



DUHRING (L.A.)

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PROFESSOR OF SKIN DISEASES IN THE UNIVERSITY OF PENNSYLVANIA.

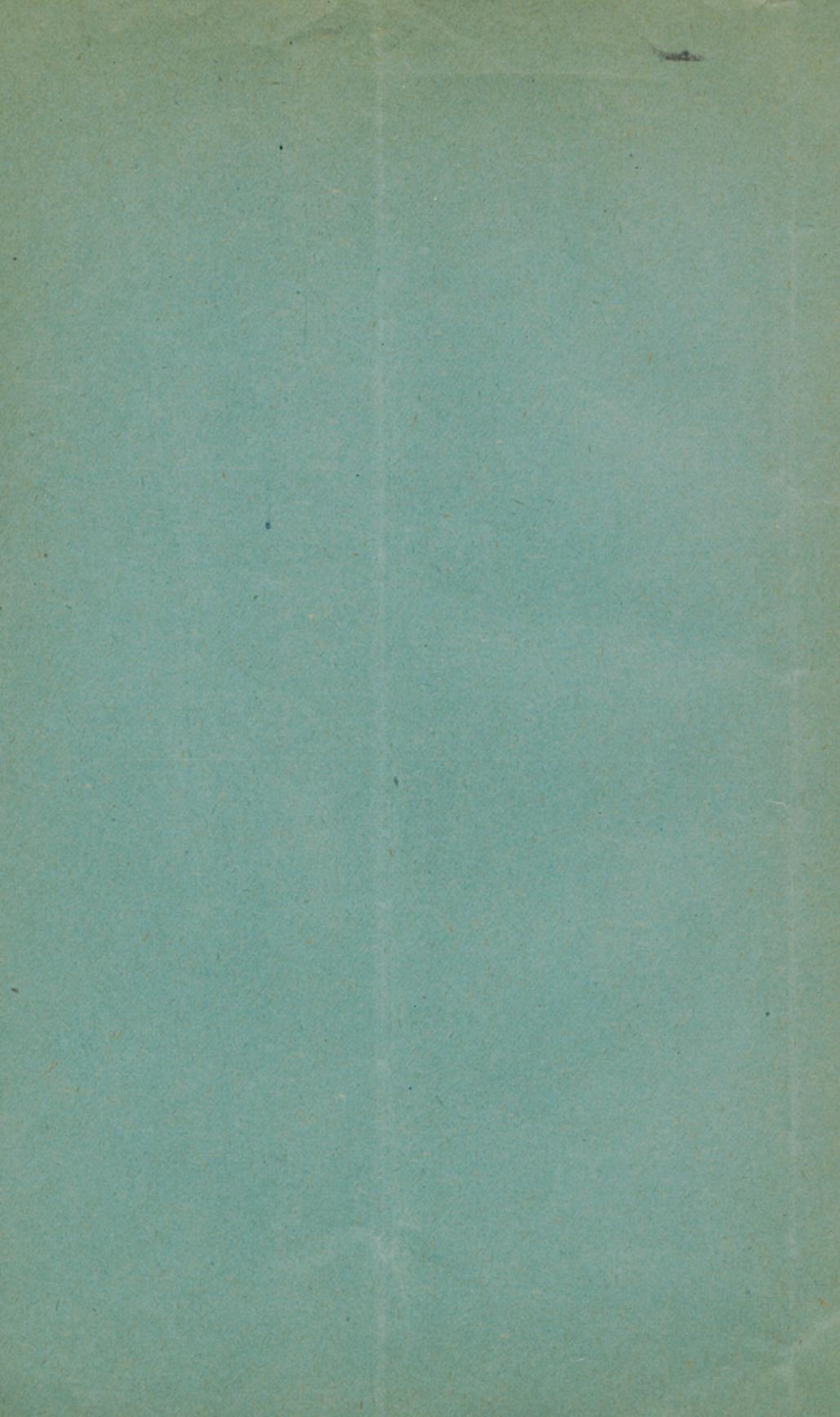
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## COMPOUND TINCTURE OF COAL TAR.

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THE preparations of coal tar, in the form of tinctures, from a pharmaceutical standpoint, are not well understood. When they are prescribed the pharmacist dispenses either a preparation of which he may hold the formula (and regards as his own property) or some proprietary article, and so labelled. In some cases the preparation dispensed proves to be indifferently made or valueless, in other cases (as the writer knows from experience) to be positively harmful. In this communication will be given the results of a series of experiments made by Mr. J. M. Baer, apothecary, and the writer, which were undertaken with the view of obtaining the most desirable and elegant pharmaceutical and therapeutic preparation for external use. It is not necessary to refer to all the numerous formulæ considered. It will suffice if the more important are mentioned, the object being to introduce a good local remedy together with the working formula, so that it may in a measure supplant certain similar proprietary preparations and be brought within the reach of all. This article, therefore, may be regarded as an abstract of the work done.

