Couch To Adolph Lippi M.D. (L.B.C.) with the compliments of L.B. Couch.

THE

PHYSIOLOGICAL ACTION

OF

PICRIC ACID,

As Shown

By Experiments upon Animals.

BY

LOUIS B. COUCH, M. D.

NYACK-ON-HUDSON, N. Y.

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ON THE PHYSIOLOGICAL ACTION OF PICRIC ACID AS SHOWN BY EXPERIMENTS UPON ANIMALS.*

BY LOUIS B. COUCH, M. D., NYACK-ON-HUDSON, N. Y.

Carbazotic, Nitrophrenesic, or Picric Acid, is a yellow crystalline dye stuff, formed by the action of nitric acid on carbolic acid, anilin, indigo, coumarin, silk, salycin, and various other complex organic substances. It has an extremely bitter taste, is sparingly soluble in alcohol, and still less so in water, requiring about 50 parts of the former, or about 700 parts of the latter for its solution. It combines with various bases forming explosive compounds, the potassium-picrate being the most active.

In 1874, after my graduation, at the request of Dr. Samuel A. Jones, I made a lethal proving upon a dog, with the alcoholic tincture of *Picric Acid*, and sent the tissues to him, together with a bottle of the dog's blood, for microscopical examination. That proving was made as carefully and intelligently as my education at that time would permit. I found that the pulse, respiration, and temperature were increased primarily, the ratio between the pulse and respiration being *especially* augmented. As larger doses were administered, however, *this ratio fell in a remarkable manner*, and death took place suddenly, as I then supposed, from paralysis of the lungs.

Owing to the action of the drug upon the digestive organs, the appetite was poor, and the tissues failing to receive their proper supply of nutriment, wasted away. Of course, under these circumstances, we would expect to find a great deficiency of that vital fluid, the blood; and so the result proved. Failing to secure enough blood to fill the bottle I had procured for the purpose, and, fearing lest the air contained would destroy it before he could examine it, I FILLED THE VACANT SPACE WITH WATER. I did not at that time know of the disintegrating action of water upon the blood corpuscles, nor did I dream that this little mistake would not only lead our Western Professor to make a most absurd diagnosis, perpetrate a most astounding theory, but condemn his associate as "dishonest," and his results as a "false report," because they did not tally with his peculiar theories, unsupported as they were by any reliable data, and not even possessing the first elements of common sense to gain them credence. Burdon Sanderson's *Text Book of the Physiological Laboratory*, contains the following remarks by Dr. E. Kleine:

"As regards the action of water in the corpuscles of mammalian blood, there is not much to be added to what has been said with reference to the newt's blood. The colorless corpuscles discontinue their movements, become globular, exhibit vesicular nuclei and vibrating granules, and finally are disintegrated. The colored disks loose their horse-chestnut form, become smooth and pale, and finally disappear."

Among the interesting symptoms observed, was anæsthesia of nearly the whole body, so that pins could be passed through the skin and limbs and into the joints, thorax, and abdomen without the animal betraying a consciousness of pain.* A highly colored urine was always present during medication, varying from blood-red to almost black, according to the amount of Picric acid administered.

It is interesting to state in this connection, that this *blood-colored* urine, was devoid *even of a trace of albumen, which almost always, if not invariably, accompanies blood coloring matters in urine.*†

*Read before the N.Y. Med. Soc., March 9th, 1878.

* Due partially to the alcohol of the tincture.?

† Blood coloring matters when present in urine are always accompanied by albumen. *Tyson, Pract. Ex. of the Urine.*, p. 66. I say *almost* invariably. There are a few

On examining the blood I had sent, the Doctor *of course* found the blood corpuscles destroyed. He prepared a paper upon the *blood destructive properties of Picric Acid*, which I believe he read before this society in 1875.

In 1877, Prof. Jones came out in the August number of the *American Homœopathic Observer*, with the following interesting paper, entitled:

"ON THE INDICATIONS FOR THE USE OF PICRIC ACID AS OBTAINED FROM ANALYSIS OF THE URINE."

The homœopathic physiologist must learn to take more cognizance of the substantial stuff of which the body is composed, and by the coming and going of which it is sustained.—DR. SAMUEL BROWN on *The Theory of Small Doses.*

PREVIOUS studies of the action of Picric Acid have led to the conclusion that it is a drug which *retards oxidation. This is effected through the blood, that composite tissue being its chief point of attack. The oldest living element of the blood, the red blood-corpuscle, succumbs to the deleterious influence of Picric acid; fatty degeneration of its contents ensues, its coloring matter is set free, and it is no longer capable of bearing oxygen to the tissues;* then the body temperature falls, the energy falls, and death from *asthenia* results.*

As a poison it is one which is rapidly recovered from when its exhibition is arrested before a lethal condition is induced. This speedy recovery is believed to be due to a replenishing of the system with red blood-corpuscles; and from experiments with this drug on rabbits we *can* learn how quickly these bodies are reproduced.

