CASES
ILLUSTRATING THE
PATHOLOGY OF MANIA AND DEMENTIA.

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THE pathology of insanity is so extensive a subject of inquiry, that it is not adapted to the limit usually assigned to papers read before the Society; I felt, therefore, that it was necessary to select only a portion of the subject; and as I was precluded from offering any remarks upon the morbid anatomy of insane patients, on account of the valuable papers of Dr. Webster, printed in the 'Transactions' of the Society, and because I had already published the results of my post-mortem examinations in the 'Medical Gazette,' I considered that it might not be uninteresting to the Fellows of the Society, if I laid before them the analysis of the mixed phosphates of the urine in cases of mania and dementia, (which was undertaken at my request by Dr. Beale, of King's College,) and if I were to compare it with the evidence of the pathology of these diseases which we derive from other sources.

It is necessary to premise that in these analyses the following method was pursued. After the reaction which each specimen exhibited had been noticed, and the specific gravity taken, 500 grains of the urine were evaporated to

dryness over a water-bath, and the dry residue was exposed over sulphuric acid *in vacuo* for several hours, when it was carefully weighed: the weight being multiplied by 2 gave the quantity of solid matter in 1000 parts. A weighed portion of the dry extract was incinerated, and perfectly decarbonized, the saline residue was weighed, and the proportion of salts existing in the total quantity of solid matter calculated from the results of experiment.

Another portion of urine, consisting of 1000 grains, was poured into a glass, and a quantity of solutions of chloride of calcium and ammonia were added, sufficient to precipitate the whole of the phosphoric acid as phosphate of lime. After standing for six hours, the glass being covered to exclude the air, the precipitate was thrown on a filter, well washed with water, dried, and ignited, and when the ash had become nearly white it was weighed. The proportion which the amount of salts and phosphate bore to 100 grains of solid matter was then calculated, in order that the results of each analysis might be compared with the rest. A comparison may be made between the results obtained in each case, quite independent of the variations in density of the several specimens examined.

It is quite true that no accurate comparison can be made, unless the whole quantity of the urine passed in the twenty-four hours be obtained, and a specimen of this submitted to analysis; but in by far the greater number of cases, more especially in those of insanity, this is quite impossible, and it is also equally difficult to obtain specimens from the various patients at any particular time of the day; the only method, therefore, by which accurate conclusions can be deduced from the results of experiment is by comparing the quantities of phosphate corresponding to 100 grains of the solid matter present in each specimen of urine. I have, however, given both results in the following tables; but in order that I might compare them with those of Dr. Bence Jones, I have referred to the first table in the remarks which I have made as to the amount of phosphates found in the different cases. I might have strengthened my case had

I referred to the other table; for if the proportion of phosphate to 100 grains of solid matter be compared with the symptoms existing at the time of the analysis in the different cases, we shall find that a larger proportional amount of mixed phosphates was shown by Table II, to have existed in cases of acute mania. I might also have referred to Table II in the cases of J. H. and J. W., patients suffering under general paralysis, but I have found that where the specific gravity is very low, as in the case of J. H., where it was only 1008, the first table is rather to be relied upon.

The great source of fallacy in the quantitative analysis of the phosphates in the urine originates in variations of diet, particularly in the quantity of bread taken at meal-time, which contains a large proportion of alkaline phosphates; but in an hospital where all the patients have the same diet, this fallacy is avoided.

The ordinary diet of the patients in St. Luke's Hospital, at the time the analysis was made, was as follows:—For male patients, 2 pints of milk-and-water gruel, and 2 oz. of bread for breakfast; 12 oz. of cooked meat, 12 oz. of potatoes, and 6 oz. of bread, and 1 pint of beer for dinner; 8 oz. of bread, 2 oz. of cheese or butter, and 1 pint of beer for supper. For females, $1\frac{1}{2}$ pint of milk and gruel, and 2 oz. of bread for breakfast; 8 oz. of cooked meat, 8 oz. of potatoes, and 6 oz. of bread, and $\frac{2}{3}$ of a pint of beer for dinner; 8 oz. of bread, 2 oz. of cheese or butter, and $\frac{2}{3}$ of a pint of beer for supper. It will be seen that the allowance of bread was the same for males and females.

It is necessary for me to give an outline of the cases, and to state that the urine was selected from patients labouring under different forms of the disease in the following proportions, viz.: 5 cases of acute mania with paroxysms, 4 of common mania, 2 of intermittent mania, 1 of remittent mania, 2 of hysterical mania, 3 of puerperal mania, 5 of acute dementia, 1 of acute dementia with catalepsy, 5 of paralysis of the insane, 3 of chronic mania, and 3 of chronic dementia; making in all 34 cases.

CASES OF ACUTE MANIA, WITH PAROXYSMS.

No. 21.—R. E—, male, æt. 18, single, without occupation; admitted into St. Luke's May 23d, 1851. The present is the first attack, and has lasted three months; the disease is not hereditary. Cause, meningitis.

Symptoms on admission.—Temperament, nervo-lymphatic. Manner, excited and restless. Conduct, mischievous and destructive. Conversation, incoherent.

Bodily condition.—He is very weak and emaciated. Complexion bloodless; pulse 84, weak; skin and head cool; tongue clean; bowels open; sleeps well; appetite good.

Ordered to take equal parts of the compound mixture of iron and camphor mixture twice daily. Ordinary diet.

May 27th.—When the analysis of the urine was made, the symptoms were the same, and the medicine was continued.

Result.—Aug. 29th, 1851. Discharged cured.

No. 24.—R. B—, female, æt. 55; wife of a farmer; two children; admitted May 23d, 1851. The present is the first attack, and has lasted three months. The disease is not hereditary; its cause unknown. Habits steady; can read and write well.

Symptoms on admission.—Temperament bilious; manner restless and peculiar. She is garrulous and incoherent, unable to sustain conversation, showing deficiency of mental power.

Bodily condition.—Pulse 72, weak; skin and head cool; tongue clean, with irregular fissures; bowels open; urine acid and turbid, with copious deposit of urate of ammonia: catamenia have ceased; countenance excited; complexion sallow; pupils much contracted; increased impulse of heart; anæmic murmur with first sound; expiration audible on left side of thorax.

Ordered one fluid drachm of the solution of bichloride of mercury, one and a half fluid ounce of compound tincture of bark in distilled water three times daily; ordinary diet.

