### Photo-Prints from Tracings.

The most important of all photographic tracing methods is the cyanotype of Pellet, a process depending upon the reduction of an organic ferric salt to the condition of a ferrous salt by the action of light; and so far it is analogous to the platinotype. Ferric compounds react with ferrocyanide of potassium to form Prussian blue, while ferrous compounds form a white salt with the same reagent. If the prepared paper of Pellet were introduced into the ferrocyanide developer without exposure, it would become blue all over, in consequence of the uniform deposition of Prussian blue; but should any part have been sufficiently exposed to the light, the paper will remain white, owing to the complete reduction of the ferric salt to the condition of the ferrous salt. It will be thus obvious that the Pellet process will therefore reproduce a positive as a positive, and a negative as a negative, this circumstance giving it an especial value for copying tracings or drawings by direct contact printing.

The paper for the Pellet method is supplied commercially by the patentees of the process; but it is convenient for those who wish to practice it experimentally to be able to prepare their own; and the following directions will be found amply sufficient:

A solution is made of

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| Common salt | 3 parts. |
| Perchloride of iron | 8 " |
| Tartaric acid | 4 " |

in 100 parts of water, and this mixture is thickened by stirring in 25 parts of powdered gum arabic. The paper should be a well-sized and rolled paper, that known as cream laid note paper being the most suitable. It is easy to obtain this paper in the original sheets from a wholesale stationer.

The sheet to be coated must be laid on a drawing board, and it is desirable to fasten it down by means of two pins, after which the mixture is applied as evenly as possible with a broad camel's hair brush. This operation should be performed in a subdued light, and it is desirable to dry the paper as quickly as practicable, in order that the sensitive coating may remain as much as possible upon the surface of the paper. When quite dry, the paper may be stored away for future use.

The tracings from which copies are to be taken should consist of well defined opaque lines upon a ground of clean tracing paper or tracing cloth, and many prefer to use India ink into which a little gamboge has been rubbed. It is unnecessary for us to say anything with respect to the kind of printing frames suitable for the process; but it may be mentioned that large frames on swing stands are required in establishments where the cyanotype process is carried on commercially, as the drawings to be copied are often as much as four feet long.

In sunlight an exposure of one or two minutes is generally sufficient, and in dull weather it may be necessary to give as long an exposure as one hour. Electric light is often used for work of this character, the time of exposure varying, according to the intensity of the light, from twenty minutes to half an hour. To develop, the print is transferred *direct from the copying frame* to a saturated solution of ferrocyanide of potassium, but it is not immersed in this, being merely floated upon its face downward. In order to prevent the developing solution reaching the back of the paper, it is usual to fold back the edges so that the paper forms a kind of dish, and this dish floats boat fashion upon the developer. In ordinary cases, the development is complete in less than a minute; and as soon as the paper is once thoroughly wetted on the face, it may be lifted off the bath, as the solution adhering to the face will complete the development. A blue coloration of the ground indicates an insufficient exposure, while weakness of the lines indicates over-exposure.

The development being complete, the print is floated, face downward, upon clean water, and in about two minutes it is plunged into an acid bath containing 8 parts of hydrochloric acid and 3 parts of sulphuric acid, with 100 parts of water. From six to eight minutes is sufficient time to allow for the removal of redundant iron compounds by the acid, and all that is now required is to thoroughly wash the print with water and to dry it. Any blue spots may be readily removed from the finished print by means of a dilute solution of caustic potash, applied with a camel's hair brush; 1 part of potash dissolved in 28 parts of water answers the purpose admirably.

When cyanotype prints are to be used in the workshop as a guide to working engineers, it is an excellent plan to saturate them with white hard varnish, as this prevents the penetration of oil and the adhesion of dirt.—*Photo. News.*

### Currier's Soap for Brown Upper Leather.

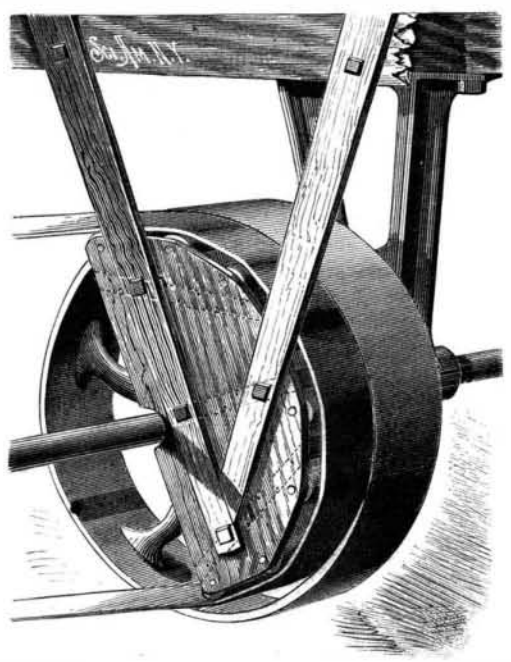
A good soap for currier's use on upper leather, says the *Gerberzeitung*, can be made as follows:

In twenty pounds of soft water dissolve two pounds of white curd soap, half a pound of pure beef tallow, half a pound of light resin, two pounds of glycerine, and half a pint of light train oil or vaseline. The soap is cut in small strips to make it dissolve quickly, and put in half of the water and set over a gentle fire. As soon as the soap is dissolved add the tallow, and when it all begins to boil put in the resin. The latter is added slowly with constant stirring. After boiling rapidly for a while the mass is put into a stone crock and the glycerine stirred in, after this the train oil or vaseline, and finally the remainder of the water.

This soap is applied lukewarm, slightly dried, and then polished with glass.

### BELT HOLDER.

The belt holder herewith illustrated consists of a series of rollers revolving on iron axle bolts whose ends are supported in a strong frame. The rollers form a curved line identical with the face of the pulley on the line shaft, beside which the holder is placed, so that the belt can be thrown, either by hand or by some of the ordinary shifting devices, from the pulley on to the holder and back again at will. By means of braces it is supported parallel with and close to the pulley, but does not touch either the shaft or pulley. It is firmly secured to the braces, by bolts passing through both the sides and the interior stays. The lowest roller is placed inside the pulley circle, so that when the belt is on the holder it is strained less than when on the pulley. It can be used in any position, care being taken to so place it beside the pulley that the highest roller shall be at the point on the pulley where the belt first touches it when running up on it, and the other rollers shall be level with the face of the pulley. Since the belt is stationary while on the holder, it is



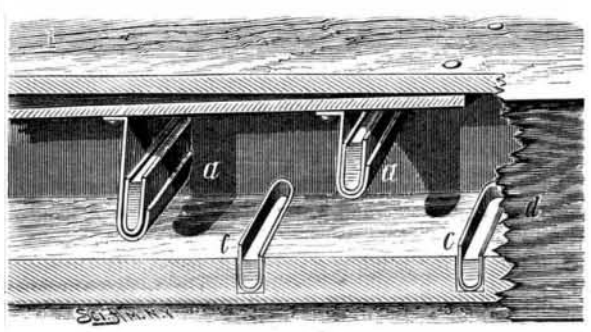
IMPROVED BELT HOLDER.

subjected to no strain or wear; the pulleys and boxes are relieved, there being no strain upon the shaft and its bearings; the belt is in a convenient position for lacing; the work of throwing off and on is simplified, as the belt is in nearly the same position as when at work.

These holders are now being manufactured by Messrs. W. R. Santley & Co., of Wellington, Ohio.

### GOLD SEPARATOR.

The invention recently patented by Messrs. H. C. Walker and William Bacon, of Silver Cliff, Colorado, is intended to be applied to a sluiceway through which water and sand pass, and consists in a series of troughs set in the bottom of the sluiceway alternately with similar troughs suspended from the top. The troughs are made of silver-plated sheet copper, the strips of metal being bent lengthwise into a U-shape, one edge being higher than the other, as shown in the engraving. These troughs are set in grooves formed transversely in the bottom of the sluice, parallel with each other and a proper distance apart, so as to be at right angles to the current. The top of the sluice box is, preferably,




IMPROVED GOLD SEPARATOR.

made double, with a hinged under portion that conforms itself to the volume of water passing through. To the top are secured hangers which are bent upward at their lower ends to receive the troughs. By this arrangement the current of sand and water passing through the box, which may be the ordinary sluiceway for the tailings in mining operations, is forced to come alternately in contact with the upper and lower troughs and the fine metal is brought intimately in contact with the mercury in the troughs. A portion of the side or bottom of the sluice is made removable in order that the troughs may be removed from time to time and filled with fresh mercury. In the absence of water, dry sand can be forced through the box.

### Lupinosis.

C. Arnold has extracted from lupius a shining brown solid matter, of a pleasant aromatic odor and taste. In water it dissolves slowly, forming a turbid solution. In doses of ten grammes it produces the usual symptoms of lupinosis, especially acute jaundice.

