

tint as when first prepared. It now shows no change and appears in perfect condition.

No. 5.—Formula of the U. S. P., with the addition of 0.05 percent of Citric Acid. On December 18th, this sample was of a very light green color, and preservation appears to have been perfect. It now shows no further change.

No. 6.—Formula of the U. S. P., with the addition of 0.1 percent of Citric Acid. On December 18th, this sample had retained its original pale green color and at this time preservation appears to have been perfect.

Conclusions:—If Syrup of Iron Iodide is carefully made, with the proper amount of sugar, no preservative whatever is needed. However, to overcome the careless manipulation on the part of some druggists, it has been deemed advisable to add a preservative. Hypophosphorous Acid has the advantage of a reducing value which is not possessed by the organic acids suggested for this purpose. It has, however, the disadvantage that, in the strength directed, it will act upon sugar in strong solutions and darken the syrup. This could be overcome by substituting Glycerin for a portion of the Sugar directed in the formula.

DONT'S IN PHARMACY.*

OTTO RAUBENHEIMER, PHAR. D.

From the experience, and quite especially from the mistakes and failures, of others we can always learn. This also holds good in Pharmacy and is my excuse for this paper.

These "Don'ts in Pharmacy" are taken at random from my lectures in the Department of Pharmacy of the University of New Jersey, and have been highly appreciated by my students. No doubt some of these "Don'ts" will be helpful, even to some members of a State Pharmaceutical Association.

In the opinion of the author it is quite as essential,—equally important,—to know how *not* to do it as it is to know how to do it. Let the following maxim be the motto of every pharmacist:

"Do it well and do it right!"

In the presentation of the present paper, the author has made an attempt to classify the "Don'ts" as follows:— General, Chemicals, Galenicals, Strength of Preparations, Dispensing, and the Prescription Department.

General.—First of all, don't hide your copies of the U. S. P., N. F., Dispensatories and other standard pharmaceutical works, but keep them in a prominent place so that you can readily consult them. A druggist who cannot lay his hands on the Pharmacopœia is like a minister who cannot find his Bible.

Don't get along without a pharmaceutical library, but collect and select the standard works on pharmacy, chemistry, materia medica, pharmacognosy, etc., which serve as reference books in the daily practice of the pharmacist. As a

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rule, the library, or the non-existent library, of the average druggist, is a disgrace to pharmacy.

Don't fail to subscribe for, and to diligently read, at least a few pharmaceutical journals, in order to keep posted on the progress of pharmacy.

Don't neglect to become a member and an active member of your local pharmaceutical society, your state pharmaceutical association and also such national organizations as the A. Ph. A. and N. A. R. D.

Don't take an apprentice and neglect to instruct him properly in pharmaceutical *technique* and practice.

Don't forget to send this apprentice to a good college of pharmacy, where he will receive a proper education in the theory and practice of pharmacy by competent teachers.

Crude Drugs.—Don't neglect to place occasionally a little chloroform on a pledget of cotton within the containers of such vegetable and animal drugs, as are prone to be infected with insects, such as Lovage Root, Raspberries, Huckleberries, Linseed, Burdock Root, Ergot, Cantharides, etc.

Don't dispense, or utilize for galenical preparations, the following, when more than one year old: Ergot, Aspidium.

Don't neglect to separate and to reject the seeds from Coloynth, before using this drug in a preparation, because the seeds are inert and they contain fat or oil which are objectionable in pharmaceutical preparations.

Don't use the entire peel of Sweet Orange, but only the outer thin rind (the so-called "Flavedo"), which is rich in oil-cells and free from tannin or bitter principles.

Don't dispense the following drugs and preparations, except when properly aged, as directed by U. S. P. or N. F.:— Cascara (1 year), Frangula (1 year), Tincture of Ferric Chloride (3 months), Tinctura Ferri Chloridi Aetherea, N. F., (first after being decolorized and then placed in the dark to assume a golden yellow color).

Chemicals.—Don't use technical chemicals for medicinal purposes, as they do *not* comply with the U. S. P. standards and very frequently contain inert, in fact, poisonous substances.

Don't keep chemicals which readily absorb moisture in a damp place. Examples are too numerous to mention and include all hygroscopic and deliquescent chemicals. I might call attention to *one* in particular which is frequently kept in cellars and which consequently spoils, namely, Chlorinated Lime.

