Amory (R)

A CONTRIBUTION

TO THE

HÆMATINIC PROPERTIES OF DIALIZED IRON

BEING EXTRACTS FROM COMMUNICATIONS READ BEFORE THE BOSTON SOCIETY OF THE MEDICAL SCIENCES AND THE BOSTON SOCIETY FOR MEDICAL OBSERVATION.

BY

ROBERT AMORY, M. D.

OF LONGWOOD, MASS.

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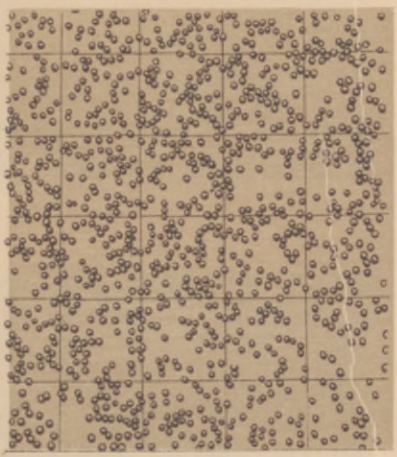

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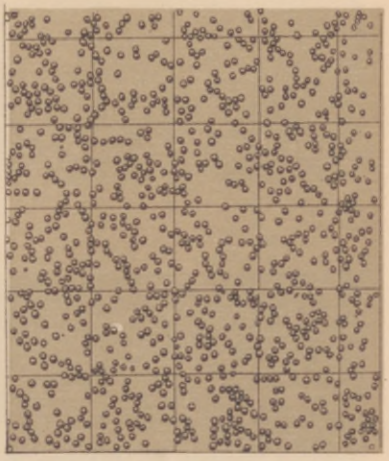

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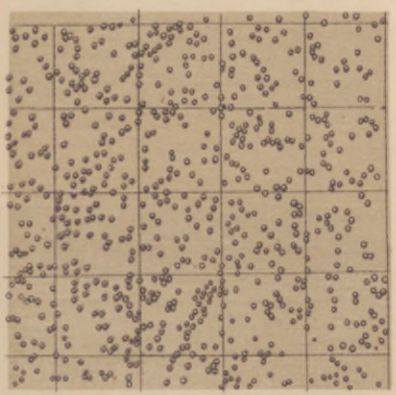

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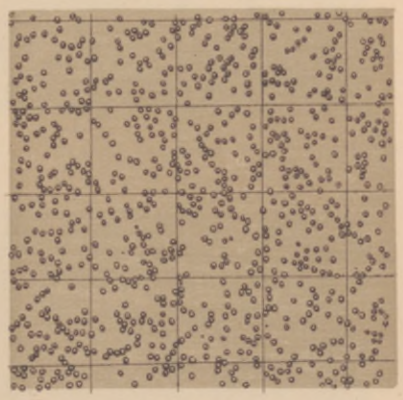

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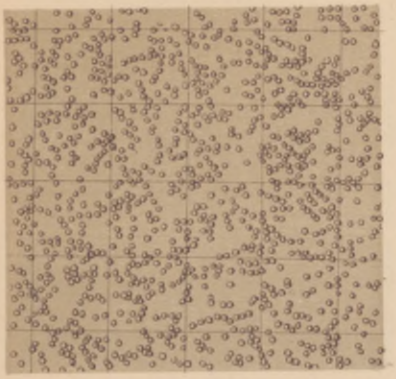

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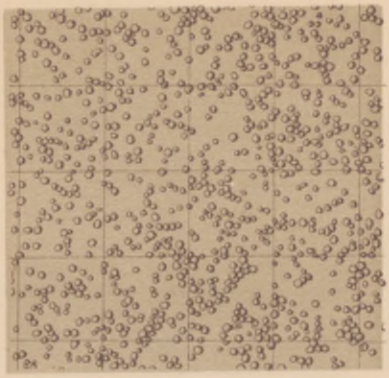

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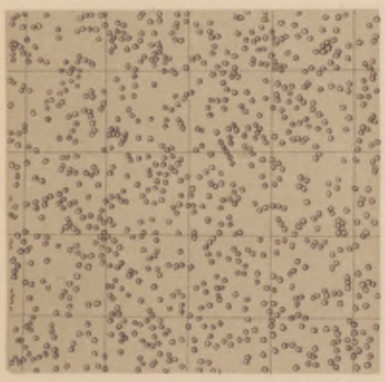

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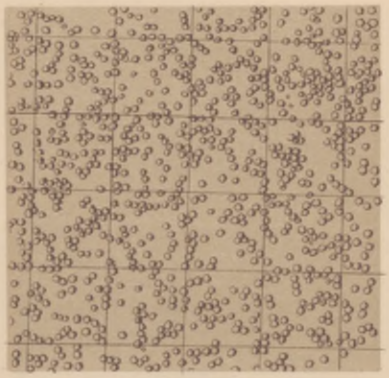

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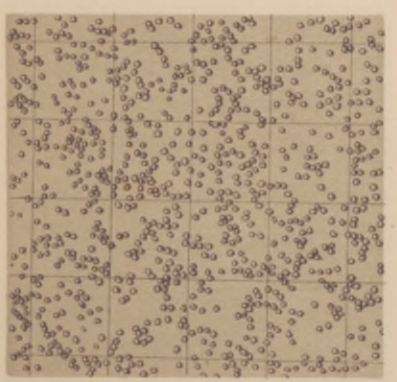

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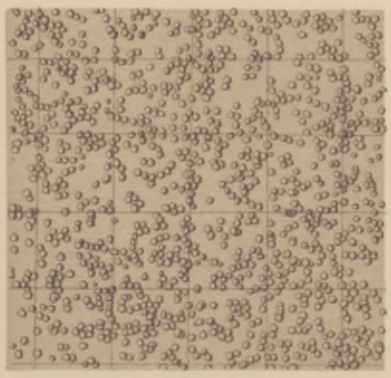

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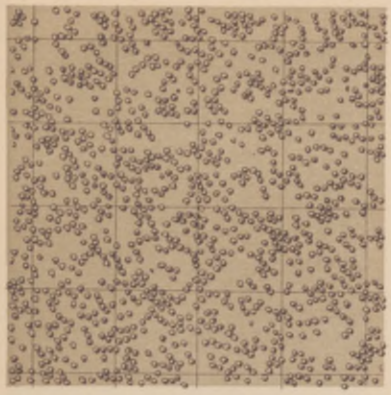

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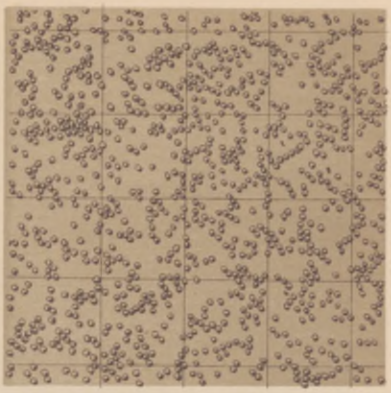

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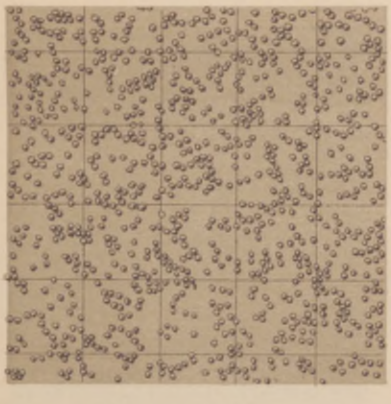

