	1010	640	154	nil	nil		

Chart to illustrate the state of the Urine previous to & during treatment I.M. (Page)

tabloid three times daily were prescribed. The patient was allowed to get up out of bed but was kept under close supervision,- the diet was in no way altered. The first effect of treatment was observed on the temperature which rose to normal, the pulse increased a little in volume,(1) and rate, and after a short time the patient decidedly decreased in weight. No bad effects were observed throughout treatment. After three weeks the patient became much brighter and more active than she had hitherto been, and took a greater interest in things about her. Treatment was stopped in the end of July when the anaemic condition had completely disappeared, and the patient could not only dress herself tidily, but was also anxious to work and be of some use.

This increased activity on the patient's part seems to have taken up the role of the thyroid as no return of the old ailment has taken place, and she is on the fair road to recovery.

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(1) Schafer has shewn that extract of thyroid increases the calibre of the arteries.
Lancet, 10th. Augt. 1895.

The general conclusions I have formed in the above mentioned cases as regards administration of thyroid preparations are:-

1. There is an appreciable effect on the temperature due to increased metabolism and oxidation of fat.
2. A generally improved bodily condition shown in the gradual disappearance of anaemia and collateral symptoms
3. The body weight is greatly reduced and this despite improved digestion and healthier appetite.
4. With the improved bodily condition there is decided improvement in the mental state, in some cases a cure is effected.
5. There is an appreciable difference in the amount of urine excreted, it is increased in amount during treatment, the amount of urea shows neither relative nor absolute change. On the principle that febrile reaction is produced by administering thyroid preparations Bruce (1) has conducted a series of experiments on very various forms of Insanity such as acute mania, acute and chronic melancholia, syphilitic alcoholic puerperal lactational clunacteric and General Paralytic Insanities His experiments were justified he proves by the records of cases which made good recoveries from exanthemata carbuncles, erysipelas and inflammations generally and

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(1) Bruce "Observations on the effect of Thyroid Feed- in some forms of Insanity". Jour. Ment. Science. Jan 1895

the enquiry prompted by Dr. Clouston (2) who says "I think we shall some day be able to innoculate a septic poison and get a safe and manageable counter irritant and fever, and so get the alterative effect of such things and the reaction and stimulus to nutrition that follow febrile attacks." In nine cases of Insanity chronic cases chiefly as I did not feel justified in using thyroid in the somewhat dangerous form that Bruce recommends on cases that were recoverable for instance acute uncomplicated mania and puerperal insanity, I have used the method as suggested. The results have unfortunately been disappointing. The febrile condition did brighten and improve the mental aspect of the patient in some cases for a time but as a rule a relapse into the old condition of mind was noticeable. In one case of long standing dementia where the patient was making slow headway towards recovery, the course of thyroid treatment did certainly benefit. In such cases Bruce holds that "the thyroid gives the necessary fillip towards ultimate recovery".

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(2) Clouston "Clinical Lectures on Mental Diseases" p. 129.