Don't expose certain chemicals to the action of direct lights. By such exposure Phenol and Resorcinol becomes pink or even red; Alkaloids are discolored; Iodides, especially Ammonium Iodid, liberate free Iodine; Silver Salts, Calomel and many other chemicals darken, owing to the formation of oxide; Santonin turns yellow; Naphthalene and Beta-naphthol become discolored; Sulphurous Acid is oxidized to Sulphuric Acid; Chlorine and Bromine Water form Hydrochloric or Hydrobromine Acid, respectively; Ferric Salts will be reduced to Ferrous Salts, and Mercuric Salts to Mercurous Salts; Compound Syrup of Hypophosphites become decolorized; and volatile oils become terebinthinate.

Among the other chemicals affected by light are Benzoic Acid and Benzoates,

Salicylic Acid and Salicylates, Hydriodic, Hydrobromic, Hydrocyanic, Nitrohydrochloric and Trichloroacetic Acids, Amyl Nitrite and others Nitrites, Chloroform, Bromoform and Iodoform, and many others.

Don't expose *Ferric* Salts and their preparations to the light, but keep them in dark amber-colored bottles.

Don't keep *Ferrous* Salts and their preparations in the dark, but expose them to the light, for instance, Syrup of Ferrous Iodide.

Don't expose the following to the action of the air, as they readily absorb CO_2 : Lead Acetate and Solution of Lead Sub-acetate; Ammonium Carbonate (forming Bi-carbonate); Calcium Oxide, Lime Water, and Magnesium Oxide, light or heavy.

Don't expose volatile chemicals, liquids or solids, as they will evaporate or lose strength.

Don't expose chemicals which effloresce to the action of dry air. In this list all crystallized salts are included.

Don't dispense the following chemical and pharmaceutical preparations, except when recently prepared: Diluted Nitro-hydrochloric Acid, Sulphurous Acid, Chlorine Water or Compound Solution of Chlorine, Creosote Water, Infusion of Digitalis, Solutions of Magnesium Citrate, of Ammonium Acetate, of Iron and Ammonium Acetate, of Potassium Citrate, of Sodium Citrate, Chalk Mixture and Compound Iron Mixture.

Don't neglect to have on hand the two (2) solutions, ready to be mixed, to form the Arsenical Antidote of the U. S. P. This should most certainly be done in every well-regulated pharmacy, as many a life might be saved, especially during the summer when poison fly paper is extensively used.

Galenicals.—Don't permit Medicated Waters to freeze, as it will destroy their aroma. This is especially true of imported Triple Orange Flower and Rose Water, which are frequently purchased in original 10 liter demijohns. It is for this reason that U. S. P. IX will include a caution notice *not* to allow Medicated waters to freeze.

Don't expose bottles of Hydrogen Peroxide to direct sunlight, as is frequently done in window-displays by druggists and other store keepers. No matter how attractive this window display may be, the H_2O_2 will gradually turn into H_2O , which can be obtained much cheaper from the hydrant or faucet.

Don't prepare Liquor Calcis by mixing together a pail of hydrant-water and a lump of ordinary mason's lime by means of a broom handle, but use the very explicit U. S. P. process, employing Calcium Oxide and Distilled Water.

Don't filter Lime Water, as filter paper will absorb, or more properly adsorb, part of the lime, and, also, because some of the calcium hydroxide will be converted into calcium carbonate by exposure to air. Lime Water should be syphoned or decanted as directed by Pharmacopœia.

Don't give away Lime Water, or any other cheap galenical preparation! Make these preparations according to U. S. P. or N. F., and charge for them!

Don't cheapen any medicines by giving them away!

Don't use Fluidextract of Belladonna *Leaves* in the preparation of Linimentum Belladonnæ, but use Fluidextract of Belladonna Root, which contains 0.4 percent

of mydriatic alkaloids, while the U. S. P. standard for Belladonna Leaves is only 0.3 percent and very likely the *unofficial* fluidextract contains the same percentage of alkaloids, if not less. I am informed by manufacturing chemists that they sell five gallons of *unofficial* Fluidextract of Belladonna *Leaves* to one pound of the official Fluidextract of Belladonna *Root*. This, very likely, accounts for the fact that a great many pharmacists in New York State had to pay a penalty for shortage in the alkaloidal-percentage of Belladonna Liniment.

