and is almost entirely composed of the saturated aliphatic hydrocarbons of the $C_n H_{2n+2}$ series. We found that paraffin wax could be readily chlorinated under easily regulated conditions, and that the product when prepared as described below was an extremely bland rather viscous oil, which readily dissolved dichloramine-T, and that the solutions so prepared were stable over long periods if kept under suitable conditions. As was to be expected, the product is not a single individual compound, but a mixture of isomeric and homologous chlorine derivatives. It is therefore impossible to give a systematic name to the product, and, as the descriptive name "chlorinated paraffin wax oil" seems unnecessarily clumsy, we have provisionally chosen the name "chlorcosane," since the systematic names of most of the hydrocarbons in paraffin wax end with the suffix "cosane."

Preparation of the Solvent "Chlorcosane."

Paraffin wax, preferably melting at $50^{\circ}C$. or higher, is placed in round bottomed flasks and heated to about 120° . Two flasks connected in series, each containing a half kilo of the wax, may be conveniently used. A rapid current of chlorine from a cylinder of the liquefied gas is then passed through the molten wax in the flasks, each of which is provided with a thermometer and the necessary glass tubes. The temperature should be controlled within the limits of $125-140^{\circ}$. The first flask in which the reaction is most vigorous will require but little heating. Chlorination is continued until the contents of the flasks have increased in weight 45 to 55 per cent. of the weight of wax taken. It will be found convenient to complete the chlorination of the first flask and then remove it, and transfer the second to its place, putting a fresh flask of paraffin wax after it. In order to avoid undue discoloration of the product, a minimum amount of rubber tubing should be used for the connexions. Wide glass tubing should be used for passing the gases, and the ends of the delivery tubes are preferably blown into bulbs provided with a number of fine orifices to promote good contact between the gas and oil. Hydrochloric acid is, of course, evolved freely during the reaction. After the requisite amount of chlorine has been absorbed, the oil, while still warm, is shaken vigorously with 5 per cent. of its weight of dry sodium carbonate and then filtered through a dry fluted paper. The clear oil, which has a light yellow or sherry colour and is slightly heavier than water, is then ready for use. It possesses a viscosity intermediate between that of olive oil and castor oil, has almost no odour, and is perfectly bland when sprayed up the nose or placed on skin or wounds.

It will be noted that the materials necessary for making the new solvent are all easily available at very cheap rates.

We have been unable to find any references in chemical literature to a product of the kind described. Lippmann and Hawliczek¹ heated paraffin wax with phosphorus pentachloride and obtained evidence of the formation of mono- and dichlor- derivatives, while Bolley,² by the exhaustive chlorination of paraffin wax, obtained solid products of varying composition. The chlorine in "chlorcosane" is mostly in a firmly bound condition not readily removable by treatment with boiling alkaline solutions. It does not react with metallic magnesium suspended in ether, but on heating with soda lime to 250° unsaturated hydrocarbons and a little fatty acid are formed. Boiling with aniline removes most of the chlorine with formation of complex bases which have not been closely characterized. "Chlorcosane," itself containing all its chlorine united to carbon, has, of course, no appreciable antiseptic action.

Preparation and Stability of Solutions of Dichloramine-T in Chlorcosane.

Chlorcosane at room temperature can dissolve from 8.5 to 10 per cent. of dichloramine-T. For wound treatment a 7.5 to 8 per cent. solution is strong enough for all purposes and is most conveniently prepared as follows: A portion of the oil—for example, a quarter—is heated to 75° or $80^{\circ}C$. and the weighed amount of solid dichloramine-T is then added. The latter substance will promptly melt and dissolve in the warm oil, which is then at once diluted with the remainder of the oil and the whole well mixed. If necessary, the solution can be filtered, but with pure materials this is not required. The clear solution should be at once stored in small amber corked bottles and not exposed to unnecessary heat.

Direct sunlight causes the most rapid decomposition of dichloramine-T solutions, and it should also be noted that blue glass bottles afford no protection. If kept in amber bottles, the solutions remain clear and retain their activity practically unimpaired for many weeks or possibly months.

Two preparations containing initially 8.7 and 8.9 per cent. dichloramine-T, kept for one month in corked amber bottles at laboratory temperature, contained 8.2 and 8.4 per cent. respectively at the end of that time. A similar oil exposed to direct sunlight for four days was completely decomposed, while another sample incubated at $40^{\circ}C$. fell from 8 to 3 per cent. in a month. Under ordinary conditions solutions which are protected from light by amber bottles and from contact with water or excessive heat may safely be used for two months or possibly longer.

