

Notes upon new remedies : read before the Kings County Medical Society, August 16th, 1859, and before the Medical Society of the State of New York, February 7, 1860 / by Edward R. Squibb.

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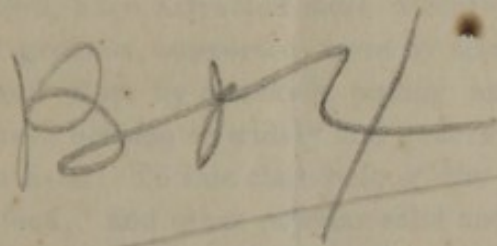
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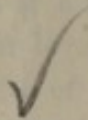
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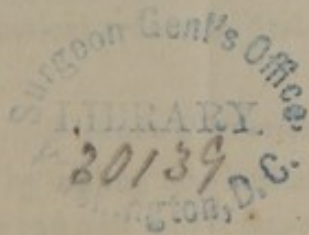
NOTES UPON NEW REMEDIES.

Read before the Kings County Medical Society, August 16th, 1859, and before the Medical Society of the State of New York, February 7, 1860.





BY EDWARD R. SQUIBB, M. D.



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NOTES BY THE RESEARCHER

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NOTES UPON NEW REMEDIES.*

Since the last decennial revision of the National Pharmacopœia an unusual number of new remedies have been proposed, and brought into use in various sections of the profession. Among these many have, from various causes, never reached the general profession otherwise than by a first cursory, indefinite notice. Others, more frequently noticed and urged with more pretension, have attracted more attention and publicity; and, upon hypothetical grounds, supported more by science and logic than by practical utility, and more by quackish puffing and advertising than by anything beside, have become so widely and generally known as to require no special allusion here. To this class belong the hypophosphites, the so called "chemical food," and other popular salts and syrups of phosphates. To neither of these classes does the writer propose to ask the attention of the Society; but rather to a portion of a far less numerous class, wherein better chemistry, supported by better logic, and confirmed in some degree by practical application, gives promise of somewhat more definite and permanent results in general practice.

The notices of these preparations do not pretend to great detail, accuracy or research, and the character of the investigation prevents their being a definite statement of established facts, so that the writer is forced to rest satisfied with the endeavor simply to bring the articles together again into notice, in conjunction with the prominent points of interest and practice which the short career of each may have gathered around it, within the limits of his reading and professional intercourse.

In adopting an alphabetical order the first article is chromic acid.

Acidum Chromicum.

This acid is prepared by adding one measure of a saturated solution of bichromate of potassa to one and a half measures of concentrated sulphuric acid. When the mixture has cooled the crystals of chromic acid are separated, and dried between porous tiles.

* This paper is not precisely as read before the Kings County Medical Society, and to be published in the Transactions, but has been revised by the author, and brought more nearly up to the present time, and one new preparation, that of opium, has been introduced.

It is in the form of red needle-like crystals, and is commonly moist, from its very deliquescent character. It is soluble in water in all proportions, and when in solution or when moist it is rapidly decomposed by all organic matter, decomposing the organic matter by oxidation at the same time.

Upon this property of rapidly oxidizing organic matter depends its action as an escharotic; and whatever advantage it may possess over potassa, chloride of zinc, &c., depends upon the rapidity and completeness of its action, but more upon the circumstance that it is self-limiting in its effect, since it is itself decomposed into insoluble inert sesquioxide of chromium in direct ratio with its activity. It is applied in a pasty condition, or in solution, and another advantage claimed for it is, that the rapidity of its action may be controlled by the strength of the solution, and that its action may be stopped at any moment by copious ablution. A strength of 100 grains of the acid to one fluid ounce of distilled water, is that recommended for destroying venereal warts, and similar morbid growths, applied by means of a glass rod.

It was first used as a caustic by Prof. Sigmund, of Vienna, by recommendation of Dr. Heller, and the accounts of its uses, and some experiments with it, were translated into the Dublin Quart. Journ., No. XIII, p. 250. It was used with success in the venereal wards of the University College Hospital of London, by Mr. Marshall, and an abstract from these notices of its use may be found in Ranking's Abstract, No. XXV. p. 149, and in the U. S. Dispensatory, 11th ed., p. 1392. In the New Orleans Medical News, for November, 1857, Dr. J. L. Crawcour publishes two cases in which he used it to remove morbid growths from the scalp, with the alleged advantages: that it caused little pain, left but little scar, and did not destroy the hair bulbs. In view of its chemical reactions with organic matter, the latter statement is a little surprising.

Acidum Sulphurosum.

A solution of sulphurous acid gas in water for medical purposes, is best prepared by Prof. Procter's formula: see Amer. Jour. Pharm., Vol. XXIX., p. 110. The gas generated from 8 fluid ounces of sulphuric acid, by means of 4 ounces of copper turnings, is passed into 4 pints of water, and the solution kept in small bottles, well filled.

This is a colorless solution, having a strong acid taste and reaction, and the well known odor of burning sulphur. When fit for medical use, it should give but slight cloudiness with solution of chloride of barium. For use, the acid, prepared as above, is diluted with twice its volume of water, and is applied by means of cloths moistened with the solution, and covered with oiled silk.

Its peculiar action as a remedy is supposed to depend upon its chemical property as a deoxidizing agent, and it is therefore in effect, as in chemical character, exactly opposite to chromic acid. In its application to diseases which depend upon the growth of parasitic plants and animalculæ, it kills them by asphyxia, by depriving them of oxygen.

Dr. Wm Jenner, of University College Hospital, London, was the first to use this remedy as a prompt and active "parasiticide," as he calls it. In a paper published by him in the London Med. Times and Gazette, of Dec. 1857, he highly extols its use in Tinea Favosa, and kindred diseases. See also Braithwaite, No. xxxvii., p. 180. Dr. Bennett, of Edinburgh, also used it successfully in inveterate cases of similar character. The alleged advantages are, that it is prompt and efficient, and successful where other means fail, while it is far more cleanly and managable than most of the other topical applications. See U. S. Dispensary, 11th ed., p. 1492. The writer has heard of its having been used with success here, chiefly in Philadelphia, but nothing definite of cases or results has been published, that he is aware of.

Argenti Nitras Fusus, containing Chloride of Silver.