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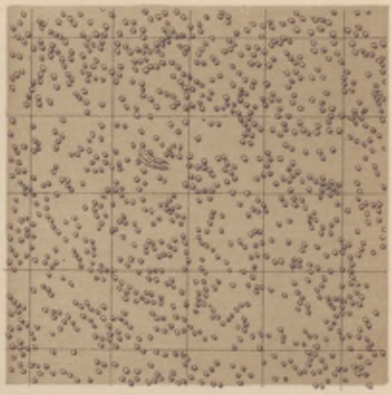

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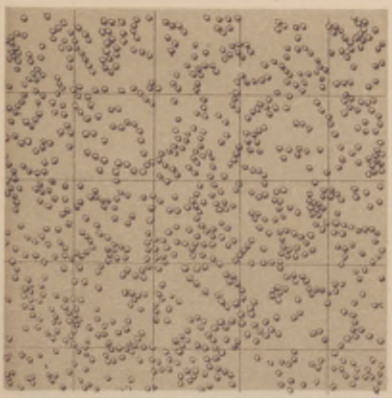

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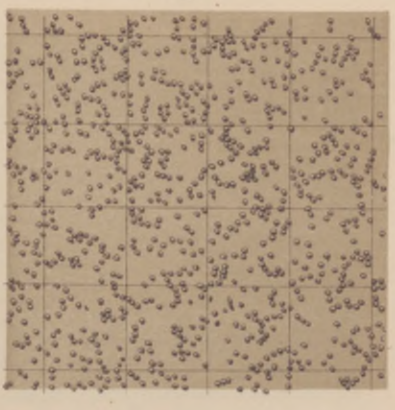

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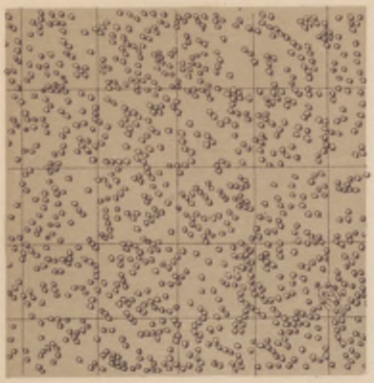

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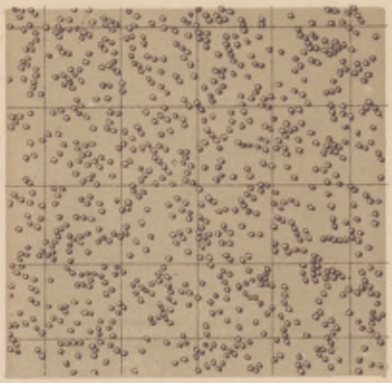

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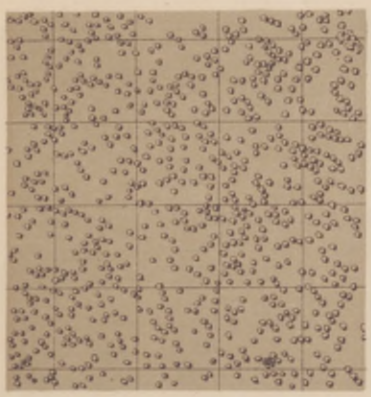

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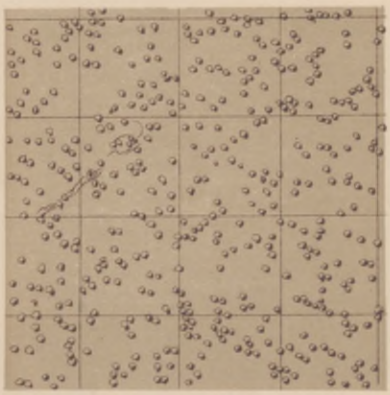

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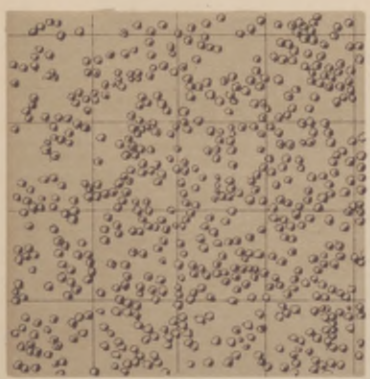

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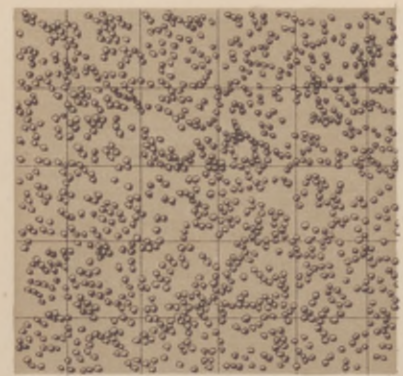

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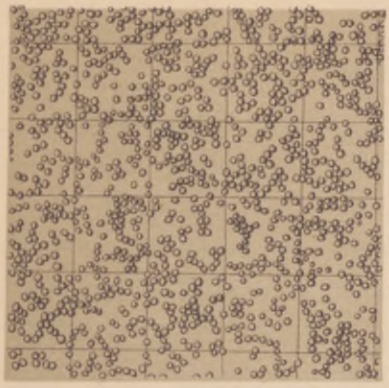

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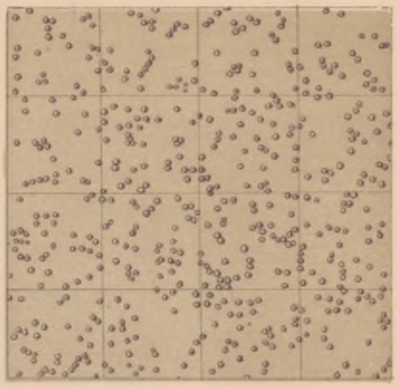

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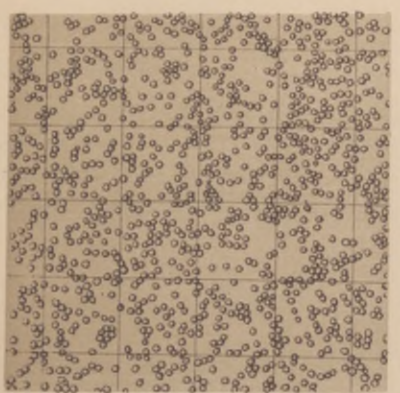

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IN reproducing the very interesting and valuable paper of Dr. Robert Amory, we present to the medical profession positive and scientific testimony to the efficiency of Dialyzed Iron, as made by us, in enriching the blood. We point, with what we think is pardonable pride, to the accumulated evidence of the therapeutic value of this preparation—evidence from all sections of our own country, from Great Britain, Canada and South America. Many practitioners, who had been led by the failure of other methods of administration to abandon the use of iron, have, upon our positive assertions, been induced to make trial of this article, and have found it in the highest degree satisfactory. We have devoted much time and attention to the subject, and have spared no expense in developing this manufacture. We have examined samples of that furnished by other makers, and confidently claim that they are without exception inferior to that which we offer.

Hence, we ask physicians who wish to employ this valuable therapeutical agent to be particular in specifying "Wyeth & Bro.'s Dialyzed Iron."

[COPY.]

Longwood, Mass., April 9, 1879.

Messrs. Wyeth & Bro.

Dear Sirs:—In answer to your inquiry as contained in your note of yesterday, I will say that in the experiments which are detailed in the Boston Medical and Surgical Journal for April 3d, I used only the solution of Dialyzed Iron manufactured by your firm.

Yours, respectfully,

(*Signed,*) *ROBERT AMORY.*

EXPERIMENTS AND CLINICAL OBSERVATIONS

ON THE

HÆMATINIC PROPERTIES OF DIALYZED IRON[1]

BY ROBERT AMORY, M. D.