May 27th.—When the analysis of the urine was made, the symptoms were the same, and she was taking the same medicine.

Result.—September 19th, 1851. Discharged cured.

No. 47.—G. G—, male, æt. 26, single; a cabinet-maker: admitted June 27th, 1851. The present is the first attack, and has lasted six days. The disease not hereditary; its cause unknown.

Symptoms on admission.—Temperament nervous.

Bodily condition.—Pulse 120, very weak; surface cold; head warm; countenance excited, but with a vacant stare; complexion anæmic and dusky: there is much exhaustion and emaciation. He weighs 7 st. 12 lb.

Ordered half a grain of morphia at bedtime. Diet, beef tea and wine.

Habits, dirty at night; he has exhibited some violence, and is suspicious of every one; he has been fed with some trouble; he is restless at night.

June 30th.—When the analysis of urine was made, he was quieter, and took his food more readily. The morphia, beef tea, and wine, were continued.

Result.—Oct. 8th, 1852. Discharged uncured.

No. 49.—E. A—, female, æt. 18, single; admitted June 13th, 1851. The present is the second attack, and has lasted fourteen days. The disease not hereditary; its cause unknown. Habits steady; disposition cheerful; educated for a governess.

Symptoms on admission.—Extremely maniacal and restless; constantly talking in an incoherent manner; mischievous.

Bodily condition.—Pulse 100, almost imperceptible; head hot; skin dry; complexion pale and dusky; countenance very excited. She is very weak and emaciated; weighs 6 st. 6 lb.

Ordered half a grain of morphia at night, four ounces of wine daily.

June 30th.—When the analysis of the urine was made she was less mischievous ; she took her food well ; and had continued to take the morphia and wine.

Result.—December 12th, 1851. Discharged cured.

No. 51.—J. C—, æt. 19, male ; single ; a blacksmith ; admitted February 21st, 1851. Form of disease, acute mania. The present is the first attack, and has lasted eleven months. The disease is hereditary ; his father and grandfather were insane. Habits very steady ; disposition cheerful. The cause of the disease unknown.

Symptoms on admission.—Temperament sanguine. He is now quiet. Countenance heavy and stupid ; sleeps well ; he is clean in his habits.

July 4th.—He was attacked suddenly with a paroxysm ; he fancied two bullets were shot into his head ; that he pulled them out of his body, and put them in his pocket ; also, that those about him were devils : had visions, and was noisy at night : now dirty in his habits. The analysis of the urine was made the day after the paroxysm broke out, and while it was at its height ; he had ordinary diet.

Result.—Dec. 19th, 1851. Cured.

No. 58.—W. M—, male, æt. 21, single ; a shopman ; admitted June 27th, 1851. Form of disease, intermittent mania. The present is the first attack : it has lasted some days.

Symptoms on admission.—Temperament, nervo-sanguine ; bodily health pretty good ; complexion florid ; countenance rather excited ; manner restless ; nights disturbed by dreams ; pulse weak ; bowels costive ; habits clean ; spermatorrhœa ; complains of pain in the back and head ; at times feels heavy and giddy.

July 12th.—Having gone on quietly since his admission, to-day he became excited, and had a paroxysm which lasted three weeks.

15th.—The urine was analysed when the paroxysm was at its height.

He had the ordinary diet of the hospital.

Result.—Aug. 20th, 1851. Cured.

No. 4.—W. B—, male, æt. 52, married; occupation an excise officer; admitted October 25th, 1850. Form of disease, at first melancholia; afterwards intermittent mania.

Symptoms on admission.—Temperament melancholic; extreme depression, with a strong suicidal tendency; pulse 120, very weak; the extremities and head cool; tongue clean; bowels costive; urine acid, scanty, and high-coloured; complexion swarthy; conjunctiva yellow and injected; pupils natural; beating of carotids natural; breath sour; sounds of thorax and heart natural: the liver slightly enlarged; some tenderness over the hepatic region.

Ordered blue pill and morphia every night; a senna draught every alternate morning; ordinary diet.

Jan. 6th, 1851.—He had a paroxysm of mania, and was very violent.

March 3d.—The paroxysm returned, and lasted till June 2d, *i. e.*, three months.

Result.—He was discharged uncured.

CASES OF COMMON MANIA.

No. 34.—W. M—, male, æt. 68, a widower; occupation, a coachman; admitted May 9th, 1851. The present is the first attack, and has lasted three weeks. Cause of the attack, intermittent fever.

Symptoms prior to admission.—He laboured under the delusions that he was possessed of a large estate, and that there was a conspiracy against him. He had attempted to kill his medical attendant.

Symptoms on admission.—Pulse 100; skin and head cool; tongue clean; bowels costive; urine scanty; complexion sallow; conjunctiva injected; pupils unequal; appetite bad; dyspeptic; liver enlarged, felt below the umbilicus; has a severe rupture.

He was ordered a draught, with taraxacum, soda, hydrocyanic acid in peppermint water. Diet, beef tea and arrow-root.

Result.—He was discharged uncured.

No. 40.—E. T—, male, æt. 23, a shoemaker, single; admitted June 6th, 1851; he has recently become a Mormonite. The present is the first attack, and it has lasted five weeks; the disease is hereditary: his maternal grandmother and uncle were insane.

Symptoms on admission.—Temperament nervous; bodily health very weak; pulse, 100; skin and head cool; tongue white; bowels costive; urine free; refuses food, obliged to be fed.

Ordered to inhale a drachm of ether three times daily, and to take half a grain of morphia at night. Ordinary diet.

He throws himself on the floor, and holds his breath; and bends his body so as to produce opisthotonos; in this posture he will remain till the face becomes turgid, and blood issues from his mouth and nose.

Result.—He was discharged uncured.

No. 58.—E. H—, male, æt. 32, a tailor; single; admitted July 4th, 1851. The present is the first attack, and has lasted a fortnight; habits steady; cause disappointment in his affections: the disease is hereditary, his paternal aunt was insane.

Symptoms on admission.—Temperament nervous; great emaciation; pulse 96, weak; tongue dry, with fissures; bowels costive; urine free; skin and head cool; complexion rather swarthy; conjunctiva injected; liver enlarged, felt almost to the umbilicus; sounds of thorax and head natural.

To have ordinary diet. He was ordered to take five grains each of blue pill and extract of henbane every night, and senna and salts every alternate morning.

July 15th.—When the analysis of the urine was made he was taking the above pills; his appetite was bad; he slept

little; his conversation was incoherent; there was no paroxysm.