Our studies of the action of this drug have led to the belief that Picric acid destroys the *oldest* of the red blood-corpuscles first, *including the younger ones as the blood stream becomes saturated with the acid. The result of this should be a more rapid disintegration of red blood-corpuscles.* The product, if properly conducted by the liver, would give an *increase in the urea-elimination.* Beside this we should also have an increase of urohæmatine. *As the sodic phosphate is found in the red blood-corpuscle, we should further find an increase of the Phosphoric acid.*

But this destruction of the red blood-corpuscles diminishes the number of oxygen bearers, and a condition of sub-oxidation would ensue. Consequently we should not expect so much of an increase of urea as of uric acid. Further, from the condition of sub-oxidation we should find a decrease of the sulphates and the chlorides.

If, then, this analysis of the action of Picric acid is correct, we should find the urinary indications for its use to consist in an increase of the uric and the phosphoric acids, and a decrease in the sulphates and the chlorides. With these substances there should also be an increase of urohæmatine.

This is the speculative side of our subject, *and let us appeal to experiment to demonstrate its truth.*

Picric acid was recently proven by three persons, who collected all the urine passed during three cycles, two of which cycles were three periods of nine days each, while the remaining one consisted of three periods of six days each. The first cycle of each prover showed the urine of health, the second the urine of medication, the third that of elimination. *The last prover was not in health. He took Picric acid as a remedy,* and he selected a cycle of only six days to see how the mean would compare with the cycles of a longer period.

The first prover, Dr. George A. Tabor, took the equivalent of thirty grains of the crude acid. The second prover, Mr. Frank N. White, had the equivalent of twenty-four grains of the crude acid. The last prover, myself, took the equivalent of six grains of the crude acid.

The results as shown by daily analysis of all the urine passed, were as follows:*

Name.	Time and Dose.	Av. daily D.	Urea	Uric A.	Phos.	Sulph.	Chlor.
Tabor.	9 days. ? | 30 grs.	3⅓ grs.	+3.5 grs.	+0.6 grs.	+ 1.2 grs.	—0.8 grs.	—14. grs.
White.	18 days.	24 grs.	1⅓ grs.	+3.5 grs.	+2.8 grs.	+27.7 grs.	—2 grs.	—65.5 grs.
Jones..	6 days.	6 grs.	1 gr.	+ 31 grs.	—2.7 grs.	— 0.8 grs.	+12.6 grs.	+32.8 grs.

In both of the healthy provers we find a *striking agreement in their results.* (? L. B. C.) In both, the urea, uric, and phosphoric acid is increased, and both show a decrease in the sulphates and chlorides. In the prover who was out of health nearly an exact opposite occurs, namely, the uric, and phosphoric acid are decreased, while the sulphates and chlorides are increased. In regard, then, to these four substances, the results are direct opposites. So far as the *urea* is concerned a discrepancy seems to exist, in that in both the healthy and the unhealthy provers an increase of this substance occurs. A moment's reflection, however, shows that this is as it it should be, because while Picric acid retards oxidation in health it should accelerate it in disease. *In the healthy provers the urea was increased not quite three-tenths of a gramme per diem, and this small gain is accounted for by the extra* 150 *c.c.'s of urine in the daily*

isolated cases in which blood corpuscles have been detected in urine by the microscope, and yet the ordinary tests failed to show the presence of albumen. See *London Practitioner*, April, 1875. This may possibly be caused by some peculiar quality or condition of the urine. For instance, the aqueous solution of *Picric Acid* has been recommended as a test for albumen. With it, I myself have detected one part of albumen in 15,000 of water. On substituting human urine for aqua pura, the addition of *Picric Acid* gave no result whatever. Subsequent experiment proved that the sulphates had prevented the success of the test. The method used was as follows: Put 200cc., or 7 oz. of the aqueous solution of albumen (1 to 15,000) in a glass jar 1x9, then add 30cc., or 1 oz. of the sat. sol. of *Picric Acid.* After a few hours, flakes of coagulated albumen are found in suspension and finally are precipitated.

* The italics are my own.

* Prof. Jones uses the French or Metrical system in giving his results. For the benefit of those as yet unfamiliar with the metrical system, we will change these results from grammes into grains, which will enable us to more easily get at the "milk of this theoretical cocoanut."

excretion! in the prover who was out of health the urea-gain was over two grammes daily—a good evidence of increased oxidation.

This increase leads us to call attention to the lesson which it teaches, namely: *the diseased condition calling for Picric acid must present not an increased but a diminished excretion of urea.*

It will aid the purpose of this paper to state the condition of the prover in whom this marked increase of urea was observed. He was markedly indisposed to either physical or mental exertion; easily fatigued; readily "blown" by walking up hill; inclined to day-sleepiness, and he felt as if in a state of semi torpidity. This apathy also pervaded the sexual system. His appetite was so poor that he seldom ate anything with a relish; he became faint rather than hungry, and this faint feeling induced a craving for stimulants. He always felt best towards the close of the day, and could sit up o'nights like an owl. He slept late in the morning, waking up thoroughly "played out," and with all his milk of human kindness in a strong acetous fermentation. The results of taking *Picric Acid* were, an improved appetite, a general feeling of well-being, a renewed vigor in the morning, and an ability to rise much earlier than usual.