Gowers's hæmacytometer, the instrument I used in the following observations, consists of a glass slide, upon which are ruled squares one-tenth of a millimetre in extent, and these are inclosed in a cell one-fifth of a millimetre in depth. This slide can be used with any microscope, and with a lens of any desirable magnifying power; moreover, the magnified image of the slide may be projected, by means of a prismatic eye-piece, upon a screen. The principle of Malassez's "compte-globule" does not admit of either of these convenient methods of delineation. In addition to the ruled slide, there are two pipettes, one of which holds nine hundred and ninety-five cubic millimetres, and the other five cubic millimetres. The principle and method of using this instrument are, then, based upon the following facts: If a known measure of blood be carefully drawn from an acupuncture, and intimately mixed with two hundred times its volume of a saline solution (specific gravity 1025), having a density sufficient to prevent the corpuscles from imbibing water, and so bursting their envelopes, these corpuscles, separated from each other, will float in this mixture, and will finally settle down to the bottom of the containing vessel or dish.

In this manner a small portion of the mixed or diluted blood is placed in the above-described cell, and the corpuscles are allowed to settle to the bottom, so as to be nearly on the same plane as the ruled lines, and are pretty uniformly distributed. The number of corpuscles in ten contiguous squares can then be readily counted, and this sum multiplied by the figure ten thousand will give the number of corpuscles in each cubic millimetre of the pure or originally drawn blood; because ten cubes, each one of which has the dimensions $\frac{1}{10} \times \frac{1}{10} \times \frac{1}{5}$ millimetres (or $\frac{1}{500}$ of a cubic millimetre), will contain $\frac{1}{50}$ of a cubic millimetre, and since the original blood was diluted with two hundred volumes, the number of corpuscles actually counted in the ten squares must be multiplied by two hundred times fifty, or ten thousand, in order to obtain

1 Read before the Boston Society of Medical Sciences, January 21, 1879, and the Boston Society for Medical Observation, March 17, 1879.

the number in each cubic millimetre of undiluted blood. If we wish still further to separate the corpuscles from each other, we may use four hundred volumes of the diluent to one of the blood, but in that case we must either count the corpuscles in twenty squares and multiply by ten thousand, or count those in ten squares and multiply by twenty thousand.

The individual or personal error of vision which is associated with all optical instruments is, perhaps, somewhat difficult to reduce to mathematical accuracy, on account of the fact that constant observation fatigues the eyesight, and hence the results of a series of these observations are subject to an inconstant variation. In consequence of this apparent difficulty, I decided to project upon a photographic plate the image of the corpuscles on the ruled slide, then to print from the negatives, and count upon the print the number of these corpuscles, each one being obliterated as soon as counted.

To show the range of error of this method of obtaining the proportion of globular richness of the blood, I will call your attention to the prints Nos. 1, 2, 3, 4, which were all taken from blood of the same individual from four different punctures, separately diluted, and a sample from each dilution separately photographed.

No. 1 shows 4,656,000 corpuscles per cubic millimetre.[1]
No. 2 " 4,750,000 " " " "
No. 3 " 4,633,000 " " " "
No. 4 " 4,673,000 " " " "

The greatest difference between these four results being only 117,000, shows less than three per cent. of variation. Again, in three separate photographs, taken from one sample on the same slide, a field at either periphery, and at its centre, the variation was even less than that above mentioned. Thus, so far as this method is concerned, the error of variation may be placed within three per cent.

Hearing from certain members of our profession expressions which indicated a skeptical distrust in regard to the virtues of the solution of dialyzed iron, I was induced to undertake a series of observations upon the hæmatinic properties of this medicinal agent, and yet I must frankly acknowledge in advance that my own clinical experience with this form of iron had led me to attach to it a value in simple anæmia, and to place this remedy by the side of Quevenne's Iron. I have taken pains to inquire how much metallic iron is contained in the so-called dialyzed iron, and learn that a sample of the scaled dialyzed iron, as prepared by one of our large wholesale druggists, has been analyzed by Prof. Charles M. Cresson, of Philadelphia, and that he found it to contain fifty-two

1 A reference to the prints will show not more than sixteen squares represented. On the original photographic prints presented at the meetings the count gave an average for twenty-five or thirty squares. To have reproduced this number of squares in each heliotype print would have required too much room. Hence a discrepancy between the numbers of corpuscles mentioned in the text and what may be counted in the illustrations may be explained.

per cent. of metallic iron, or over seventeen per cent. more than is contained in the sesquichloride of iron; compared with the sesquichloride, it is equally soluble, keeps without change, does not corrode the teeth or fabrics with which it may be brought in contact, and contains a greater percentage of iron. The manufacturer from whom this sample was obtained claims that his solution of dialyzed iron has over twenty grains of ferric oxide in each ounce of solution, and in proof of this has shown me a certificate from Prof. F. A. Genth, of the University of Pennsylvania, that a sample of his manufacture, which was purchased by the latter from a retail druggist of Philadelphia, contained 21.69 grains of ferric oxide in each ounce of solution.

The following table of assays of various iron preparations was made by M. Quevenne. One gramme (fifteen grs.) of the following preparations was soluble in two hundred grammes of gastric juice, in the proportions named:—

Of 1.0 iron by hydrogen containing	1.000	pure iron was dissolved	0.102	pure iron.
Of 1.0 iron filings	"	1.000	"	"	0.070	"
Of 1.0 protosulphate of iron	"	0.210	"	"	0.056	"
Of 1.0 protocarbonate "	"	0.490	"	"	0.050	"
Of 1.0 persulphate "	"	0.250	"	"	0.046	"
Of 1.0 lactate "	"	0.190	"	"	0.040	"
Of 1.0 protochloride "	"	0.430	"	"	0.036	"
Of 1.0 tartrate of iron and potass	"	0.210	"	"	0.022	"
Of 1.0 oxide of iron heated to red heat	"	0.700	"	"	0.016	"

Forty parts of scaled or dialyzed iron, from which water had been withdrawn without aid of heat, was levigated very fine and placed in an artificial gastric juice prepared as follows: five parts hydrochloric acid and acetic acid, fifteen parts of pure pepsin, with traces of chlorides of sodium, potassium and ammonium; also phosphates iron, lime and magnesium, in one thousand parts of water; and temperature was maintained at 100° F. for five hours, then filtered through a "tared" filter, dried and weighed, showing a loss of iron amounting to fifteen parts. This shows that 3.00 grammes of scaled dialyzed iron (containing 1.5 grammes pure iron) are soluble in two hundred grammes of gastric juice.

Having thus compared the properties of dialyzed iron with other well known preparations, I will report five cases only, in which I observed its effect upon the globular richness of the blood. These were cases of simple anæmia uncomplicated by organic disease, and none of the individuals were placed upon any regimen of diet or exercise, but were allowed to continue their usual habits of life. My object was to prevent the error of attributing any improvement in health or appearance to an improved diet, or to the more favorable effects of fresh air and exercise.

I selected those cases in which I could personally observe the individuals from day to day, and could note any peculiarity of symptoms or unusual mode of life. The instrument which I imported from London was so inaccurate that I was forced to abandon it, as well as the reports of three cases in which it was used, and obtained from Prof. W. A. Rogers, of Harvard College Observatory, some very accurately ruled glass slides. I also procured some pipettes, and carefully estimated their capacity, so that I could place more reliance upon their measurements. I took especial care in the photographs herewith presented not to use various pipettes or ruled slides in the same individual; in the few cases in which (owing to accidental breakage) I was obliged to use more than one set of apparatus, the second set was carefully measured anew, so that my comparative results should not be invalidated.

