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On Some Points of Chemical Theory, on the Ammonia- and Ammonium-Bases, and on the National Pharmacopoeia; being Extracts from the Introductory Lecture, delivered before the Class of Jefferson Medical College, of Philadelphia, October 14, 1858.

Franklin Bache, MD

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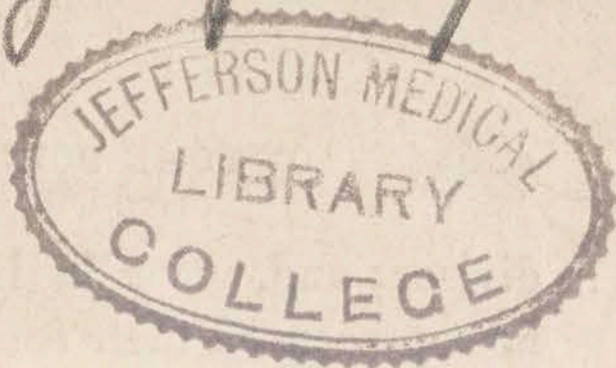
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VERTICAL FILE

Jefferson Medical College opening address, 1858



Bache

THE
AMERICAN JOURNAL OF PHARMACY.

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SEPTEMBER, 1860.  
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ON SOME POINTS OF CHEMICAL THEORY, ON THE AMMONIA-
AND AMMONIUM-BASES, AND ON THE NATIONAL PHARMA-
COPŒIA; being Extracts from the Introductory Lecture, delivered
before the Class of Jefferson Medical College, of Philadelphia, October
14, 1858. BY FRANKLIN BACHE, M. D., Professor of Chemistry in the
College.

It is well known that the ponderable elements have fixed combining weights, called their equivalents, which form a chain of ratios, representing the proportion in which they unite with one another. This fixedness of the combining ratios by no means implies that they shall be necessarily represented by whole numbers. In order that they may be whole numbers, their relation must be such, that they may be all divided by the same number without a remainder. Prout contended at an early period, that the combining numbers were divisible in this way; in other words, that they might be divided by some number forming the common divisor of them all. The number which he selected for the common divisor was the combining number of hydrogen, which he fixed at one. Accordingly, he said that his common divisor, one, was contained in the combining number of hydrogen once, in the combining number of carbon, six times, in the combining number of oxygen, eight times, in the combining number of nitrogen, fourteen times, and so forth. Berzelius, to the last moment of his life, rejected the law of Prout, that the combining numbers are exactly divisible by a common

divisor; and, accordingly, in the cases of the elements just named, he represented their combining weights by the average numbers, deduced from his best analyses; even though the numbers obtained varied from a whole number by an amount so small as not to exceed the inevitable error of the best conducted analysis. At a comparatively recent period, Dumas undertook a research for the express purpose of determining whether the law of Prout was well-founded, at least so far as those elements are concerned which have a small combining weight; and the result of his examination has been, that, setting out with the hydrogen standard unit, carbon may be represented by 6, oxygen by 8, and nitrogen by 14, without any appreciable error. The proof of the accuracy of these numbers is so convincing, that, at the present day, the whole chemical world adopts them. The next important step in this investigation relates to the combining weight of chlorine. A number of skilful chemists have labored to determine its combining weight; as it is the hinge on which a great many analyses turn. It was found to be between 35 and 36, and for many years, 35.42 was adopted as a close approximation to the truth. These investigations, therefore, militated against Prout's law, as he enunciated it; for 35 and a fraction is not an exact multiple of 1. The investigation of the number for chlorine has been lately resumed by Dumas and other distinguished chemists, who have settled down in the belief that 35.5 is its correct combining weight. Prout's law, as laid down by him, constituted one case only under the general law, that all the combining numbers are divisible by the same number without a remainder. The case, adopted by Prout under the general law, was to make the divisor equal to the hydrogen combining weight, which, consequently, contained the divisor once. But the verity of the general law did not depend upon its being true in this particular case; but its truth depended upon this; namely, whether there could be found any number which would be contained in all the combining numbers, an exact number of times without a remainder. Let us see, then, whether the adoption of the number, 35.5 for chlorine, militates against the general law, as we have given it. To decide this question, let us select five-tenths as the common divisor. Thus, five-tenths are contained in 1, the hydrogen number, twice; in

6, the carbon number, twelve times; in 8, the oxygen number, sixteen times; in 14, the nitrogen number, twenty-eight times; and in 35.5, the chlorine number, seventy-one times. In this way it is shown, that the adoption of 35.5 as the number for chlorine, is not inconsistent with the general law of exact multiples; though it does not permit of the selection of unity, that is, the equivalent of hydrogen, for the common divisor.