It may be stated that the more valuable published formulæ of the so-called coal-tar tinctures may be divided into two groups: (1) those containing alkalies, and (2) those made with tincture of quillaia bark or tincture of elm bark. Some of them are old, and have been published and republished, more or less accurately, chiefly in foreign journals, while others are modifications of them. The literature on the subject, however, is meagre and unsatisfactory, so that any contribution to the subject must be welcome. The experiments made may be classed into those which contain:

1. Coal tar and alcohol.
2. Coal tar and potassa or soda.
3. Coal tar and tincture of quillaia.
4. Coal tar and tincture of elm.
5. Coal tar and tincture of quillaia, potassa or soda.

Some of these may be briefly referred to before presenting the formula selected as being the best. The object desired was a good product phar-

maceutically, containing the therapeutic virtues of coal tar, and in particular a product miscible with water.

A simple formula, but one not to be recommended, consists of coal tar, 10 parts; alcohol (95 per cent.), 24 parts. Diluted with water 1:8, this forms a dingy, orange-yellowish, densely cloudy mixture, manifestly not homogeneous; an oily substance variegated in color floats on the surface and adheres to the sides of the glass test-tube. The addition of water causes an oil or oily products to be separated, thereby rendering it an undesirable mixture, both pharmaceutically and therapeutically. This product is sometimes dispensed when "tincture of coal tar" is called for, but it is a mischievous fluid, liable to set up a dermatitis, for the reasons given.

The action of caustic soda and potassa on coal tar is to emulsify it, but emulsification occurs only when strong solutions are employed. Upon the addition of water the mixture becomes cloudy and the coal tar separates. This fact was pointed out by Le Bœuf.<sup>1</sup> McCall Anderson,<sup>2</sup> many years ago, in speaking of the value of tarry preparations in eczema, gave the following formula for an emulsion, which he stated had the advantages of being both serviceable and cheap:

R.—Coal tar . . . . .	ʒij.
Alcoholis . . . . .	ʒij.
Cola et adde	
Liq. ammon. fort. . . . .	ʒviii.
Glycerini . . . . .	ʒvj.
Aq. dest. . . . .	ad ʒxij.

This formula makes an opaque, milky, dirty-brownish emulsion, which can be further weakened with water in all proportions. It forms no precipitate. The amount of glycerin seems to the writer to be unnecessarily and objectionably large. Diluted one part to fifteen of water, it is slightly cloudy and of a light brownish-yellow color. Owing to the small amount of alcohol it contains, it is a weak preparation and one which requires less dilution than the other formulæ mentioned.

The action of a caustic upon coal tar is illustrated in the following formula, containing tincture of elm, which has been published as a desirable formula: Take of coal tar, ʒij; solution of caustic potassa, 5° Beaumé (5 per cent. solution) (ʒj-ʒij), sufficient to make a thick, grayish mass. Stir and allow to stand, stirring frequently for several days. Pour off the liquid and mix with one gallon of tincture of elm (one pound to a gallon). This is an alkaline solution, containing about five grains of caustic potassa to the ounce. Diluted with water 1:8, it produces a clear, brownish solution with a precipitate. Upon the whole, the results obtained with the many formulæ containing coal tar and

<sup>1</sup> Pharmaceutical Journal, 1866-67, second series, vol. viii., p. 470.

<sup>2</sup> Treatise on Eczema. Second edition. London, 1867.

alkalies were not satisfactory, most of the products when water was added showing more or less precipitation.<sup>1</sup>

Reference may now be made to the action of tincture of quillaia on coal tar. Le Bœuf, in France, about 1860, was the first to make use of this combination under the name of "coal tar saponiné," of which further mention will be made presently. Before taking up the action of tincture of soap-bark on coal tar, the manner of preparing the tincture of soap-bark itself may be discussed, as there exists considerable variation in the several published formulæ. Some are made with alcohol, 57 per cent., others with 95 per cent. strength, and the proportion of bark also varies. The London and Westminster Hospitals (according to *Squire's Pharmacopœia of the London Hospitals* for 1891) give this formula (which is 1 : 4):

Quillaia bark (inner) bruised . . . . .	℥v.
Alcohol, 90 per cent. . . . .	℥xxx.