### How Canes are Made.

Comparatively few understand how and where the material is gathered, or the process of its manufacture into canes and umbrella handles. The Chicago *Times* furnishes some information on these points. According to that paper, many of the canes are of imported woods, some from the tropics, China, and the East Indies. The celebrated Whongee canes are from China, where they are well known and celebrated for the regularity of their joints, which are the points from which the leaves are given off, and the stems of a species of phyllosiachys, a gigantic grass, closely allied to the bamboo. The orange and lemon are highly prized and are imported chiefly from the West Indies, and perfect specimens command enormous prices. The orange stick is known by its beautiful green bark, with fine white longitudinal markings, and the lemon by the symmetry of its proportions and both prominence and regularity of its knots.

Myrtle sticks possess also a value, since their appearance is so peculiar that their owner would seldom fail to recognize them. They are imported from Algeria. The rajah stick is an importation. It is the stem of a palm, and a species of calamus. It is grown in Borneo, and takes its name from the fact that the rajah will not allow any to go out of the country unless a heavy duty is paid. These canes, known as palm canes, are distinguished by an angular and more or less flat appearance. Their color is brownish, spotted, and they are quite straight, with neither knob nor curl. They are the petioles of leaf stalks of the date palm. Perhaps the most celebrated of the foreign canes are the Malacca, being the stems of the Calamus sceptonum, a slender climbing palm, and not growing about Malacca, as the name would seem to indicate, but imported from Stak, on the opposite coast of Sumatra. Other foreign canes are of ebony, rosewood, partridge, or hairwood, and cactus, which, when the pith is cut out, present a most novel appearance—hollow, and full of holes.

The manufacture of canes is by no means the simple process of cutting the sticks in the woods, peeling off the bark, whittling down the knots, and sand papering the rough surface, and adding a touch of varnish, a curiously carved handle or head, and tipping the end with a ferrule. In the sand flats of New Jersey whole families support themselves by gathering nanneberry sticks, which they gather in the swamps, straighten with an old vise, steam over an old kettle, and perhaps scrape down or whittle into size. These are packed in large bundles to New York city, and sold to the cane factories. Many imported sticks, however, have to go through a process of straightening by mechanical means, which are a mystery to the uninitiated. They are buried in hot sand until they become pliable. In front of the heap of hot sand in which the sticks are plunged is a stout board from five to six feet long, fixed at an angle inclined to the workman, and having two or more notches cut in the edge. When the stick has become perfectly pliable, the workman places it on one of the notches, and, bending it in the opposite direction to which it is naturally bent, straightens it.

Thus sticks, apparently crooked, bent, warped, and worthless, are by this simple process straightened; but the most curious part of the work is observed in the formation of the crook or curl for the handles which are not naturally supplied with a hook or knob. The workman places one end of the cane firmly in a vise, and pours a continuous stream of fire from a gas pipe on the part which is to be bent. When sufficient heat has been applied, the cane is pulled slowly and gradually round till the hook is completely formed, and then secured with a string. An additional application of heat serves to bake and permanently fix the curl. The under part of the handle is frequently charred by the action of the gas, and is then rubbed down with sand paper until the requisite degree of smoothness is attained.

### Photographing on Linen and Silk.

A Detroit photographer says: "There is this feature about photographing on linen: You can *wash and boil* the work and it won't come out. There is some special interest shown among society people just now on this subject, because of some napkins used at the banquet given to Henry Irving, the actor, before he left London. His photograph was on each one, and of course it was intended as a souvenir for the guest to take away with him. The silk or cambric is printed from the negative. There will be a rage for it if it once gets started, and people will have photographs printed on their curtains and tidies, and in handkerchief corners. The face of a beautiful young lady on the corner of a gentleman's handkerchief would be much more attractive than a monogram or initial letter. It would be just the thing for hat linings and bands." The Detroit *Free Press* suggests that not the least of the advantages of such photographing would be that the wash would be promptly returned if the missing pieces were to haunt the wretched laundress with a vision of her customers.

### Illumination of Steam Boilers.

The lighting up of the interior of steam boilers was long ago suggested. It has lately been carried into practical operation by the Patent Steam Boiler Company, London. They arrange lights within the boiler in such a way that the cascades, currents, and miniature whirlpools of the water may be clearly observed. It is believed that useful information will be derived from the observations touching the cause of priming, the best modes of separating steam from the water, etc.