If we suppose that the final result of the investigation, now in progress, shall be to prove that the common divisor of all the equivalents is a number, equal to half the equivalent of hydrogen, the question still remains to be answered, what hypothesis shall we adopt to explain this curious relation of the equivalent numbers? The most plausible one is that the common divisor represents the equivalent of an unknown element, which would, therefore, have an equivalent weight, half that of hydrogen. Dumas throws out this conjecture, and broaches the hypothesis that all the so-called elements may possibly be formed of one kind of matter; the unknown element being the parent matter, out of which all the other elements are formed, by its addition to itself, condensed to a greater or less degree. This hypothesis of the essential identity of all matter, appears to me to be extremely improbable.

It is now more than thirty years, since a German mineralogist called my attention to the fact, first observed, I believe, by the German chemists, that several cases existed, where three elements, having similar properties, formed a triad, and possessed equivalents, so peculiarly related, that, if the largest and smallest were added together, and divided by 2, the quotient would be the intermediate equivalent. This curious relation of the equivalents of allied elements was at first thought to be fortuitous, and likely to disappear when the numbers were more correctly determined. The progress of science, however, has not realized this surmise; but, on the contrary, rather gives support to the alleged relation. Dumas has recently taken up this subject, and has brought forward so many cases in support of the relation, that it may be considered almost as a law. Thus 16, added to 64, the equivalents of sulphur and tellurium, gives 80, the half of which, namely 40, is the equivalent of selenium. Again, 20 and 68, the equivalents of calcium and barium, added together,

make 88, and this number, divided by 2, gives 44, the equivalent of strontium. Once more, 7 and 39, the equivalents of lithium and potassium, added together, make 46, which number, when halved, gives 23, the equivalent of sodium. Chlorine, bromine and iodine are three elements, connected by the closest affinities. Here, according to Dumas, we have the equivalents, 35.5 for chlorine, 80 for bromine, and 127 for iodine. Let us see whether these numbers support the law. They certainly do not, very exactly; for, to confirm the law, the equivalent of bromine should be 81.25, instead of 80. Nevertheless, the departure from conformity to the law is not very great; and, when we reflect how nice a problem it is to obtain the equivalents of bromine and iodine exactly, from the difficulty of purifying these elements, we may be permitted to suppose, that new determinations may possibly alter the equivalents, 80 and 127, for bromine and iodine; although Dumas states that he obtained these numbers after the most careful experiments.

Before leaving this subject, I will mention a kindred one; namely, that two equivalents have, sometimes, the simple relation to one another of one to one, or of one to two. Thus, manganese and chromium have, according to Dumas, the same equivalent number (26), and we all know that the equivalent of sulphur is exactly double that of oxygen.

Perhaps I have occupied too much space with these curious speculations respecting the equivalent numbers. Hypotheses, however, are not without their use, and, if they lead us to interrogate nature by experiment, are often productive of fruit. Theories are more useful than hypotheses, because they embrace an extended generalization of facts, or supposed facts; still, they are liable to be changed with the progress of our knowledge. "A theory in chemistry," as Gregory has very happily expressed it, "is nothing more than such a view as groups together the largest number of facts at a given time; and has no pretensions to absolute truth, nor to be more than a guide to the inquirer, and an aid to his memory."

One of the most important sets of compounds, known to the chemist, is the series of homologous carbohydrates, each containing a progressively increasing amount of carbon, represented, in equivalents, by the even numbers, 2, 4, 6, 8, &c., up to 60;

with but few chasms in the series, and these are filling up gradually by new discoveries. In these compounds the hydrogen uniformly exceeds the carbon, in number of equivalents, by one equivalent; and, consequently, is represented by equivalents, which gradually rise by the odd numbers, 3, 5, 7, 9, &c., up to 61. These carbohydrogens are *positive radicals*, each of which has a protoxide, that is, an ether; and also a hydrated protoxide, that is, an alcohol. Take from each of these positive radicals, two equivalents of hydrogen, which makes the hydrogen fall below the carbon, in number of equivalents, by one equivalent, and they are converted into *negative radicals*, each of which has a derived acid, all of similar constitution, being uniformly hydrated teroxides. Of the positive radicals, the first five in the series, namely, methyl, ethyl, propyl, butyl and amyl, are the most deserving of study; because they form a key to the knowledge of the principal ethers and alcohols.