Heat to ebullition and filter.

Guy's Hospital gives the following :

Quillaia, coarse powder . . . . .	℥iv.
Rectified spirit . . . . .	℥xxx.

This formula contains somewhat less of the bark (1 : 5). The British Pharmaceutical Conference adopted the formula of 1 : 8. Le Bœuf makes a strong tincture—1 part of coal tar to 4 parts 90 per cent. alcohol. Our own experiments show that a strong tincture, 1 part to 4, 95 per cent. alcohol, is the best, and this may be accepted as a standard.

The tincture of quillaia acts favorably upon coal tar, diluted with all proportions of water, forming a homogeneous emulsion. There is no other substance, so far as I am aware, that is able to take its place. Tincture of elm acts similarly upon coal tar, but less satisfactorily as concerns its emulsifying property. It does not possess the cleansing properties of soap-bark. The following formula is that given by Hans Wilder:<sup>2</sup>

Tincture of quillaia . . . . .	4½ pints.
Coal tar . . . . .	2 pounds.

Digest eight days and filter.

The tincture of quillaia is to be made by percolating two pounds of soap-bark with one gallon of 65 per cent. alcohol. Diluted 1 : 8, it produces a densely clouded solution of a yellowish-brown color, with a slight precipitate. It is a weak preparation, owing to the small amount

<sup>1</sup> It will be borne in mind that coal tar only, and not wood tar, was employed in the experiments, wood tar, as is well known, combining with potassa and making a homogeneous mass, miscible with water.

<sup>2</sup> *Pharmaceutical Era*, March 1, 1892.

of alcohol it contains, and it is doubtful if all the virtues of the coal tar are extracted.

Coal tar saponiné, according to Le Bœuf's formula,<sup>1</sup> is prepared as follows:

Soap-bark, crushed . . . . .	1 part.
Alcohol (90 per cent.) . . . . .	4 parts.

Heat to boiling and filter.

Of this tincture take twelve parts, and digest for eight days ten parts of coal tar. It is a stable preparation and is miscible with water. Diluted with four parts of water, it constitutes the preparation labelled "coal tar saponiné," ready for use, pure or diluted as may be required. Alcohol of 95 per cent. strength we find makes a better preparation than the 90 per cent. alcohol Le Bœuf's original formula calls for.

The preparation known as "liquor carbonis detergens," manufactured by Wright & Co. as a proprietary article in England, is probably in like manner made with soap-bark. Its properties are much like those of the formula published at the close of this article. Therapeutically it appears to be the same. As a substitute for it the British Pharmaceutical Conference adopted in the unofficial formulary the following formula. Take of

Soap-bark, powdered . . . . .	℥ij.
Alcohol (57 per cent.) . . . . .	Oj.

Moisten the powder and macerate for twenty-four hours in a closed vessel. Then pack in a percolator and gradually pour on the alcohol. To this add prepared coal tar four ounces. Digest at a temperature of 120° F. for two days; allow to become cold and filter. (Prepared coal tar is commercial coal tar which has been exposed in a shallow vessel to a temperature of 120° F. for one hour, stirring frequently.) Mixed with water 1:8, we find it produces a slight precipitate, the mixture being somewhat milky, and of a pale brownish-yellow color.

CONCLUSIONS.—Summing up the result of these investigations, we may conclude:

1. That the best tincture of coal tar is made with the aid of tincture of quillaia.
2. That the strength of the tincture of quillaia should be 1:4, with 95 per cent. alcohol.
3. That the coal tar (1 part) should be digested with the tincture of quillaia (6 parts), with frequent agitation, for not less than eight days, and preferably for a longer period, and finally filtered.
4. The resultant product is a brown-black, clear tincture, which upon the addition of water forms a cleanly yellowish emulsion, the color and certain other characters varying with the kind of coal tar employed.

<sup>1</sup> Pharmaceutical Journal, 1866-67, second series, [vol. viii. p. 470.

5. The tincture is stimulating, and is prescribed usually largely diluted, with from 10 to 60 parts of water, as a wash, and is useful where tar is indicated, as in certain forms of eczema, psoriasis, pruritus, and in other inflammatory diseases of the skin. It is often more useful when employed weak than strong.

6. This preparation, which may be designated as "compound tincture of coal tar," takes the place of several similarly composed proprietary preparations known as "liquor carbonis detergens" and "coal tar saponiné."





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