turning up of the great toe, which was noticeable a few moments ago. It is not a constant symptom. Frequent pains are present in this case, but notice that they are of late development.

Ophthalmic examination reveals no ciliary or pupillary diminution of reflex, but the field of vision is abnormally contracted in every direction. Nystagmus is not demonstrable today.

Analysis of urine gives negative results. Analysis of blood shows 82 per cent. of hemoglobin, and the excellent record of 4,870,000 red corpuscles.

Case 3.—This young woman is 24 years of age and Canadian by birth. Variola was the starting point of her disease nineteen years ago. The ataxia has progressed until the lower limbs have reached the paralytic stage, and the upper ones an advanced incoördination, the speech becoming more and more faltering, until it is at times unintelligible. Atrophy is pronounced, and the superficial, as well as the deep, reflexes are abolished. There is the same double spinal curvature here, and the hyperextension of the great toe. The last few years have developed lancinating pains in the limbs. The mind is much impaired. Ophthalmic examination, rendered uncertain by corneal opacity and enfeebled mental condition, shows no abnormality. Analysis of urine reveals nothing further than a high specific gravity with an abundance of urates. The analysis of the blood gives us 58 per cent. of hemoglobin, and the extremely poor record of 1,330,000 red corpuscles.

The stigmata of degeneracy is very marked in all three cases, as observed in the tables below.

Diagnosis: These are cases of Friedreich's disease or hereditary ataxia.

Symptoms: 1, the ataxia, beginning in the lower limbs and extending to arms and tongue; 2, the spinal curvature; 3, gradual development of paraplegia; 4, loss of knee jerk; 5, that the symptoms began in childhood; 6, the absence of Argyll-Robertson pupil, of anesthesia, of vesical symptoms, of severe pains, of intention tremor, of spasticity of the gait. These several symptoms readily differentiate these cases from posterior spinal sclerosis and multiple sclerosis.

As to cerebellar heredo-ataxia, I believe the form of the disease before you is identical with it in pathologic process, the one beginning in the cerebellum and giving eye symptoms and exaggerated reflexes in the start, and traveling downward; the other commencing in the lower region of the cord with loss of reflex and no sensory or eye manifestations, and passing upward, finally involving the cerebellum.

Pathology: The seat of the morbid changes is at first the posterior and lateral columns of the cord, later the anterior cornua and finally the nerve structure. In some cases there is developmental failure; in others, an inflammation resulting in a steady encroachment of the connective tissue on the nerve elements.

Prognosis and treatment: The prognosis of the disease is clearly demonstrated before you. We have no cure. Our province lies in protecting the other children as soon as one case is diagnosed. The family surroundings should be the best hygienically, and every care taken for the prevention of infectious disease, which hastens the development of the ataxia. A nutritious diet is necessary, and medical treatment when indicated by the general physical condition. For the disorder itself nerve stretching might be palliative. Alterative treatment coupled with the best

of hygiene, will give as good results as we are able to bring about by the science of today.

CASE 1.	CASE 2.	CASE 3.
Height, 4 feet 3½ inches.	5 feet 2 inches.	Well developed.
Occiput, full.	Full.	Flattened.
Bregma, sunken.	Flattened.	Narrow and low.
Forehead, full and narrow.	Narrow and low.	Dark.
Hair, dark.	Dark.	Considerable.
Hair on face.	Scanty.	Normal.
Hair on body.	Considerable.	Right more developed.
Face, sunken.	Sunken.	Tubercle on right.
Zygomata, normal.	Left more prominent.	Normal.
Ears, a, long and narrow; b, Darwinian tubercle on left.	Jug-handle shape; left higher than right.	Goitre.
Nose, defects to left.	Defects to right.	Sunken.
Thyroid gland, enlarged.	Almost a goitre.	W. u. 1¼ in.; h. v. ½ in.; a. p. 1½ in.
Eyes, right higher than left.	Left higher than R.	Hypertrophy.
Jaws, lower arrested, width upper 2½ in.; high vault ½ in., anterior post. 1½ in.	L. arrested, w. u. 2¼ in., h. v. ½ in., a. p. 1½ in.	Abrasion, upper lateral missing.
Alveolar process, hypertrophy.	No abrasion.	Double spinal curvature; emaciat'n
Teeth, six permanent lower, and upper abrasion.	Abnormal muscular development of right shoulder; double spinal curvature.	Right not so fully developed as left.
Body, arrest of chest walls, post.-cerv. and ing'l glands enlarged, double spinal curvature.	Unusually full.	Flattened.
Breasts, —.	Flattened.	
Tibia, flattened.		