To those in his condition an increased elimination of urea is an essential to improvement; it indicates a completer oxidation, and denotes a status which *Picric Acid* will always produce when it acts homœopathically in disease.

Let us now examine more closely the contrasts afforded by these analyses, and we will compare the results in Mr. White's case with those in our own.*

	Uric Acid.	*Phosphates.*	*Sulphates.*	*Chlorides*
White,	+2.8	+27.7	— 2.	—65.5
Jones,	—2.7	— 0.8	+12.6	+32.8

These marked differences and their significance will be readily apparent to the reader, and on them we base the indications for the use of Picric acid as obtained from an analysis of the patients urine, namely: *a plus of uric, and phosphoric acid, and a minus of sulphates and chlorides as compared with the normal standard.*

To fix the patient's "normal standard" is the one difficulty, but Hassell, Vogel, Parkes and Harley give *mean quantities*, and a marked *plus* or *minus* must serve as our criterion in a given case. When Picric acid is needed the reader may rest assured that excesses and deficiencies will readily be found to exist, and it is hoped that the data here furnished may aid in giving precision to the choice of the remedy, and a firmer reliance on a choice which is made from a consideration of both the subjective and objective symptoms.

Would that every practicing physician would "read and inwardly digest" Harley's *Lecture VI.*† His remarks on the pathology of urohæmatine will make many an obscure case clear to him who for the first time peruses them.

We have reverted to this because it indicates the direction in which *Picric Acid* does its work.

Far this side of "Progressive Pernicious Anæmia" is a condition wherein the physician finds a marked loss of strength, and yet no detectable organic lesion to account for it. Then let the test for urohæmatine be applied, and the significant *color* obtained will at once put the attendant in possession of the secret, and at work in the right direction. The trouble is too rapid a destructive metamorphosis of the red blood-corpuscles—a condition wherein *Picric Acid, in the higher potencies*, is indicated, and one in which this remedy will win some of its proudest laurels. (? L. B. C).

S. A. Jones.

This theory is briefly, that *Picric Acid* produces "fatty degeneration of the red blood corpuscles."

2d.—That the amount of "fatty degeneration" depends upon the degree of blood saturation with the acid.

3d.—That the coloring matter of the red blood corpuscles is "no longer capable of bearing oxygen to the tissues," and is, therefore, eliminated by the kidneys as "urohæmatine."

4th.—That his urinary analyses prove blood destruction.

5th.—That animals poisoned with this drug die from "asthenia."

Now I propose to prove that *Picric Acid* does *not* produce "fatty degeneration of the red blood corpuscles."

2d.—That it has *no destructive action whatever* upon the blood corpuscles.

3d.—That the oxygen bearing function of the hæmatin is unimpaired.

4th.—That the coloring matter in the urine which Dr. Jones calls "urohæmatine," is *not* urohæmatine, but a *vegetable coloring matter*, a product of the decomposition in "Nature's laboratory" of a portion of the *Picric Acid* administered.

5th.—*That the Doctor's own urinary analyses by which he endeavors very ingeniously to prove blood destruction, actually disprove such action*;

6th.—And lastly, that animals poisoned with this drug, do *not* die from "Asthenia," but from an entirely different cause.

For several months past, I have been experimenting upon animals with pure *Picric Acid* crystals, and my results have been so uniform and satisfactory, as to leave no doubt in my mind that I have learned the true action of this drug.

*Mr. White introduced the drug into his system slowly. Dr. Tabor took larger doses sooner, and thus established renal elimination, escaping so full an action as might have been had with more care and smaller doses. Mr. White's results are selected as giving truer indications of drug action.

†*The Urine and its Derangements*, p. 96. The first edition is out of print, but a second is forthcoming.

To ascertain if *Picric acid* produced the wonderful action upon the blood corpuscles so *accurately* described by Professor Jones, I prepared 45 or 50 specimens of blood in various stages of the poisonings, and even after death. In *none of them, however, was there the least change in the blood corpuscles from the normal condition.** I went further. Procuring some healthy blood, I mixed with its serum as large a quantity of the acid as possible without coagulating the albumen it contained, but even then the blood corpuscles were unchanged.

A highly colored urine was always present during medication, varying from *blood red to almost black, according to the amount of the acid administered.* This urine *also* was unaccompanied even by a trace of albumen, which as before stated, almost invariably accompanies *blood coloring matter in urine.*†

Just what this coloring matter was, is an intensely interesting matter to me, for upon this point all the theories advanced by my learned opponent concerning the physiological action of the drug, must either stand or fall.