Result.—December 5th, 1851. He was discharged cured.

No. 32.—S. H—, female, æt. 33, married; has seven children, youngest aged ten months; admitted March 14th, 1851. The present is the first attack, and has lasted one month. Cause, lactation and anxiety of mind; habits steady; the disease is hereditary; her sister is insane.

Symptoms on admission.—Temperament bilious; pulse 80, almost imperceptible; skin cool; head cool, irregularly shaped; Malay face; tongue white; bowels open; urine free; catamenia absent; countenance anxious; complexion sallow and bloodless; conjunctiva and pupils natural. She is very weak, speaks little, but is excitable and rambles in conversation; sleeps pretty well.

She was ordered infusion of cascarrilla and camphor mixture, of each six drachms three times daily.

June 2d.—When the analysis of the urine was made, she was silent; stood for hours together in the same place, and was much lost and stupid. Had ordinary diet.

Result.—August 22d, 1851. Discharged cured.

No. 36.—M. D—, female, æt. 40, married; has two children; admitted May 30th, 1851; formerly a lady's maid. The present is the second attack, and has lasted ten days. Cause unknown; disease not hereditary; incoherent; violent; habits dirty; does not sleep well; refuses food.

Symptoms on admission.—Temperament nervous; bodily health very weak; countenance and manner much excited; mischievous and noisy at night. Pulse 120, extremely weak; head warm; tongue dry and brown; complexion sallow and pale.

Ordered half a grain of morphia at night, and four ounces of wine daily; beef tea and milk diet. Form of disease, remittent mania.

June 9th.—When the analysis of the urine was made, she was cleaner in her habits.

She took the half-grain of morphia every night. She had ordinary diet, and no longer refused food.

Result.—Discharged uncured.

CASES OF PUERPERAL MANIA.

No. 14.—C. P—, æt. 22, wife of a farmer; has two children, youngest aged 8 months; admitted May 9th, 1851. The present is the first attack. She has been “strange” ever since her confinement, and violent for the last three weeks. Her mother died insane; her father is insane; her habits have been steady.

Symptoms on admission.—Says that she has had a revelation from heaven; at times incoherent. Pulse 108, very weak; skin and head cool; tongue clean; bowels costive; urine free; conjunctiva injected.

Ordered M. Sennæ cum Jalapæ, ʒss, every morning.

May 20th.—The analysis of the urine was made eleven days after admission, and four weeks and a half after the excitement was stated to have commenced. She fancied at this time that she saw her mother every night.

Ordinary diet.

Result.—June 20th, 1851. Cured.

No. 30.—S. P—, æt. 29, single; has two children, youngest aged three months; admitted April 25th, 1851. The present is the first attack, and has lasted ten weeks, it came on seven days after lying-in; the disease is not hereditary; she has been incoherent and violent for two months. She tore her clothes, and was dangerous to her child.

She was ordered Morphiæ Acet., gr. $\frac{1}{4}$ every night, and four ounces of wine daily, at the time of her admission.

Symptoms on admission.—Pulse 96; hands cold as ice; very destructive.

June 2d.—The analysis of the urine was made nine weeks after her admission, and nineteen weeks after the attack

commenced. She was taking *Misturæ Ferri Comp.*, ʒiiss, ter die; and her diet was the ordinary one of the hospital.

Result.—November 28th, 1851. Cured.

CASE AFTER PROLONGED LACTATION.

No. 50.—A. C—, æt. 32, wife of a clerk; has two children, youngest aged fourteen months; admitted March 7th, 1851. The present is the first attack, and it has lasted seven days; the disease is not hereditary.

Symptoms on admission.—She is very weak and emaciated; conversation incoherent; she refuses food; she is inattentive to the calls of nature; sleeps little; tears her clothes.

July 5th.—The analysis of the urine was made. She was taking two ounces of brandy, and two pints of porter daily, with ordinary diet; and there was no alteration in the symptoms, except that she no longer refused her food; she also took half a grain of morphia every night.

Result.—Uncured.

CASES OF HYSTERICAL MANIA.

No. 55.—A. G—, female, æt. 20, single; a servant; admitted June 20th, 1851. The present is the second attack, and has lasted a fortnight; the disease is hereditary; her father died insane. Cause, disappointment in her affections.

Symptoms on admission.—Temperament sanguine; pulse 96, weak; skin and head cool; tongue white, with raised papillæ; bowels open; urine free; catamenia regular; sounds of thorax and heart natural; much flatus abdominis; manner excited; noisy at night; destroys clothes; conversation incoherent; behaviour immodest.

She was ordered to take half a grain of morphia every night, and a shower bath three times a week. Also one drachm of the ammoniated tincture of valerian in peppermint-water three times daily; and ordinary diet.

Result.—November 21st, 1851. Discharged cured.

No. 28.—E. W—, æt. 19, female, single ; a weaver, works eight to twelve hours in the day ; admitted May 23d, 1854. The present is the first attack, and has lasted six weeks. Cause, overwork, and disappointment in her affections.

Symptoms on admission.—Temperament nervo-lymphatic ; pulse 72, weak ; skin cool ; head warm ; bowels open ; urine free ; catamenia present ; complexion bloodless ; mucous rattle on both sides of the thorax ; cough, with mucous expectoration ; conversation incoherent ; language disgusting ; conduct lascivious ; inattentive to the calls of nature ; restless and noisy at night.

Ordered to take half a grain of morphia every night, and four ounces of wine daily. Ordinary diet.

June 2d.—When the analysis of the urine was made, she was less anæmic ; her habits were clean ; she took her food well ; the pulse was 68, and stronger ; and she continued to take the wine and morphia.

Result.—December 12th, 1851. Discharged cured.

CASES OF ACUTE DEMENTIA.

No. 52.—Madame E. A—, æt. 30, married ; no children ; admitted June 20th, 1851. The present is the first attack, and it has lasted two months. Cause unknown ; disease not hereditary.

Symptoms on admission.—Temperament lymphatic ; pulse 100, very weak ; skin has a strong, disagreeable smell ; an oily secretion oozes from the sebaceous glands ; complexion bloodless ; pupils unequal ; muscular system atonic ; mind much lost ; inattentive to the calls of nature ; obstinate ; it is difficult to make her move, or to get her out of bed ; catamenia present ; sleeps well ; os frontis receding.

Ordered ordinary diet, with a pint of porter daily.