Don't keep Sweet Spirit of Nitre in a quart shelf-bottle about one-quarter full, as is frequently done in ordinary drug stores, but *do* keep it, as correctly ordered by U. S. P., in small, dark, amber-colored vials in a cool place, remote from flame or fire. The author is in the habit of storing this product in four-ounce glass-stoppered amber bottles.

Don't use *gray* filter paper, as it contains impurities and frequently traces of iron. Use *white* filter paper which is a pure article, even if it costs a *few cents* extra *per 100 sheets*.

Don't use *powdered* Asafetida to make Emulsion or Milk of Asafetida, but employ *selected tears*, which are free from inert substances.

Don't forget that Elixir Iron, Quinine and Strychnine Phosphates contains the salts as *phosphates* and about 1/60 grain of Quinine Alkaloid to one fluidram, while Elixir Iron, Quinine and Strychnine, N. F., contains the Iron as Citrochloride, the Quinine as Hydro-chloride, and the Strychnine as Sulphate, the latter in the proportion of 1/100 grain to one fluidram.

Don't employ *Precipitated* Chalk when *Prepared* Chalk is ordered, because the latter possesses the decided advantages of being an amorphous powder which is more adhesive.

Don't store powdered or ground white or black mustard, or mustard-plasters in a damp place, as they will rapidly lose strength.

Don't keep Compound Licorice Powder and other compound powders in the cellar, as they absorb moisture and deteriorate.

Don't dispense Cerates and Ointments when rancid, because they are very irritating.

Don't neglect to keep Syrups, Mucilages, Honeys, in fact all preparations which are liable to turn sour, in a cool place, preferably in a refrigerator.

Don't dispense Biologic Products, Ferments and other limited preparations after expiration of date, as much injury to the health of the patients may result from the use of such preparations.

Strength of Preparations.—Don't forget that, according to the Brussels Protocol, an International Agreement was signed by which all potent tinctures are 10 percent in strength, and all arsenical preparations are 1 percent in strength, and that the U. S. P. VII was the first Pharmacopœia to adopt these new standards.

Don't forget that Pearson's Solution of Sodium Arsenate, N. F., contains only one-tenth the amount of Sodium Arsenate as the U. S. P. Liquor Sodii Arsenatis.

Don't forget that, according to this International Agreement, Diluted Hydrocyanic Acid contains 2 percent of HCN, and Cherry Laurel Water 1 per mille. HCN.

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- (2) Method of concentration: We start with one or more molecular solutions and obtain the colloid by chemical reaction. Colloidal silver, gold, barium sulphate, etc.

In using these methods, we obtain at times particles of different sizes; we remove the coarse ones by filtration and the molecular ones by dialysis.

Most metals have been obtained in colloidal solutions, either in water or in organic solvents, such as alcohol, pentane, ethyl-ether or iso-butyl alcohol. Even the radio-active elements, or their salts, have recently (see *Kolloid Zeitschrift*, Feb., 1914) been prepared in this condition.

The Properties of Colloids. (1) Mechanical properties. They exhibit Brownian movement when observed under the ultra-microscope. This is a dancing, trembling movement discovered by the English botanist Brown in 1827. The motion is back and forth from a fixed central point. Smaller particles move faster than large ones, particles larger than $3-5\mu$ in diameter do not show the motion any more. There are several theories for the cause of this motion; one is that the gravity of the particles is only partially overcome by the viscosity of the medium, that the particles fall or rise until the viscosity of the medium overcomes the gravity and the particles are pushed back again. In coarser suspensions, the gravity overcomes the viscosity and a separation takes place, viz., cream, in which the particles of butterfat are $2-10\mu$ in diameter.

(2) Diffusion: Colloids have been found to diffuse. They differ in this respect from crystalloids only in the rapidity of diffusion.

(3) Osmotic Pressure. The osmotic pressure of colloidal solutions is, as a rule, very slight; some have none at all.

(4) Gravity: The density of colloidal solutions cannot be calculated from the density of the dispersoid and that of the medium. Dispersoids show, as a rule, a volume contraction and the density increases with increasing dispersion.