In order to introduce to your notice the important doctrine of chemical substitution, which has been so fertile of new discoveries, I must remind you of the composition of the compounds of nitrogen and hydrogen. Ammonium is a compound radical, which consists of one equivalent of nitrogen and four of hydrogen. Withdraw the hydrogen gradually, one equivalent at a time, and you have, first ammonia, then amide, and, finally, imide; the latter being a compound of single equivalents of nitrogen and hydrogen. It is only lately that imide has been recognised under a distinct name. It is now many years since I pointed out in my lectures, that such a compound exists in hydrocyanic acid, associated with carbon, and mentioned how important it would be, for the elucidation of the laws of combination, to obtain it in a separate state; since it is composed of single equivalents of nitrogen and hydrogen. This compound, though now named, has not, indeed, been isolated, but may be transferred to different substances, so as to form various combinations.

Now, ammonia is a fertile source of substitution-compounds. It may have one, two, or all of its equivalents of hydrogen replaced by certain compound radicals, which fit, as it were, the place previously occupied by the hydrogen. We have, when one equivalent of hydrogen is replaced, amide bases; when two equivalents are replaced, imide bases; when three are replaced, that

is, all the hydrogen, nitryl bases. Of the ammonia there is left, in the first case, amide; in the second case, imide; in the third, nitrogen alone. Hence the names of these three classes of bases. The compounds which come in by substitution, are, principally, the five positive radicals, methyl, ethyl, propyl, butyl and amyl, already mentioned. The names of all the bases, thus formed, end with the syllables, "amine," as an abbreviation of the word, ammonia. Suppose one equivalent of methyl to be substituted for one equivalent of the hydrogen of ammonia; the amide base, thus formed, is called methylamine. In a similar way the names, ethylamine, propylamine, butylamine, amylamine, &c., are formed. The imide bases are more complicated; for here two equivalents of hydrogen undergo replacement, which may be done by two equivalents of the same radical, or by one equivalent of two different radicals. Finally, the nitryl bases are formed from ammonia by the replacement of all three of the equivalents of hydrogen; and here the replacing radicals may be all alike or all different, or two alike and the third different. From this sketch it must be evident, that these substitution-bases, derived from ammonia, are very numerous, and, at the same time, difficult to name.

Ammonium is considered by many chemists to be a compound metal. It was so considered by Berzelius; and hence he gave a metal termination to its name. Now, ammonium is the type of a set of bases, called ammonium-bases, which are even more interesting than the ammonia-bases. Thus, some of the nitryl bases are capable of uniting with one equivalent of a radical, additional to the three equivalents of radicals, already present by substitution. These four equivalents of radicals are, of course, united with one equivalent of nitrogen; and, hence, the compound is supposed to assimilate in constitution to ammonium, which is composed of four equivalents of hydrogen and one equivalent of nitrogen. For example, suppose triethylamine, which is a nitryl base containing three equivalents of ethyl, to unite with one additional equivalent of ethyl—not by substitution, for there is nothing for it to replace, but by what may be called annexation—and we get the ammonium-base, consisting of one equivalent of nitrogen and four equivalents of ethyl, called tetrethylammonium. Now, when it is considered that

the four eqs. of hydrogen in ammonium may undergo a quasi-displacement by four eqs. of radicals, all of them the same or all different, or partly the same and partly different, it is easy to understand that the ammonium-bases, if all discovered, would be very numerous. Already a large number of them have been obtained, chiefly through the labors of Hofmann. What is most singular in regard to these bases is, that, when converted into hydrated protoxides, they form compounds analogous to the hydrated protoxides of potassium and sodium, that is, to caustic potassa and soda; for, they have a caustic taste, saponify oils, and are capable of neutralizing acids. They have the bitterness of quinia, and it is not improbable that they may hereafter prove to be valuable remedies.

