

**CIHM
Microfiche
Series
(Monographs)**

**ICMH
Collection de
microfiches
(monographies)**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1998

The copy filmed here has been reproduced thanks to the generosity of:

National Library of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

Bibliothèque nationale du Canada

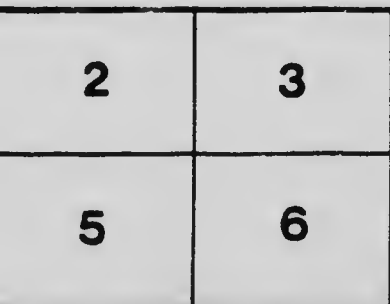
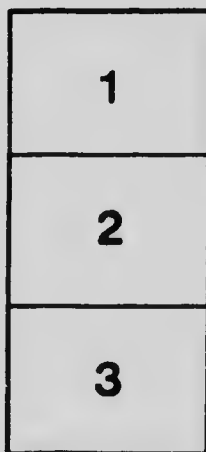
Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents.

Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.



FOODS AND DRUGS

LABORATORY

OF THE

DEPARTMENT OF TRADE AND COMMERCE

OTTAWA, CANADA

BULLETIN No. 419.

WATER GLASS
(SODIUM SILICATE.)

NOTES AND COMMENTS.

Under this heading, as occasion arises, the Bulletins issued by this Department will contain, as an appendix, such comment as may seem necessary or advisable upon matters relating to the work of the Department in connection with the administration of the Adulteration Act, the Fertilizers Act, the Feeding Stuffs Act or the Proprietary Medicines Act.

It frequently happens that correspondents ask information regarding the above Acts, of such nature that the matter in question possesses general interest, and comment upon it would prove acceptable and useful to others than the immediate questioner. In such cases the reply may find a place in these columns. For convenience of reference these notes will be numbered in series.

A. J. GULL,

Analyst.

FOODS AND DRUGS

LABORATORY

OF THE

DEPARTMENT OF TRADE AND COMMERCE

OTTAWA, CANADA

BULLETIN No. 419

WATER GLASS (Sodium Silicate.)

OTTAWA, January 3, 1919.

F. C. T. O'HARA, Esq.,
Deputy Minister of Trade and Commerce.

SIR,—Water Glass (essentially sodium silicate) is not a food; but it has come to be so largely used as a preservative for eggs and its relation to this most important food is so very close, that a special report in connection therewith is justified. My attention was first called to the article by a letter of date 27th April, 1918. It was pointed out that Water Glass as sold in Canada was a very variable article, sometimes thin, sometimes quite thick and viscous; while the quantity supplied in tins of similar size varied considerably. It was further stated that, while excellent results in egg-preservation were commonly obtained, a considerable number of failures had occurred, presumably due to the too great dilution of the preservative liquid.

The following directions for the use of Water Glass are given in the Weekly News Letter of 14 August, 1918 (Dept. of Agriculture, U.S.A.)—

“Dissolve 1 quart of Sodium Silicate in 9 quarts of water. This is sufficient for 15 dozen eggs.”

It will be seen in the sequel that the amount of actual sodium silicate contained in the solutions on our markets varies from about 30 per cent. to about 55 per cent. If the user of the article is led to believe that he is dealing with actual sodium silicate, it is manifest that serious mistakes must be made.

The standardization of commercial water glass is therefore necessary and I believe that the excellent report furnished by Mr. Rowat of this staff, to whom this investigation was entrusted, will be found sufficiently complete to enable your Advisory Board to recommend practicable standards.

It may be well here to state that both vaseline and lime water have been found to be fairly satisfactory in the preservation of eggs. Dr. Longworthy, (Farmers' Bulletin No. 128, Dept. of Agriculture, U.S.A.) says: “Some of the eggs were

4

varnished with vaseline; these were all good, as were those preserved in lime water, or in a solution of water glass. Of the last three methods, preservation in a solution of water glass is especially recommended, since varnishing the eggs with vaseline is time-consuming, and treatment with lime water sometimes communicates to the eggs a disagreeable odour and taste."