Dr. Mary Hollister and Dr. Eugene S. Talbot furnished the ophthalmic and anthropologic data respectively.

INFLUENCE OF DIET, IN A CASE OF DIABETES MELLITUS, UPON THE ABNORMAL CONSTITUENTS OF URINE AND UPON THE GENERAL CONDITION OF THE PATIENT.

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Clinical History.—The patient was a married man, 33 years of age, and of excellent previous health. There was no history of any neurosis, but he stated that his mother had been a great sufferer with neuralgia and had periods of great mental depression. His life had chiefly been spent in open-air work, and on the first of March he had obtained a position as policeman, his weight at that time being 148 pounds. At about that time he first noticed a polyuria and white spots, which evaporating drops of urine left on his shoes. The diagnosis of his condition was not made, however, until the following August, when loss of weight and increasing weakness compelled him to resign his position. He came, on the last day of September, under the care of the writer. At that time his weight was 132 pounds, the general condition was fair, except for emaciation and weakness, with occasional cramps in the legs and a dull pain in the lumbar region. Up to this time his diet had consisted almost entirely of carbohydrates, especially the sweeter pastries, cake, etc., there being an especial craving for such foods. He had never been a spirit drinker. Physical examination showed sound heart and lungs, liver slightly decreased in size, spleen small. There was marked tympanites. On this date the twenty-four hours urine amounted to 8.360 c.c. There was a specific gravity of 1.027 and it was neutral or faintly acid to litmus. No odor of acetone could be detected either in the breath or urine, although a small amount was demonstrated to be present in the latter by Gunning's iodoform test. No reaction with ferric chlorid could at this time be obtained. Sugar was present to the amount of 11 per cent. making a daily excretion of 920 gm. The urea excreted amounted to 67 gm.

October 3, patient placed on rigid proteid diet for forty-eight hours. Thirst is much increased and there is a severe frontal headache with malaise. The urine, on testing with ferric chlorid, gives a strong, ruby-red reaction. It is strongly acid to litmus. Amount 9,370 c.c., specific gravity 1,030, sugar 4.25 per cent. The iodoform reaction had increased in volume fifteen to twenty times.

October 4, appetite greatly increased; otherwise condition unchanged; sugar 1.25 per cent. Ferric chlorid and iodoform reactions greatly increased.

October 8, general condition unchanged; weight 125 lbs.; sugar 3 per cent.; iodoform and ferric chlorid reactions still increasing.

October 12, severe frontal headache for two days; much vertigo and patient feels weaker; sugar 2.25 per cent.

October 16, headaches continue with increasing severity; spasmodic twitching of facial muscles; weight 122 lbs.; sugar 3.25 per cent.

October 22, general condition the same; characteristic urine reactions increased; sugar 5 per cent.

October 26, patient nervous and depressed; frontal headaches continuous. Patient fainted but recovered in a few minutes. Sleep very poor and bowels obstinately constipated; urine shows 0.1 per cent. of albumin; sugar 2.25 per cent.; ferric chlorid reaction shows a maximum intensity; weight 118 lbs.

November 6, condition gradually becoming worse; appetite enormous and considerable dyspepsia. Patient is very weak; sleep poor; memory failing and mind wanders at times, especially at night; urine reactions the same; sugar 5 per cent.

November 12, persistent headache with facial neuralgia; vertigo frequent and insomnia great; sugar 6 per cent.

December 6, mind wanders continually and patient is subject to great depression; much vertigo, nervous irritability and insomnia.

December 7, pulse 108, weak and intermittent; pains all over body. Patient is slightly delirious a considerable part of the time and very despondent and melancholic; urine reaction with ferric chlorid very large.

December 9, cerebral symptoms somewhat improved and sleep obtained by use of hypnotics; bowels badly constipated and much dyspepsia present; sugar 6.25 per cent.

December 14, condition is unchanged; appetite enormous; urine reactions marked; sugar 5.25 per cent.

December 26, has visited in the country for a fortnight; felt much improved at first, but the last few days has had severe headache and vertigo; sugar 6.25 per cent.

January 15, great mental depression with muscular weakness; tormenting frontal headache; urine passed in twenty-four hours 7,230 c.c.; sugar 5.25 per cent.; ferric chlorid and iodoform reactions very large.