The circumstances under which the blood was taken from the patient were as nearly similar as possible, and I have a strong confidence that the results of my observations are not materially affected by the method of procedure, and that the error of variation may be safely placed within five per cent. I have not the time in this communication to prove the grounds for this statement, nor would it be worth your while to examine the details of experiment which were used to determine my opinion. The pains that have been taken may, perhaps, be better appreciated by the careful examination of two hundred photographs, taken under various circumstances and conditions, among which may be mentioned the temperature of the surface after exposure to dry and wet heat and cold; the depth and method of puncture of the skin, blood taken while the patient was depressed by pain or temporary disturbances of other sorts, during the menstrual flow, and before rising from bed in the morning. The variation shown in these photographs is not, to my knowledge, dependent upon any of these disturbing causes.

CASE I Is that of a woman whose appearance was anæmic, and, as far as I could learn, had no organic disease. An earlier examination of her blood had shown about 3,900,000 corpuscles per c. mm. of blood, but this negative was unfortunately lost. The print No. 5 was taken on the third day after the commencement with the solution of dialyzed iron. I have estimated in this 4,189,000 corpuscles per c. mm., or about eighty-three per cent. of the normal state of health. At first she took her medicine quite regularly, and in ten days gained 171,000 corpuscles, her blood having attained a per centage of eighty-six. The following six days she took the medicine very seldom, and lost 500,000 corpuscles, and was in the same anæmic condition as before treatment, having a percentage of seventy-six. From this time onward she took the medicine more faithfully, but still omitting one dose about every two or three days, and in five days regained 440,000 corpuscles, having now a percentage of eighty-four. In another week she gained 60,000, and in four days more

160,000, having then a percentage of ninety-six. In the whole period, from December 11th to January 10th, this patient showed an increase of 1,000,000 corpuscles, or an improvement of twenty per cent. During the whole time she was under observation she menstruated twice, but apparently with very slight effect upon the globular richness of the blood. None of these prints, Nos. 5, 6, 7, 8, 9, 10, 11, were taken during menstruation:—

No. 5.	December 5th,	4,189,000, or 83 per cent.	
No. 6.	" 13th,	4,360,000, or 87 per cent.	
No. 7.	" 19th,	3,850,000, or 77 per cent.	(Has taken iron seldom.)
No. 8.	" 24th,	4,240,000, or 84 per cent.	
No. 9.	" 31st,	4,630,000, or 92 per cent.	
No. 10.	January 6th,	4,820,000, or 96 per cent.	
No. 11.	" 10th,	4,860,000, or 97 per cent.	

CASE II Is that of a girl about sixteen years of age, who consulted me for neuralgia, dizziness, especially during the act of stooping, lassitude and general malaise; she had the habit of awaking with a slight headache, which, towards the latter part of the day, forced her to leave her regular household duties. She had been out to walk two or three times a day, and, like all the other cases, had but slight loss of appetite, a good home, good food, warm clothing, without much requirement for excessive mental or physical work. Her catamenia occurred too frequently —once in three weeks. Without advising any change in diet or occupation, I gave her in water, as in all the other cases, thirty drops of dialyzed iron solution three times a day. I may as well say here that I obtained the solution of dialyzed iron always from the same manufacturer, furnished it directly to each patient, and that it had a uniform standard and purity, so far as I could determine. Its specific gravity was 1042, and in two instances the solid residue was about twenty-four grains to the ounce of solution. The record of Case II is estimated from the prints:—

No. 12.	December 16th,	4,070,000, or 80 per cent.	(Began treatment.)
No. 13.	" 20th,	4,220,000, or 84 per cent.	
No. 14.	" 28th,	4,370,000, or 87 per cent.	
No. 15.	January 6th,	4,620,000, or 92 per cent.	(Discontinued treatment.)
No. 16.	" 15th,	4,500,000, or 90 per cent.	

All her anæmic symptoms, above mentioned, gradually disappeared, and she omitted the treatment because she felt well, and up to the present time none of these symptoms have reappeared.

CASE III Is that of a young woman about twenty years of age, pale and thin in appearance, who has at previous times been much improved by a ferruginous tonic treatment. She complained of languor, dizziness, muscular fatigue, cold, moist hands, painful menstruation, etc. Estimates from prints:—

No. 17. December 17th, 3,700,000, or 74 per cent. (Began treatment.)
No. 18. " 31st, 4,700,000, or 94 per cent.
No. 19. January 15th, 4,200,000, or 84 per cent. (Having a headache.)
No. 20. " 17th, 4,600,000, or 92 per cent.

Apparently, on January 15th, her headache caused a diminution in globular richness, and for the sake of comparison I show print No. 21 of my own blood, taken during a headache: ordinarily my blood shows over 5,000,000 corpuscles per c. mm. The number estimated by this print is only 4,350,000.

CASE IV Is that of a clergyman, who had been suffering from neuralgia, headache, an uncomfortable feeling of pressure in the head, and general malaise; these symptoms were aggravated after mental or physical work. Though actively engaged in his professional duties, he led a healthy life, took daily exercise, eating well and at regular times. He had been taking, a few weeks previously, Carlsbad water, though he had no indigestion or constipation. His record is as follows: Omitting Carlsbad water, he began, December 3d, dialyzed iron solution—half a teaspoonful, diluted with water, three times a day after meals, and taken regularly; he omitted only one dose during five weeks' treatment. The estimate from the prints is:—

No. 22. December 3d, 3,800,000, or 76 per cent.
No. 23. " 13th, 4,500,000, or 90 per cent.
No. 24. " 28th, 5,191,000, or 103 per cent.
No. 25. January 6th, 4,900,000, or 98 per cent.
No. 26. " 16th, 4,500,000, or 90 per cent. (The day after a headache, and iron omitted.)

This was the only headache he had while taking the iron, and his professional work about Christmas time was excessive.

CASE V A married woman, who has had chlorosis and anæmia for several years, her appearance being white and bloodless, has been a patient of Dr. Sabine's for two years, and her chronic anæmia has been a marked feature; apparently, she has no organic disease other than this impoverishment of blood. Figure 27 indicates that the globular richness of blood is only 3,350,000, and at that time she began treatment by dialyzed iron. On one of the last days of February she had diarrhœa, with some catarrh of intestines, which was controlled in two or three days by ordinary doses of morphine and chalk mixture. On March 3d, after a fortnight's use of the solution of dialyzed iron (Figure No. 28), her globular richness had improved to 3,560,000, in spite of the diarrhœa. On March 19th another examination showed 3,6000,000 corpuscles per c. mm.

There certainly is good reason for saying that four or five cases are insufficient to establish definitely that the solution of dialyzed iron cures anæmia. However, an analysis of the history of these cases shows that all the individuals were in comfortable circumstances, as far as food,

clothing and homes were concerned; that none of them had any organic disease (if we except simple impoverishment of the blood); that they were aware of being out of their usual health; that they were unable to accomplish their regular work; that none had impaired appetite, nor feeble digestion; that three of the four suffered from neuralgia or headache; finally, all had diminished corpuscular richness of blood, varying from 3,350,000 to 4,000,000, and that under the continued use of ninety drops of solution of dialyzed iron per diem this condition of impoverished blood was replaced by an increase in the number of corpuscles from 3,600,000 to 4,900,000, and the symptoms of ill health simultaneously disappeared with this improvement.