Tyson says:‡

"The coloring matter of plants, especially chrysophanic acid,§ found in rhubarb and senna leaves, contributes to alkaline urine a reddish yellow to a deep red color. It can be recognized by the fact that red alkaline urine by the addition of an acid becomes *yellow*, and by the addition of an excess of ammonia, again takes on the *red* color.*

"*Precautions.* Such precipitation by heat and potash, *might possibly be taken for blood coloring matters;* but the absence of *Albumen* in the urine, the production of the red color by an excess of ammonia, and its paling on the further addition of an excess of acid, *serve to distinguish* this vegetable coloring matter from blood coloring matters and uroerythrin."

In every case the urine responded perfectly to this test, thereby showing conclusively that its beautiful tint was due, *not* to "urohæmatine," as our Ann Arbor friend so positively declares, but to a *vegetable coloring matter.*†

I next endeavored to find if *Picric Acid* as *Picric Acid* was eliminated by the kidneys, as stated in the former experiment in 1874, and which Dr. Jones doubted. To determine this point, I evaporated about 100cc. of urine upon a water bath, and treated the residue with *Alcohol* to extract the red coloring matter and *Picric Acid*, if any were present. After filtering, a few drops were placed upon a slide and examined with a microscope, when the beautiful crystals of *Picric Acid*, tinged with the reddish chrysophanic acid came into view.‡ (? L. B. C.)

Wishing to place this matter beyond the possibility of a doubt, I sent specimens of the urine to Professor James Tyson, of Philadelphia, the author of that excellent work, *Practical Examination of the Urine*, for his opinion of the coloring matter it contained. Here is his answer:

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* A specimen of the blood of Dog No. 3 was here submitted, showing the blood corpuscles to be in a perfectly healthy condition. The specimen was obtained during the fourth medication when the dog was receiving 66 grs. of *Picric Acid* per day.

† In the *N. Y. Journal of Homœopathy*, June and July, 1875, may be found the following comments by the general editor, Samuel A. Jones, M. D., on the work of an *undergraduate* who failed to make exhaustive analysis of his provers' urine:

"As the 'gold medal' proving of a graduate in medicine, we feel that we are doing true editorial *duty* in calling attention to it as being the most truthful, the severest, and the most unanswerable comment upon the existing system of medical education. We beg leave to add that these remarks are applicable not only to the latitude and longitude of New York."

These remarks on "medical education" are by a professor, who four years afterwards saw "fatty degeneration of the red blood corpuscles" of *watered blood*, and discovered urohæmatine in a urinary solution of chrysophanic acid. *We* beg leave to add that these remarks are applicable *only* to the "latitude and longitude" of Ann Arbor.

‡ *Pract. Ex. of Urine*, p. 68.

§ The picrates of sodium and calcium give similar reactions, and have been recommended as tests for acidity or alkalinity of urine, in place of litmus.—*New Remedies*, July, 1876. 206.

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*Like *Picric acid*, Santonine, or more properly, Santonic acid, also of vegetable origin, is decomposed in the system, forming a remarkable coloring matter which is eliminated by the kidneys, and which Falk of Marburg calls Xanthopsin, from its supposed property of producing Xanthopsia, ("yellow vision.")—(See *British Journal of Hom.*, xxvii., 214). This coloring matter also reddens or pales according as an excess of ammonia or acid is added.

† We take this opportunity of commending our physiologico, sanguino urochemico scientific critic to a study of the rudiments of the histology of the blood, and of the chemistry of the urine. We suggest besides, that he cultivate a little more respect for the opinions and reputations of his fellow-men. A reform in this direction would be very desirable, and our Western friend would, we doubt not, soon be respected most where known best.

‡ Chemists have lately discovered that *Picric Acid* may be easily and profitably prepared from plants containing a large proportion of chrysophanic acid, as for instance, the "goa powder," which Attfield has found to contain 85 per cent. of this drug.

"PHILADELPHIA, *Nov.* 20, 1877.

Dear Sir:—Extreme occupation has prevented my giving attention earlier to your note of the 11th ult. I have indeed not had the time to test the fluid you sent to me personally, but placed it in the hands of my assistant, Dr. B. F. Lauderback, who declares it to be *Chrysophanic Acid*, and I have every confidence in his results.

Respectfully yours, JAMES TYSON."

I also sent specimens of the urine to Profs. T. F. Allen and S. P. Burdick of this city. Prof. Allen placed his specimen in the hands of Prof. O'Connor for his examination. Both these gentlemen examined the urine with the spectroscope, and declared it to be *devoid of hæmatin*, but that it did contain *Picric Acid.*

Prof. Burdick's letter reads as follows:

"NEW YORK, *Nov.* 25th.

My Dear Sir:—Yours of the 21st received. I find the specimen you sent me gives absorption bands of *Picric Acid* and no hæmatin bands.

Fraternally yours, S. P. BURDICK."

As an evidence that the "oxygen bearing functions of the hæmatin" is unimpaired, I will state that during the experiments upon the various canine provers, even while they were eliminating a prodigious amount of this "urohæmatine of Jones," there was a decided *increase* in the animal heat, as the temperature records of all the poisoned dogs will show.