This new form of lunar caustic is prepared by adding a definite proportion of hydrochloric acid to the nitrate of silver at the time of fusing, and pouring the fused mixture into moulds, in the usual way. The proportion of the officinal acid which gives 5 per cent of chloride in the fused nitrate, is 40 grains to 2 ounces.

The sticks of lunar caustic thus made, become of a darker color than usual, in consequence of the more rapid effect of light upon the chloride. They are harder, much less soluble, and of a strength or toughness at least double that of the pure nitrate. Pure fused nitrate of silver is of a crystalline structure, translucent, generally greyish, very soluble, and quite brittle. It is so soluble that when applied to moist surfaces, or delicate parts, more of the salt is left upon the part than is necessary or desirable, and the solution is apt to spread over the surfaces in blotches, whilst its brittleness is a source of frequent loss, and also of some danger, in applications to the throat, uterus, vagina, etc. The increased strength of the sticks, and diminished solubility in this new form, must therefore prove to be valuable qualities in a large proportion of cases wherein the nitrate is used, whilst as yet there are no known disadvantages from the admixture.

This improvement in lunar caustic is due to Prof. J. Lawrence Smith, of Louisville, Ky., and an account of it was published in the Semi-Monthly Medical News, of Louisville, for Feb. 1859, p. 65.

It is known in the commerce of lunar caustic, but not so well known in the medical profession, where this important article comes into use, that the manufacturers, without any known exception, sell two kinds, which are of different degrees of purity, and which are often designated on prices current as "No. 1" and "No. 2," or as "Pure" in the one case, and "No. 2" in the other. The "No. 1," or so called "Pure" nitrate commonly contains from 1 to 12 per cent of nitrate of potassa, or other cheap salt, added, as is alleged, for the purpose of toughening the sticks, and making it run well in the moulds. The "No. 2" commonly contains from 25 to 33 per cent of the adulterating salt. In "the trade" these two varieties are known and distinguished by the sticks being rolled, in the one

case, in white paper, and in the other, in white paper of a blue tint; or, when both are rolled in paper of the same tint, by the ends being sealed with wax of different colors. And when in pound bottles, the figure "2," often in lead pencil, may be found on one corner of the label. These delicate distinctions do not, however, often accompany the article into the hands of medical men, and the effect is so unmistakably bad, in many of the applications of nitrate of silver, that, apart from the fraud upon the profession, it became very desirable to have some simple, easy test for its detection. The writer was fortunate enough to find such a test, which if generally applied, will probably cause four-fifths of the lunar caustic now in the hands of medical men to be rejected.

A small fragment of nitrate of silver, say four times the size of a pin's head, crushed to powder with a knife blade, or pencil head, upon a piece of soft paper, three or four inches square, the powder spread out over the paper, and the paper and powder then rolled up into a small, compact, match-like roll, set on fire and burned, leaves a tasteless residue of pure silver, if the nitrate be pure. But if the nitrate contains even 1 per cent of any alkaline impurity, the residue of the burning instead of being tasteless, will have the sharp alkaline taste of the base of the adulterating salt. The little match burns rapidly with deflagration, and provided the quantity of nitrate taken be not too great for the size of the paper, and provided the powder be fine, and well distributed over the paper, the carbon of the paper will, in burning, reduce all the silver to the metallic state, and will leave only the base of the adulterating salt to give taste to the residue.

With this simple test, no one need be deceived in the character of the lunar caustic he uses, until some new and more fixed adulteration substances are found. The chloride of silver, in the new form, does not interfere at all with the application of this test, since in this case, also the residue is tasteless.

Bismuthi Subcarbonas.

Subcarbonate of bismuth is prepared by adding a solution of the ternitrate of bismuth slowly, and with constant agitation, to an excess of solution of carbonate of soda. The subcarbonate which separates as a yellowish white powder, is well washed, and dried with a gentle heat.

Two points in this process are of great importance; first, to have the preparation free from arsenic, and second, to have the full equivalent of carbonic acid present. The metallic bismuth of commerce all contains arsenic, and this arsenic passes into solution with the bismuth, and is precipitated with it in preparing the subnitrate, but not to the same extent in the subcarbonate. Some recent investigations of Prof. Rogers, of Philadelphia, seem to show that subnitrate of bismuth is very commonly contaminated with arsenic, and occasionally to a mischievous extent, and in view of the results obtained by various other authorities, it appears probable that some of the unpleasant effects hitherto attributed to the subnitrate, were due to this impurity.

So close is the association between arsenic and bismuth, that it is very difficult in operating with the quantities large enough for medical uses, to separate the arsenic absolutely, so that a critical application of Marsh's test may give negative indications, yet it is comparatively easy, by redissolving and reprecipitating the bismuth preparations to free them of all but the merest trace.

Subcarbonate of bismuth is in the form of a white (or yellowish white, when tinged with iron,) powder, tasteless and odorless, and free from roughness. It is specifically much lighter than the subnitrate, and dissolves freely with effervescence in dilute acids.

It is administered in substance, before meals, in water or in syrup, in quantities of ten to thirty grains, three times a day in adult cases.

The only preparation of bismuth hitherto much used, is the subnitrate. This, by varying and often unskillful manufacture, is far from being uniform in its composition. When washed till the washings cease to have an acid reaction, as is frequently done, it is reduced nearly to the condition of an oxide, when from diminished solubility, and its basic character, much larger doses are required and imperfect results obtained.

At best, however, this preparation is liable to produce mechanical irritation and oppression of the stomach, constipation, and, when long continued, a train of symptoms approaching those of scurvy. The subcarbonate is said to produce no such ill effects. It is soluble in the gastric secretion, with the additional valuable property of being antacid. It excites no repugnance by roughness or tenacity upon the palate, and its action is uniform, prompt, and efficacious. During the first few days it is sedative, and subsequently tonic. It is regarded as being peculiarly adapted to secondary atonic gastralgias; to laborious digestion, particularly when accompanied by acid or putrescent eructations with tendency to vomiting and diarrhœa; to the vomiting of children, whether caused by detention or indigestion; and to the diarrhœas of feeble children. Under its use the digestion improves rapidly, the tongue assumes its natural form and color, the appetite improves, and the skin looses its shrivelled appearance, and sallow color. In short, judging from its chemical character and uniformity, as well as from the statements made respecting its therapeutic effects, it appears well adapted to replace the subnitrate altogether.