Result.—Discharged October 29th, 1852, uncured.

No. 6.—J. L—, male, æt. 17, single ; a weaver ; admitted April 25th, 1851. The present is the second attack,

and has lasted twelve weeks. Cause, overstudy ; the disease is hereditary ; father insane.

Symptoms on admission.—He is incapable of answering questions, and is inattentive to the calls of nature ; pulse 92, very weak ; skin and head cool ; tongue white ; bowels open ; complexion bloodless ; anæmic murmur with carotids, and with first sound of heart ; sleeps well.

Ordered to take equal parts of compound steel mixture and camphor mixture twice daily. Ordinary diet ; a pint of porter daily.

May 10th.—When the analysis of the urine was made, the symptoms were the same as when he was admitted. He took the mixture thrice daily.

20th.—Improved ; more conscious of what is passing around him.

Result.—September 19th, 1851. Discharged cured.

No. 18.—T. T—, male, æt. 21 ; a compositor ; admitted January 31st, 1851. Cause of the disease unknown.

Symptoms on admission.—Pulse 80, not weak ; skin cool ; head warm ; tongue clean ; bowels open ; urine free ; countenance vacant ; complexion sallow ; acne on forehead ; hands blue ; nervous palpitation of the heart ; remains in one position for some time.

He was ordered to take the tincture of the sesquichloride of iron, and chloric ether, of each twenty minims in camphor mixture thrice daily. Ordinary diet.

May 27th.—There was no improvement in the symptoms ; he was taking three grains of quinine three times a day.

July 15th.—Some improvement, but the mind is at times weak.

Result.—February 6th, 1852. Discharged uncured.

No. 31.—M. A. M—, female, æt. 22, single ; a silk-winder ; admitted May 2d, 1851. The present is the first attack, and has lasted two months. Cause unknown ; her maternal grandmother was insane.

Symptoms on admission.—Temperament nervo-sanguine ; pulse very weak ; skin cold : catamenia absent last period.

Ordered extra diet, and four fluid ounces of wine daily ; and a draught containing three fluid drachms of compound tincture of cinchona, and twenty minims of chloric ether, three times a day, and a warm bath every other night.

Countenance vacant ; pupils dilated ; conversation incoherent ; appears to apprehend very imperfectly what is said to her ; imbecile ; restless, and wet at night ; requires to be fed.

June 2d.—When the analysis of the urine was made, the mental condition was the same ; her health had improved ; she took her food better ; and was clean at night.

Result.—May 7th, 1852. Discharged uncured.

No. 35.—C. B—, female, æt. 22, married, (three months since) ; admitted May 30th, 1851. The present is the first attack, and commenced fourteen days after marriage ; her paternal grandfather was insane.

Symptoms on admission.—Temperament lymphatic ; pulse very weak ; catamenia absent, and did not appear till four months after admission ; bowels costive ; complexion anæmic ; extremities cold ; quite taciturn ; saliva runs out of the mouth ; inattentive to the calls of nature ; appearance quite demented ; requires to be fed. Sits in one place with her chin resting on her chest.

She was ordered four fluid ounces of wine daily ; diet, beef tea and arrow root, and a draught containing three fluid drachms of compound tincture of bark, and twenty minims of chloric ether, thrice daily, and aperient medicine.

June 2d.—The analysis of the urine was made.

30th.—The analysis of the urine was repeated, when her habits were very dirty, and the drivelling continued. She was now taking the compound steel mixture and camphor mixture, of each six fluid drachms, and seven fluid ounces of brandy instead of the wine. She remained quite inanimate, unable to understand what was said.

Result.—February 20th, 1852. Discharged cured.

ACUTE DEMENTIA WITH CATALEPSY.

No. 64.—H. J—, æt. 22, single ; shoemaker ; admitted January 28th, 1853 ; religion, a Jew. The present is the second attack, and has lasted two months. Cause, masturbation ; the disease is not hereditary.

Symptoms on admission.—He appears only partly conscious of what is passing around him ; he is incapable of conversation, but he occasionally utters short sentences with effort ; he is subject to a variety of apparently automatic movements. Pulse 100, very weak ; hands cold, firmly clenched, and purple ; forehead warm ; eyes closed ; chin resting on his chest ; anæmic systolic murmurs of the heart ; respiration sometimes 28 in the minute, sometimes very slow, as if he held his breath ; urine acid, 1020, not albuminous. He was at one time constantly drivelling. The saliva was feebly acid, rather turbid, viscid, and could not be made to drop. It consisted of

Water	.	.	.	.	.	990.22
Solid Matter	.	.	.	.	.	7.60
Fixed Salts	.	.	.	.	.	2.18

The presence of sulpho-cyanide of potassium could not be detected.

May 11th.—When the analysis of the urine was made, the symptoms remained the same ; he was taking one twentieth of a grain of strychnine three times a day, and had an ointment with strychnine rubbed down his spine every night ; and he had ordinary diet.

Result.—Uncured.

CASES OF PARALYSIS OF THE INSANE.

No. 1.—F. B—, male, æt. 36, married ; a cabinet maker ; admitted October 11th, 1850 ; the disease is not hereditary. The present is the first attack, and has lasted two months.

Symptoms on admission.—Pulse 84, weak, skin and head cool; tongue white; bowels open; urine free, acid, specific gravity 1029, turbid, with broken epithelial deposit. There was thickness and hesitation of speech, and tremor of the upper lip; the pupils were unequal.

Ordered salts and senna every other morning. Ordinary diet.

May 3d.—When the quantitative analysis of the urine was made, the symptoms were much the same; he had only upon one occasion spoken of having immense wealth, but he says that he never felt better in his life. The right pupil was still dilated.

June 9th.—The urine was again examined, and he was improved, and made himself very useful.

Result.—November 21st, 1851. He was discharged cured, at which time the asynchronous action of the pupils had ceased.

No. 2.—J. C. T—, æt. 45, single; a blacksmith; admitted January 31st, 1851. The present is the first attack, and has lasted one month. Cause unknown; habits stated to be steady.

Symptoms on admission.—Temperament nervous; pulse 80, weak; skin and head cool; tongue clean, with fissures; bowels open; urine free; left pupil dilated; dulness on percussion of left side of the thorax; sounds of heart natural; says he is prime minister, a judge, Emperor of France, perpetual chaplain to the Queen, and has ninety tons of gold; countenance elated; spirits excellent.