Dr. Jones informs us that Tabor "took *larger doses sooner and thus established renal elimination, escaping so full an action* as he might *have had with more care and smaller doses.*" This, however, does not seem to agree with the statement previously made, *that "the larger the doses"* and greater degree of blood "*saturation*," the more blood destruction, and consequently the *larger production of urea and phosphates.*

Tabor then took doses sufficient to "saturate" the blood and establish "renal elimination." As a result of this blood destruction (?) we find an increase of 3½ grains of urea in over 330, or about 1 per cent. of increase, which is *far less than the differences that occur from day to day in a state of health;* while White, who "took *small doses,*" "introducing the drug into *his* system slowly," had the *same* increase of urea, and I doubt not, the same amount of blood destruction.

Turning now to the *Phosphates*, we find that Tabor, as a result of blood destruction, had a daily increase of 1.2 grains of *Phosphates*, which is equivalent to 0.6 gr. of *Phos. Acid;* while White, who took "*small doses,*" had a plus of 27.7 grs. of phosphate, or an equivalent of 13.9 grs. of *Phos. Acid* in the daily excretion.

White, then, as a result of this blood corpuscular destruction, had a plus of 3.5 grs, of urea and 27.7 grs phosphates, which *clearly proves* that the "red blood corpuscles" contain 89 per cent of phosphates to 11 per cent of urea producing material. This result completely upsets all preconceived ideas of the chemistry of the blood.

According to the theory of my learned opponent, "oxidation" is retarded in direct proportion to the amount of *Picric Acid* administered, and he cites his provers' *uric acid increase* to prove that point. Yet Tabor, who took by far the *largest doses,* had the *smallest increase of uric acid,*" 0.6 gr.;" while White, who took "small doses," had a plus of 2.8 grs. Either of these results, however, are less than the fluctuations which may occur from day to day in a state of health.

As the decrease of the sulphates is very small and that of the chlorides of comparatively little importance, we will pass them over and take up the Doctor's own proving. Here we find a daily increase of 31 grs. of urea, and as he took within 1-3 gr. as large a daily dose as White, who got such remarkable results, we conclude that this great increase is also due to "fatty degeneration of the red blood corpuscles," "the product of which if properly converted by the liver," we are told would give this increase. Then, "as the sodic phosphate is found in the red blood corpuscles, we should further find an increase of phos. acid." Turning now to the phosphates, we find that instead of *gaining* he has *lost* 0.8 gr.

I was at a loss to account for this, and still save the theory, but the Doctor evidently was not; such knotty little points as this he glides over with the greatest ease and quietness. He informs us that he was "not in health" when he made that "proving," so "he took *Picric Acid* as a remedy"——?

A remedy for what? "Fatty degeneration of the red blood corpuscles?" I cannot for a moment entertain such an idea, for I feel certain that at no time during the past five years, has the proportion of water in the erudite Doctor's *liquor sanguinis*, exceeded the normal standard. At any rate, the proportion has never

been so great as to make him at all liable to become a victim to the "fatty degeneration of Jones."

A daily increase of 31 grs. urea for a period of six days, then, "is a good evidence of increased oxidation."—Granted. The other provers who were victims of "fatty degeneration of the red blood corpuscles," and whose hæmatin was "no longer capable of bearing oxygen to the tissues," had during the period of medication, (18 days,) a daily increase of 3½ grs. of *urea*, which our Scientific Physiologist would have us understand is an evidence of "sub-oxidation."

This is indeed "an elastic kind of logic." We beg leave to differ with our sapient friend. He is entirely wrong. His "logic" may do for Ann Arbor, but it will never do for the "latitude and longitude of New York."

In view of the fact that this drug has no action whatever upon the blood corpuscles, it will be interesting to know how Dr. Jones came to discover that "the oldest of the red blood corpuscles *are destroyed first, including the younger* ones, as the blood stream becomes *saturated* with the acid." Then, too, this would imply a *chemical*,* rather than a physiological action, and if chemical, how homœopathic to "Progressive, Pernicious Anæmia?" "a condition," he informs us, "wherein *Picric Acid* in the higher potencies is indicated, and one in which this remedy will win some of its proudest laurels."

Although at first declaring positively "fatty degeneration of the red blood corpuscles" as an effect of *Picric Acid*, and citing his provers increase of urea as *evidence* of such action, he forgets that before he is done with his article, and says that Tabor's and White's urea increase is *not* due to blood destruction, but "to the extra 150cc. of urine in the daily excretion." In his *own* case, he again discards the blood destruction theory by declaring *his* urea increase to be an evidence of "*increased oxidation*," which it undoubtedly is.

In closing this interesting paper, the author says: "Would that every practicing physician would read and inwardly digest *Harley's Lecture* VI. His remarks on the pathology of urohæmatine would make many an obscure case clear to him who for the first time peruses them." And I would add, would that Dr. Jones himself had studied well the pathology of the blood, and its coloring matters in the urine. Had he done so, he would not have recognized "fatty degeneration of the red blood corpuscles" of watered blood, nor discovered "urohæmatine," where none existed.