It was first used and brought to the notice of the profession by Prof. Hannon, of the University of Brussels, in 1857, and his paper on the subject may be found in the *Bulletin de Thérapeutics*, for February, 1857. In the *British and Foreign Med. Chirurg. Review*, for July, 1857, p. 229, or *Braithwait's Retrospect*, part xxxvi, p. 285, and in the *U. S. Dispensatory*, 11th ed., p. 1489, may be found the greater part of what has yet been published concerning this preparation. It has of late been used here by members of this Society with very satisfactory results, and appears sometimes to arrest the vomiting of pregnancy, when common remedies fail.

Ferri et Ammoniae Sulphas.

Double sulphate of iron and ammonia, or ammonio-ferric alum, as it is commonly called, is prepared by adding together, in definite proportions, solutions of tersulphate of sesquioxide of iron, and sulphate of ammonia, and setting aside till the double salt crystalizes out. The crystals are redissolved and recrystallized from a slightly acid solution, washed with very dilute sulphuric acid, and dried as speedily as possible at ordinary temperatures. It should then be kept in well stopped bottles and secluded from light, since a very little exposure, particularly in sunshine, causes the crystals to become brown or rusty from decomposition of a portion of the salt.

This alum, like all others, occurs in regular octohedral crystals. It is of a violet or amythist tint, the crystals being often a little moist, and sometimes a little dingy without their value being materially impaired. It is odorless, but has an acid, astringent ferruginous taste,—is very soluble in water, forming a dark colored solution in consequence of a partial decomposition, and the formation of a basic iron salt. It is commonly used in solution, whether for internal or external application. The dose is from three to six grains, three times a day, and is commonly given by Dr. W. Tyler Smith, in infusion of columbo.

Mr. Lindsey Blyth, of St. Mary's Hospital, London, in December, 1853, brought to the notice of the profession, through the London Pharm. Journal, two iron alums,—the potassio-ferric, and ammonio-ferric, both of which had been used with success in that hospital. Dr. Wm. Tyler Smith, of London, in his work upon the Pathology and Treatment of Leucorrhœa, states that he commenced the use of them as early as 1852, and from prolonged experience knows no internal remedy that equals them in the treatment of leucorrhœa. Farther experience among other observers, both in England and this country, seems to indicate that of the two the ammonia alum is preferable chiefly in consequence of its more ready solubility, and that it is a remedy of much therapeutic value. The two Drs. Darrach, of Philadelphia, were the first to use it in this country, and it was first prepared for them by Mr. Wm. Hodgson, Jr., of Philadelphia. The results of the observations of Drs. Darrach seemed to confirm the statements of Drs. Blyth and Smith, and have led to a more extended use of the salt.

Similar in action to the sesquichloride of iron, it is not stimulant like that preparation, and seldom causes nausea or headache, while as an astringent tonic it is more effective. It is said to be more astringent than common alum, and its tendency to constipate has led to its employment in "Choleraic Diarrhœa and Dysentery" with advantage. Its topical use, as an infection or wash, is said to be very efficacious. For an abstract notice of this preparation, see U. S. Dispensary, 11th ed., p. 1490.

Liquor Ferri Perchloridi.

Solution of perchloride, or, rather, sesquichloride of iron, is made by saturating a definite quantity of hydrochloric acid with metallic iron, at a boiling temperature, out of contact of air, filtering the solution off from

the excess of iron, adding one-half more hydrochloric acid, heating the mixture, and then adding nitric acid as long as it produces effervescence, and then adjusting the strength by s. g.

The points of prominent importance in this process are, that there should be no free acid in the solution, and that the combined acid should not be driven off by heating. It is a somewhat difficult preparation to make of a given strength, and under the best conditions for permanency. Even with the utmost care, it is frequently found to undergo decomposition by depositing oxide of iron in its insoluble form, and becoming contaminated with a corresponding proportion of free acid. In such a condition it is entirely unfit for use in medicine or surgery, and by its caustic and irritant character, is liable to produce most mischievous effects. So liable is it to this decomposition, that it should never be used, even as hæmostatic, without being tested. This testing is fortunately simple and easy, and is based upon the fact, that minute quantities of alkali do not produce a permanent precipitate in an acid solution. If four or five drops of the solution be added to a test tube, nearly full of water, and a moistened glass rod, which has been held for an instant in the atmosphere inside of an ammonia bottle be dipped into it, a reddish, flocculent precipitate of hydrated oxide of iron will form about the rod. Should this precipitate be easily re-dissolved by stirring, it indicates the presence of free acid, and that the preparation is unfit for use. To guard against the risk of injury, however, and to ensure the best chances of success with it, M. Gobley and other authorities think it better to have the chloride in the solid state, wherein it keeps indefinitely, and make the solution as required. But, beside the difficulty of keeping a substance that is so extremely deliquescent always ready for immediate use, the time necessary to make a definite solution and filter it, is incompatible with many of the uses of the perchloride. The writer has, however, made the solid salt, and takes the additional precaution of drying in it an excess of the base, so that by no possibility can a recently filtered solution of this salt contain a trace of free acid. By direct experiment with it he has proved that when, after direct exposure to sunlight for some days, it deposits a portion of oxide, and is again filtered, it is still absolutely devoid of free acid. This circumstance shows, that in the salt so prepared, the acid is super-saturated, or that the solution is capable of holding sesquioxide of iron in solution.

The solution first recommended as an hæmostatic, and for injecting aneurismal tumors, is one containing forty-three per cent of the solid chloride. More recent authorities have found this unnecessarily strong, and prefer a solution of thirty per cent. But as there is less liability to decomposition the stronger the solution is, and inasmuch as it is very easy to reduce it, the original forty-three per cent solution of M. Pravaz, or a stronger one, is that best adapted to keeping.

This solution is of a very dark brownish-red color, of a somewhat syrupy consistence, transparent, bright, and free from sediment, nearly odorless, but with a very rough and powerfully astringent taste. The solid salt is

in reddish brown amorphous masses, of a dingy hue, and is liable to be moist or soft on the surfaces unless the stopper of the bottle containing it is very perfect. It makes a thick muddy solution, and so clogs a filter that much time is required to render it clear and fit for use. In case of emergency, however, it might be used without filtration, as the oxide of iron could do no greater harm than any other insoluble inert matter.