He was ordered to take one fluid drachm of the solution of bichloride of mercury, three fluid drachms of compound tincture of bark, in an ounce of camphor mixture, twice daily. Ordinary diet.

May 3d.—When the quantitative analysis of the urine was made, the symptoms were the same. He fancied he had all the money in England; and he was taking the same medicine.

June 9th.—When the urine was again submitted to

quantitative analysis, he had become irritable in his temper, and weaker in his mind.

Result.—Discharged uncured.

No. 9.—J. H—, male, æt. 42, married; a cab-owner; admitted May 9th, 1851. The present is the first attack, and has lasted two weeks. Cause, anxiety in business; the disease is not hereditary.

Symptoms on admission.—Temperament sanguine; pulse 120, weak; skin and head cool; bowels open; no tremor of the upper lip, tongue or limbs; unequal pupils; speech hesitating; appetite good; sleeps well; habits clean; talks of having considerable possessions, and that he can do anything.

Ordered ordinary diet.

May 19th.—The urine was examined at the commencement of a paroxysm of excitement; he was violent, said he was the champion of England; always attempting to fight; noisy at night.

Ordered $\frac{1}{4}$ grain of tartar emetic twice a day.

June 2d.—The urine again examined when the excitement had passed off. The tartar emetic was ordered to be omitted this day.

Result.—August 1st, 1851. Discharged uncured.

No. 12.—C. C—, male, æt. 40, married; a compositor; admitted April 11th, 1851. The present is the first attack, and has lasted about a fortnight. Cause, over-anxiety; habits intemperate; paternal uncle is insane.

Symptoms on admission.—Temperament nervo-sanguine; pulse 84, weak; skin and head cool; tongue clean; bowels costive; can scarcely articulate; thinks he has millions of money, and can buy up all London; very irritable if contradicted; complexion anæmic; much tremor of the limbs and of the lips.

Ordered one fluid drachm of the solution of bichloride of mercury in decoction of bark, twice daily. Ordinary diet.

May 20th.—When the quantitative analysis of the urine

was made, the paralysis was advancing; his habits were dirty; he was incoherent.

June 9th.—The urine was again examined, the draught having been omitted on the 2d instant; he was mischievous, destructive, dirty, incoherent, and excited, and worse than before.

He still had ordinary diet.

Result.—November 7th, 1851. He went out cured.

No. 15.—J. W—, male, æt. 33, married; occupation, a mason; admitted April 11th, 1851. Temperament sanguine. The present is the first attack, and has lasted two months. Cause unknown; disease not hereditary.

Symptoms on admission.—Says that he has been to heaven in a chariot of fire; pulse 120; skin and head cool; tongue clean; bowels open; right pupil dilated; sleeps well; expiration audible on right side of the thorax; secretes rubbish in his pockets; there is stiffness of the upper lip. Soon after this there was hesitation of speech, with the extravagant ideas so often met with in cases complicated with paralysis; he fancied he had married three queens, and that he had twenty millions of money.

He had ordinary diet.

May 10th.—When the analysis of the urine was made, he was destructive; broke windows, and tore his clothes; and was incoherent. He took one fluid drachm of the solution of bichloride of mercury from June 9th to August 18th, when he was better. The delusions gradually subsided.

Result.—February 20th, 1852. He was discharged cured.

TABLE I.

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Form of Disease.	Acute Dementia.								Catalepsy.	Paralysis of the Insane.									Chronic Mania.			Chronic Dementia.		
Initials of the Patient	E. A. H.	I. L.	I. L.	T. T.	T. T.	M. M.	C. B.	C. B.	H. J.	F. B.	F. B.	J. C. T.	J. C. T.	J. H.	J. H.	C. C.	C. C.	J. W.	E. K.	J. C. C.	J. S.	A. M.	H.	S. H.
Number . . .	52	6	17	18	54	31	35	48	64	1	43	2	42	9	33	12	37	15	16	27	53	3	23	57
Date . . .	July 5	May 10	May 17	May 27	July 15	June 2	June 2	June 30	May 11 1853	May 3	June 9	May 3	June 9	May 19	June 2	May 20	June 9	May 20	May 20	June 2	July 8	May 3	May 27	July 15
Reaction . . .	Neutral	Feebly acid	Neutral	Feebly acid	Acid	Acid	Acid	Acid	Acid	Very acid	Acid	Acid	Feebly alkaline	Neutral	Acid	Feebly acid	Acid	Acid	Very acid	Acid	Acid	Feebly acid	Feebly acid	Feebly acid
Specific Gravity.	10.17	10.16	10.16	10.20	—	10.24	10.25	10.15	10.24	10.19	10.30	10.19	10.15	10.08	10.16	10.18	10.17	10.21	10.27	10.22	10.25	10.24	10.11	—
Water . . .	971.00	969.2	973.20	957.6	939.80	945.20	931.60	963.00	944.20	—	912.6	—	959.4	988.6	958.2	959.8	959.00	958.00	944.40	949.80	929.20	—	978.4	973.00
Solid Matter . .	29.00	30.8	26.80	42.4	60.20	54.80	68.40	37.00	55.80	—	87.4	—	40.6	11.4	41.8	40.2	41.00	42.00	55.60	50.20	70.80	—	21.60	27.00
Fixed Salts . .	16.91	14.88	15.04	20.46	18.20	12.75	11.49	11.47	10.71	—	21.42	—	13.31	4.74	8.45	14.77	13.13	16.82	17.95	19.48	9.15	—	8.88	10.16
Phosphate of Lime precipitated by Ca. Cl. and N. H.	1.63	1.52	3.95	2.49	5.10	2.70	5.23	2.37	6.44	4.64	5.18	3.42	1.57	2.90	2.86	4.46	2.95	4.33	7.56	2.76	4.02	4.10	2.68	1.26

TABLE II.

Solid matter of the urine . .	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Fixed salts . .	58.30	48.31	56.11	48.25	30.73	23.26	16.79	31.00	19.19	—	24.50	—	1.84	41.57	20.21	36.70	32.02	35.28	32.28	38.80	12.92	—	41.11	37.62
Phosphate of Lime precipitated by Ca. Cl. and N. H.	5.62	4.93	14.73	5.87	8.47	4.92	7.64	6.40	11.50	—	5.92	—	3.86	25.44	6.84	11.09	7.19	10.30	13.59	5.50	5.67	—	12.40	4.66

TABLE I.