### The Japanese Bronzes.

In a lecture on Japanese art, G. Richter gave the following description of their bronzes:

The manufacture of bronze appears to have been brought from China, as shown by the use of the word "kara-kana" for metal. This must have been very long ago, for the earliest European visitors to Japan found bronze cannon and firearms in use there.

Japanese bronzes contain copper and tin as their chief constituents, with the addition of a little lead or zinc. In the second half of the fifteenth century, Yuido, a friend of the painter Motorsubu, exersuted a great influence upon the development of the manufacture of bronze. He was master of the ornamental art and was celebrated for his great skill in making patterns and models.

The chief objects produced in Japan from bronze are figures, vases with flowers or birds, fishes, animals, dragons, censers, and incense vessels. Very great care is taken in making these, and they cast large dragons and other objects in one piece, which we have not yet succeeded in doing.

The best bronzes are those made for the temples. There is always a vase and a candlestick on the right and left of the god, in the middle is a censer, and below two lanterns or lamps. The old vases and candlesticks were not made in pairs, but single; they are now made in pairs for export. Great care was formerly expended in decorating the swords. The guard especially as well as the dagger and handle were decorated with the finest bronze. The sword guards as well as the dagger handles were made of iron inlaid with bronze.

Shakudo is a bronze of bluish black color and contains 3 per cent of gold. Shinbuichi is an alloy of 3 parts of silver to 1 of copper, and has a silver gray color.

The art of working iron in Japan has reached a stage that deserves mention. The richly ornamented old swords afford proofs of their skill in this art. Miyochin-Meneharu, who lived in the sixteenth century, was a master of this art. The British Museum possesses one of his works, a unique piece. It represents a sea eagle standing on a rock with outspread wings, bristling feathers, and claws sprawled out. Every feather is wrought, and the whole is so beautiful and true to nature that it justifies the use of the term unique.

It is not certain when the art of enameling was first introduced. It is positively asserted to have been known for centuries. In enameling objects made of copper the enamel is put on and made in the shape of a flower or arabesque and such like. The Japanese are so skillful in this that they first use one color and make everything that is to have that color first, then another color, and so on till the work is completed. Another and more complicated process, called *cloisonne*, uses gold thread rubbed with the juice of an onion, and this makes it adhere to the surfaces, and the figures are afterward filled out with enamel. In both processes the article is baked in a furnace until the enamel exhibits a luster or glossy surface. This is a sign that it is melted. The process must be conducted with great care, for if it is over-baked the enamel burns and falls off. It may also happen that in places where the enamel burns it thinner, it burns. When cool the roughness is removed by polishing by hand with a fine sandstone, and finally the enamel is polished.

Still another method of enameling consists in cutting figures from the metal. The depressions are filled with enamel and then all treated in the same manner. Plates of metal with raised or smooth enamel are used for inlaying chests and wooden articles.

Both kinds of enamel are applied to porcelain in many colors. Chinese *cloisonne* was long considered the best, but the Japanese now excel them in the beauty and purity of the colors and the art of decoration.—*Deut. Ind. Zeitung.*

### Printed Calico.

The "fast" coloration of textile fibers depends on the penetration of the fiber by the coloring matter, or the materials which produce it, in a dissolved condition, and its subsequent conversion into an insoluble body. This process can be effected either by the operations of dyeing, or, as is more frequently the case in printing, by application and subsequent steaming. Among the steam colors there is a class the fixation of which depends on a quite different principle, *i. e.*, the albumen colors. Insoluble or indifferent colors are mixed with albumen, printed, and steamed. The albumen is coagulated, and thus cements the color to the fiber. In examining printed goods the question may often arise whether the coloring matter has been produced within the fiber, or whether it has been fixed by the aid of albumen. If the swatch is macerated and teased out with a needle, so that the single fibers are separated, they appear, on examination with the microscope, uniformly colored through their entire mass, and translucent if they have been steeped in dissolved tinctorial substances. In colors applied by means of albumen the fiber itself appears as perfectly colorless, but in numerous places there are found adhering colored fragments of albumen.—*R. Meyer.*

SOME dealers, says the *Northwestern Lumberman*, are arguing in favor of lath of smaller dimensions. The old size of ½x1½ inches has given away to some extent to ⅜x1½, but less width is wanted, say ⅜x1⅜. The latter size would permit the loading of 60,000 lath in a car of 24,000 pounds, while but 50,000 can be loaded of the present size. Less plastering is required for the thin lath, and they are preferred by many on that account.

