preserve the temperature carefully and also to maintain a standard rate of dropping to get accurate results.

A number of drop weights of some of the more important medicines, as determined by Mr. Roon and bearing out the above statements, is appended.

Substance.	1 gm. equals at 15° c. Drops.	1 Drop weighs Grams.	1 Drop measures cc.
Acid, Hydrochloric	19.5	.051	.042
Acid, Hydrocyanic, Diluted	20.0	.050	.045
Acid, Nitric	22.9	.043	.025
Alcohol, Ethyl	65.5	.015	.020
Chloroform	58.8	.017	.010
Creosote	37.4	.027	.022
Ether	90.0	.011	.015
Fluidextract Belladonna	55.2	.018	.020
Fluidextract Ergot	52.6	.019	.020
Glycerin	23.1	.043	.030
Guaiacol	38.1	.026	.023
Oil Santal	41.5	.024	.020
Oil Wintergreen, Synthetic	40.6	.025	.020
Phenol, Liquified	35.5	.028	.025
Solution Arsenic and Mercuric Iodides	19.7	.051	.045
" Arsenous Acid	19.3	.052	.045
" Iodine, Compound	32.	.027	.025
" Potassium Arsenite	21.1	.047	.045
" Potassium Bromide, 10%	20.0	.050	.050
" Potassium Iodide, 50%	18.7	.053	.035
" Strychnine Sulphate (f3i=1 gr.)	20.0	.050	.045
Spirit Ammonia Aromatic	57.3	.017	.020
Spirit Nitrous Ether	65.5	.015	.017
Syrup Ferrous Iodide	18.9	.053	.040
Tincture Aconite	56.3	.017	.020
" Digitalis	48.1	.021	.020
" Ferric Chloride	53.3	.019	.018
" Hyoscyamus	50.8	.020	.020
" Iodine	63.3	.016	.015
" Nux Vomica	57.3	.018	.020
" Opium	50.9	.019	.020
" Opium Camphorated	50.9	.019	.020
" Strophanthus	57.2	.017	.020
Water, Bitter Almond	29.3	.034	.037
Water, Distilled	20.0	.050	.045

LIQUID SHAMPOO OR TOILET SOAP.

ERNEST R. JONES, PH. C.

Many inquiries have appeared in the current issues of the various drug journals for a liquid soap that a pharmacist could prepare and dispense under his own label. It is my purpose to discuss such a preparation and give working formulas for the same.

Selection of Fat.—Practically all of the oils or fats are adaptable to making liquid soaps excepting perhaps castor oil, my experience with this oil showing it to produce a soap having very poor lathering qualities.

Corn oil makes a good soap; saponifies easily and the soap is free from objectionable odor. It lathers quickly but the lather is too light. Sweet almond

oil and olive oil are too expensive, and these soaps also give too light a lather. Lard and tallow make very good lathering soaps but are hard to saponify.

Cottonseed oil is cheap, but is very hard to saponify without the presence of alcohol or other fats, and the lather is not heavy enough for a good shampoo.

Soaps made from any of the above oils or fats are poor latherers when used in hard water. It should be remembered that the hardness of water is due to calcium salts and sometimes iron and magnesium. These salts when brought in contact with soap solutions form oleates and stearates of the corresponding bases or metals, and as these compounds are insoluble they will not form a lather. Cocoanut and palm nut oils require about twice as hard a water to destroy their lathering qualities as does any other ordinary fat. For this reason,soaps that are to be used in hard waters should contain a good proportion of one or the other of these.

The question of solubility of soaps is also an important fact to be considered in obtaining a quick lather. Cocoanut and palm oils are of a peculiar composition and contain glycerides which when saponified are very soluble in water. An oleate of soda or potash is about ten times more soluble than a stearate, hence the more olein a fat contains the quicker it will lather. But there follows another difficulty: the lather from an oleate is too light to be entirely satisfactory, and consequently needs a certain amount of a stearate to give it body.

For these reasons I find that a combination of cocoanut oil, cottonseed oil, and stearic acid is required to produce the best lathering soap. The stearic acid might be replaced by tallow, as tallow contains considerable stearin, but I prefer the stearic acid as it greatly hastens the saponification by forming a soap at once with the alkali. This soap acts as an emulsifier between the oils and balance of alkali, thus rendering the completion of the saponification comparatively easy.

Alkali.—Potassium hydrate is the principal alkali used.

A mixture of sodium and potassium hydrates is said to impart better lathering qualities to a soap than when either is used alone. Only a very small quantity of sodium can be used, however, if the soap is to contain much stearate, as it would cause the soap to "jell" or harden.

Potassium Carbonate.—This is an excellent detergent. When used as a shampoo with soap, it leaves the hair light and fluffy. It is also an excellent water softener thus adding to the lathering properties of the soap.

While it is a very necessary ingredient of a good shampoo, it will be found too harsh for general toilet use for persons with a delicate skin. Such persons should not attempt to use a liquid soap for toilet purposes other than as a shampoo. They should be advised to buy only a high grade toilet soap, free from excess of alkali, and in certain cases, even an unperfumed soap will be necessary.

Precipitation.—Liquid soaps if allowed to stand in a cool place will give a white precipitate. The amount of this precipitate depends directly upon the amount of stearate present, and is caused by crystallization of the stearates or acid stearates. It is generally redissolved if allowed to stand a few hours in a warm place.

For this reason some persons may prefer to dispense liquid soaps in dark colored bottles.