The clinical results of dichloramine-T dissolved in the new oil are similar to those already recorded by Lee, Sweet, and others, and the same is true of its disinfecting action in the nasopharynx. The only difficulty that we have thus far encountered is the fact that the high viscosity of the oil prevents its being readily sprayed with a hand spray, though this is easily accomplished with a power spray. The addition of about 10 per cent. of carbon tetrachloride will reduce the viscosity of the mixture to a point at which it can be readily sprayed in an ordinary oil "atomizer." This dilution has no deleterious effect on the stability of the solution and is unobjectionable for wound treatment. It appears desirable to add the carbon tetrachloride only to the oil used in the hand spray and to use the thicker oil undiluted for other modes of use.

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A SKIN INK FOR RADIOGRAPHY.

BY

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RADIOLOGISTS have long been troubled by the thorough way in which some nurses endeavour to remove localization skin marks as soon as the patient returns to the ward; hence the need for a substance which will make an indelible mark on the skin, proof against rough treatment, has been acutely felt in this war. The properties required in such a substance are as follows:

1. It should stain the skin such a colour that it will show up against iodine.
2. The mark should be unaffected when rubbed with spirit, acetone, ether soap, or tincture of iodine.
3. The mark must last, when covered up with dressings, at least five days, and longer if possible.
4. The mark should be quickly and easily made, and making it should not hurt the patient, for it must often be placed on a part that is acutely inflamed and tender.
5. The substance used for the mark must not damage or inflame the skin.
6. The mark should be visible immediately it is made.
7. The materials used must be obtainable.

Condition 4 practically requires the use of a liquid applied with a brush, as the pressure of a pencil often causes considerable pain. The liquid should penetrate the skin well, and evaporate quickly, so that watery solutions are ruled out; and it is advisable, in order to save time, to have a single-solution marking fluid.

Silver nitrate forms a good mark, but it turns white with iodine and is not easily seen. It cannot be seen when first applied, it must be used in aqueous solution, and it may cause a good deal of inflammation when developed *in situ* by photographic developer. This substance cannot therefore be regarded as at all suitable.

I experimented with a number of dyes without finding a thoroughly satisfactory one. A solution of ferric chloride in alcohol, followed by a solution of haematoxylin in alcohol and ether, as suggested to me by Captain C. E. S. Phillips, formed a satisfactory mark, but being in two solutions took some time to apply, and, as haematoxylin is no longer obtainable, it need not be further considered. The least unsatisfactory aniline dye was a solution of methyl violet in acetone and water 50 per cent. followed by a painting with tincture of iodine. Aniline green also gave a fairly satisfactory mark when applied in the same way.

I eventually found that ferric chloride followed by pyrogalllic acid gave a grey mark, which gradually turned a

* The ordinary indelible pencil appears to contain this dye.

fine black after five or six hours, and this mark lasted more than double as long as the iron-haematoxylin mark when exposed to the same conditions. Further, the mark was unaffected by iodine, acetone, ether soap, etc., and could, in fact, be scrubbed with a nail-brush and ether soap two days after it was made without being completely removed.

Experiments were next carried out in order to obtain the fluid in one solution, and it was found that a mixture of the two solutions was quite satisfactory and seemed to keep well, showing no great tendency to oxidize even when kept in an open test tube. This is possibly due to a small amount of acid in the liquor ferri perchlor. from which it was prepared. The next points to find out were a satisfactory concentration and the best proportion of the ingredients. The latter was determined by painting the skin with a mixed solution of known constitution, and then, when dry, painting marks on it of solutions of pyrogallie acid and ferric chloride respectively. If one or the other improved the result the mixture was amended accordingly. The former point was disclosed by a series of comparative marks with different strengths.

Different skins seem to vary in the degree to which they take stains and as to the durability of the resulting marks. Experiments with different solvents showed that acetone and methylated spirit gave little difference in result on my own skin, the latter, however, was better than rectified spirit. Owing to the greasiness of some skins it seems advisable to make the fluid, at any rate in part, with acetone, though if this is not obtainable, methylated spirit may be substituted.

The formula I finally arrived at was—

Acid, pyrogallie.	...	...	1 gram
Spirit, vini meth.	...	...	10 c.cm.
Liq. ferri perchlor. fort.	...	...	2 c.cm.
Acetone	...	...	ad 20 c.cm.

This gives a concentration of 5 per cent. pyrogallol and 2 per cent. Fe. The solution is best kept in a bottle with a camel's-hair brush attached to the cork so that it can easily be painted on. The mark is a brownish-grey at first, but after a few hours turns a brilliant black. It fulfils the conditions set forth above.

DRAINAGE v. SCRAPING IN THE OPERATION OF CURETTAGE OF THE UTERUS.