January 20, patient is depressed and delirious at night; has bad dreams and sleep is poor. Bromids are given in small doses with relief; weight 112 lbs.; urine in twenty-four hours 7,880 c.c.; sugar 5.25 per cent.

January 28, general condition unchanged, no improvement; sugar 6.25 per cent. Ferric chlorid and iodoform tests very large.

February 3, condition is unchanged; urine passed in twenty-four hours 9,680 c.c.; sugar 7.25 per cent.

February 8, condition is worse; headache is so severe as to induce frequent fits of crying; sleep is poor and vertigo almost constant; amount of urine 10,900 c.c.; sugar 7 per cent.

February 16, patient threatened with collapse. Vomiting; is unable to walk up stairs. Pulse 128, weak and intermittent, with shallow and hurried respirations. For weeks appetite and thirst could not be satisfied. Weight 108 lbs.; sugar 7 per cent.

February 20, condition somewhat improved as regards headache and cerebral symptoms. Urine 9,150 c.c.; sugar 6.5 per cent.; urine reactions strong.

February 22, the condition of the patient steadily becoming worse, it was thought advisable to stop the treatment by proteid diet and allow carbohydrates with the addition of eggs and milk. The patient was encouraged to use alcohol freely, particularly in the form of eggnog, and was urged to restrict the quantities of drink taken as far as possible.

February 26, patient much improved; cerebral symptoms almost disappeared; appetite much less but thirst increased. The patient drank thirteen quarts of milk in the twenty-four hours. The ferric chlorid reaction in the urine much diminished.

February 29, great subjective improvement. Patient feels much better and stronger.

March 3, feels perfectly well except for muscular weakness. Twenty-four hours urine 9,469 c.c.; sugar 7.75; ferric chlorid reaction greatly decreased in intensity.

March 8, strength returning; no cerebral symptoms. Weight 113 lbs., showing a gain of five pounds on this treatment. Ferric chlorid reaction only moderate; sugar reaches its maximum on a carbohydrate diet 9.5 per cent.

March 14, patient rides or walks out every day for short distances; had bad dreams but no other cerebral symptoms. Urine 9,820 c.c.; sugar 7.5 per cent.

March 18, still improving; sugar 7 per cent.

March 22, one month after employing a mixed diet the patient finds himself subjectively better in every way. He has gained in weight and muscular power and the previously marked cerebral symptoms have almost entirely disappeared. Headaches and vertigo, which were formerly almost constant under a proteid diet, are now only occasional and not as severe as formerly.

March 28, patient feels well except for muscular weakness.

March 29, no headache. Patient sleeps well. Ferric chlorid reaction still persists, but is only a small fraction of its former intensity while under a proteid regimen.

April 1, condition unchanged; sugar 5.75 per cent.

April 5, patient still improving, although is still very weak. Sleeps well and has little cerebral trouble; sugar 6.5 per cent.

April 9, has been working out of doors and contracted considerable bronchitis. Otherwise in good condition, although has had two severe headaches which were, however, of brief duration. For experimental purposes the patient was put temporarily on a purely meat diet; sugar 7 per cent.

April 12, patient's cough worse. Headache troubled him yesterday. Urine passed after two meat meals gives an intense ferric chlorid reaction and contains 12.43 grams of ammonia. If the ammonia was excreted for the full twenty-four hours in the same ratio the daily excretion would amount to about fifty times that of health.

April 14, cough much worse with severe pain under left scapula; pulse 120 and weak; respirations short and hurried, 51 to the minute. Physical examination shows dulness on percussion under left scapula, with fine crepitant râles. Temperature 104.4. Diagnosis: Pneumonia. A "pneumonia jacket" was ordered and small doses of morphin with ammonium carbonate administered.

April 15, patient suffering great pain, to quiet which morphin in sixth-grain doses was given by mouth. Physical examination showed extension of the pneumonic process. Pulse 106; 102.6. Eggnog given every two hours.

April 16, has been suffering extremely all night as he refused to take the morphin. Temperature 104.4 and pulse 140. At the desire of the family small doses of morphin were given subcutaneously as were also stimulants. At this time the patient endeavored to urinate but was unable to do so. Shortly afterward he became quiet under the morphin, the action of the heart steadily growing weaker in spite of careful stimulation. Death followed five hours later. About one hour before death he broke into profuse perspiration, the first one in a year. Unfortunately a postmortem examination could not be made.