Organic chemistry, or the chemistry of the compounds, produced, for the most part, under the influence of the vital force, forms the most interesting, and, at the same time, difficult department of the science. The compounds known are very numerous, and but imperfectly understood; and the number of possible combinations is almost infinite. The great problem of modern chemistry to be solved, is to determine to what extent it may be possible to produce, artificially, the products of vital action. The production of the animal base, urea, by Wöhler, was the first example of an organic product, artificially formed, if we except oxalic and hydrocyanic acids. Two other bases of animal origin, namely, glycocin or sugar of gelatin, and kreatinin, have been artificially produced; and more recently, a number of vegetable organic bases have been formed by art. The discovery of these artificial bases is a step in the right direction, and well fitted to throw light on the nature of the natural bases, as to the manner in which these are built up under the influence of the vital force. The usual processes of the chemist have the effect of reducing more complex to less complex molecules; but, in order to succeed in producing the natural bases, his mode of proceeding must be reversed. He must build up more complex molecules from those that are less so, and thus imitate nature. This has been done in the formation of the bases, furfurine and amarine; and is there not room to hope, that the time will come when we shall be able to produce quinia and morphia artificially? Indeed, the attempt

has already been made by Hofmann to form quinia from quinoline, a principle found in coal-tar. Quinoline is a volatile oily base, which is likewise obtained from quinia and the other alkalies of Peruvian bark, as also from strychnia, when these substances are severally heated with caustic potassa. Here we have a case of transformation under the influence of potassa, which consists in reducing a complex molecule to a more simple one; but the converse reaction, which would imply the power of converting quinoline into quinia, &c., is quite a different thing, and much more difficult to accomplish. The recent researches of Wöhler, Blyth and Anderson have shown that narcotin, acted on by the deutoxide of manganese and sulphuric acid, is susceptible of numerous transformations, which throw a valuable light on the true constitution of the natural organic alkalies. Methylamine has been found among the products of the decomposition of morphia, codeia and caffen, and probably forms a constituent of these substances. By the action of nitric acid, brucia yields several products, among which is methyl, a fact which renders it probable that this radical pre-exists in it. These and similar facts lead to the conclusion, that chemists are on the eve of discovering a method of producing artificially some of the natural organic alkalies.

Should our hopes, in this respect, be disappointed, still it is highly probable that the artificial organic alkalies, the number of which is rapidly increasing by new discoveries, will furnish the physician with some valuable remedies. Already furfurine, in the form of nitrate, has been used as an antiperiodic. It is bitter, like quinia, and approaches, in composition, to several of the natural organic alkalies. For its discovery we are indebted to Fownes. Amarine, another artificial alkali, would probably prove an active remedy, and deserves a fair trial.

Within a recent period, the chemist has presented us with several principles, extracted from plants, which have proved to be more or less febrifuge. In proof of this it is only necessary to call attention to salicin, phloridzin, and picrolichenin, all of which, upon trial, have been found to be efficacious in arresting fever. At this time, particularly, this class of vegetable principles deserves to be studied in relation to their therapeutic applications; as a well-founded fear is entertained that the

cinchona trees of South America are in danger of being wholly exhausted.

When we consider the numerous contributions, made by chemistry to medicine, in the form of some of our most valuable remedies; and when we reflect that the future is as likely to be prolific in chemical discoveries as the past, we cannot fail to perceive, that to no science can the physician or pharmacist direct his attention with a greater prospect of enriching the healing art than to chemistry. The medical applications of the science are far from being all known. Chemical substances may yet be discovered, which shall rival, as therapeutic agents, ether and chloroform. The practical application of ether, as a means of abolishing pain, is exclusively an American discovery; and the subsequent use of chloroform for the same purpose, is only making a second, but far less important step in the same direction. Ether is a safe anæsthetic, and it is claimed that chloroform, *when properly used*, is safe also. Gregory has asserted, that, in Edinburgh, where chloroform has been employed in more, perhaps, than 100,000 cases, no instance of death has occurred from its use; and he attributed the fatal cases that have taken place elsewhere, either to the use of impure chloroform, to the unfitness of the cases in which it was employed, or, finally, to the administration of an over-dose. The question of the comparative merits of ether and chloroform as anæsthetics is a practical one, and must be decided in favor of ether; for, while safety requires that certain precautions shall be observed in giving chloroform, the neglect of these is attended with little or no danger in administering ether.