The new applications of perchloride of iron as an internal remedy in erysipelas, anasarca, scarlatina and intermittent fever, have been too frequently commented upon to require farther notice here than to remark, that in some grades of the first two diseases the weight of authority appears much in its favor.

It is to its surgical uses as an hæmostatic and styptic that most attention has been attracted of late years, and it is in this relation that it is most important, particularly for the radical cure of aneurisms and varices, by injection. In Bouchardat's *Annuaire de Thérapeutics* for 1853, p. 213, is an account given by M. Rayer, to the Académie des Sciences of Paris, of some experiments by M. Pravaz, of Lyons, upon animals with this agent as a new means of coagulating the blood in the living vessels. The method being soon after applied in practice to aneurisms by M. M. Deslongchamps, Serre, and others. M. Lallemande announced to the Académie that the success which had already attended the method of M. Pravaz promised better results than any other hitherto used. Upon more frequent repetition, however, the results proved far less favorable, so that by 1854, M. Malgaigne, in a memoir published in the *Annuaire de Med. et de Chirurg. Prat.*, for that year, p. 131, says that successful cases are rare, and obtained at such a cost in the way of accidents, that no prudent surgeon could expose his patients to such a disastrous method of treatment. It afterwards became probable that some of the accidents and reverses which stood in the way of this otherwise promising mode of treatment, were attributable to the use of solutions rendered mischievous by excess of acid; such solutions producing high grades of local inflammation and irritative fever which often sacrificed the lives of the patients. Complicated and troublesome processes were then resorted to in order to improve the chemical character and permanency of the solution, but with only partial and rather uncertain effects, so that the method took a position as an important one certainly, and most valuable under certain conditions.

Upon a late occasion, Drs. Minor and Isaacs used this solution by injection, in a case of extensive aneurism, with, as the Society knows, perfect success; yet in their hands, with every precaution taken, the local irritation was so great, as to cause the coagulum to be discharged by suppuration. At best, therefore, it must be regarded as a preparation of too caustic a nature to be used with security; and since other preparations have been since brought into notice, which are not liable to the same objections in anything like the same degree, it is probable that it will be gradually superseded in the practice of prudent surgeons, except in special cases.

Liquor Ferri Persulphatis.

Monsel's solution of persulphate of iron is prepared by sesquioxidizing the iron in a definite quantity of sulphate of protoxide, by means of nitric acid, in the presence of a proportion of sulphuric acid, which gives to the salt formed just half an equivalent of acid less than would be required to form the normal, or so called neutral persulphate. Hence from its chemical character it seemed probable that it was in composition a tersulphate, holding a portion of sesquioxide in solution; but farther observations upon its character and reactions seem to favor the idea that it is a determinate chemical compound, hitherto unknown. Although not properly a persulphate, it yet approaches more nearly to that than to any other iron salt, and as there is no prefix used in chemical nomenclature that would indicate its composition, and as there is now no other form of persulphate commonly used in medicine, or officinal in any Pharmacopœia of the English language, the writer, in making it, gave it the above title in conformity with the method of nomenclature adopted in our own Pharmacopœia; and because M. Monsel, in his original paper, calls it, in his caption, "Nouveau persulphate de fer soluble." The too common usage of applying the names of individuals to compounds that come into use in the materia medica, is very properly condemned by all authoritative writers.

This preparation, as described in M. Monsel's original paper, may be made in three forms. First, in the form of a solution containing about 53 per cent. of the salt: of a dark ruby, or brownish ruby color, nearly odorless, but with a rough, exceedingly astringent taste. Secondly, solid, in the form of yellowish-red scales, somewhat like citrate of iron. In this form it contains 25 per cent. of water, and is so deliquescent that it is difficult to keep it in a condition fit for use. Thirdly, in the form of a greenish-yellow, anhydrous, spongy powder, or scales, strongly resembling tannic acid. This form is also deliquescent. From the practical difficulties in keeping and manipulating the solid forms, and the greater convenience of application in solution, as well as from the circumstance that it must be moist or wet, and therefore in part, at least, in solution, in order to be effective, it is commonly used in this latter form, wherein it fulfills all the indications to its use.

The test by which this peculiar compound is characterized, as pointed out by M. Monsel, are very simple and distinctive. A drop or two of concentrated sulphuric acid, dropped into the solution, decolorizes it to a considerable extent, whilst an excess of the acid converts it into a white, homogeneous soft solid, like plaster of Paris which has commenced to set. A specimen which, under such treatment, does not set like plaster, should be rejected. When the solution is brought in contact with any form of fibrin or albumen, it instantaneously forms a firm and resisting clot, which is perfectly insoluble, and which becomes harder, and swells for some time after. In consequence of this singular property, possessed in so high a degree, it is undoubtedly the most prompt and efficient hæmostatic known, whilst its value is much increased by its freedom from irritating or caustic effects.

These peculiar properties appear to adapt it admirably to the purposes of injecting aneurisms, varices, and erectile tumors, whilst its astringent and corrugating power adapts it equally well to the condensation of spongy tissues and bleeding surfaces.

M. Monsel, Pharmacien-Major to the Military Hospital at Bordeaux, in a memoir addressed to the council of health of the army, on the 20th of July, 1852, made known the hæmostatic properties of the sulphate of peroxide of iron, and M. Larrey was appointed by the council to examine into the value of this new therapeutic agent. On the 13th of October, of the same year, he published in the *Scientific Correspondence of Rome*, a letter in which he characterizes it as the most powerful of the hæmostatics then known. In a thesis upon hæmostatics, by Dr. Viennet, read before the Montpellier school, M. Monsel is quoted as believing, in the actual state of science there does not exist a substance capable of coagulating the blood more promptly than this sulphate. As these statements were all published prior to the experiments of M. Pravaz with the perchloride, they appear to establish M. Monsel's right to the credit of having first brought into notice the hæmostatic properties of persalts of iron, although it does not appear that he had at that time discovered this new salt, since its peculiar properties are not alluded to until the publication of his paper and formula, in September, 1857. See *Journ. de Pharm. et de Chimie*, for September, 1857, and July, 1859.