Dr. Richard Hughes, in commenting on Dr. Jones' paper, presented to the World's Homœopathic Convention in 1876, "On the Erythraemalysis produced by *Picric Acid*," said:* "Finally, Dr. Jones suggests the remedy as promising something for the hæmastosic diseases, among which he specifies, Morbus, Addisoni, Idiopathic Anæmia and Intermittent Hæmaturia." Morbus Addisoni? Idiopathic Anæmia? and Intermittent Hæmaturia? Indeed?

Picric Acid does dye the skin of a dingy yellow hue, which is probably the reason that our far-sighted friend regarded it as homœopathic to 'Addison's disease;' "but such logic as that"† would also lead him to give the *Silver Nitrate* to a 'blue baby,' because a dark hued skin is a characteristic of both.

The "anæmia" of *Picric Acid* is the anæmia of starvation; the effect of the drug upon the appetite. How then it can be homœopathic to "idiopathic" or "progressive pernicious, anæmia," is more than I can see.

And now we come to "Intermittent Hæmaturia!"

Dr. Jones *himself* does not claim for *Picric Acid* the power of *producing* hæmaturia. The blood corpuscles he declares are destroyed by "fatty degeneration," and then converted into urea by the liver, the hæmatine only, being of no further use in the system, is eliminated by the kidneys. But this "urohæmatine of Jones" we have proved to be a vegetable coloring matter.

Just how then *Picric Acid* is homœopathic to "intermittent hæmaturia" I leave for our hypercritical author of "*Master Work*"‡ to determine.

The effect of *Picric Acid* upon the optic nerve and retina is very interesting.

The eyes of the different animals were examined with an ophthalmoscope before medication, and all were found to be normal.

* That this acid may chemically convert an animal tissue into fat, may seem almost incredible to some, but we venture to predict that the Doctor will yet add this to his many important discoveries of the wonderful action of this drug.

British Hom. Review, Dec., 1877.

†*American Hom. Observer*, Oct., 1877, p. 493.

‡See *American Hom. Observer*, Jan. 1878, p. 12.

When thoroughly under the influence of the drug the eyes were again examined; venous congestion existed in every case.

The eyes of dogs No. 3 and 4 were also examined, to see if any marked change in the intra occular circulation occurred during the spasms, which will afterward be described, but none was detected.

Being anxious for a thorough diagnosis, I sent dog No. 3 to Dr. G. S. Norton, of this city, who kindly gave me his written opinion concerning the lesions found.

"Oct. 12th. This morning I examined the eyes of a dog chronically poisoned with *Picric Acid*, that Dr. Couch had sent me. Pupils dilated with atropine. Ophthalmoscopic appearances of the two eyes are similar, refractive media clear, optic nerve apparently slightly hyperæmic, retinal vessels, especially the veins, enlarged; thin streaks of reddish color in choroid, probably physiological, and due to want of pigment; above optic nerve in particular, immense white patches of exudation are observed, with some hæmorrhagic spots. It is impossible to say whether they are in the retina or choroid, as there are several points in favor of each."

"Oct. 22d. This morning the dog's eyes were sent to me for microscopical examination. Optic nerve entrance much swollen and infiltrated; masses of yellowish white exudation are observed, extending from the nerve into the various portions of the retina; others are unconnected with the nerve entrance. In some places these points have a white glistening look, but generally partake of the appearance noted above. The whole retina appears as if infiltrated; small extravasations are found on the optic nerve and in the retina. The choroid was normal as far as examined. Owing to an accident the different retinal layers could not be seen"

Picric Acid also produces spasms, both tonic and clonic, which have a striking resemblance to those produced by *strychnine*. Like that potent drug it exerts its poisonous effects mainly upon the spinal cord, the brain functions being to all appearances unimpaired. When thoroughly under the influence of the drug the animals betray great weakness and lassitude; especially is this noticable of the hind legs, they being scarcely able to support the already attenuated body which sways constantly from side to side; the tail too is as limp as a wet rag, and cannot be made to either wag or curl. As more of the drug is absorbed these symptoms became more and more prominent, the animal falls over at the slightest push and seems unable to rise. Its whole aspect is now one of the greatest terror: the fur on the neck is erect and bristling, the eyes are prominent and staring, the head is turned quickly from side to side as if fearing a deadly attack from some dreadful unseen enemy; the gait too is peculiar, resembling somewhat that of locomotor ataxia. This is due to sudden spasms of individual muscles during the act of walking. On being urged to run three or four feet, he seems as if suddenly pulled back upon his haunches by some unseen force. The spasms now become general, involving all of the voluntary and some of the involuntary muscles, the whole body becomes convulsed, respiration is stopped, opisthotonos sets in; after one or two minutes the muscles relax and respiration is slowly established.