Influence of diet.—That the ingestion of various food stuffs exerted a marked influence upon the excretion of certain abnormal constituents of the urine was very noticeable. Although, according to the accepted treatment of diabetes, there should have been a great diminution or absence of sugar from the urine while under a proteid diet, in this instance such a diet has had by no means the effect which was to have been expected. Before proceeding to a discussion of the influence of diet upon the several constituents of the urine individually, it may be well to make a general statement to the effect that an exclusive proteid (meat) diet has in this case been observed to directly produce and increase the quantity of certain of these bodies, that this state of things is accompanied by, and is probably in part the result of, an excessive tissue waste and that these abnormal bodies so produced are probably important factors in the production of cerebral symptoms which may so increase as to ultimately in fatal coma. It has also been observed that a return to a mixed diet from a proteid regimen greatly increases the amount of certain of these bodies, this increase being accompanied by marked physical and mental improvement. As has already been stated, this patient came under treatment feeling perfectly

well except for muscular weakness. His weight at that time was 132 pounds. Subsisting almost entirely upon carbohydrates, there was a sugar output of about 980 grams in the twenty-four hours. A rigid exclusion of all carbohydrates was now ordered, the patient being allowed the usual diabetic bill of fare but, from choice, subsisting almost wholly upon meats and animal broths. On October 3 the sugar excretion had fallen to 4.25 per cent., the following day, five days after instituting treatment, bringing the sugar down to 1.25 per cent., the smallest amount to which it ever fell while under the care of the writer. On October 8, there was a rise to 3 per cent. and on October 22, after considerable variation, it reached 5 per cent. During the next three weeks there was a fluctuation of several per cent. on both sides, and on November 12 it had risen to 6 per cent. From that date until February 20, a period of fifteen weeks, there was at no time a variation of more than 1 per cent. from this point. The proteid diet, then, during the five months of its continuance, had succeeded in permanently diminishing the sugar excretion not quite one half. The quantity of urine eliminated daily continued at about the same point—9 liters. Accom-

forms, together with eggs and milk. The use of gruel, rice, oatmeal, bread, etc., was encouraged. Following this treatment, on February 22, the sugar excretion amounted to 6.5 per cent. February 28, it had risen to 9.75 per cent. March 3, there was a slight fall to 8.75 per cent., while on March 8, two weeks after giving a mixed diet, it reached 9.5 per cent., its maximum under this treatment. March 14, it stood at 8.5 per cent., and on March 22, exactly one month after instituting a mixed diet, the sugar secretion had again reached the 6 per cent. mark, which had so long been the average under proteid treatment. There was no great subsequent variation from this point.

But it may be objected that nothing had been gained by a mixed diet, since the sugar excretion remained at about the same proportion. It must be reiterated that the quantity of sugar excreted is in itself of no importance and that a patient with a large sugar secretion is in no more immediate danger of death than one secreting a fraction of that amount. In fact, from a study of this case, the writer is convinced that a patient secreting only a few grams of sugar on a strictly proteid (meat) diet is in a far more precarious condition than one who excretes

panied by what symptoms had this reduction of some 5 per cent. of sugar been accomplished? On February 20 the patient weighed 108 pounds, showing an actual loss of body weight of 24 pounds. Progressive weakness had confined him to his room for the past three months and severe dyspepsia had resulted from excessive ingestion of proteids. Severe cerebral and nervous symptoms had been almost constant for three months. He was daily subject to severe headaches, vertigo and neuralgia; memory had failed and the mind frequently wandered, these symptoms deepening in several instances to slight delirium. There had been one fainting fit, and sleep had been obtained with difficulty and was disturbed by bad dreams and nightmare.

It may be objected that all these physical and mental symptoms were due to the natural progress and increasing severity of the disease itself and that there was necessarily no relationship between them and the diet administered.

On February 22, however, the patient being apparently on the verge of coma and collapse, the treatment by proteid diet was abruptly discontinued and all meat interdicted, the patient being allowed moderate amounts of carbohydrates in easy assimilable

forms, together with eggs and milk. The use of gruel, rice, oatmeal, bread, etc., was encouraged. Following this treatment, on February 22, the sugar excretion amounted to 6.5 per cent. February 28, it had risen to 9.75 per cent. March 3, there was a slight fall to 8.75 per cent., while on March 8, two weeks after giving a mixed diet, it reached 9.5 per cent., its maximum under this treatment. March 14, it stood at 8.5 per cent., and on March 22, exactly one month after instituting a mixed diet, the sugar secretion had again reached the 6 per cent. mark, which had so long been the average under proteid treatment. There was no great subsequent variation from this point.