BY

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THE object of this paper is to protest against the recent modification of an old and good operation which is nothing but bad and is tending to bring a good operation into discredit. The new-fangled procedure is to dilate the cervical canal by a three-bladed dilator just sufficiently to allow the passage of a small curette, the dilatation being often to about the calibre of a lead pencil. In the original operation the canal was dilated as much as possible, and safe, to the size of the largest Hegar dilator. I shall give my reason for thinking that this is the proper procedure.

Any benefit derived from the so-called operation of "curettage" is not from the scraping, but the drainage which dilatation to introduce the curette involves. Apart from removal of soft breaking down and loose mucous membrano by gentle use of the curette, I suggest that the results of the "curettage" operation would be at least as good if no scraping were done. The persistency of leucorrhoea is due to the inadequacy of the lower opening of the uterine cavity to permit drainage of what is virtually an open abscess cavity. For the same reason it is absurd to treat whites with douches; the drainage of the uterus (without artificial interference) through the tightly-closed cervical canal into the vagina being inadequate, the discharge tends to find its way along the path of least resistance to tubes and ovaries. If the condition is analogous to the persistent discharge of an inadequately drained abscess cavity and a condition demanding prolonged drainage, it seems obvious that to dilate the vent to such a slight degree that it rapidly closes again is absurd. We must revert to the old Hegar method, amplify it and not worry too much, if at all, about scraping; drainage is the important thing, and dilatation

must therefore be thorough, must be maintained for an adequate time, and the surgical principle of making the drainage opening at the most dependent part must not be disregarded. The cervical tissues must be rendered soft or the operation commenced after preliminary use of a laminaria tent, or following the period. The cervical canal must then be dilated to the full Hegar size. If the curette be used, it must be gently. I have found that application of iodized phenol makes little difference; if it is of benefit, I imagine it acts not by destroying germs but by determining blood to the part, and thus favouring the flow of serum. The cavity of the uterus being wiped out, one of the tubes illustrated should be inserted to maintain the dilatation and be used for a few days or a week. A thiodine pessary is inserted in the vagina, and then a little gauze, and the patient put to bed; the top end of the bed is raised on blocks to facilitate drainage from the uterus. As soon as the patient is able she gets up and remains up, so as to place the drainage opening at the most dependent part. Using this operation for drainage instead of scraping I have had the most gratifying results. If the drainage tube tends to fall out, a small amount of iodoform gauze is placed at the top of the vagina. Every night for about two to three weeks, when the patient goes to bed, a thiodine pessary is placed in the vagina.

The tube is a modification of a tube for which I am indebted to a previous contributor to the JOURNAL. It is

A, Slot. B, Retention ring. C, Flange. D, Opening for silk. E, Interior tube.

about 2 inches long, slightly flanged at the vaginal end. At the upper third (uterine end) there is a slit to allow of the escape of exudation, and about three-eighths of an inch from the end around the tube is a ring to prevent the tube coming out of the cervical canal. At the flanged end is a small aperture for a silk thread to allow of easy extraction. Tubes have been made in five sizes, uterine diameters $\frac{3}{16}$, $\frac{4}{16}$, $\frac{5}{16}$, $\frac{6}{16}$, $\frac{7}{16}$ of an inch, by Messrs. Allen and Hanburys. The smaller tubes could be used for drainage in leucorrhoea without an operation after preliminary dilatation by a

laminaria tent. Many cases of whites can be cleared up or improved by such procedure if the drainage is maintained for a suitable time. Instead of curettage we might call this operation drainage of the uterus. It is a valuable prophylactic operation against damage of ovaries and tubes and the necessity for their mutilation and removal later. The tubes will also prove of value in maintaining dilatation for spasmodic dysmenorrhoea.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

MILK SUBSTITUTES FOR THE SICK.

IN view of the present scarcity of milk it seems urgent that we should reconsider our present custom of feeding sick adults on a diet more or less composed of milk. There are, of course, many for whom it is essential. On the other hand, there are great numbers for whom it is not necessary and some for whom it is not even desirable. Indeed, there are not a few to whom it is repugnant.

In a hospital dietary before me the diet of every patient contains 1 to 3 pints of milk daily, unless specially ordered otherwise. Now, is there any real difficulty in giving a digestible and sufficient diet without milk to a large proportion of these invalids—let us say, to many surgical, cardiac, and mild febrile cases? The fashion is to a great extent only of recent origin, and a peculiarly British one. We have not, indeed, the advantage our Continental friends possess in their light and harmless bouillons, potages, and ptisanes, nor are our patients (unfortunately) accustomed to them, nor have they the mild non-intoxicating breakfast beers of our forefathers, but the chief reason for the popular use of milk as a staple food for the sick, apart from its harmlessness and digestibility, is the ease of preparing it, which saves so much work to friends and purses in a sick house. In many cases