### Are Nickel Cooking Utensils Poisonous?

Nickeled utensils were first made more than thirty years ago by the late Professor Boettger, but have recently become more popular, owing to the success that has attended Dr. Fleitmann's attempts to work nickel on a large scale, especially of malleable nickel that can be rolled. The increased favor which this brilliant silver white metal has met with recently has given rise to the question of its poisonous quality. Dr. Fleitmann does not consider the metal as poisonous. The *Polytech. Notizblatt*, formerly edited by Dr. Boettger, thus discusses this interesting question:

At the present time metallic nickel and its salts are prepared in a very pure state: the copper and arsenic frequently present in nickel ores are almost completely removed. Especial care is taken to remove the arsenic, because it would injure the color of the nickel plate.

In regard to the supposed poisonous nature of nickel, it may be remarked that nickel and copper alloys have long been in use for domestic utensils, as well as copper itself. Such vessels must, of course, be protected from acids and always kept clean and bright. When this is done, none of the metal passes into a soluble form. All metallic salts are more or less poisonous, even the salts of iron, to which the salts of nickel are more nearly related than to those of copper, which are indeed quite poisonous. Metallic vessels should always be kept clean, and this is true of nickel too, and then there is no need to concern ourselves about its poisonous character. It would be very desirable to have thorough and careful experiments made upon the physiological action of nickel salts when in solution.

Birnbaum has shown (in *Dingler's Journal*, ccxlix., 515) that solutions slightly acidified with acetic acid, as well as the juice of sour cherries, when left for some time in nickel vessels, takes up considerable quantities of nickel, which confirms the view above expressed that acid solutions should be kept as far away as possible from all such utensils and vessels.

We may add that Dr. J. M. Da Costa has been experimenting with nickel salts for medicinal uses, and finds that they have some efficiency in doses of one or more grains, three or four times a day. It does not produce the tonic effects of iron salts, but can scarcely be considered poisonous. The bromide can be substituted for other bromides and in smaller doses. This paper may be found in full in the *Medical Age.*

### The Cotton Centennial of 1884.

The Board of Managers of the World's Industrial and Cotton Centennial, to be held at New Orleans in December, 1884, are showing energy in many directions in their endeavors to get the enterprise promptly under way. The design for the main building has been accepted, the one preferred out of ten submitted being that of G. M. Jorgensen, of Meridian, Miss. The building will have several towers but no dome, and will be lighted from the sides; it will cover an area of 900 by 1,500 feet, or a space of 31 acres, as compared with 21·47 acres occupied by the main building at Philadelphia. A tank and reservoir for cascades to be lighted by electric light is arranged for, and there will be a music hall to seat ten or twelve thousand people. In some leading directions the managers are taking the experience afforded by the exposition of 1876 as a guide, and are endeavoring to organize commissions from the several States in order to insure the thorough co-operation of all. They intend to make a feature of the exhibit of woman's work, and this department will be under the management of two leading representative women from each State and Territory.

### The Peculiar Sky Appearance in Peru.

The remarkable aspect of the evening sky, noted in so many places in the United States and in England during the past month, and which has been attributed to the passage of the earth through a region of meteoric dust, has been observed also in Peru. A correspondent, writing from Tocopillo under date of October 28, says: "We first observed, on the evening of September 2, that after sunset the sky was overcast with a bright yellow light, which gradually became orange-colored. It lasted for about half an hour after sunset. Several nights later it was again seen, but the light was redder. It did not appear again until the night after the last new moon, but has been visible almost nightly ever since. It is seen on the greater part of this coast, and also in the interior."

### Enameled Pasteboard.

The following process for enameling cardboard and pasteboard is taken from the *Papierzeitung:* Dissolve ten parts of shellac in a sufficient quantity of alcohol and add ten parts of linseed oil. To each quart of the mixture add also about ¼ ounce of chloride of zinc (solid?). The board may be immersed in it or the solution applied with a brush. The board is thoroughly dried and the surface is polished with sand paper or pumice before applying this preparation.

A COMPREHENSIVE map of the "Coke Regions" in the vicinity of Pittsburg, Pa., is in course of preparation by Alex. Y. Lee, C.E., of that city. The mills, foundries, and glass houses of Pittsburg will be located, and the lines of pipes laid for the introduction of natural gas are to be shown. The map will embrace the country from Connellsville to Neville Island.