Dialyzed Iron may increase the globular richness of blood, but it may have no effect in bringing about the chemical combination of oxyhæmoglobin. If the supposition be true that there is a state of ill health in which the corpuscles may be numerically normal, but may simultaneously be deficient in coloring matter, we may conceive of an anæmic or chlorotic patient who may require some therapeutical means for improving this deficiency other than simple iron. I may have been extremely fortunate in selecting just those cases in which a simple form of iron was indicated, and it may not be impossible that another form would have benefited my cases as much as the dialyzed iron; yet the latter is preferable to the more astringent iron salts, because it does not impair the digestion, nor produce constipation.

I cannot close my communication without an expression of thanks to Dr. Sabine and my laboratory assistant, Mr. J. G. Hubbard, whose material assistance lent much to the value of the record of these experiments.

Now, one final word about the various solutions of dialyzed iron. Many of these solutions are valueless, some are very dilute, and a few are of pretty uniform standard, and contain only the products of dialysis from a salt of iron and distilled water. If physicians use a worthless preparation, they need not expect an improvement in the anæmia; if they use a dilute solution, they must prescribe a larger amount of the solution.[1] In the preparation I used for these experiments the solution had a specific gravity of 1042, and had no free acid.

1 See Boston Med. and Surg. Journal, Sept. 21, 1878.

WYETH'S DIALYSED IRON,

(FERRUM DIALYSATUM,)

A Neutral Solution of Oxide of Iron in the Colloid Form, the Result of Endosmosis and Diffusion with Distilled Water.

About two years ago we placed before the medical profession of the United States our preparation of Dialysed Iron. The practical working of our appliances enables us to prepare it on any required scale, and of a uniform quality, in every respect equal to the highest standard of the well known chemists who have given it a trial in hospital and private practice, under the observation of some of the most eminent physicians of this and other cities, fully justifying us in claiming, in our circulars and in our correspondence with physicians and druggists, many advantages possessed by our Dialysed Iron over all the ordinary ferruginous preparations.

These advantages are:—

1. It is easily administered—the dose being very small.
2. It has no unpleasant taste or smell.
3. It does not irritate the stomach.
4. It has no effect on the bowels, producing neither constipation nor diarrhœa.
5. It does not blacken the teeth.

Immediately upon the introduction of this article by us, and the recognition so generally accorded to its merits, other manufacturers began offering to the drug trade preparations which were called Dialysed Iron, and which were asserted to be equal in every respect to ours. We confidently maintain, however, that no reliable article of this kind can be made except by the process of dialysis. The digesting of an acid solution until it is neutral will by no means result in a preparation at all identical with our *Dialysed Iron*. We have, at great expense, perfected an apparatus which enables us to produce this article on a large scale. So delicate is the process of manufacture, and so important did we consider the purity of the water used to accomplish the endosmosis, that we bored an artesian well to supply our dialysers.

Our Dialysed Iron is not a saline compound, and is easily distinguished from salts of iron by not giving rise to a blood-red color on the addition of an alkaline sulpho-cyanide, or to a blue precipitate with ferro-

cyanide of potassium. It does not become cloudy if boiled. When agitated with one part of alcohol and two parts of ether (fortior), the ether layer is not made yellow.

We cannot assume the responsibility of the claims put forth for this preparation, except for that manufactured by us.

The following may be adduced from among many testimonials received by us from physicians who have employed this remedy:

1524 WALNUT STREET, PHILADELPHIA.

To WYETH & BROTHER.

Gentlemen:—I am glad to be able to say that now, after much more prolonged use of your Dialysed Iron, I have more and more reason to be pleased with it. As I use the solution in drachm doses, I have had a fair chance of testing its power to disturb the patient's functions. So far, however, even in these large doses, it does not seem to constipate, nor to affect injuriously the process of digestion.

Yours truly,

WEIR MITCHELL.

"An extended trial of the Dialysed Iron prepared by Messrs. John Wyeth & Brother has convinced me that it is a most valuable addition to the Materia Medica, and likely to supersede, in great degree, the chalybeates heretofore employed.

The results obtained from it under my observation have been such as to fully justify the strong claims of the manufacturers in its behalf."

JOHN H. PACKARD.

1924 Spruce St., Philad'a., Nov. 7, 1877.

Dr. Baldwin, editor of the *Ohio Medical Recorder*, in an editor's note to an analysis of Dialysed Iron by Dr. Robert Amory, published in the *Boston Medical and Surgical Journal*, writes as follows:

"We have prescribed Dialysed Iron frequently, and have, apparently, at least, secured as good results, as by the use of the tinct. ferri chlor. Our patients have never complained of any unpleasant effects, except on a few occasions, and then, on inquiry, we have ascertained that the druggist had *not* dispensed Wyeth's preparation. Of late, therefore, we have always indicated 'Wyeth's' on our prescriptions. B.

Dr. T. A. Emmet ("Diseases of Women," p. 549,) speaking of fibrous growths of the uterus, says:

"In the treatment of two cases, recently, I have been particularly pleased with the marked improvement following the use of Wyeth's preparation of Dialysed Iron. In both instances other forms of iron had caused headache and constipation, and an unexpected loss of blood."

Dr. W. Pepper, of Philadelphia, in a communication to the Pennsylvania State Medical Society in 1879, reporting several cases of exophthalmic goitre, says:

"So much discussion has occurred as to the value of Dialysed Iron, and my own experience with it in suitable cases has been so gratifying, that I take pleasure in pointing to the marked effects which, in cases II and III, are certainly in large part to be attributed to its action."

"DIALYSED IRON.—I have used about ten or twelve pounds of Dialysed Iron, mostly Wyeth's, and am much pleased with the results. I find it both agreeable and reliable, and for many cases prefer it to any other ferruginous preparation. I have given it to persons, with good effect, who affirmed that they 'could not take iron, as it always made them sick.'"—*Dr. Q. C. Smith, in Pacific Med. and Surg. Journal.*

Lunsford P. Yandell, M. D., Professor of Therapeutics and Clinical Medicine in the University of Louisville, says, in the *Louisville Medical News*, April 27th, 1878:

"A year since, when Dialysed Iron was a novelty, I commended it in the *News* as a most valuable addition to the Materia Medica. Twelve months of additional experience have confirmed my faith in its excellence. The object of this note is to call attention to the great variety of *spurious* preparations sold under the name of Dialysed Iron. In this city, I have found nine varieties of so-called Dialysed Iron. Some of these were manufactured here, but most of them were made elsewhere. Genuine Dialysed Iron is nearly tasteless. It has the faintest possible saline flavor, and a mere suspicion of roughness. Slightly diluted, its taste recalls that of fresh blood. It is not in the least unpleasant, and does not blacken the teeth or tongue. It seldom or never produces any gastric disturbance or headache, and very rarely constipation. It is exceedingly reliable and rapid as a tonic.

"The *spurious* forms of this drug are without the characteristics of taste and efficacy above enumerated, and chemical analysis readily detects their deficiencies. One of the spurious specimens before alluded to was little less unpleasant than the tincture of muriate of iron; another was excessively acid; another was decidedly saline; another was exceedingly astringent; another was sweetish; another was bitter, and another was, seemingly, only colored water; another more nearly approached correctness, but only a single specimen possessed the peculiarities of the true article.

"My attention was first directed to this matter through the failure or misbehavior of the Dialysed Iron in practice. It is but just to say that the good specimen is from WYETH & BROTHER, the original manufacturers of this medicine in America. Wyeth's Dialysed Iron sells at about a dollar a pound. Other makes may be bought at fifty cents."