Hardness of Water.—In different parts of the United States, different degrees

of "hardness" of water are met with. For this reason, I propose to give three different formulas, in order that one may choose the one adapted to his particular locality. For instance the "Soft Water" formula contains plenty of cocoanut oil for such water as is found in the vicinity of Boston. The "Medium Hard Water" formula would be satisfactory for such water as found in the vicinity of Detroit, while a district like Kansas City would require the "Hard Water" formula.

The formulas I would suggest are as follows:

Formula for 2500 cc.	Soft Water.	Medium Hard Water.	Hard Water.
Cocoanut Oil	100. gms.	200. gms.	300. gms.
Cottonseed Oil	400. gms.	300. gms.	200. gms.
Commercial Stearic Acid	100. gms.	100. gms.	100. gms.
Caustic Potash, U. S. P., 85%	120. gms.	126. gms.	132. gms.
Caustic Soda, U. S. P., 90%	12. gms.	12. gms.	12. gms.
Alcohol	125. cc.	125. cc.	125. cc.
Potassium Carbonate	20. gms.	30. gms.	40. gms.
Soft or Distilled Water	q. s.	q. s.	q. s.
Talcum	15. gms.	15 gms.	15. gms.

Melt the stearic acid and oils together and add the caustic potash and soda dissolved in 1000 cc. soft water. Boil carefully, to avoid burning, adding more water as necessary, until no alkali is perceptible upon tasting. Then add the potassium carbonate dissolved in 250 cc. soft water and boil for two hours more. Allow to cool, add the alcohol and perfume if desired, and add sufficient soft water to make 2500 cc. Let stand three days, or longer if possible, add talc and filter through double filter-paper until clear.

Perfume.—For cheap odors, oils of rose, geranium, sassafras, lavander, bergamot, caraway or citronella are good. Terpineol is also used, but is claimed by many to be irritating to the skin if used in too large a quantity.

For a pleasing, delicate odor of lilac character, I have found the following to be satisfatcory, this amount to be used to perfume 2500 cc. liquid soap of the above formula:

Syringeol	5.0 cc.
Oil of Rose, Artificial	0.5 cc.
Oil of Jasamine, Artificial	0.5 cc.
Terpineol	7.5 cc.
Oil of Rose Geranium	0.5 cc.
Oil of Cloves	0.5 cc.
Artificial Musk	0.5 gm.
Alcohol, qs. ad	20.0 cc.

Place in bottle and warm gently and shake until the musk dissolves.

Colors.—Some may desire to color their Liquid Soap.

For Yellow—Use 1 grain Lieber's Deep Yellow No. 3003 to 2500 cc. Liquid Soap.

For Green—Use 1 grain Lieber's Vertoline Green No. 1855 to 2500cc. Liquid Soap. A darker green may be had by adding a trace of caramel.

Pine Tar Shampoo.—Add about 10 grams of Pine Tar, dissolving this in the alcohol. The insoluble portion is removed when filtering, leaving a clear dark liquid which emits the tar odor strongly when used.

Conclusions.—The above formulas make excellent appearing products. They

produce an abundance of lather in all kinds of water, and when used as a shampoo, leave the hair light and fluffy. They contain no free caustic alkali, as an excess of fat over the amount of caustic alkali is used, and potassium carbonate is used to complete the saponification of the balance of the fat.

Do not expose liquid soaps to the cold as it causes precipitation of stearates. These will generally redissolve if the liquid is allowed to stand in a warm place.

NOTES ON THE DECOMPOSITION OF NEO-SALVARSAN.

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That Neo-Salvarsan is capable of producing toxic symptoms if used while in a decomposed state is a fact that must be more seriously borne in mind by those who have occasion to use it but once in a while.

By reason of its peculiar loose combination, it tends to deteriorate at the slightest provocation, eventually changing, within a few hours, from that of a comparatively harmless medicament, to that of a very poisonous and dangerous compound.

This is particularly true in those instances where the product is made into solution some hours in advance of its use.

This is a practice, however, that is being rapidly disregarded and one that Ehrlich himself greatly deplores, for it is generally known that Neo-Salvarsan is more readily altered by exposure than Salvarsan. Erhlich's precautions along these lines are emphatic and must be zealously heeded in order to avoid serious troubles. With the more improved appliances of administration now at our command, solutions barely become a half hour old before they are used. They should be used at once, however, after preparation.

It has been observed nevertheless, that toxic symptoms have developed in many cases notwithstanding the most careful technic. In this connection no one has as yet advanced a satisfactory explanation of the causes leading up to these conditions. Judging from what has been gleaned from this brief study, it would seem, that the body fluids, and the tissues and organs that convey them, would in a large measure be responsible for these symptoms by reason of the alteration of this compound after introduction into the body.

After once Neo-Salvarsan has been released from its sealed enclosures it begins to suffer a change. This change begins at once, but proceeds slowly as crystal by crystal becomes involved, by reason of atmospheric contact. So delicate is this decomposition at first, that it is imperceptible to the unaided eye.

This remains unnoticed until an advanced stage is reached, when suddenly it manifests itself by a darkening of the substance.

It was observed that high temperatures with a moist atmosphere, caused decomposition more readily than low temperaures with drier surroundings. Hence, to keep Neo-Salvarsan it must be in a dry state and free from atmospheric influences, just as we find it on sale in the open market.

In order to demonstrate the ease with which this product changes, the follow-