The writer's notes of the surgical history of this preparation were accidentally destroyed by fire, and the sources whence the information was compiled are forgotten, so that he can only state from memory that upon its first introduction at Bordeaux it was used by some of the surgeons, and in one or two hospitals of that city and Paris with great advantage. Then, from the circumstance that the formula for its preparation was freely and liberally published from the outset by M. Monsel, that it is not very difficult to make, and is comparatively cheap and permanent, it appeared to go quietly into frequent use on the continent of Europe without becoming the special hobby of any one, or even the subject of a "concourse."

As far as the writer knows, it was first used in this locality by Drs. Hutchison, Minor and Isaacs, the first named of whom published a notice of its use in the *N. Y. Journ. Med.* for January, 1859. It was soon after used internally, probably for the first time here, by Dr. T. F. King alone, in uterine hemorrhage, with prompt success. Dr. D. C. Enos then used it by injection in the treatment of varix, and obliterated the saphena vein without a single untoward symptom. It was then frequently used for such purposes, and as an hæmostatic by all the surgeons of the Brooklyn City Hospital, and always with success, but in a majority of the cases of its use by injection, the clot afterward supplicated out, and sometimes left an indolent and troublesome ulcer at the point of injection. It appears, however, to be perfectly safe, and innoxious, since in no case, even when used most copiously in arresting dangerous hemorrhages after other means had failed, did it produce any of the inflammatory symptoms, either local or

constitutional, which are so common and dangerous in the use of the perchloride for similar purposes. Dr. J. Marion Sims then commenced its use, and speaks in high terms of its value in arresting the hemorrhages which follow operations about the os and convex uteri, and he relies upon it with a confidence not hitherto given to any agent, including the perchloride. It has also been used with great advantage internally, in colliquative and scorbutic diarrhœa, where it appears to exert a tonic influence in conjunction with its astringency. Dentists who have become acquainted with its hæmostatic and astringent powers, consider it peculiarly applicable to a large class of their cases, and as occupying a place with them also hitherto vacant. Drs. Toland, Tibbets, and others, of California, were among the first to use it in this country, and their notices of its peculiar qualities, published in the *Pacific Med. and Surg. Journal*, from time to time, for a year and a half past, have done much to attract professional attention to it. In short, as it becomes more generally known, it exhibits strong claims to an important rank in the *materia medica*.

Externally it is applied by means of lint, a small sponge mop, or by a glass rod. Camels' hair brushes, unless really made from good camels' hair, do not answer well, as they are soon drawn up into a hard knot by the solution. When carefully applied to the exact point desired, a very small quantity usually serves the purpose, and this is a point of some importance in cases where a profuse application would interfere, by the formation of a large clot, with the adhesion of surfaces and union by first intention. When used by injection in the treatment of varices, Pravaz's syringe is the proper instrument, and one to five drops may be used in proportion to the size of the vein. As much as thirty drops, however, have been used without other ill effect than the formation of a larger clot to be discharged by suppuration. Some surgeons, who have used it most frequently by injection, suppose there might be an advantage in using a more dilute solution, in view of producing a looser and softer clot, which might be more frequently removed by absorption. Internally, it is given in doses of five to fifteen drops, diluted with water at the time of taking, and repeated p. r. n.

Its useful application might be much extended in the form of astringent injections, washes, etc., except for the circumstance that dilute solutions are liable to decomposition in keeping.

The solid salt in the form of scales, has been recently recommended by Dr. J. P. Tibbets, of Iowa Hill, California, (see *Pacific Med. and Surg. Jour.*, for January, 1859, p. 251,) as an antisymphilitic, as accidentally discovered by Dr. Tollard. When applied to primary chancre, it appears, without any escharotic effect, to decompose the veins, and strangle the ulcer. Experiments with the solution upon primary syphilis are now in progress here, and thus far give promise of success. In all these local applications, indeed in all its uses, the minus proportion of acid in its composition appears to be important to its innoxious and unirritating character,

Ferri Pyrophosphas.

Medicinal pyrophosphate of iron is a double salt, formed by an association of the true chemical pyrophosphate of iron with the citrate of ammonia. The iron salt is prepared by double decomposition, between solutions of tersulphate of sesquioxide of iron and pyrophosphate of soda. When this reaction is managed at low temperatures, a light white gelatinous magna is formed, which is insoluble in water, but freely soluble in solution of citrate of ammonia. By this latter combination, it is rendered soluble in water in all proportions, and forms the medicinal salt.

Since the time when phosphorus and its combinations were recognized as holding the important place they do in the nervous and osseous portions of the animal economy, their use as remedial agents has been looked upon with increasing interest, and soluble, easily assimilable salts, have been eagerly sought for. The insoluble phosphates of lime, magnesia and iron, now regarded as almost inert, were commonly used until 1847, when M. Persoz published a paper upon pyrophosphate of sesquioxide of iron and soda, which, from its solubility and the difficulty with which it is decomposed, he anticipated would one day have important uses in medicine. M. Leras, in 1849, again drew attention to this salt, as being, except the potassio-tartrate, the only one which was not instantaneously precipitated, or decomposed, by the gastric secretions. His statements, however, not being received in theory or confirmed by facts, and the salt being soluble only to a limited extent, it failed of general application. After Graham had studied the transformations of phosphoric acid and the phosphates, M. Robiquet, of Paris, took up the subject in connection with this salt, and in 1857, read a paper before the Académie des Sciences, in which he showed that citrate of ammonia might be substituted for the soda salt as a solvent, with numerous important advantages, and that a soluble double salt of pyrophosphate of iron and citrate of ammonia might be made to fulfill the two desired indications of being easily assimilated, without decomposition in the stomach, and of being devoid of astringency. It possessed, too, the advantages of being less stimulating than other preparations of iron, and devoid of disagreeable taste. This paper of M. Robiquet attracted much attention, and was referred to a special committee for investigation. This committee reported in 1858, and from their report, published in the *Jour. de Pharm. et de Chémie*, for May, 1858, most of these statements are compiled.