The following curve shows the sugar excretion between September 29 and April 10, and is based upon the full twenty-four hours urine in each case. It will be readily seen that, in this case at least, a purely proteid diet was not followed by a great permanent increase in the sugar output nor did a return to a mixed diet permanently increase its excretion. In this instance, therefore, the treatment by an exclusive

proteid diet in the hope of cutting off the sugar supply and so preventing its appearance in the urine has entirely failed in its object while at the same time it has apparently induced and aggravated those mental and physical conditions which are premonitory of coma. On the other hand, these symptoms have abated at once on a return to a mixed diet.

During work on the sugar excretion it was noticed that the percentages of sugar varied greatly at different times in the twenty-four hours. Urine passed in the early morning contained only a relatively small quantity of sugar, but this steadily increased until the maximum was passed at about the middle of the afternoon. It then gradually diminished and the urine passed in the late evening only contained a small amount. Such a variation in the excretion of sugar will show the necessity of basing all quantitative estimations upon the entire twenty-four hours' excretion. The ferric chlorid reaction, showing the presence of aceto-acetic acid, could not be obtained from this case previous to beginning treatment, but it appeared with considerable intensity within forty-eight hours after the institution of a proteid diet. It was also noticed that this reaction obtained its maximum two or three hours after a meat meal and was least in the urine passed just previous to such inges-

siderable increase while under the latter treatment. This fact, in connection with the fact that the urine acidity always rose after the ingestion of large amounts of meat by this patient would seem to show that the amount of diacetic acid excreted depended entirely upon the amount of proteid which the system was obliged to decompose. If diabetic coma is due to an acid toxemia, as is now generally believed, a too rigid meat diet must without doubt be a main factor in its production.

The following curve shows the urine acidity so found under both mixed and proteid diet. Under a mixed diet there is a decrease of 14.69 per cent. of acidity, although the acidity under both conditions of diet was in excess of what it was possible to attribute to acid phosphates.

With regard to the excretion of ammonia under mixed and proteid diet it was found by a large number of experiments that while under a meat diet the ammonia excretion was about twelve times that of health, but that the change to a mixed diet was at once followed by a decrease of about one-third in the ammonia excretion.

In this case, then, the restriction to an exclusive proteid diet resulted in a diminution of the sugar excretion about one-half. This was accomplished at

tion. These latter facts were repeatedly noted. This is evidence in favor of the theory that diacetic acid is produced directly in the decomposition of proteid—more especially of the albumin ingested, but also to a certain extent of the body tissue itself—and is not, as has been advanced, a result of the oxidation of sugar.

With regard to oxybutyric acid, the amount of this body present in the urine of this case was at no time large and probably never exceeded 3 to 5 grams in the twenty-four hours. There was, however, a marked increase in the amount of this acid while under a mixed diet. This agrees with Hugounenq (*Am. Jour. Med. Sci.*, October, 1887), who seems to be about the only one who has observed the influence of foods on diabetic urine, and who believes that a meat diet is a prime factor in the production of this body.

For the purpose of supplementing the results given by the ferric chlorid reaction determinations of the acidity of the same specimens of urine were also made. The results so obtained approximated very closely with the variations of the ferric chlorid reaction, showing that aceto-acetic acid was the chief factor in the production of the high urine acidity found in this case. Determinations of the urine acidity in urines passed under proteid and mixed diets showed a con-

siderable increase while under the latter treatment. This fact, in connection with the fact that the urine acidity always rose after the ingestion of large amounts of meat by this patient would seem to show that the amount of diacetic acid excreted depended entirely upon the amount of proteid which the system was obliged to decompose. If diabetic coma is due to an acid toxemia, as is now generally believed, a too rigid meat diet must without doubt be a main factor in its production.

CYSTITIS IN WOMEN.

Read at the Nashville Academy of Medicine, Dec. 17, 1896.

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There is no more prevalent, distressing or intractable malady in the whole range of gynecic affections than cystitis. It is a subject that rarely comes up for discussion in medical societies. It seems that our appreciation of the difficulties and limitations in its treatment, combine to render our interest in the disease lukewarm. Your essayist feels like apologizing