Form of disease	Acute Mania with Paroxysms.						Intermittent.		Common Mania.				Remit- tent.	Puerperal Mania.			Hysterical Mania.	
Initials of the Patient	R. E.	R. B.	G. G.	E. A.	J. C.	J. C.	W. M.	W. B.	W. M.	E. T.	E. H.	S. H.	M. D.	C. P.	S. P.	A. C.	A. G.	E. W.
Number	21	24	47	49	51	62	59	4	34	40	58	32	36	14	30	50	55	28
Date	May 27	May 27	June 30	June 30	July 5	August 2	July 15	May 8	June 2	June 9	July 15	June 2	June 9	May 20	June 2	July 5	July 15	June 2
Reaction	Acid	Feebly acid	Acid	Acid	Acid	Acid	Acid	Neutral	Acid	Acid	Acid	Acid	Acid	Very acid	Acid	Acid	Acid	Acid
Specific gravity	10.20	10.23	10.33	10.28	10.32	10.30	—	10.16	10.28	10.30	—	10.25	10.18	10.26	10.20	10.18	—	10.27
Water	945.8	943.00	908.00	931.6	925.2	924.00	927.60	964.8	932.40	915.4	965.40	938.00	946.4	941.60	957.20	965.2	931.00	924.4
Solid Matter	54.2	57.60	92.00	68.4	74.8	76.00	72.40	35.2	67.60	84.6	34.60	62.00	53.6	58.40	42.80	34.8	69.00	75.6
Fixed Salts	12.91	15.10	13.18	20.33	15.28	12.16	8.93	12.31	11.87	14.35	13.37	12.91	7.91	10.32	15.62	18.71	12.48	17.00
Phosphate of Lime precipitated by Ca. Cl. and N. H.	6.05	7.14	9.73	4.49	8.03	6.29	3.80	1.77	3.10	3.86	1.80	3.57	3.23	7.72	2.60	1.23	4.96	5.66

TABLE II.

Solid matter of Urine	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Fixed Salts	23.81	26.49	14.32	29.72	20.42	16.00	12.33	34.97	17.55	16.96	12.33	20.82	14.75	17.67	36.49	53.76	18.08	22.48
Phosphate of Lime precipitated by Ca. Cl. and N. H.	11.16	12.52	10.57	6.56	10.73	8.27	5.24	5.02	4.58	4.56	5.24	5.75	6.02	13.21	6.07	3.53	7.18	7.48

Remarks.—We observe that in the five cases of acute mania the proportion of phosphates to 1000 grs. was, in four, above the mean quantity found in health, and in one the proportion was nearly of the healthy standard. in Case 47 the phosphates were as high as 9·73, the specific gravity of the urine being 1033; but while we see that this amount of the phosphates is nearly equal to what Dr. Bence Jones has found in certain cases of delirium, and inflammatory action from fracture at the base of the skull, and in violent delirium at the end of phthisis, we must not too hastily conclude that acute inflammation is present in acute mania, because this theory is refuted by the analysis of the blood, by our post-mortem examinations, and by the effect of treatment.

In Case 47 the analysis of the urine was made three days after the admission of the patient, the disease having existed only six days; in Cases 21 and 24 the analysis was made four days after the admission of the patients, the disease in both cases having existed three months; and in Case 51 the analysis was made on the day after the symptoms had changed from tranquillity to excitement, the paroxysm having broken out in the hospital. The analyses in 49 and 59 were made in one case seventeen days, in the other eighteen days, after the admission of the patient; whilst that of Case 4 was made after the paroxysm had lasted nine weeks, and when the patient was much exhausted from its effects. It would appear, therefore, that if the urine be analysed at the commencement of a paroxysm of acute mania, a plus quantity of the phosphates will be found to exist—in some instances equal in extent to the quantity found in encephalitis; that this large secretion of the salt lasts but for a short period; and that it is modified, as in Case 49, by refusal of food, and the prolongation of the paroxysm; and that the exhaustion, which is the effect of the paroxysm, is accompanied, as in Case 4, by a minus quantity of the phosphates, as small, indeed, as that found by Dr. Bence Jones in certain cases of delirium tremens.

The question, then, which is forced upon the mind from these results is this: Is the amount of phosphates found in

the urine a measure of inflammatory action? Is it not rather a measure of the consumption of nerve force? to this question we shall return in the sequel. In the four cases of common mania, and in the case of remittent mania, no symptoms of paroxysmal excitement were present when the analysis of the urine was made, and the amount of phosphates in the urine was in all below the average of health. In Case 34 the health was much broken, in consequence of previous habits of intoxication; and E. H—, Case 58, was admitted in a very weak and emaciated condition, the insanity being accompanied with scrofulous disease of the ankle-joint; besides which, the digestion was much impaired, and he took very little food; these circumstances may in some measure account for the quantity of the phosphates being as low as 1.80. In Case 32 there were well-marked symptoms of the stage of exhaustion, indeed the case was nearly allied to one of acute dementia; upon admission, the reaction of the urine was alkaline, with deposit of the triple phosphate crystals, and as the symptoms improved the urine regained its acid reaction; this may be considered by some to favour the opinion, to which I shall afterwards have to refer, that in cases of mania the urine is generally found to be alkaline; but it is an exception to the general rule which I shall have to lay down, viz., that in the majority of cases of mania, the reaction of the urine is acid.

In the cases of puerperal mania the analysis was made in Case 14, before the stage of excitement had passed off, about a month after the commencement of the attack, and eleven days after the patient was admitted into the hospital: and the quantitative analysis gave the amount of phosphates, as 7.72. In Case 30 the analysis was made during the stage of exhaustion, nine weeks after the admission of the patient, and nineteen weeks after the commencement of the disease, and the amount of phosphates was 2.60. While in Case 50, where the disease occurred after prolonged lactation, although the patient, at the time the analysis was made, was taking abundance of food with two ounces of brandy and two pints of porter daily, to prevent her sinking into a state of

collapse, the amount of phosphates was 1.23. These cases appear to confirm the results met with in the above cases of acute mania, and would lead us to infer that, in the acute stage of mania, there is a plus quantity—in the stage of exhaustion a minus quantity, of the phosphates present in the urine.

In the two cases of hysterical mania it was interesting to compare the manner in which the disease manifested itself in constitutions so dissimilar, the cause of the illness being the same in both. In Case 28, that is, in the anæmic weaver, we find that the phosphates amounted to 5.66; and, in the hyperæmic case, to 4.96; in the second table we find that the amount of phosphates was very nearly of the healthy standard, being in A. G—, 7.18; in E. W—, 7.48.