Dr. Shutt of the Experimental Farms, Ottawa, (Exhibition Circular No. 42, January, 1916) has experimented with more than twenty-five different preparations as egg-preserved, and he gives preference to lime water, giving water glass the second place. There can be little doubt that much of the complaint heard as to the unsatisfactory character of eggs which have been subjected to one or another variety of preservative treatment, is due to the fact that the eggs have not been strictly fresh in the first instance. A stale egg is a witness to the efficacy of its preservative treatment when it turns out a stale egg. Only strictly new laid eggs should be subjected to any preservative process.

I beg to recommend publication of Mr. Rowat's letter and the accompanying table of analytical results as Bulletin No. 419, both for the information of the public, and as a basis for the standardization of Water Glass.

I have the honour to be, Sir,

Your obedient servant,

DR. A. MCGILL,
Chief Analyst,
Ottawa, Ont.

A. MCGILL,
Chief Analyst.

DEAR SIR,—I beg to submit the following report, dealing with the analysis of 71 samples of Water Glass, collected on the order of July last. Of those samples, 8 were analysed at Halifax, 22 at Winnipeg, 3 at Vancouver and the remainder at Ottawa.

This is the first occasion that this material has been subjected to examination in these laboratories, hence a brief review will be made of the nature of water glass.

Water glass is not a pure chemical compound; it is not a chemical individual. The product marketed under this name is usually a concentrated solution of mixed silicates of soda, and in pre-war days, it also frequently contained silicate of potassium.

It is usually prepared by fusing 2 parts of sand with 1 part of carbonate of soda and 0.1 part of charcoal. Sodium hydroxide or sulphate sometimes replace the carbonate. After fusion, the glass like mass which has been formed is broken up, leached with hot water, and the resulting solution evaporated to a viscous syrup. This syrup is the article commonly sold as water-glass. The solution contains an indefinite mixture of the ortho and meta-silicates of sodium, and the constitution of the dry material varies between the limits $\text{Na}_2\text{O}\cdot 2\text{SiO}_2$ and $\text{Na}_2\text{O}\cdot 4\text{SiO}_2$. The chief impurities found in commercial water-glass are chlorides, sulphates, and small amounts of iron. These are frequently present to the extent of 2 per cent. or more.

Sodium silicates have long been used for imparting a fireproof character to wood and other materials, and more recently for producing artificial stone for building purposes, and for a peculiar kind of permanent fresco-painting (stereochromy) the results of which are intended to withstand exposure to the weather. Its more common use in rural communities, however, is as an Egg-Preserver. For this purpose, this substance has been shown to be, all things considered, decidedly the best known at the present

time. It is relatively inexpensive, clean and easy to handle, and does not, as do lime, salt, and other chemicals, tend to impart any noticeable flavor and eggs preserved in it will remain in satisfactory condition for a year, and even longer.

The excellent reputation which this matter enjoys, has created a considerable demand for it, and as a natural consequence a number of manufacturers have each placed upon the market a brand of water-glass. Since waterglass is not itself a definite chemical compound; since the methods of its manufacture differ in themselves; and since no arbitrary standards have been set to which this product must conform, it is not reasonable to expect all brands of commercial waterglass to be uniform in character.

In general it may be stated that the waterglasses at present found on the market can be divided into two classes, viz:

- (1) Solutions of sodium silicates of specific gravity 1.30 to 1.45, perfectly fluid, and containing from 25—33% of total solids, generally labelled Improved Water Glass.
- (2) Solutions of sodium silicates of specific gravity 1.65-1.75 semi-solid, and containing from 53-57% of total solids.

All brands of waterglass are put on the market in small tins of an average content of 300cc. and in larger tins containing 600cc. The smaller tin will hold about 17 ounces of 1.7 Sp. Gr. water glass, and about 13 ounces of 1.3 Sp. Gr. water glass. A small tin of the heavy solution sells for 20 cents and the same size tin of weak solution for 15 cents. When it is considered that the weak solution is the cheaper of the two to manufacture, and that it contains little more than half as much sodium silicate as the strong solution, these prices appear decidedly out of proportion to the value offered. In general, the weak solution costs the consumer 2.5 times as much as its equivalent in the heavy solution.

The thin liquid has one advantage over the denser article, namely that it is more easily handled. This advantage, however, hardly warrants the difference in the price of the two articles.