Dr. Yandell also says, in a letter written by him from Cork, Ireland, whither he went as a delegate to the British Medical Association:

"Wyeth's Dialysed Iron is preferred to all others in Cork, as it is in Dublin and London, and when I inquired of Corbyn, Stacy & Co., of London, who have a good exhibition of drugs at the Cork meeting, for a specimen of their own Dialysed Iron, they gave me a specimen of Wyeth's, stating that it is chiefly prescribed in London."

Besides the above, the following leading medical journals give ample recognition and endorsement of that manufactured by us:—

The *Philadelphia Medical Times.*
The *New Orleans Medical and Surgical Journal.*
The *Virginia Medical Monthly.*
The *American Journal of Pharmacy.*
The *Louisville Medical News.*
The *Louisville Medical Journal.*
The *Boston Journal of Chemistry.*
The *Ohio Medical Recorder.*
The *Canada Journal of Medical Science.*
The *Pacific Medical and Surgical Journal.*
The *Philadelphia Druggist and Chemist.*
The *Oil, Paint and Drug Reporter.*

We give below the opinions of British Medical Journals on our Dialysed Iron:

Report on the Preparation of Wyeth Bros., Philadelphia and London, by C. R. C. Tichborne, Ph. D., F. C. S.

"DIALYSED IRON.—Messrs. Wyeth have succeeded in making a very excellent preparation, which is quite as good as any we have seen, and superior to many of them. In fact, some of the preparations known as Dialysed Iron have been shown to be of the most variable composition. *Vide* paper read at the late meeting of the British Pharmaceutical Conference at Dublin, and *Pharmaceutical Journal.* It seems to vary from a weak liquor ferri mur. to solutions, which according to Dr. Yandell, of Louisville, are nothing but colored water. Our analysis of Wyeth's preparation gave:—

Ferric Oxide (in the soluble form),	6.2'8
Chlorine,	1'0
Water,	93.672
Total,	100.000

We may say, therefore, that it contains in the fluid ounce, 27.68 grains of a basic salt of iron, which strange to say, almost exactly agrees in compcsition with the results obtained by Graham. In his experiments he obtained a red liquid containing 98.5 parts of oxide, and 1.5 of muriatic acid. The salt contained in Wyeth's preparation, contains 98.42 ferric oxide, and 1.58 of chlorine.

We have found Wyeth's Dialysed Iron to be a pure and concentrated solution, which has been well prepared."—*British Med. Press and Circular.*

"Wyeth's preparation is excellent. We find, on analysis, that the proportion of Hydrate to Chloride is so high, that the latter can hardly produce any effect. If for no other purpose, Dialysed Iron should always be kept as an antidote for Arsenical poisoning."—*The Lancet.*

"Wyeth's preparation of this very valuable ferruginous preparation is one of the best we have seen; and as there is much evidence that preparations of so-called Dialysed Iron, of very inferior quality, are in use, this one deserves attention."—*British Medical Journal.*

"We have found Wyeth's Dialysed Iron to be a pure and concentrated solution which has been well prepared. It contains in each fluid ounce 27.68 grains."—*Analytical Report by Prof. Tichborne, Ph. D., F. C. S., to Medical Press and Circular.*

"A very superior preparation of Dialysed Iron, of which Messrs. Wyeth are perhaps the largest makers in the world."—*The Chemist and Druggist.*

DIALYSED IRON

AS AN

ANTIDOTE FOR ARSENICAL POISONING

The value of Dialysed Iron in this very important and frequently recurring class of cases is established beyond question. We append only a few out of a large number of instances which are upon record, or have been reported to us:

A Case of Arsenical Poisoning Treated with Dialysed Iron by Thos. B. Reed, M. D.

PHILADELPHIA, November 15, 1877.

As I was leaving my office one morning, a few weeks ago, a young lady patient, Miss S., hastily entered, with a face indicative of intense pain and nervous disturbance, saying, "Doctor, I am poisoned." Her story was as follows: While attending to the wants of a valuable servant who was sick and confined to her bed, Miss S. found hidden away in the servant's trunk, a paper of Arsenious Acid, which had been procured by Mrs. S. some weeks before, for use as a poison for rats. As this servant had been in ill health for some time, and morbid and melancholy, Miss S. at once very naturally, and no doubt very rightly supposed, that she had secreted the poison for the purpose of taking her own life. Quietly placing the packet of arsenic (which was open) in her pocket, she continued her duties, intending at the earliest moment to put it in a safe place. Days elapsed; the arsenic was forgotten, stored away in the pocket of her wrapper, until this unlucky morning, when, putting a couple of handfuls of gum drops and bon-bons into her *arsenic pocket*, she sat down to her sewing machine and her confectionery. She noticed from time to time, as she sewed, more powder upon the drops than seemed usual, but she continued quietly to dust them off as she ate, and went on with her work. *Can anything be more absurdly tragic than this unconscious suicide, deliberately eating gum drops powdered with arsenic?* Probably an hour and a half passed in this innocent amusement, when suddenly, "becoming deathly sick, instantly followed by intense pain, as if," as she quaintly expressed it, "she had had a pure mustard plaster on the inside of her stomach," she was roused to the consciousness that some strange mischief was at work. Terrified, on remembering the arsenic, she attempted, unsuccessfully, to relieve her stomach with warm water; then, unwilling to alarm her mother, who was also an invalid, she hastily threw on her street dress and hat and hurried to my office, about two blocks away. Fortunately for both of us, I had upon my table a sample bottle of Dialysed Iron, (John Wyeth & Bro.) and as soon as she told me she had taken arsenic, and before she began her story, I administered half a tablespoonful of the Iron, well diluted in a tumbler of water. This gave her almost instant relief. I repeated the dose in ten minutes, and then gave her a bottle of the Iron, directing her to take a similar dose every half hour, and later, every hour during the day. I saw her at her home in a few hours after, but she had had no return of her pain, except some slight cramp in the lower bowel and limbs; and a dose of magnesia at night, with mucilaginous drinks, soft food, with occasional doses of the Iron well diluted, kept up for a few days, completed her cure.

Dr. Wm. B. Hazard, editor of the *St. Louis Clinical Record*, in an editorial note to an article on Dialysed Iron, published in the *Cincinnati Lancet and Clinic*, Oct. 26, writes as follows:

Editor's Note on Dialysed Iron in Arsenical Poisoning.

"During the first week in September, 1878, the writer was called to see a case of poisoning by arsenious acid. The patient was a young man, aged about twenty-five years, who had ingested a large quantity of the poison that had been used by mistake in the place of baking powder, in the composition of griddle cakes. The poison had been taken at about eight o'clock A. M. He had been seen shortly afterwards by a most competent physician, who had given him several ounces of the hydrated sesquioxide of iron. Vomiting had persisted all day, and, when seen by the writer at five and a half o'clock P. M., he was still nauseated, and ejected the smallest quantities of liquids almost as soon as taken. He had discontinued the hydrated sesquioxide about an hour before. There was extreme tenderness over the epigastrium, and constant desire to drink.

The writer immediately commenced the administration of Wyeth's Dialysed Iron in drachm doses, given with a tablespoonful of ice-water. He vomited only two or three times after this treatment was instituted. At about seven o'clock, he was given a mixture of subnitrate of bismuth and aqueous extract of opium, to lessen the pain and irritability of the stomach. As soon as it could be retained, sulphate of magnesia was given in small doses, until the bowels were moved freely. The patient was intensely jaundiced next day, and some irritability of the stomach persisted for two or three days. His recovery was satisfactory.