A slight rustling, a jar, or other noise is sufficient to produce a recurrence of the above phenomena. If rest and quiet are allowed, the animal may perfectly recover. If however too large a dose has been administered, the spasms recur more and more frequently, till death finally occurs from prolonged spasms of the muscles of respiration. During the later stages of the poisonings, clonic spasms of the jaws occur with sufficient force to cause the sound of clashing teeth to be heard fifty feet or more away.

It should be remembered that in the proving made in 1874, the *alcoholic tincture* which contains less than 5 per cent of *Picric Acid* was used, while the later experiments were made with pure *Picric acid* crystals. Some persons might ask why dog No. 1 did not die in spasms as did the later cases? I answer that he was 'too drunk' to properly complete the proving, and from subsequent observations I am satisfied, that this is not the only case wherein *alcohol* has interfered seriously with a proper knowledge of a drug's physiological action.

Another very interesting and important symptom, anesthesia of the posterior extremities, also existed to such an extent that pins could be passed into the joints, and even through the limbs themselves, without the animal betraying a consciousness of pain. These symptoms occur in *both posterior extremities and in them alone.* This fact would lead us to regard the lumbar portion of the cord as the seat of lesion.

It is possible, and very probable, that exudation occurs into the connective tissue of the cord, similar to that described by Dr. Norton as existing in the optic nerve and retina. This exudation if permanent would tend to produce atrophy of the nerve substance, and if only temporary will readily account for the ataxic symptoms which occurred in every one of the poisoned animals.

Although exerting its poisonous effects mainly upon the spinal cord, *Picric Acid* does possess a marked action upon the pneumogastric nerve, just how this brought about we cannot at present say, but the symptoms and pulse respiration ratio, show a marked similarity to the phenomena following section, and consequent paralysis of both pneumogastric nerves.

Flint says:*

"When both nerves are divided, an experiment which we have often tried, the effect upon the respiratory organs is very marked. The inspirations become unusually profound and are attended with unusual dilation of thorax. The animal is generally quiet and indisposed to move. We have seen under these conditions the number of respirations fall from 16 or 18 to 4 per minute."

"When the animal is in this condition, the beats of the heart are very much increased, at least doubled; but they are insufficient and tremulous."

Let us now turn to the pulse respiration ratios of the poisoned dogs and see how they will compare with the above description.

Dog. No. 1, 1874.
Alcoholic Tinc. of Picric Acid.

	RESP.	PULSE.
Health.....	25	100
1st 20 days.	20	100
Last 4 days.	9.4	100

No. 2.—Pure Crystals used.

	RESP.	PULSE.
Health.....	23.4	100
Medication..	31.4	100*

*Primary action.

No. 3.—Pure Crystals.

	RESP.	PULSE.
Health.....	19.	100
1st Medication.	25.	100
1st Elimination	14.2	100
2d Medication.	15.2	100
2d Elimination	12.	100
3d Medication.	9.4	100
4th Medication	8.9	100

No. 4.—Pure Crystals.

	RESP.	PULSE.
Health.....	18.6	100
Small Doses...	13.7	100
Medium Doses.	14.4	100
Elimination...	11.1	100

The action upon the abdominal viscera generally is of little importance, and will be passed over in a very few words.

The appetite is poor; vomiting ensues immediately after taking the drug; loose scanty brownish stools giving acid reaction is a constant symptom during medication. It is important to state that aside from a slight softening of the intestinal mucous membrane no lesions in any of the viscera were found.

The bile was black in all cases, and contained a generous amount of *chrysophanic acid*, as did the urine. *Picric* and *chrysophanic* acids then are eliminated by the liver and kidneys. When therefore the quantity of *Picric Acid* is absorbed faster than eliminated, the nervous system becomes poisoned, and death from convulsions ensues.

The convolutions of the brain are beautifully injected, but if any other abnormality or tissue change exists, we cannot at present say, as the microscopical part of the work has yet to be performed; the person to whom it was intrusted being too busy at present to give it the proper attention.

As is well known this drug possesses a powerful action upon the male sexual organs. Even in dogs the same marked erethism, so prominent a symptom in the human provers, was present. It is an interesting fact that small doses only are capable of producing sexual *excitement;* medium or massive doses producing a directly *opposite* effect. A knowledge of this action will enable us to control habits of self-abuse very effectually. I have used this drug in several such cases, and can recommend it as very efficient.

I was once consulted by a widower, who had practiced onanism ever since the death of his wife, a period of 12 years. He freely confessed his faults, and begged for "something to cool his blood." I gave him 12 powders of *Picric Acid*[30], one to be taken every night. In about two weeks a crest-fallen, anxious looking individual appeared at my office door, the very picture of despair. In answer to my inquiries as to whether he had continued his vile habits he reproachfully exclaimed. "I—I *cant.*"

"Do you want any more of that cooling medicine," I asked?

"No, no—no! I don't want any more of that stuff—it is altogether *too* cooling."

I gave him *phos. acid*, and advised him to get married, which he did shortly afterward. If the dilutions fail in such cases, I should not hesitate to give the drug in material doses.