J. Rose determined the following figures for gold:

Gold, melted and pressed.....	19.33
Gold, by oxalic acid.....	19.49
Gold, by FeSO ₄ —finest powder.....	19.55-20.71

(5) Optical properties: Most colloidal solutions appear to be clear and transparent when viewed with the naked eye. Often, a turbidity, fluorescence or opalescence can be noticed, especially in reflected light. A ray of strong light sent through a solution of this kind, will show the "Tyndall phenomenon," viz., the light is repeatedly reflected and polarized. The ultra-microscope is constructed so that all rays, except those reflected from the suspended particles, are excluded. We see the "halo," so to say, of the particles. The color of the colloidal solution varies with the degree of dispersion. System Liquid-liquid most often appears whitish to pale yellow. Gold "sols" may be violet, red, blue, green, orange. The intensity of the color is measured by the amount of white which must be added to get a certain tint.

(6) Electric Properties: The disperse-phase is charged either positively or negatively.

Positive charge have: Metal hydroxides, silicic acid and certain dyes like methylene blue.

Negative charge have: Metals and their sulfides, dyes like indigo, eosin, fuchsin, also starch, mastic and acacia.

Filter paper in water becomes negatively charged—a substance, therefore, which does not ascend the filter paper by capillarity, is positive in charge, viz., it coagulates on the paper.

The kind of charge is usually stated for water, for it may be different in other solvents; for example, it is the opposite charge from that in oil of turpentine. Graphite in oil is positive, in water it is negative. Addition of certain substances may reverse the electric charge; albumin becomes negative by addition of an alkali; it becomes positive on addition of an acid. In passing the electric current through a colloidal solution, the particles travel either to the anode or cathode, according to their charge. This is Electro-osmosis or Kataphoresis. Colloidal solutions conduct electricity considerably less than dissociated solutions. The addition of a so-called "protective colloid," such as albumose, acacia, etc., imparts to the dispersoid the charge of the protective colloid. So, collargol, lysargin and other colloidal preparations carry the charge of the protective colloid used.

(7) Jellification: Under this head we distinguish (a) setting, and (b) swelling.

The setting or jellifying of colloidal solutions is due to changes in the internal dispersion and in hydration. Setting takes place upon warming and consequent concentration, or upon the addition of electrolytes. The amount of the latter must exceed certain minimal values and amounts, which differ greatly with the nature of colloid as well as electrolyte. Hydrophilous colloids increase their volume on being brought in contact with water—they swell. This swelling may go on to such an extent that the particles of the substance are torn apart and a colloidal solution results, or it may reach a certain limit and then stop. The setting and swelling of colloids is a very important phenomenon. Every substance or organ has a certain definite swelling-value, which may counter-balance or even overcome osmotic pressure. The force of swelling is often very great. Ostwald states that swelling peas lifted the cover of an iron pot which had been weighted down with 83.5 Kg. The swelling-pressure of starch has been found to be equal to a pressure of 2523 atmospheres. The old Egyptians drove wooden sticks into stones and poured water in them. The swelling of the wood broke the stones, which were used for building purposes. The curling of gelatine-films is due to a swelling, also the straightening or curling of hair in dry or moist air respectively. Interesting work has been done on the structure of jellies. When we dissolve a small amount of gelatine in a mixture of alcohol and water and allow to cool slowly, we note under the microscope, that small semi-liquid drops separate and, as their number increases, they adhere to one another and finally form a net-like structure. By varying the amount of the gelatine, we get slightly different results, but we find that jellies are sponge-like colloidal structures filled with colloidal solution.

Salts, or acids, or bases—in short, electrolytes, have great influence upon swelling.

Acids and alkalis increase swelling, as do many neutral salts. Gelatine swells more in the presence of Magnesium Citrate than in water alone. Calcium Chloride, Hydrochloric Acid and Sodium Hydroxide increase the swelling ca-

capacity very considerably. The cause for this must be sought in the chemical nature of these hydrophilous colloids. They are probably amphoteric, that is they have weak acid and alkali reaction at the same time. By an addition of acid or bases, they form more or less ionized salts, which in turn cause a hydration, or a taking up of water, with subsequent increase in volume. R. Chiari, in Vienna, found that he could distinguish between distilled water and ordinary water, by means of the degree of swelling of purified globulin, which he found to be very sensitive to electrolytes.

(8) Coagulation: When we boil a solution of albumin, or add Ammonium Sulphate, we coagulate the albumen. Coagulation is an electrical phenomenon conditioned by colloids of different electric charge or by electrolytes. The amount of electrolytes must, however, exceed certain minimum values.