In the cases of acute dementia we find the amount of phosphates to be remarkably deficient in quantity in the first table, and below the average of health in five of the analyses. When the first analysis of the urine was made, in Case 6, the patient was unconscious of the calls of nature, and inattentive to all that was passing around him: when the second analysis was made, in the same case (No. 17), there was some improvement in the symptoms; and we find the quantity of the phosphates to be 3.95, *i. e.*, 2.43 higher than in the first analysis. In Case 18, when the powers of the mind were in abeyance, the proportion of phosphates was 2.49; when they began to be again exercised, the proportion was 5.10: as a contrast to this we have the case of C. B—, 35, in which we find the proportion of phosphates, June 2d, to be 5.23; and, as the disease advanced, and when she was unable to comprehend what was said to her, the proportion was 2.37.

The analysis of the urine of those suffering from paralysis of the insane, corresponds with that made by Dr. Bence Jones, who was the first to point out the great deficiency of phosphates in this disease; and as the cases from which he derived the specimens of urine, in 1845, were under my care in the hospital, I am able to compare the two analyses with the particular symptoms in all the cases.

The first case in our analysis, F. B—, 1, had a fair average

amount of phosphates when the urine was examined in May and June: this patient recovered. The second case J. C. T—, 2 and 42, is interesting as showing that, when the disease was in the first stage, the proportion of phosphates was 3·42, and the reaction of the urine was acid; and a month afterwards, when the disease was in the transition stage, the amount was 1·57, and the reaction of the urine was alkaline. In the third case, J. H—, 9 and 33, although the urine was examined at the commencement of a paroxysm, the proportion of phosphates amounted only to 2·90; and after the excitement had passed off, and the urine was again examined, it was 2·86: this patient was discharged uncured. In the fourth case, C. C—, 12 and 37, the amount of phosphates was at first 4·46, and, afterwards, when he became worse, it was 2·95. I should say, however, that soon after the second examination of the urine was made, a large boil appeared on his side, after which the symptoms began to improve, and he ultimately recovered. In the fifth case, the examination was made during the stage of excitement, and the proportion of phosphates was 4·33: this patient likewise recovered.

In the first case referred to in Dr. Bence Jones's analysis, the proportion of phosphates was 6·90, and the patient was well enough to be discharged on trial about a month afterwards; he however relapsed, and was readmitted into the hospital August 8th; and when Dr. Jones again examined the urine, the phosphates amounted to 4·14; this patient was discharged uncured. In the second case, the patient was admitted March 7th, the paralysis became rapidly worse, and when the urine was analysed, on June 16th, the proportion of phosphates was only 2·02. Cases 3 and 4, in Dr. Jones's analysis, refer to the same patient; and although the urine was examined the second time during a paroxysm the amount of phosphates was only 1·30. Case 5, in Dr. Bence Jones's analysis, was one where the patient had laboured under paralysis of the insane for many years, and the disease had passed into dementia; here the amount of phosphates was as low as 1·35. In these cases we observe a

diminution in the amount of phosphates corresponding with the progress of the disease ; and in the two analyses we have evidence that in two cases where the analysis was made during the existence of a paroxysm, it was, in Case 9, 2·90 ; and in Dr. Jones's second case, 2·02 : if, therefore, the amount of the mixed phosphates be any measure of the expenditure of nerve force, as the above analyses appear to me to prove, we have here evidence of the small amount of phosphoric acid possessed by the atrophied brain in white softening, or cedema of that organ ; and we might ask, whether there be not something analogous to this in those cases of delirium tremens where an equally small amount of the phosphates is found in the urine ; and whether it be not the atrophy and cedema of the brain which is the cause of such diminution, and not the peculiar action of alcohol upon nervous matter, which action is, in all probability, neutralized by the vital power of the brain itself.

The cases of chronic mania, and chronic dementia, are so far interesting, as they exhibit an amount of the phosphate below the average in every case but one, viz., that of E. K—, 16, whose powers of mind were very little impaired by the existence of her disease, and who was discharged "on trial" from the hospital on the 22d instant.

If we compare the reaction of the urine in the above cases of acute mania, and chronic dementia, we shall find that in recent cases of mania it was acid seventeen times, feebly acid twice, neutral once ; whereas in chronic cases, and those complicated with general paralysis, it was acid nine times, feebly acid four times, neutral once, and feebly alkaline once. Erlennmayer has stated that the urine is generally alkaline in recent cases of mania ('*De Urina Maniacorum*,' 1844), this does not correspond with my experience, I find that in 125 cases of recent mania admitted during two years under my care into St. Luke's hospital, the urine was acid in 111 cases, neutral in 1, alkaline in 13 ; being in the proportion of 88½ per cent. acid, 10½ alkaline, and, omitting fractions, 1 neutral ; whereas in 100 cases of chronic mania and dementia, under my care at the same time, the urine was acid in 61,

neutral in 6, alkaline in 33; and in 25 cases of paralysis of the insane, the reaction of the urine was acid in 12, neutral in 1, alkaline in 12.

But we must not infer that it is always a bad symptom when we find the urine alkaline, or an alternation of the acid and alkaline reaction, as in the cases of fracture of the spine, mentioned by Sir B. Brodie; as it is not an evidence of the existence of organic disease of the brain in cases of mania, but rather of exhaustion of the nervous centres; and in this respect it is analogous to the urine of fever; for, as Simon has observed, "in proportion as fever assumes a torpid character, and the vital powers become depressed, the urine becomes clearer, loses its acidity, becomes neutral, and in a very short time alkaline."

If we compare the analysis of the urine in the above cases of mania and dementia, with that of the brain, and the blood, it will appear that they correspond in a very interesting manner: we find in the brain of infancy, and old age, according to L'Heritié, a minus quantity of albumen, cerebral fat, and phosphorus, as compared with that of adults, and a minus quantity of the same substances in the brains of idiots; whereas there is a plus quantity of phosphorus, according to M. Conerbe, in the brains of those suffering from acute mania. In the quantitative analysis of the blood of acute mania, published by Hittorf we find a deficiency of blood-corpuscles, and a slight increase of fibrin, and albumen; and Michéa states that, in cases of paralysis of the insane, he found the albumen to be remarkably deficient in the blood in nearly one third of the cases, and that there was an augmentation of the blood-globules, and an absolute diminution of the fibrin. The tissue from which the phosphates are eliminated is the albuminous, and in the urine we find a plus quantity of the mixed phosphates at the commencement of the paroxysm, and a minus quantity in acute dementia, and in the third stage of paralysis of the insane.