The solution of the double salt, called for brevity, pyrophosphate of iron, is a bright transparent liquid, of a yellowish green color, odorless, but having a very mild and rather pleasant acid saline taste. When mixed with simple syrup, in definite proportion, this forms the *syrupus ferri pyrophosphatis*. And when concentrated by evaporation, and exposed to a gentle heat in thin layers, and dried, it forms a yellowish green salt, in granular or scaly form, very soluble in water, slightly deliquescent, with the pleasant acidulous saline taste of the solution. This is the so called soluble pyrophosphate of iron of Robiquet, but it is very liable to mis-

lead those who apply it in practice by its feebleness, since it commonly contains only about thirty-seven per cent of the iron salt, the remainder being citrate of ammonia and water. The specimen examined by the writer with this result, was from the manufactory of Meniér et Cie, of Paris, and a subsequent examination of a bottle of the syrup which bore the seal of Robiquet, the label of which stated that it contained one per cent of pyrophosphate of iron, only yielded twelve per cent of metallic iron.

From any ordinary dose of such compound little medicinal effect could be expected, and the writer, therefore, agrees with Prof. Procter, of Philadelphia, (see Amer. Jour. Pharm. for Sept., 1857, p. 404,) that a better proportion of the iron salt is desirable; this iron salt to be composed in round numbers of forty-two per cent sesquioxide of iron, and fifty-eight per cent phosphoric acid. In making out the subject from the imperfect data furnished by Robiquet, the writer formed a compound salt, having the following composition:

Anhydrous pyrophosphate of iron,.....	48.8	per cent.
“ citrate of ammonia,.....	34.66	“
Water,	16.54	“
	100.	

This is considered to be a better medicinal salt than that of Robiquet, because it contains a larger proportion of the medicinal element. The dose for tonic purposes is two to five grains, three times a day. It may be given in substance, in solution, or in the form of syrup, and in all forms appears to be acceptable to the most delicate palates and stomachs.

Syrupus Ferri Pyrophosphatis.

This is a solution of the above salt in simple syrup, in the proportion of one grain of the iron salt, or a little more than two grains of the compound salt in each teaspoonful, making that quantity the mean dose.

When, judging from the chemical character and sensible properties of this preparation, and from the statements of the French commission concerning it, that a properly made syrup would be a valuable addition to the materia medica, the writer determined to make it, for trial, he first adopted a slight modification of the formula of Prof. Procter, in the absence of any definite information from M. Robiquet. The result was the production of a dark colored opaque, exceedingly clumsy-looking, inelegant syrup, nearly tasteless, except for the orange-flower flavor. This syrup, after standing for a month or two, gave a scanty sediment, in which neither iron nor phosphorus could be detected. But if exposed to light and air for forty-eight hours, and in very cold weather, it deposited a white sediment containing both iron and phosphorus. This syrup was freely and critically tried by a number of good observers, and was decided to be an efficient, useful preparation, having the following advantages over all other preparations of iron. It does not stimulate the brain or circulation, and does not therefore produce tinnitus, headache, nausea, &c. Nor does it produce constipation, whilst it does not often fail in producing a prompt tonic effect.

Another peculiarity is that when it does not produce the desired tonic effect, it appears to be perfectly inert or harmless, a property not often met with in efficient medicinal substances. From being bland and tasteless it is well borne by the most delicate stomachs, and is easily given to children, and fastidious persons.

The results of its use being considered good, and confirmatory of the reasoning and statements concerning it, the writer then applied himself to study its character more thoroughly, and was not long in finding the cause of imperfection in the dark, clumsy syrup, and in correcting it. The fault was found to lie first in preceipitating the iron salt at too high a temperature, and secondly in the use of an insufficient proportion of the citrate of ammonia as a solvent. The result of these observations was the production of the light green, elegant syrup which has since been used with similar general results. It was found, however, in a very few cases, where there was an excessive susceptibility of the mucous membranes, that the light green syrup produced, or rather reproduced a tendency to diarrhœa. This the writer at once attributed to its probably true cause, namely, the citrate of ammonia in conjunction with the syrup, since the dark syrup had less of this effect. These few cases, and the good results obtained in the first trials appear to have established a preference for, or prejudice in favor of the dark syrup which is only slowly being overcome. The dark syrup must, however, be entirely abandoned in view of its imperfections and want of uniformity as a pharmaceutical preparation; and this is the less to be regretted from the circumstance that in a very large proportion of the cases requiring ferruginous tonics, the slightest laxative effect is most desirable, whilst in the few cases where it is objectionable it may be easily controlled, either by using the salt in substance or simple solution, or by associating either of the preparations with some mild astringent. The new or light syrup has exactly the same ferruginous strength, namely, one grain of the iron salt in each fluid drachm, but in it all flavoring matter is omitted, because even the most delicate flavors become disagreeable from continued use, whilst the faint delicate saline taste of the ammonia salt relieves sufficiently the flat insipidity of the simple syrup. It is incompatible with most vegetable tonics and astringents, although Robiquet makes a contrary statement. It is not, however, incompatible to a degree that would prevent their association in the same case by alternation, or even by admixture, provided the mixture be made at the time of administration.

Liquor Opii Compositus.

To any one who has examined, chemically, the best varieties of the opium of commerce, even no more frequently than the writer has within the last six years, it must appear curious that any degree of uniformity in results can be obtained by the therapeutic use of the drug in substance, or even in powder. In nine critical examinations of the very best classes of this drug, within the time mentioned, no two specimens were found alike, and the extremes of variation in morphia strength, were 5.15 and 11.15 per

cent, making a difference of more than one-half in medicinal power. The writer's observations lead directly to the conclusion that in every case of opium imported into this country from Smyrna, lumps would be found of every strength within these extremes, and that no physical examination of the sensible properties of the drug can possibly discriminate between the strong and the feeble lumps, because not one of these sensible properties of the opium belongs to the alkaloids it may or may not contain. In another place, (for publication in the Amer. Jour. Pharm., for March, 1860,) the writer has entered into the consideration of this subject at large, and would earnestly invite the attention of the profession to the facts and circumstances there given in detail.

The remedy for this great variation in strength of opium that naturally suggests itself, is to rely upon the extracted morphia salts, which may be given in definite quantity. But apart from the variation in morphia salts, as commonly met with, there are certain effects to be obtained from opium, or certain influences avoided, which cause a large proportion of the profession to adhere to its use, or to the use of those preparations which more nearly represent its natural combinations. In almost every country of the world, some such preparation of opium meets with popular professional favor, and is habitually used. In some countries, such preparations occupy legitimate places in the Pharmacopœias, but more frequently they are made by secret or proprietary formulæ, and though liable to all the objections that lie against quack nostrums, they yet come into professional use to supply the wants of practice. Such, for example, are Battley's and Morson's "sedatives," in Great Britain, and "McMunn's Elixir," here. It is not known, however, that in either of these any provision is made to correct the variable strength of the drug; and indeed one, at least, of these is rather remarkable for want of uniformity of effect.