Gold or platinum "hydrosols" can be coagulated by Ferric or Aluminum hydroxide "hydrosols," provided the amounts added are such as to exactly neutralize the electric charge of each other. A 1/10,000 percent solution of gelatine will coagulate a mastic emulsion; if more is added the gelatine will act as a protective colloid.

(9) Pectization is the gradual resolution of substances into the colloid condition; for example, when we treat silver or mercurous iodide with solutions of potassium iodide of different strengths, we will get a colloidal solution. Szillard, of Paris, has made a large number of interesting experiments in which he tried to prove that inorganic substances can act like albumens.

(10) Adsorption: We are all familiar with the property of charcoal to condense large volumes of gases, or to take coloring matter out of solutions; the various silicates, like fuller's earth, kaolin, etc., can be used for the same purpose. Gelatine and isinglass can also be used for clarification or decoloration. The analyst knows that the concentration of certain salts (viz., lead), is reduced upon filtration through paper. These phenomena are classed as adsorption phenomena and are due like many other properties of colloids to their tremendously large surface development. A cubic centimetre of a substance reduced to colloidal dispersion has a total surface of 600 square metres and the surface forces of the colloids are, therefore, very pronounced. Adsorption is caused by a decrease in the surface tension of the solvent conditioned by the dispersed substance, or a third substance added. Quincke showed that a substance which causes a decrease in surface tension of a colloidal solution, has a tendency to travel to the dispersoid phase and form a sort of covering around it.

Fats, fatty acids, albumen and its decomposition-products, decrease the surface tension of water very considerably and are also readily adsorbed. It appears that adsorption is a physical phenomenon and that no chemical process plays any part. Ostwald, to emphasize this, has termed it "Mechanical absorption."

(11) Reactions in jellies: When we allow chemical reactions to take place in jellies, we find that the reaction-product separates out in ring forms, which rings appear in periods. A gelatine "gel" containing potassium dichromate, with a solution of silver nitrate on top of it, will slowly show the yellow rings of silver chromate. Such rings are called "Liesegang's rings" after the scientist who investigated them most thoroughly.

On reviewing what I have told you so far about the preparation and properties of colloids, I find that I have omitted much that is important and exceedingly interesting, but I must hurry. I hope, however, that another opportunity will present itself to take some one certain phase of colloid-chemistry and go into it more thoroughly. Time does not permit me to tell you anything about the methods of colloid research. Most of them are directed, of course, by the properties of colloids. Splendid and very promising results have been obtained by the method of ultra-filtration devised by Bechold. In fact, colloid chemistry has opened a field of research which is tremendously large.

There is no science in which colloid chemistry does not enter in some way or other, and as a system of knowledge it is of the utmost importance. Each of us here is a fine example of a heterogeneous polyphasic colloid system; so is the chair on which you sit, the nails which hold the pieces of wood together and the glue which lends stability. You arise in the morning—the linen of your bedding, the feathers of your pillows are colloids, you proceed to bathe and use soap—again a colloidal process. You have your breakfast which consists of colloids; digestion sets in—again a colloidal process; the cigar you smoke and the smoke you exhale are colloidal systems—and so on and on. To still more emphasize the importance of colloids, I beg leave to say a few words about their uses in the various arts and sciences.

Cookery and Foods: The kitchen is a great colloidal-chemical laboratory. Meat of young animals is richer in juice and of softer tissue than that of older animals. This depends upon the swelling value of the tissues, which value changes with the age. Meat, on boiling, loses 20-30 percent of its weight of water—no doubt a dehydration of a colloid. On frying meat, a heat coagulation prevents the loss of juice. Artificial foods are now classed according to their content of carbohydrates and nitrogen. The colloid chemist will classify them according to their swelling value, upon which depends primarily the degree to which a food can be readily absorbed. Milk will be examined as to its surface tension and viscosity, which show abnormal fat and protein contents. Addition of water is detected by coagulation with calcium chloride and the refractometer; the amount of milk sugar is estimated by the polariscope after removal of the milk colloids with colloidal ferric hydroxide. Cheese is albumen colloiddally dissolved in milk; the determination of the swelling-values of the different cheeses will, no doubt, solve the question of their digestibility. Bread and beer are colloidal preparations which are now being investigated. The taste of beer depends on its viscosity, due to colloids, and its electrolytes. The brewing water used, seems to have considerable influence upon the taste.