The manufacturers of water glass, as a rule, make no claim as to the weight of the material in the containers, save in one case, namely Lyman's, Ltd. One can of this make shows a deficiency of 2 ozs. but as other samples of the brand are well up to weight, this is hardly to be considered as more than accidental.

As a result of this investigation I am of the opinion that waterglass is an article which it would be in the interest of the public to standardize, and I present this report with the hope that the information it contains may be sufficiently full to allow you to fairly define this product.

I have the honour to be, Sir,

Your obedient servant,

R. M. ROWAT,
Public Analyst.

No. of Sample.	Results of Analysis.				No. of Sample.	Results of Analysis.			
	Net Weight.	Specific Gravity.	Soda Na ₂ O.	Silica SiO ₂ .		Net Weight.	Specific Gravity.	Soda Na ₂ O.	Silica SiO ₂ .
	oz.		p. c.	p. c.		oz.		p. c.	p. c.
83901	16.3	1.53	15.55	30.20	84276	16½	1.74	18.20	36.80
83902	14.9	1.70	18.50	35.74	81315	15½	1.68	17.04	37.68
83903	17.6	1.72	18.52	35.74	81320	16½	1.68	17.36	36.91
80116	15.2	1.74	19.09	36.90	81321	16½	1.75	17.65	36.43
80117	16.6	1.73	18.83	35.75	81336	16½	1.68	16.67	37.43
80118	16.8	1.73	18.72	35.50	81341	13½	1.36	7.44	22.48
80119	15.1	1.74	19.16	36.20	79470	8½	1.80	14.80	44.80
80129	16.3	1.70	18.64	35.65	79475	13½	1.41	8.75	24.87
84873	16½	1.72	16.74	38.95	79476	15.0	1.69	16.78	37.56
84877	16½	1.70	17.10	37.90	79496	15½	1.71	17.60	37.60
6540	14.0	1.69	17.62	36.71	79890	.....	1.35	7.83	28.10
6541	18½	1.72	17.23	38.80	79892	.....	1.43	9.10	31.20
6545	16½	1.70	17.22	36.86	79893	.....	1.70	17.57	35.6
6560	16½	1.72	17.36	38.36	79894	.....	1.42	8.65	30.1
6563	17½	1.72	17.36	38.41	79898	.....	1.41	7.90	28.7
80735	16½	1.68	17.85	36.30	79896	.....	1.40	8.72	28.7
80736	16½	1.69	17.62	36.68	79896	.....	1.41	8.78	30.0
80740	15½	1.68	17.16	37.42	83043	.....	1.41	8.28	26.0
80747	15½	1.68	17.36	36.80	83049	.....	1.43	8.53	29.4
80751	15½	1.70	18.0	37.07	83052	.....	1.41	8.72	30.0
80754	13½	1.31	7.23	19.71	83053	.....	1.47	8.91	30.0
80759	19½	1.69	17.51	36.88	83058	.....	1.72	18.14	37.0
80767	14½	1.53	8.65	30.80	83060	.....	1.45	8.72	30.0
80774	27½	1.42	8.75	25.15	83060	.....	1.68	17.44	35.8
80776	34½	1.74	17.92	38.56	81871	.....	1.40	8.21	28.2
84330	13½	1.35	7.34	22.55	81883	.....	1.43	8.41	29.8
84331	15½	1.72	17.98	37.30	81884	.....	1.41	8.34	28.3
84332	16.0	1.69	16.78	37.51	81895	.....	1.42	8.28	29.4
84333	15½	1.69	16.86	37.20	81899	.....	1.46	8.79	30.5
84334	14½	1.68	17.36	37.33	86196	.....	1.41	8.40	29.2
84335	33½	1.65	16.12	33.48	86119	.....	1.41	8.40	29.2
84271	13½	1.42	8.10	26.04	86113	.....	1.41	8.41	28.20
84272	16½	1.71	17.36	37.21	68612	.....	1.70	17.02	36.36
84273	15½	1.70	17.40	37.52	68613	.....	1.71	17.08	36.46
84274	17½	1.42	8.90	24.70	68614	.....	1.83	13.42	47.14
84275	16½	1.69	16.88	37.35					