In view of these circumstances chiefly, and by the request of his professional friends, the writer undertook to make a fluid preparation of opium of absolutely uniform composition or strength, within practical limits, which should be free, as far as practicable, from the injurious or disturbing constituents of the drug, and free from the charge of quackery. The experiments made with the preparation in practice, are, perhaps, sufficiently successful to warrant the publication (above alluded to) of the formula and process, and its introduction here as a new remedy, under the title given to it. And if on trial upon a more extensive scale, the favorable results of its application be confirmed and sustained, the writer hopes to see the formula, or some better modification of it, introduced into our national Pharmacopœia.

It is an aqueous solution of the natural morphia salts of opium, depurated by using as solvents, first, cold water, and then alcohol, and by washing the residue with ether before its final solution, and it contains 12.5 per cent of compound spirit of ether, with a view at once to prevent change by keeping, and to favorably modify the effect of the opiate. It contains, by absolute assay, 4 grains of morphia, equal to 5.33 grains of sulphate of

morphia, in each fluid ounce, and is of the same strength as laudanum, provided the laudanum be made by the officinal formula, and from the best powdered opium. About 20 drops of it is equivalent, in anodyne effect, to one-fifth of a grain of good sulphate of morphia, and 20 to 30 drops is equivalent to one grain of the best powdered opium.

In therapeutic application, it is only expected that this preparation will fulfill the purposes of certainty and uniformity in the use of opium, and not that it will either do or avoid what legitimately belongs to a judicious use of the drug in other forms, and in practice thus far it appears to have fully met these anticipations.

When opium, or salts of morphia are given in full doses, they often, perhaps almost always, meet the indication to their use with an overwhelming shock, or concussion, and the rebound or reaction is violent in proportion as the aim and object have been over-reached; and hence, the prostration, headache, nausea, and all that distressing train of symptoms which so commonly follow the free use of these agents. Now any hope of avoiding a reaction, without controlling the initial power, would be as fallacious in medicine as in mechanics, and therefore, if this preparation does not produce these after effects in the same degree as the other forms of the drug, as it appears in practice that it does not, it is probably in consequence of its susceptibility of a uniform control in administration, more than to any mere circumstance of preparation. The combination with Hoffmann's Anodyne has, however, been long and favorably known in its modifying effects upon opiates in general, and this, doubtless, is no less efficient here than it ever has been, though the amount present in this preparation is so guarded as not to contra-indicate its use in cases of active inflammatory disease.

The prominent advantages which appear to belong to this preparation in practice, are that it produces a character of sedative effect, and a kind of sleep, that are more normal, and have less of insensibility and coma about them,—and that, in a majority of cases, no depression or disagreeable effects follow its use; and that the dose is susceptible of a nice adjustment to the requirements of the case to which it is applied. This latter result must follow, from its mode of preparation, because it is made of about double the required strength at first, so as to be outside of all the variations of opium, and this first solution is subjected to careful chemical assay, and upon the results of such assay it is diluted in finishing, until each fluid ounce contains the prescribed four grains of morphia in its natural combination. This assay process is as far as possible reduced to absolute rules and quantities, so that any well educated pharmacist should, with a little practice, be able to perform it with accuracy.

The disadvantages of the preparation in actual practice, as far as yet brought to notice, are first, that in medium doses it sometimes produces tranquility and perfect sedation and repose, but without sleep. An increment of dose however, usually, completes the effect. Secondly, it will not take the place of opium in that class of cases represented by delirium tremens, for although in ordinary sedative, anodyne, effect, 20 or 30 drops appear to

be equivalent to a grain of opium, yet in one or two cases of delirium tremens two grains of opium have succeeded after an hundred drops of this preparation failed. Indeed it appears hardly capable of producing in any moderate quantities, that heavy soporific or narcotic effect of the opium in substance. This unexpected result, if confirmed by farther experience, will be an anomalous fact, and new in the therapeutic history of the drug.

Potassæ Permanganas.

Permanganate of potassa is prepared by heating together peroxide of manganese, hydrate of potassa, and chlorate of potassa in definite proportions, exposing the dried residue to a red heat, dissolving the soluble portions in water, decanting the clear solution from the residue, and evaporating it until crystals begin to form. The crystals are washed and then dried upon porous tiles.

It is in the form of dark-purple or reddish-purple needle shaped crystals, odorless, but of a rough sweetish taste, and soluble in 16 parts of water, forming a beautiful purpleish-red solution, rose-colored when diluted.

This is a difficult and expensive salt to make in consequence of the small proportionate yield from the materials, of the difficulty of getting basins to stand the evaporations, and from the necessity of excluding every form of organic matter from the process. These circumstances must stand in the way of its ever coming into general use for many purposes to which it would otherwise be well adapted.

The cheaper article commonly sold as permanganate of potassa, and which has repeatedly disappointed physicians who supposed they were using the proper salt, is in dark-green, amorphous lumps, and forms a green or purplish-green solution. This is a crude and variable mixture of manganate and permanganate of potassa, containing a large excess of caustic potassa. It is thoroughly and entirely unfit for medicinal use or for local application, and is even unfit for common disinfecting purposes, in consequence of the caustic potassa it contains.

The crystalized salt only should be used, and the solutions made from it should not be filtered, but decanted off from the residue, because all contact with organic matter decomposes the salt. Its action, both as an escharotic and disinfectant, depend upon its great oxidizing power, as it parts with two equivalents of its oxygen instantly on contact with oxidizable substances.