Mineralogy: Most precious stones owe their colors to minute quantities of a colloid substance, viz., in topaz? sapphire we have colloidal cobalt oxide, in ruby, chromium oxide. The opal is a "gel."

Metals: Steel is a system: Iron-Carbon-Iron Carbide. Tungsten filaments were made by pressing tungsten together with dextrin or syrup through small openings into wire form. The filament was then subjected to high heat to carbonize the organic material. Kuzel has improved this method by preparing a "tungsten-gel" by alternate action of acid and alkali upon finely powdered

tungsten. This is pressed into filaments and gives splendid results in the Tungsten lamp.

Dyeing and tanning are purely colloidal processes and our knowledge of these most important subjects has been considerably enriched by colloid chemistry.

The setting of cement is a colloidal process; pottery and porcelain ware are colloidal substances.

Photo-chemistry has made tremendous progress since Luppö-Cramer, of Dresden, has applied colloid chemical methods to its research.

Cellulose and its preparations are colloids: Parchment paper swells in presence of acid, mercerized silk in sodium hydroxide. A solution of cellulose in copper-ammonia solvent, is a colloidal solution. Rubber is a colloidal system. Vulcanization is an adsorption of sulphur by rubber.

To come nearer home: Enzyme-action is a colloidal process, so are the various immunity reactions, the Wassermann reaction, for example.

The urine, the blood, as well as all other body fluids are colloidal solutions.

Martin H. Fischer, of Cincinnati, has made very interesting experiments on the cause of œdema and finds that all swellings of parts of the body are due to abnormal acid production, which is again a colloidal phenomenon. He also finds that nephritis is caused by abnormal productions of lactic acid, which causes the kidney tissues to become soft and the appearance of albumen in the urine. The application of colloid-chemical methods has proved most fruitful in explaining the causes of many physiological phenomena, viz., muscle contraction, ossification, formation of gall-stones, disturbances of circulation, etc. Under the heading, "Importance of Colloids to Pharmacy," we must consider first of all the remedies which are colloidal and are supplied by the pharmacist. The first one of these was Ung. Cr  d  , which appeared in the market in 1896, and from then on, and especially in the last few years, colloidal remedies have been put forth, one after another, so that to-day we have a very large number of them, and with them has come a voluminous literature of their own. French physicians and pharmacists are especially prolific, and a French firm now puts on the market the following:

Electrargol	Colloidal silver stabilized
Electraur��l	" gold "
Electroplatinol	" platinum "
Electropalladiol	" palladium "
Electrocuprol	" copper "
Electroselenium	" selenium "
Electromartiol	" iron "

They are also investigating, at the present time, the physiological activities of

Electrotellurol.....	Tellurium	Also, Thallium Cadmium Lead Aluminum Oxides of heavy metals and ferrocyanides, etc., all in the colloidal state
" indiol.....	Indium	
" uraniol.....	Uranium	
" vanadiol....	Vanadium	
" manganese..	Manganese	
" cobalt.....	Cobalt	
" nickel.....	Nickel	

The larger pharmaceutical manufacturers of England, Germany and the United States have also taken up the manufacture of such preparations. Names like

Collargol, Lysargin, Protargol, etc., are familiar to us. Collargol is prepared by reducing silver nitrite with ferrous citrate in the presence of dextrin, which acts as a stabilizer. Lysargin contains metallic silver protected by the sodium salt of lysalbinic acid. As to the action of these preparations, we may say in general that they have the same physiological activity as their salts would have in diluted solution, viz., colloidal silver is used as an antiseptic, colloidal iron is recommended for the different forms of anæmia. One of the prominent features of their activity is a certain catalytic action which they exert. Palladium colloid, for example, is now used for obesity. It seems to stimulate the oxidation processes of the body and it has been found that intravenous injection of this colloidal metal is followed by a considerable loss in weight. No bad side-effects whatsoever have been reported.

Considering next the time-honored remedies prepared by the pharmacist, I believe that I do not overstate matters when I say that fully 80 percent of all of our pharmaceutical preparations are colloidal. Our gums, resins, and many alkaloids will form colloidal solution by simply mixing with a solvent. We use gelatine, gum acacia, tragacanth, etc., to stabilize preparations. Emulsions, most liniments, our collodions are colloidal preparations. All of our fluidextracts, most of our tinctures and syrups, as well as glycerites, are colloidal preparations.