The *Southern Clinic*, of January, 1879, contains the following account of two cases of arsenical poisoning treated with Dialysed Iron, by O. A. Crenshaw, M. D., Richmond, Va.:

Driving up Second Street at 11 A. M., December 22, I met a man hastily in search of a doctor. He stated that his two children had been poisoned, half an hour previously, by ratsbane. I hastened to the house, a couple of blocks off, and found a girl nine years of age sitting over a basin, into which she had vomited a large quantity of undigested bread, in lumps, and a considerable quantity of a yellowish liquid. The other sister, aged eleven, had not been sickened.

I immediately gave the younger girl a mustard emetic, which acted instantaneously, and dispatched her father to the nearest drug store for some Dialysed Iron. He returned in a few minutes, and I gave her one teaspoonful in half a glass of water, with directions that it should be repeated every half hour. Also ordered the elder girl to be vomited, and treated as the other, with Dialysed Iron.

Saw the patients again at 2 P. M., and learned that the eldest girl had commenced vomiting before the emetic could be administered. It was given, however, and both kept on the iron treatment. Both had vomited occasionally, during my absence, and the younger, who was said to have eaten most heartily of the bread, was suffering with fever, restlessness, thirst and burning heat in the region of the stomach. The elder suffered comparatively little, and was free of fever. Ordered the iron continued every half hour, as before, and the free use of milk.

At 8 P. M., saw the patients again—the elder girl entirely relieved; the younger still suffering with fever, thirst and great restlessness. Treatment continued.

Dec. 23.—Visited patients at 10 A. M. Found that the elder girl had gone to school, and the younger up, and entirely free from all symptoms of poisoning, with an appetite for breakfast.

The rapidity of recovery, in these cases, speaks volumes in favor of Dialysed Iron in the treatment of arsenical poisoning. The quantity of arsenic incorporated with the bread, which these children had baked and eaten, was one teaspoonful, and though it is true that much of the bread was vomited undigested, yet, from the quantity of the yellowish liquid vomited along with the bread, and the severity of the symptoms, a considerable quantity of the arsenic must have come in contact with the mucous membrane of the stomach.

I was induced to use the Dialysed Iron because of the facility with which it could be procured—not more than five minutes elapsing between the writing of the prescription and the administration of the first dose. In the treatment of such cases, time is everything, and that lost in preparing the ordinary antidote, might have cost the life of one or both these patients. That Dialysed Iron, in addition to its other virtues, is an antidote for arsenical poisoning, I have no doubt.

[It gives us great pleasure to add, that we have just learned from Dr. Crenshaw that the Dialysed Iron used in these cases was prepared by Messrs. John Wyeth & Bro., of Philadelphia.—ED.]

Dialysed Iron as an Antidote to Arsenic.

Editor Medical and Surgical Reporter:—An elderly gentleman and his wife were poisoned, last week, by arsenious acid put in their coffee, from which they suffered very severely. Mr. C. drank a cup of the coffee, and also a glass of sweet milk, at the table, and immediately after rising from the table he drank two more glasses of milk, with cream, not apprehending poison. In less than thirty minutes he became sick, nauseated and threw up his dinner. Supposing he was bilious, or had eaten something indigestible, he took a dose of calcined magnesia, and soon threw that up; then drank a solution of sodæ carb., which was likewise thrown up. Mrs. C. was also seized with nausea and vomiting, when a physician was called in, who treated the nausea and irritability of the stomach, not apprehending poison, for the lady was not well before taking the poison. Mr. C. did not suffer many hours, as he had unwittingly taken three very good remedies. Mrs. C. was extremely prostrated; she is about sixty years old, and in poor health generally. The poison was taken on Monday at noon, and she continued to vomit and suffer till Thursday, when I sent her, in the evening, two ounces of Dialysed Iron, prepared by Wyeth, of which she took nearly a fluid drachm, and experienced great relief in a few moments. She repeated the dose before bedtime, and rested better than she had since Sunday night. I saw her on Friday, when she was able to sit up, and expressed her thanks for the medicine and the prompt relief it gave her, for she vomited no more after the first dose She continued to use the iron till restored to health.

Navasota, Texas. A. R. KILPATRICK, M. D.

A Case of Arsenical Poisoning Treated with Dialysed Iron.

I send you the history of a case of arsenical poisoning, which occurred in this City, thinking it may interest some of the readers of your valuable journal:

On the 22d day of March last, I was summoned to visit Mrs. J. A. McK——(a married woman, about twenty-four years of age,) who, the messenger said, had taken arsenic, with suicidal intent, and I immediately repaired to her dwelling. She was

reclining on a lounge, attended by her husband and several female acquaintances—a picture of anxiety and distress. Her haggard face, clammy skin and feeble pulse plainly indicated the necessity of prompt medical assistance, as gastric pain and uneasiness, with continual hiccough, were already prominent symptoms. I offered her some water, and noticed that the power of deglutition was considerably impaired. Having no antidote with me, I wrote on a slip of paper "Wyeth's Dialysed Iron," and giving it to her husband, directed him to a drug store near by, where I knew he would find this reliable preparation. In a few minutes he returned, and I administered two or three tablespoonfuls of the solution, each well diluted. She showed no inclination to vomit, but a mixture of powdered alum and ground mustard, in conjunction with tepid drinks and tickling of the fauces, caused the stomach, after a while, to eject its contents freely and fully. The remaining treatment consisted in the employment of remedies calculated to lessen irritation and strengthen the nervous system—milk, opium and small doses of the iron for a period of twelve hours. I was of course unable to determine the exact amount of arsenic which my patient swallowed, but I think certainly ten or fifteen grains, judging from her own statement and the appearance of the partly emptied package, which was accidentally discovered before I left. She recovered in a few days.

H. N. CANER.

Freeport, Ill.

We have information of the recent occurrence, in one family residing near Jersey City, N. J., of three cases of poisoning by arsenic (Paris green) contained in some raw tomatoes, all of which were immediately relieved by the administration of our Dialysed Iron, and ultimately recovered.

Other instances, both in the United States and in Canada, have been reported, but the above may suffice for reference.

SOLUBLE COMPRESSED PELLETS.

A NEW FORM OF REMEDIES FOR HYPODERMIC USE.

By H. AUGUSTUS WILSON, M. D.,

Ophthalmic and Aural Surgeon to St. Mary's Hospital; Lecturer on Diseases of the Eye and Ear, and on Fracture Dressings at the Philadelphia School of Anatomy; Member of the Philadelphia County Medical Society, Northern Medical Society, etc., etc.

Extracts from a paper read before the Philadelphia County Medical Society, Oct. 27, 1880.

Solutions for hypodermic use have been very generally abandoned because the *penicillum*, which so soon forms, renders the use of medicines in this form uncertain, if not dangerous.

Because of the danger and uncertainty, as well as the inconvenience of carrying the medicines in solutions, the profession has resorted, where practicable, to the use of powders, which are carried either in the hypodermic or pocket case.

It is as a substitute for the latter that I propose the new form of soluble compressed pellets, because of their convenient size and certainty of contents and action. I have confined my experiments to the salts of morphia, because it is the drug most frequently used hypodermically, and because I felt confident that if I could succeed with this drug it would be but a simple matter to place in the same form other remedies, such as strychnia, arsenic, apomorphia, etc.

The result of my first attempt to obtain a soluble pill I now show you. Besides the morphia, it contains one-quarter grain of white sugar; but the moisture necessary to roll the pills rendered them difficult to dissolve when required. Then the compressed form was tried with sugar; but the smarting, burning pain which immediately ensued led me to believe that the sugar was an irritant to the tissues, and, instead of aiding, really interfered with the process: therefore sodium chloride was substituted, which I found had not the disadvantages of sugar and possessed merits of its own.