As an escharotic it is used in powder, sprinkled upon the parts, and it is said to produce less pain than other escharotics, while it is equally effective, and possesses the collateral property of disinfecting and deodorizing the parts and excretions. It is, however, chiefly as a stimulant deodorizing lotion or injection that it is used with greatest effect. It keeps down exuberant granulations, and controls or destroys morbid growths with promptitude, and is susceptible, by varying the strength of the solution, of a wide range of effect in this direction, whilst its application, in however dilute solutions, serves to cleanse and deodorize the foulest ulcers. It is

said to be peculiarly applicable to those cases of cancerous disease, especially of the uterus, which often become almost insupportable from the fœtor of the discharges. By the use of a solution of twenty grains to the pint of water, applied by injection or wash, the offensive discharges are soon changed, and the comfort of patients and attendants very materially improved. From a proportion of twenty or ten grains to the ounce of distilled water, when a slight escharotic or prompt stimulant effect is desired, down to twenty or even ten grains to the pint as a disinfectant, it appears to have been used with much advantage. It has also been used, but chiefly upon hypothetical grounds, and without success, internally in diabetes, by Mr. Sampson, of London. See Pharm. Journ. and Trans., July, 1853, p. 18.

As an external remedy, it appears to have been first brought prominently to the notice of the profession by Dr. G. F. Girdwood, of London, in a paper published in the *Lancet* of September, 1857, p. 269. An abridgement of this paper may be found in Braithwait's *Retros.*, part xxxvi, p. 261, and in the *U. S. Dispensatory*, 11th ed., p. 1447. Other more extended notices are published in the *Lancet* of 1858, p. 33, and in the *Pacific Med. and Surg. Journal*, 1858, p. 331.

Sodæ Chloras.

Chlorate of soda, for medicinal purposes, is made by decomposing chlorate of potassa by means of bitartrate of soda, and evaporating the resulting solution to the point of chrySTALLIZATION. The chrySTALS are granulated and dried, and kept in well closed bottles.

As commercial chlorate of potassa is very impure, this salt, when made from it, is apt to be slightly contaminated with chloride of sodium, and nitrate of soda. But these, and the traces of bitartrate of potassa in it, are present in so much smaller proportion than in the common chlorate of potassa, that they may almost be disregarded.

It is in the form of granular crystals of a tetrahedral form, odorless, but with a fresh pungent taste. It is very slightly deliquescent, and is soluble in three parts of water.

It has been proposed and successfully used as a substitute for chlorate of potassa, in almost, if not quite, all the cases in which that salt is indicated, with the advantages of being far more soluble, and therefore susceptible of being used in stronger solution, of being less disagreeable in taste, and of being free from impurities. It is used in the same manner, and same doses as the potassa salt, but requires only one fourth of the water for its solution. See *Lancet*, June, 1858, p. 595.

In closing these cursory notices of some of the prominent new remedies, the writer would ask the earnest attention of the Society for a few moments, to the collateral subject of old remedies in a new dress.

It has become somewhat fashionable among physicians of late, and it is believed that the custom is steadily increasing, of prescribing dragées, granules, or sugar coated pills, and also fluid extracts which are either im-

ported, or manufactured extensively, as special articles of trade, by uneducated persons. It is probable that this variety of medicine, made easy, is coming into general use, because the convenience of it to the physician and patient has led both to overlook its real character and importance, since it is in one prominent respect, at least, upon] the same basis with homœopathy and other quackeries. If the physician will give to it the thought and consideration that it really deserves, he will hardly fail to arrive at the conclusion that it is emphatically a step in the wrong direction, since it not only removes the responsibility from the dispensing pharmacist entirely, but completely dissipates it in the atmosphere of commercial trade and competition, thus removing still other classes of important remedies from beyond the reach and control of the physician, and placing in the stead of these, a set of preparations that are beyond the easy reach of any method of testing beyond that of their therapeutic application. This branch of business, fostered, as yet, only to a limited extent by professional and popular favor, has grown into such commercial importance that already four or five large domestic manufactories enter for competition, and advertise their pretensions to excel the articles of foreign origin; whilst attractive advertisements, setting forth the alleged advantages and standard character of each, are to be seen on the covers of most of the prominent journals. If it was possible to have faith in the truth of all that might be said in advertisements, and in the skill and capacity of uneducated workmen, or women and children who are employed upon these chemical and pharmaceutical preparations, then there might be some safety in this system of medical confectionary. But taking the tendency of competition in trade as we find it, in connection with the condition of the market in regard to medicinal substances generally, the only safe rule for the profession to adopt, is that of contracting the compass of responsibility within the narrowest possible limits. Hence the writer would suggest, as a rule for practising physicians, to send their prescriptions only to such pharmacists as make their own pills and fluid extracts, with known ability, and that they urge upon such pharmacists, as a basis for their reliance and support, that all articles to which reliable tests cannot be applied, should be made, and not purchased. In pursuing such a course, and supporting pharmacists in charging liberal prices for articles of their own making, physicians would do much to elevate the character of that science and art of pharmacy, upon which they are day by day becoming more dependent, through neglect to cultivate or keep it up as an important branch of knowledge, indispensable to their own profession.

By the opposite course of fostering a system of cheap and easy wholesale medication, they debase the character of pharmacy to the level of common trade, because the pharmacist must have less access to the interior of his commercial pills and extracts than the bookseller has to the books he sells, while the responsibility for the character or quality of the contents is about the same in both cases. This, too, is apart from any consideration of fitting patients' stomachs upon this ready made method applied to medicine. It is doubtful whether laws consistent with the spirit of our

system of government can be enacted that will limit or control any branch of trade, and therefore the professions of medicine and pharmacy must rely upon their joint moral influence to protect and defend the neutral ground upon which their true interests are blended; and the more completely they harmonize in their naturally close association, and the more determined activity they exhibit in support of every well matured step in liberal advancement, the more will their common standard be elevated, and the better will be their defences against the subtle influences and covert inroads of all these various forms of quackery.

Notwithstanding the success of quacks and their nostrums, both in and outside of both professions, it must be evident upon due reflection, that a large mass of the educated people of all countries have a firm reliance upon the legitimate practice of medicine. This reliance being always based upon correct reasoning to tangible results, it follows that every well directed, well sustained effort to protect the agencies which enter so largely into these results, must tend to extend the boundaries of this confidence in the only permanent and effective manner.

The first part of the paper is devoted to a general
 introduction of the subject, and to a statement of the
 objects of the present investigation. It is then shown
 that the problem is equivalent to the solution of a
 certain partial differential equation, and that this
 equation can be reduced to a system of ordinary
 differential equations. The solution of these
 equations is then obtained, and the final result is
 expressed in the form of a series. The convergence
 of this series is then proved, and the result is
 compared with the results of other authors.

