

figures obtained for white and yellow petrolatum, or petroleum jelly, on the one hand, and white and yellow vaseline, on the other, were identical. Furthermore no marked difference was observed between the yellow and white varieties of petrolatum, vaseline or beeswax by the phytopharmacological tests. The author has shown elsewhere that oxysterin, even in minutest quantity, is very toxic for plant protoplasm. In view of the presence of oxysterin and its derivatives in wool fat, the toxicity of lanolin can be explained. The hydrogen-ion concentration of all the solutions was determined by the potentiometer and the figures obtained were practically identical with that of the control and certainly not sufficient to account for the difference in the phytotoxicity. The present investigation gives further support to the extensive observations of the writer and his collaborators in regard to the greater sensitivity of plant protoplasm to animal poisons.

TABLE I.

Index of growth.		Index of growth.		Index of growth.	
1. Paraffinum.....	85%	4. Cetaceum.....	69%	7. Lanolin.....	68%
2. Cera alba.....	67%	5. White petrolatum.	88%	8. White vaseline....	88%
3. Cera flava.....	68%	6. Yellow petrolatum	91%	9. Yellow vaseline...	91%

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## METHYLENE BLUE U. S. P. AS PRECIPITANT OF IRISH MOSS.\*

BY GEORGE E. ÉWE.

When a solution of methylene blue U. S. P. is added to a decoction of Irish moss dark blue insoluble clots are formed.

The writer is unable to find mention of this fact in the literature, and since the known means of identifying the common gums, or distinguishing between them, are very meagre, it may be helpful to pharmacists to make known this action of methylene blue upon Irish moss, or emphasize it if it has already been noted and published elsewhere.

A solution of methylene blue precipitates a decoction of Irish moss whether the moss is previously washed with cold water or not; or whether the decoction of Irish moss is hot or cold. The dark blue clots are almost entirely insoluble in water, even at boiling temperature. When an excess of Irish moss decoction is added to

\* Scientific Section, A. PH. A., Rapid City meeting, 1929. No discussion.

a solution of methylene blue the latter is practically entirely removed from solution, only a very pale purplish color being left in the liquid. A methylene blue solution does not precipitate an aqueous extract of the ash of Irish moss, nor does it precipitate a neutralized, hydrochloric acid extract of the ash. The ash of Irish moss was found to contain much silica and sodium, some potassium, a little iron, more aluminum than iron, much calcium and some magnesium. It would seem that this action of methylene blue is concerned with the organic portion of the moss.

When 25 cc. of a decoction of Irish moss assaying 0.105 Gm. of dry extractive was titrated at room temperature with a 0.5% aqueous solution of methylene blue, between 0.120 and 0.125 Gm. of methylene blue was required for complete precipitation of the extractive. On this basis, 1 Gm. of dry extractive of Irish moss would require about 1.17 Gm. of methylene blue for precipitation. When the above titration was conducted at boiling temperature 0.105 Gm. of dry extractive required between 0.135–0.137 Gm. of methylene blue for complete precipitation. The end-point of the titration is indicated by lack of a precipitate after allowing the titrated liquid to stand for 5 minutes after the addition of the methylene blue solution. The end-reaction is satisfactorily sharp, there being an immediate precipitate within 1 cc. of the end of the titration and a precipitate after 5 minutes within 0.5 cc. of the end-point.

The methylene blue used in these experiments assayed 0.52% ash, was free from zinc and other heavy metals and answered all U. S. P. requirements. Methylene blue solution precipitates mixtures of Irish moss and tragacanth, Irish moss and Indian gum and Irish moss and acacia, but the precipitate is occasioned solely by the presence of Irish moss, as methylene blue solution does not precipitate decoctions of tragacanth, Indian gum or acacia; nor does it precipitate gelatin. When Irish moss is precipitated in the presence of other gums the dark blue precipitate is in a finer state of subdivision than when plain decoction of Irish moss is precipitated.