### An Emulsion of Castor Oil.

Julius Mulfinger contributes a note on emulsions to the *Pharmaceutische Centralhalle.* A physician in Brussels proposed to me the problem of preparing a cheap emulsion in very concentrated form for a patient suffering from skin disease. Five liters of oil were to be used in a full bath. Castor oil was selected as the cheapest easily emulsifiable oil, and the experiments were limited to this oil. It was not so easy to find a suitable emulsifying agent. Experiments were made with gum arabic, tragacanth, albumen, marsh mallow, linseed mucilage, soapwort, and decoctions of quillaya. Saponine and cholesterine were excluded, partially on account of the cost, and partially because some other experiments with them had failed. The emulsions with gum arabic and tragacanth held best, and after these marsh mallow and quillaya, but the latter was brown. The emulsions with linseed and soapwort were also unsightly and less permanent. All had one disagreeable quality—that of decomposing in from three to six days, smelling sour and becoming useless.

The numerous favorable results that had previously been obtained with quillaya as an emulsifier led me to try it again. It did not seem advisable to use the tincture because alcohol decomposes emulsions, but in spite of this fact very good results were obtained by shaking the tincture with water. Five parts of tincture of quillaya (5 to 1) were mixed with ninety-five of castor oil and thoroughly shaken; without water it formed a complete emulsion having the appearance of condensed milk, and was easily miscible in all proportions with water. Even in warm weather it showed no indications of change at the end of six weeks.

This emulsion mixed with equal parts of sirup of orange flowers or almonds is an excellent form for administering this laxative, otherwise so difficult to take.

I would add that when 10 per cent of the quillaya tincture is mixed with tincture of benzoin, water can be added to the mixture in any proportion and yet the resin remain permanently suspended, which it is often difficult to do in any other manner.

### Process for Refining Vegetable Fibers.

Vegetable fibers, such as cotton, flax, jute, etc., are immersed for four hours in a bath of caustic soda at 12° B. Steam is then introduced into the bath in order to bring the temperature up to 80° C. The material is next brought into a solution of muriatic acid at 6° B., in order to remove the yellowish tint which is formed in the former bath. A thorough washing follows, and this is continued until the washings are completely neutral when tested with litmus paper. The bleaching is performed in a bath of hydrochloride of sodium at 7° B., the treatment lasting until a complete decoloration is obtained. The dried material is afterward introduced in a warm solution of glucose or sugar of 8° B., and left there for four or five hours, and afterward well dried. Then follows a treatment with a mixture of nitric and sulphuric acids, which transforms the sugar into nitro-saccharose, and the cellulose into binitro-cellulose. This is rinsed thoroughly in a hydro-extractor, and then brought into a boiling soap bath, and again rinsed. Then follows a mordanting with tannic acid or sumac in a bath at 30° C., and afterward with tartar emetic. It is stated that fiber so prepared is capable of being carded either alone or mixed with silk or silk waste. For this purpose it is wetted with a preparation consisting of water, olive oil, soap, and glycerine. —*M. Aubert.*

### Ox Gall Soap for Silks.

The Berlin *Industrie Blatter* gives the following directions for an ox gall soap to be employed in cleansing silks and satins: One pound of cocoanut oil is heated to 30° (100° Fahr.) and half a pound of caustic soda stirred in very thoroughly. At the same time half a pound of white Venetian turpentine is heated and then stirred into this soap. The soap is left to stand covered up for four hours, then heated again just sufficiently to make it flow, when one pound of ox gall is well stirred in.

Some good curd soap, which is perfectly dry, is then pulverized, and enough of it stirred into the gall soap to make it solid, so that it yields but little to the pressure of the fingers. It will require from one to two pounds of curd soap to accomplish this. When the mass gets cold, it can be cut or pressed into cakes.

### Tincture of Musk.

Vigier prepares the tincture of musk by first grinding up the musk with 95 per cent. alcohol to a fine impalpable powder that will remain in suspension for hours. He then adds the sirup and water. Four parts of alcohol to one of musk are sufficient, with two or three minutes' rubbing. The following are the proportions suggested, but the strength can be varied to suit the physician prescribing it:

| | | |
|---|---|---|
| R. Moschi | 1 | part, triturated with |
| Spiritus | 4 | " |
| Syr. simpl | 30 | " |
| Distilled water | 100 | " |

A NATIONAL Butter, Cheese, and Egg Convention met for a three days' session at Cincinnati, December 4. President John J. McDonald, of Philadelphia, said the value of the annual butter product of the United States was $352,000,000, and of the cheese product $36,000,000, with eggs and poultry about the same. Twenty-one States were represented by delegates, and Prof. Sheldon and Thomas Higgins were present representing the Royal English Dairy Association.