This result corresponds also with the symptoms which we observe during life; for in dementia, when the brain is in a passive state, there is less interference with the func-

tions of the nerves of organic life, and digestion goes on much as in health ; but in acute mania there is great disturbance in the functions of primary and secondary assimilation, as is evident from the symptoms of constipation, the unhealthy evacuations, and the deposits of uric acid and urate of ammonia in the urine ; the emaciation also which takes place during the acute stage of mania is sometimes very great ; and the patients at St. Luke's hospital sometimes weigh many pounds heavier at the time of their discharge as compared with their weight upon admission. The fat appears to be absorbed from all parts of the body to supply the brain ; for in acute mania the production of nerve force is very rapid, the increased flow of blood, which is the result, at first stimulates the intellect beyond its ordinary power, when ideas pass through the mind with unaccustomed rapidity ; as the disease advances incoherence is the result, in consequence of the multiplicity of thoughts which pass through the patient's mind making it impossible for him to give utterance to all ; the cell-nuclei are thrown into a state of unhealthy activity, there is little repose night or day, and want of sleep, as is well known, is one of the most common symptoms ; there is a constant demand upon the blood for the albuminous and oleaginous principles ; the whole nervous system partakes of this activity and feels its influence, and is thrown into a state analogous to that of electric tension ; not only are the hemispheric ganglia involved, but the fibrous structure conveys the impulse to the peripheral extremities of the nerves, producing hyperæsthesia and pseudæsthesia : the nerves of organic life likewise sympathise ; the false perceptions of the nerves of special sense, and of those of sensation, and the errors of nutrition and secretion, are sufficient evidence of this ; and when the disease arrives at its highest point, and a paroxysm occurs, we have then to deal with another force, which becomes equally unmanageable, I mean the force developed by muscular contractions, which, as Matteucci has shown, is quite independent of the nervous system ; these two forces acting and reacting upon each other, produce such a state of

nervous erethism that I have seen patients with symptoms resembling those of an animal poisoned by strychnine; the fury of the passions and the movements of the limbs are quite beyond their control, and the muscular force is developed to such an extent that they sometimes perform feats of strength which they would have been quite unequal to when well.

The symptoms of acute dementia form a striking contrast to the paroxysm of mania; the patient never speaks, he is apparently unconscious of all that passes around him, and his movements are automatic, the pulse is weak, sometimes scarcely perceptible, the extremities are cold and livid, the respiration is chiefly abdominal, and slower than in health: in a case at present under my care, the index of Dr. Quain's stethometer showed that the thorax was raised during each inspiration only five degrees instead of fifty, while the abdominal respiration ranged from thirty to forty-five degrees, the number of respirations being sixteen in the minute. In these cases there is little consumption of nervous force, whereas in the dementia of general paralysis there is little supply; for the atrophy and œdema of the brain must prevent the cell nuclei from being formed in sufficient quantity, and the blood, as has been shown, is not able to furnish the requisite amount of albumen: but this happens in the last stage of the disease; for if the nervous system and the blood were affected in the same way in every case, we should not be able, as in some of the cases given above, to quote instances of recovery, and medical treatment would be of no avail: the fact has been overlooked, that there is more than one species of paralysis of the insane; the scrofulous species differs from that which is the result of delirium tremens; that which is accompanied with anæmia and local congestion differs from that with hyperæmia and hypertrophy of the left ventricle of the heart, and that species which is the result of atheromatous and bony deposits of the blood-vessels of the brain, no less than the hardening differs from the softening of the brain found in these cases, in our post-mortem examinations: probably the reason why Dr.

Conolly has spoken so strongly as to the incurable nature of paralysis of the insane is, that patients labouring under this disease are seldom admitted into Hanwell during its first stage.

If, then, we compare the plus quantity of the mixed phosphates secreted in the commencement of the paroxysm of acute mania, and the minus quantity found in acute dementia, and in the third stage of paralysis of the insane, with the symptoms during life, it gives us, to a certain extent, a measure of the expenditure of nervous force; we know that this force is intimately associated with all the operations of the mind, we believe it to be the connecting link in its relation with matter, being probably the highest form in which matter is found; over-exertion of intellect exhausts its energies, no less than over-exertion of body tends to impair its supplies. It is now generally admitted, that the cell nuclei found in the nervous centres, and at the extremities of the afferent nerves, are the sources of nervous force, and that this force is correlated with electricity, therefore the subject of electricity becomes of greater importance to us in our investigations, whether physiological or pathological. It has long been observed that sudden variations in the temperature and weight of the atmosphere, exert a powerful influence upon all nervous disorders, and that the partial distribution of light and heat have favoured the production of insanity on the northern sides of mountainous districts; the effects, also, of the Siroc of the Mediterranean, and of the viento norte of Buenos Ayres are well known, and we are able to trace a connection between disorders of the nervous system and epidemic diseases; but whether the magnetic variations have any influence upon nervous disorders is still a problem to be solved by future investigations. Schwabe has proved that the epochs of maxima and minima in the variations of the solar spots, are identical with those which have been assigned to the magnetic variations; but Colonel Sabine has shown that he has not been able to derive, from the indications of the thermometer and barometer, any sensible connection between climatic conditions and the number of spots.

The conclusions which may be drawn from the above analysis of the mixed phosphates in the urine of cases of mania and dementia, and the comparison of this analysis with that of the brain, and of the blood, and of the symptoms in similar cases, are as follows :

1. A plus quantity of phosphates exists in the urine in the paroxysms of acute mania.

2. A minus quantity exists in the stage of exhaustion in mania, in acute dementia, and in the third stage of paralysis of the insane.

3. The plus and minus quantities of phosphates in the urine correspond with the quantitative analysis of the brain and of the blood ; for a plus quantity of phosphorus is found in the brain, and a slight excess of albumen in the blood of maniacal patients ; and a minus quantity of phosphorus and albumen are found in the brains of idiots, and a minus quantity of albumen in the blood of paralysis of the insane.

4. The plus quantity of phosphates in the urine of cases of acute mania, denotes the expenditure of nervous force, and is not a proof of the existence of acute inflammation in this disease.