Chemistry has thrown an important light on certain dietetic articles, which are used by all civilized nations, and, after having been once adopted by them, have never been known to be laid aside. I allude to coffee and tea, and to the Paraguay tea and guarana of South America. The instinct of the human stomach, it would seem, leads different nations to adopt these substances as a drink; they being valued for their invigorating and refreshing qualities. The most enlightened nations employ, for the most part, coffee and tea; and, if our best writers were willing to own it, they would acknowledge their obligations, for much of their inspiration, to these beverages. Now, all these substances contain the same essential principle, namely, caf-

fein; although the substances themselves are derived from plants, belonging to four distinct botanical families. Chocolate furnishes another drink, employed like coffee and tea. This substance, it is true, is devoid of caffein; but it contains theobromin, a principle closely allied to caffein.

A few remarks will now be made on the beautiful chemical relations which subsist between plants and animals. The vital processes of vegetation are uniformly those of deoxidation, and the liberation of oxygen; while those occurring in animals are the reverse, or oxidation. The vital processes in plants consist in building up complex molecules, by means, for the most part, of deoxidation; the same processes in animals are characterized by the reduction of complex molecules to more simple ones, effected by oxidation. If plants alone existed, the oxygen of the atmosphere would be increased and its carbonic acid diminished, and plants would perish for want of carbon. If animals alone existed, the oxygen of the atmosphere would be diminished, and its carbonic acid increased, until at last it would become unfit to support animal life. By this wonderful compensation, effected by the vital action of plants and animals, the atmosphere is kept unchanged in composition; and, while plants give out oxygen, animals consume it, converting it into carbonic acid, which in turn furnishes part of the food of plants; they appropriating the carbon, and giving out the oxygen, to be returned once more to the atmosphere.

Organic chemistry is an extremely important study for the medical man. The chemical examination of plants throws much light on the vegetable materia medica, and is often rewarded by the discovery of the essential principles of our medicines, on which their activity depends. The analysis of animal parts and products, both healthy and diseased, furnishes information, highly important in the diagnosis and treatment of disease. What would have been the present state of pathology, let me ask, had the physician been deprived of analyses of the blood and urine? It will not be saying too much to assert, in view of the analytic precision attained at the present day, that the chemical study of the animal secretions will, for the future, form the surest means of advancing practical medicine.

The labors of physiological chemists have pretty well settled

the general principle, that the material by which our bodies are sustained, may be conveniently arranged under the heads of blood-producing food, and food which is principally consumed, during the process of respiration, in generating animal heat. The blood-producing food, consisting chiefly of albumen, fibrin and casein, contains nitrogen; while the heat-producing food is devoid of that element. Very complicated formulæ are assigned to the blood-producing principles, giving, according to some authorities, more than one hundred equivalents to two of their elements, namely, carbon and hydrogen. Such formulæ cannot be supported by analysis with any show of probability. Nevertheless, there are chemists, who take these improbable formulæ as proved; and venture to trace the transformations which the blood-producing principles of the food undergo, during their conversion into blood. Thus, they say, that casein, with a certain proportion of water, may yield blood-albumen and chondrin, the latter being the principle of cartilage; and, again, that two equivalents of albumen and two of water are equal to one equivalent of blood-fibrin, one equivalent of choleic acid, and one equivalent of gelatin. The equations here given are true equations, on the assumption that the composition of the substances concerned is correctly represented; but this assumption is wholly gratuitous. Admitting, however, that the analyses are correct, can it be believed that equations like these represent the truth of nature? These chemists, drawing on their fancy, do not hesitate to make any transformation that may suit their theoretic views. If they have too much oxygen to suit their views, oxygen is alleged to be given off; if there is present too much of both oxygen and hydrogen, then water is formed; and, if carbon is redundant, they do not hesitate to say that the portion in excess is removed, in the form of carbonic acid, by the oxygen of the air! This scientific facility reminds me of an anecdote which is related of one of our commissioners of patents, who was in office about the beginning of the present century. He was a man of general information, but had no pretensions to a knowledge of science; and to him, in his own opinion, every thing was easy to accomplish. Being simple-minded and credulous, he was easily imposed upon. A wag applied to him for a patent for making boards out of sawdust. Oh! my friend, said the commissioner,

that art has long been known, and is very easy. But, said the applicant, I fear, sir, you do not exactly understand my purpose. My invention consists in making *pine* boards out of *oak* sawdust. Oh! is that it, rejoined the commissioner; but that is very easy also, for you have only to add a little turpentine!