Picric Acid also exerts a remarkable effect upon the urine and its constituents, as will be

*Flint's *Physiology—Nervous System*, pp. 235 and 224.

seen by the following analytical records of the poisoned animals.

Dog No. 1.—Alcoholic Tinc Picric Acid.

	Doses.	Resp.	Pulse.	Temp.
Health.....	—	22 5	88.	101.5°
First 20 days.	?	20.	109.	102. °
Last 4 days..	?	12 2	129.	101.5°

ture, while the *urea and phosphates are greatly diminished.* Also that the urea, phosphates, sulphates and chlorides are diminished in *direct proportion* to the amount of the drug administered. These are important facts, and they bear directly upon the truth or falsity of the blood destructive theory of Prof. Jones.

No. 2.—PURE CRYSTALS USED.

			Resp.	Pulse.	Temp.	Urine	Urea.	Phosphates.	Sulphates.	Chlorides.
Health.....	—	—	25.5	108	101.9°	182cc.	106.	28.	4.4	3.0
Medic.....	6 days.	15 grs.	38.	124	102.8°	96cc.	55.	16.6	2.6	0 6

No. 3.—PICRIC ACID CRYSTALS.

			Resp.	Pulse.	Temp.	Urine.	Urea.	Phosphates.	Sulphates.	Chlorides.	
Health.....			19.	99	102.1°	195cc.	95.	29.2	12.0	2.4	
1st Med.....	6 days.	15 grs.	30.	121	102.3°	95cc.	61.	17.2	2.8	0.3	
1st Elim....	5 days.	—	19	134	103.3°	134cc.	61.	9.2	5.6	2.1	
2d Med.....	9 days	15 grs.	21.	124	102.1°	130cc.	55.8	14.0	6 8	0.7	
2d Elim.....	6 days.	—	15.	129	101°+	140cc.	60.	25.2	9.0	4 7	
3d Med.....	8 days.	22 grs.	12.6	128	101.4°	141cc.	62	28.6	17.0	1.7	
4th Med.....	5 days.	66 grs.	11.1	126	103.9°	88cc.	42.7	15.2	8.3	0.8	(1)

No. 4.—P. A. CRYSTALS.

			Resp.	Pulse.	Temp.	Urine.	Urea.	Phosphates.	Sulphates.	Chlorides.	
Health.....	—	—	18 6	99	102.2°	200cc.	112	22.1	11.8	1 5	
1st Med.....	11 days.	5 grs.	16.2	112	102.6°	320cc.	188.2	25.2	13.4	2.9	
2d Med.....	9 days.	14 grs.	15.4	113	102.6°	219cc.	113.4	9.4	4.5	2.2	
Elim.....	5 days.	—	15.5	138	102.1°	300cc.	101.	9 9	7.5	3.2	(2)

GENERAL RESULTS.

	Daily Doses.	Resp	Pulse.	Temp.	Urine.	Urea.	Phosphates.	Sulphates.	Chlorides.
No. 2.....	15 grs.	+12 5	+18	+0.9°	— 86cc.	—51.	—11.4	—1.8	—2.4
No. 3. 1st Med.	15 grs.	+11.	+22	+0 2°	—100cc.	—34.	—12.	—9.2	—2.1
" 2d Med..	14 grs.	+ 3.	+25	0°	— 65cc.	—39.2	—15.2	—5.2	—1.7
" 3d Med..	22 grs.	— 6.4	+29	—0.7°	— 54cc.	—33.	— 0.6	+5. —	—0.7
" 4th Med.	66 grs.	— 7 9	+27	—1.2°	—107.	—52 3	—14.	—3.7	—1.6
No. 5. 1st Med.	5 grs.	— 2.4	+13	+0.4°	+120.	+76.2	+ 3.1	+1.6	+1.4
" 2d Med..	14 grs.	— 3.2	+14	+0.4°+	+ 19.	+ 1.4	—12.7	—7.3	+0.7

It will be seen that the primary effect of small doses is to increase markedly the amount of the urine, as well as the urea, phosphates, sulphates and chlorides; secondarily however an exactly opposite condition is induced.

The primary effect of large doses is to *decrease* in a remarkable manner the amount of the urine, together with the urea, phosphates, sulphates and chlorides; the cessation of the drug however is followed by a marked increase of each and all of the above constituents.

It will be seen that the primary effect of even 15 grain doses is to *increase* the animal tempera-

In closing, I predict for this drug a brilliant future; it is as you have seen a close analogue of *strychnine;* and will be at no distant day as often and successfully employed.

NOTE.—(1) It will be seen that dog No. 3 took doses much larger than those which proved fatal to No 2. This was owing to the fact that No. 2 vomited less after the administration of the drug than No. 3, and his kidneys also were less active in eliminating the acid from the system; a glance at the records will show this. (2.) After waiting five days for the drug to be thoroughly eliminated from the system, 30 grs. were given at 9 A. M., and about the same quantity at 1.30 P. M. Death occurred about 4 P. M. from tetanic spasms.