The use of the sodium chloride will be apparent when I say that if morphia salts are compressed alone they become extremely hard and very slowly soluble. Hence the necessity of mixing thoroughly, before compression, some material which at the same time shall give increased bulk, be inert, and have a great affinity for water. The sodium chloride acts as a *disintegrator*, for upon coming in contact with water it readily dissolves and leaves the morphia in a fine state of subdivision, ready to be acted upon by water. The sodium chloride, instead of causing pain or irritation, seems really to assist in promoting absorption. To accomplish the solution usually requires not more than thirty seconds, and may be brought about as follows: The syringe is charged with about twenty minims of water,

which is poured into a teaspoon or other convenient receptacle; the pellet, being dropped in, is crushed with the end of the syringe, to which the needle fits, and after all the lumps are broken the solution is drawn up and forced out three or four times, when usually the whole mass will be entirely dissolved and ready for use.

It is well known that the addition of atropia sulphate greatly increases the hypnotic and anodyne properties of morphia salts and decreases the tendency to after-headache and constipation. I have, therefore, used this combination in all my experiments, and would suggest the following formula:

℞		
	Morphiæ hydrochloratis, gr. ¼,	.015
	Atropiæ sulphatis, gr. $\frac{1}{150}$,	.0004
	Sodii chloridi, gr. ¼,	.015

Mix and make into compressed pill No. 1.

I claim that the advantages of this method over any other known are:

1st. The convenient size of the pellets.
2d. That they may be used by the mouth, if desirable.
3d. Their certainty of contents and dose.
4th. Their certainty and rapidity of action.

Those who have used the hypodermic method, and have often experienced the disadvantages of solutions and the inconveniences of powders, from their increased bulk and from the difficulty of removing all the powder from the paper, will, I trust, accept this my suggestion, and from actual use decide whether it is or is not an improvement upon existing methods.

NOTE.—Since I called the attention of the profession, in October, 1880, to this form of remedies for hypodermic medication, Messrs. John Wyeth & Brother have experimented with reference to the employment of the Sulphate Salts of Morphia, Atropia, Strychnia, etc., and to that end, at the suggestion of Prof. Roberts Bartholow, have substituted as a *disintegrator* the Sulphate for the Chloride of Sodium. I consider the change a good one, in view of the fact that physicians as a rule are more familiar with the administrations of the Sulphate Salts.

The employment of the pellets for hypodermic use, during the past nine months, has convinced me that their careful use will tend still further to banish from our armamentarium the bulky changeable solutions, and the equally inconvenient powders, in preference for the soluble pellets to which I have had the honor of calling the attention of the medical profession.

H. AUGUSTUS WILSON, M. D.,
331 South Twelfth Street, Philadelphia.

April 1st, 1881.

COMPRESSED

SOLUBLE HYPODERMIC TABLETS.

We have recently given much attention to the preparation of Soluble Compressed Tablets, to be used in hypodermic medication. This idea was brought to the notice of the medical profession by H. Augustus Wilson, M. D., of this city, in a paper read before the Philadelphia County Medical Society. His views were based upon carefully made experiments and were received with much interest. At his instance we undertook to prepare in this manner a number of combinations, which have, upon trial, proved eminently satisfactory. We therefore feel warranted in offering these articles to the profession as superior in several respects to all other forms for hypodermic purposes.

They are convenient, both to carry and to use; they are accurate, enabling the physician to administer precisely the dose desired; and they are not liable to change by keeping. Solutions are bulky, the bottles are apt to break or to leak, and the liquid often becomes decomposed or deteriorated by time. Powders become inert from atmospheric influences; the papers become torn and part of the medicament is often lost in the necessary handling. The patented gelatine discs are not quickly soluble, and are sometimes slow in taking effect. Their use is apt to be followed by abcesses, which is rarely the case with crystalloid substances.

An extensive experience of many years in the manufacture of compressed powders (or pills), and the precision and accuracy of our mechanical appliances, enable us to make these articles with a degree of perfection not attainable in any other way or by any other process. The exact amount specified of each drug is thoroughly incorporated and distributed throughout every tablet. In water at ordinary temperatures a perfect solution may be made in from thirty to sixty seconds.

No extraneous material is employed except the Sulphate of Sodium, and this only in such proportions as to facilitate solution.

CAUTION.—The dose of Morphia for hypodermic use varies from $\frac{1}{12}$ to $\frac{1}{2}$ of a grain. We would suggest to the profession the necessity for caution, the large doses sometimes recommended—$\frac{1}{2}$, $\frac{3}{4}$, and even 1 grain—are unsafe for the first trial, unless the conditions requiring the injection be exceptional. *In commencing, it should not exceed one-third of that ordinarily administered internally.*

DIRECTIONS.—The syringe is charged with about twenty minims of water, which is poured into a teaspoon or other convenient receptacle; the pellet being dropped in, is crushed with the end of the syringe, to which the needle fits, and after all the lumps are broken the solution is drawn up and forced out three or four times, when usually the whole mass will be entirely dissolved and ready for use.

If warm water is used, or the spoon is heated over a lamp or gas jet, a perfect solution is effected in a moment. The Tablets may be readily powdered with the blade of a knife, and a solution is even more speedily made in this way.

JOHN WYETH & BRO.,

PHILADELPHIA.

SOLUBLE COMPRESSED
HYPODERMIC TABLETS.

The following formulæ and combinations embrace all those in general request. Others will be added as the demands of the profession warrant their manufacture.

We claim for our HYPODERMIC TABLETS:

ABSOLUTE ACCURACY OF DOSE.
READY AND ENTIRE SOLUBILITY.
PERFECT PRESERVATION OF THE DRUG.

Their convenience and utility will at once be apparent on examination.

Morphiæ Sulphas, 1-2 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-3 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-4 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-6 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-8 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-12 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-2 grain,
Atropiæ Sulphas, 1-100 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-3 grain,
Atropiæ Sulphas, 1-120 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-4 grain,
Atropiæ Sulphas, 1-150 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-6 grain,
Atropiæ Sulphas, 1-180 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-8 grain,
Atropiæ Sulphas, 1-200 grain,
Sodæ Sulphas, 1-4 grain.

Morphiæ Sulphas, 1-12 grain,
Atropiæ Sulphas, 1-250 grain,
Sodæ Sulphas, 1-4 grain.

Atropiæ Sulphas, 1-60 grain,
Sodæ Sulphas, 1-4 grain.

Atropiæ Sulphas, 1-100 grain,
Sodæ Sulphas, 1-4 grain.

Atropiæ Sulphas, 1-150 grain,
Sodæ Sulphas, 1-4 grain.

Strychniæ Sulphas, 1-60 grain,
Sodæ Sulphas, 1-4 grain.

Strychniæ Sulphas, 1-100 grain,
Sodæ Sulphas, 1-4 grain.

Strychniæ Sulphas, 1-150 grain,
Sodæ Sulphas, 1-4 grain.

We are under many obligations to Professor Roberts Bartholow, who, from his thorough scientific investigations and extensive experience in hypodermic medication, is recognized as the highest authority on the subcutaneous treatment of disease, for suggestions and advice in regard to the care required in preparing our Hypodermic Tablets; also for the kind interest in devising the above formulæ.

His book on "*Hypodermic Medication*" is well known as the standard work on that subject, and has reached a third edition.

The success of our efforts to furnish the medical profession a much needed improvement in hypodermic medication is due to the happy suggestion of Dr. H. Augustus Wilson, and to the kind interest of other medical friends, who have advised us as to the absolute essentials in preparing so delicate and important a series of medicaments.

JOHN WYETH & BROTHER,
1412 & 1414 Walnut St., Philada.