Our National Pharmacopœia was first published in 1820, under the authority of a Medical Convention, which met in Washington in that year. The credit of originating this work belongs to the late Dr. Lyman Spalding, of the State of New York. Agreeably to the recommendation of the first Convention, the work has been revised, by similar authority, at intervals of ten years; namely, in 1830, '40, and '50. It fell to my lot to assist in all these revisions; and it is natural that I should feel a deep interest in the approaching revision, which is to take place in 1860.* Before the appearance of our national standard in 1820, we were embarrassed by the conflicting authority of the three British Pharmacopœias, emanating severally from the Colleges of Physicians of London, Edinburgh and Dublin; and even since its appearance, we have still felt the disadvantage of the conflicting formulæ and nomenclature of these authoritative works. From an early period, British practitioners admitted the evil of having three Pharmacopœia standards; but how to remedy it was the great difficulty. If the British Colleges of Physicians could have agreed upon a common standard, the evil would have been removed; but their views were too conflicting, and all their attempts to construct a British Pharmacopœia proved fruitless. It is now more than twenty years since I received a letter from that distinguished chemist, the late Dr. Edward Turner, of London, in which he alluded to this subject, and gave it as his opinion, that no hopes can be entertained that the British Colleges will ever lay aside their local preferences, and agree upon one national standard; and that nothing but the strong arm of Parliament could effect that desirable object. In my Introductory of 1854, I made some remarks on the intimate connection between American and British Pharmacology; and,

* Dr. Bache is chairman of the committee, now engaged in the fourth revision of the U. S. Pharmacopœia, under the authority of the National Convention which met for that purpose, in May last, in Washington City.—ED. AM. JOUR. PH.

after having spoken of the advantages which would flow from the adoption of a single Pharmacopœia for the British Empire, I endeavored to show that the only way to reach the evil was the one pointed out by Dr. Turner. Wishing to make known these views to the reading public, I had the part of my lecture relating to them published in this Journal, for January, 1855; and, subsequently, I was gratified to find that the extract was copied into the Pharmaceutical Journal, of London, for March of the same year. I have entered into these details, in order to convey to you the gratifying intelligence, that the British Parliament, after repeated failures for more than a quarter of a century, has at last passed a bill, the object of which, as stated in the preamble, "is to enable persons, requiring medical aid, to distinguish qualified from unqualified practitioners." The powers conferred by the bill are vested in a "General Council of Medical Education and Registration," consisting of eighteen members; twelve appointed by twelve medical corporations in England, Scotland, and Ireland, one by each, and six by the government. Among the powers conferred on the General Council, is that of publishing a single Pharmacopœia for the British Empire. The words of the act conferring this power are as follows: "The General Council shall cause to be published under their direction, a book containing a list of medicines and compounds, and the manner of preparing them, together with true weights and measures by which they are to be prepared, and containing such other matter and things, relating thereto, as the General Council shall think fit, to be called 'British Pharmacopœia'; and the General Council shall cause to be altered, amended, and republished such Pharmacopœia as often as they shall deem it necessary."

This is certainly an important step in medical progress, and one that intimately concerns all the apothecaries and medical practitioners throughout the world who speak and write the English language. Let us cherish the hope that the British work will be issued before the completion of the revision of our National Pharmacopœia, which is again to be published in 1860; so that we may avail ourselves of the labors of our British brethren.

August 28, 1860.

IODIDE OF PROPYLAMINE.

BY BENJAMIN J. CREW.

While the base Propylamine and its chloride are being investigated medicinally in this country, in order to verify or disprove the accounts received from Europe in relation to their asserted remedial powers in the cure of rheumatism, it occurred to the writer that a combination, of this new remedy with iodine, in the form of an *Iodide of Propylamine* might possess some valuable medicinal properties in the same disease in which iodine either simply or in some of its combinations has been long employed especially, in chronic cases attended with nodular swelling. Propylamine combines readily with the aid of a gentle heat with iodine, and forms a colorless solution, in which the characteristic odor of each of these substances can be perceived. It may be prepared by adding iodine to a convenient quantity of Propylamine in a glass flask over a sand bath as long as the iodine is taken up; a deep red solution is first formed, which as the combination is effected becomes gradually colorless; in case of an excess of iodine, a small addition of Propylamine will speedily take it up. Its odor, as before observed, is a combination; in taste it is saline, resembling closely iodide of potassium, and behaves with reagents like this salt, giving the usual characteristic precipitates with acetate of lead, nitrate of silver, &c. It is decomposed by acids, liberating free iodine, which colors the solution red; with concentrated oil of vitriol the violet vapors of iodine are evolved and crystallize on the sides of the test tube. It is alkaline to test paper, but upon exposure, it changes and gives an acid reaction. I have not been able to procure the crystals in any appreciable quantity, as upon concentration the Propylamine is volatilized, and the solution becomes red from free iodine.