I will cite specific cases, which show that the pharmacist has made and is making daily use of colloid chemistry.

You prepare Peppermint Water by rubbing up the oil with purified talcum—you increase the surface of the oil so that it may be dissolved in the water—this is a colloidal solution—a colloidal-chemical process has been made use of. You make an emulsion by shaking up in a dry bottle some oil of turpentine with tragacanth and then add water and again shaking. This is colloid-chemistry—the system, oil-water, is stabilized by the tragacanth, which is adsorbed at the boundary lines of the two liquids and thereby forms a covering around the globule of oil. The stability of an emulsion is directly proportional to the dispersion of the oil. You prepare liniment of ammonia. The ammonium oleate formed, decreases the tension of the cotton seed oil toward the water and is, therefore, absorbed at the boundary line of the system, oil-water. You prepare vinegar of squills and boil it—the coagulation of the albumin is a colloidal process. We add alkalis to fluidextracts of senega and taraxacum, to prevent pectization. We know that alcohol or salts in certain amounts, will crack emulsions; this is due to the dehydration of the colloid and subsequent coagulation. We distinguish between solution of ferric sulphate and Monsel's solution, by addition of sulphuric acid—this is a colloid-chemical test. Monsel's solution is a colloidal solution which is coagulated by the electrolyte H_2SO_4 .

Cold cream is a colloid-system water-fat. The water, the dispersed phase, is dissolved in the fat. We know that only such substances as are soluble in fat, are absorbed by the skin, and the principal action of cold cream depends upon its water contents.

Ferric hydroxide is used as arsenic-antidote because it adsorbes arsenous acid.

And so I could go on and on and recite to you manipulation after manipulation, test after test, used by pharmacists and belonging strictly to the field of colloid-chemistry.

What a field of research lies here before us! The scientific pharmacy of the future will be in a position to determine in advance what the action of certain remedies will be or, how certain remedies must be modified, to exert certain actions, or to make them more stable and presentable. Professor Thoms, of the University of Berlin, in a lecture delivered before the German Pharmaceutical Association, pleaded for more active participation of the pharmacists in researches of biologic standardization. Without wishing to detract one iota from his arguments, I want to call to your attention that in colloid-chemistry there is a field of research for the pharmacist which is not alone of interest and value, but also full of promise of reward.

The lecturer carried out the following experiments to illustrate his remarks:

Preparation of colloidal gold and of colloidal silver by the electric spark under water.

Preparation of colloidal gold and silver in different colors by chemical means.

The Tyndall phenomenon in gold "sols," in cigar smoke and other colloidal systems.

Different forms of dialysers—sausage—thimble—filters—parchment—colloidion, etc.

A number of Liesegang's rings and LeDuc's figures.

Preparation of coagulated colloidal Ferric Hydroxide.

Preparation of gelatinous Barium Sulphate, gelatinous charcoal, etc.

LIQUID PETROLEUM OR "RUSSIAN MINERAL OIL."*

Petroleum has been in use as a medicine from time immemorial. It was known to Herodotus 400 years before Christ and is mentioned by Plutarch, Dioscorides, Pliny and other early writers. It was extensively used by the Arabians and evidently played an important part in the practice of medicine in India, being known to the Bengalese as "Muthe Katel." The raw product was the substance used in earlier times and differed much in character and composition, as obtained from different sources.

As an internal remedy it was early employed in chronic pulmonary affections, in obstinate skin diseases, in rheumatism, and for the expelling of tapeworms. It was extensively used for these several purposes in France under the name "Oleum Gabianum" and in North America as "Seneka oil." The internal use of the refined product may be traced to a patent granted to Robert A. Chesebrough of New York, in June, 1872, for the manufacture of a "new and useful product from petroleum, named vaseline." This name was originally applied only to a semi-solid preparation, but later a liquid products known as liquid vaseline was marketed and for a time exploited as a cure for coughs, colds, consumption and a number of other diseases and conditions.

The liquid petrolatum has since become known under a variety of names, proprietary and otherwise, in addition to being used as a substitute or an adulter-

*From the Journal of the A. M. A., May 30, 1914.