Other colored substances capable of precipitating Irish moss were sought and only one was found. This was a purple "Coal tar" color offered for tablet coating purposes. The composition of this color was not determined but upon ignition it gave off a very disagreeable odor quite similar to that yielded by methylene blue upon ignition and the latter may have been a constituent of this color. The color was free from zinc and other metals except the usual traces of iron when tested by the U. S. P. method for methylene blue.

Fifteen certified "coal tar" food colors of various colors were tried and none was found capable of causing a precipitate in a decoction of Irish moss. Methyl orange, methyl red, brom-phenol blue, haematoxylin, brom-cresol purple, iodeosin, fluorescein, malachite green and tartrazine No. 94 also proved incapable of precipitating Irish moss. The ability of methylene blue to precipitate with a decoction of Irish moss suggests the possibility of employing methylene blue for the detection, or possibly the estimation, of Irish moss. Vice versa it may be possible to use Irish moss for the detection or estimation of methylene blue, or Irish moss may be of service in depleting a solution of methylene blue during analytical chemical procedures.

The abstraction of methylene blue from solution by Irish moss appears to be due to an adsorption action exerted by organic constituents of the moss by a

process analogous to "staining." It does not seem to be due to the formation of a "lake" as the term "lakes" is applied to a group of coloring substances which are salts of an animal or vegetable coloring matter united with a metal, generally aluminum or tin ("U. S. Disp.," 21st Ed.), and methylene blue shows no disposition to precipitate with aluminum salts such as the neutralized, hydrochloric acid extract of the ash of Irish moss, or aqueous solutions of aluminum sulphate or ammonium alum. Nevertheless, there is a possibility that the aluminum in Irish moss may be present in such form as to "lake" with methylene blue, so that this is an open question.

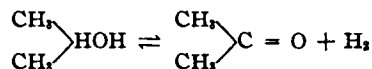
Because of the apparently strong adsorptive "attraction" between methylene blue and Irish moss an attempt was made to use an Irish moss decoction for removing methylene blue stains from the hands. However, the Irish moss proved less effective for this purpose than the detergent power of soap.

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### CATALYTIC DEHYDROGENATION OF ISOPROPYL ALCOHOL.\*

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The dehydrogenation of isopropyl alcohol to form acetone is of practical im-



portance and can be used as a manufacturing process. Moreover, the behavior of alcohols at elevated temperatures in contact with various substances is of importance in studies relating to the production of ethylenic compounds. Padoa and Foresti (*R. Atti, Accad. dei Lincei* (5), 23, 11, 84) converted the alcohol into the ketone by the action of benzene in the presence of a Ni catalyst at 185° for 67 hours; 37% acetone and some cyclohexanol are formed. Meyer and Eckert (*Monatsh. f. Chem.*, 39, 241) have oxidized isopropyl alcohol to acetone in the presence of anthraquinone in the presence of light; and Wells, U. S. Patent 1,497,817 oxidizes secondary alcohols by atmospheric oxygen and steam in the presence of certain especially prepared metal and metal oxide surfaces. In French patent, 525,108 (1920), the claimants also oxidize the alcohol by atmospheric oxygen in the presence of copper catalyst at 500° C., with 75% yield.

Hara, Tohoru (*Memoirs. Coll. Science Engin. Imp. Univ. Tokyo Series A*, 9 (1926), 405), reports a simple dehydrogenation of isopropyl alcohol in the presence of reduced copper made in a special manner, at 230–330° C. Reduced copper made in other ways gave no reaction. British Patent 263,877 (1927) (addition to British Patent 262,120 (1927)) claims the phosphides, selenides, tellurides, antimonides, bismuthides and sulfides of heavy metals as catalysts which effect the dehydrogenation of isopropyl alcohol at 410° C. to acetone, giving a yield of over 80 per cent.

\* Scientific Section, A. P. H. A., Rapid City meeting, 1929.