Not having seen any account of this preparation, it may be proper to suggest a formula for its employment, should it be deemed worthy of examination and trial; and being in a liquid form, a formula similar to one published some time since in this Journal for the use of Propylamine is proposed.

R. Iodide of Propylamine,	25 drops.
Peppermint Water,	6 f.oz.
Sugar,	2 dr.

Dose.—A tablespoonful every two hours.

In this form the patient would receive the $\frac{1}{16}$ gr. of Iodine at a dose.

Philadelphia, 7th month, 1860.

NOTE ON FLUID EXTRACT OF WILD CHERRY BARK.

BY WILLIAM PROCTER, JR.

The recipe for this preparation, published at page 108, vol. 28th, (1856,) has been received with such general favor that it may be looked upon as an established formula, and probably is, in substance, the one to be adopted in the revised edition of the United States Pharmacopœia. In a paper on fluid extracts read before the American Pharmaceutical Association, last year, and published in the November (1859) number of this Journal, I included a process for this fluid extract of double the original strength, so as to be in the proportion of an ounce to the fluid ounce in accordance with the general strength adopted in that paper;—but at the same time it was doubted whether the bark could be properly extracted and condensed in so small a bulk without the loss of a portion of its valuable qualities. As the strength of eight ounces to the pint gives the dose a teaspoonful, the Committee of the College of Physicians of Philadelphia adopted the formula as originally proposed, in preference to the stronger preparation.

The object of this note is to offer a few hints in regard to the details of the process, which have been suggested by considerable practical experience with the manipulations required.

Wild cherry bark contains amygdalin, a bitter principle not yet isolated, tannic acid, resin and fixed oil, besides other less important matters. It is desirable to get all the amygdalin and the bitter principle and a part of the tannic acid in the fluid extract, whilst the remainder of the tannic acid and all of the resin and fixed oil should be excluded. In order to render these comments intelligible to the reader who may not have the volume for 1856 at hand, I will recapitulate an outline of the

formula, with the quantities altered for a gallon of the fluid extract.

Take of Wild Cherry Bark (*Cerasus serotina*) 64 ounces Troy.
Sweet almonds, 8 " "
Granulated Sugar, (pure), 96 " "
Alcohol (U. S. P.,)
Water, each a sufficient quantity.

Macerate the bark (powdered and passed through a No. 60 seive) moistened with two pints of alcohol, for two hours, pack it firmly in a cylindrical percolater, and gradually pour on alcohol until twelve pints have slowly passed. If the powder has not been carefully prepared as directed, the passage of the liquid must be regulated by a cork or stop cock. The tincture is then poured in a still, and ten pints of alcohol drawn over by distillation, the residue is evaporated to a syrupy consistence, and, while hot, mixed with two pints of cold water. Separate the resinous and oily matter which precipitates, and evaporate the liquid again till all traces of alcohol are removed. The almonds, without blanching, are now to be thoroughly beaten, with a little water, until reduced to a smooth paste. (This part of the operation is most effectually performed in an iron mortar with a flat-faced pestle.) They are then rubbed down with sufficient water to make the emulsion measure four pints, without straining it. This is then incorporated with the syrupy extract of the bark in a bottle, securely closed, and agitated from time to time for twenty-four hours, at least, and unless the weather is very warm forty-eight hours will be better, as on prolonged contact of the almonds with the amygdalin of the bark, depends the development of the hydrocyanic acid and volatile oil. The liquor is now thrown on a cloth, rapidly and forcibly expressed, to remove the solid residue, which is reserved, and the liquor filtered through paper into a gallon bottle containing sugar. If the liquid, thus obtained, is not sufficient to dissolve the sugar by agitation and make the measure of a gallon, pour water on the dregs in the cloth, express and filter until sufficient liquid is obtained to make that measure, and strain. The most annoying part of this process is frequently experienced in the extreme slowness with which the liquid passes the filter (owing to the fixed oil and fine particles of the almond paste,) and the conse-