of gas by *M. pinoyi* Cast., the presumption is that the liquid contained three sugars—glucose, levulose, and maltose. The explanation is found in the fact that *M. bulcanica* Cast. ferments with production of gas glucose only; *M. krusei* Cast., glucose and levulose; *M. pinoyi* Cast., glucose, levulose, and maltose.

There are, however, in certain circumstances some sources of error, but with these, as well as the precautions for avoiding them, and with the whole subject of the presence of more than one reducing substance, we propose dealing in a future paper.

Application of the Method to the Detection of Certain Non-reducing Substances.

The method, using certain species of fungi and bacteria, may be applied to assisting in the detection of certain other substances—saccharose, inosite, dextrin, etc. To help in the identification of saccharose, for instance, make a 1 per cent. peptone water solution of the substance to be examined, and inoculate two of the tubes of the solution with two germs (bacteria or monilias or saccharomyces) identical in all their biochemical reactions except on saccharose; for instance, inoculate No. 1 with *B. coli* Esch. and No. 2 with *B. pseudocoli* Cast. If after forty-eight hours' incubation at 37° C. No. 1 shows absence of gas, while gas is present in No. 2, the sugar is saccharose. With this subject also we propose dealing more fully in a future paper.

Use of the Method in Urine Analysis.

From a number of experiments we have carried out, adding to samples of urine various sugars and other carbohydrates, and also from a few pathological specimens, we can say that the method can be used in urine analysis for the detection and differentiation of certain sugars and other substances—glucose, levulose, lactose, pentose, etc.—provided that the amount of such substances present is not too minute (not less than 0.1 per cent.). The urine is distributed in sterile tubes containing Durham's fermentation tubes or similar devices and inoculated with the organisms mentioned in the table and key. Two points of considerable importance are (1) the urine must be aseptic; if it cannot be collected aseptically it should be sterilized as soon as possible—after distribution in the tubes—by heating in Koch's steamer for thirty minutes on two or three consecutive days. It should never be autoclaved, as this procedure may alter the characters of the sugars and other carbohydrates present. (2) It is of great advantage to add a third or the same amount of peptone water to the urine before inoculation, otherwise the organisms may grow very scantily, and there may be no production of gas.

A METHOD OF SKIN GRAFTING UNDER SEPTIC CONDITIONS.

BY

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THE difficulty which has arisen in connexion with skin grafting is recognized by most military surgeons. In a considerable number of instances grafts have not grown on account of the generally septic conditions prevalent. Hitherto the first principle of successful skin grafting has been the most rigid asepsis, without using antiseptic solutions on the raw surface of the wound, since efficient antiseptic solutions have proved as fatal to the delicate grafts as the bacteria which they sought to eradicate. As a rule, the only solution used by most surgeons has been normal saline. Another difficulty arises when a patient has multiple wounds and the wound to be grafted cannot therefore be retained in the best position possible, so that the grafts are sometimes pulled out of place in handling the dressings.

By the method here described I have been able to obtain successful grafts upon areas which, though "clean" to the naked eye, were still actually suppurating, dressings which had been left on for twenty-four hours showing a certain amount of pus, and even possessing an offensive odour.

The following is a case which seemed less promising at the beginning than any other I have dealt with:

The patient had been wounded in the arm, the head, the back, and the left thigh. The wound in the arm had necessitated a guillotine amputation in France, which had remained septic; the wound in the thigh had been excised in France, and when I received the patient in England it consisted of an area on the posterior surface extending from two inches above the knee to the natal fold. The outer border reached to about one and a half inches in front of the great trochanter, and the inner border to within about one and a quarter inches of the rectum—an area of approximately seventy-two square inches, in which all the skin, superficial fascia, and fat had been removed and had left the hamstring muscles exposed and still in a septic condition in very nearly their whole length. On first viewing this leg it seemed doubtful whether it could be saved, especially as the wound was of such an irregular shape that a plastic operation by means of which parallel strips of skin might be brought over portions of the exposed surface was not possible.

For ten days the wound was dressed on every third day with pure sterilized liquid paraffin containing one drachm of ordinary bipp to the ounce. At the end of this period the wound was quite clean at the edges and had granulated well over the muscles; a skin graft under the following conditions was decided upon in spite of the fact that the dressings were still somewhat offensive.

The edges of the wound and the skin of the buttocks, whence the graft was to be taken, were sterilized with iodine; the surface of the wound itself was sprayed with zoel, which the manufacturers inform me is made by mixing 1 lb. of 78 per cent. electrolytic caustic soda ground to pass through a sieve with ten holes to the linear inch, with 1½ lb. of No. 20 pure salt; to this is added 5½ lb. of granulated borax and the whole well shaken together. Combination of the caustic soda with the borax takes place rapidly, resulting in a mixture (zoel) containing 19½ per cent. sodium chloride, 3 to 4 per cent. of sodium diborate, and 76½ to 77½ per cent. of sodium monoborate. I then raised small portions of the skin of the buttocks with forceps and dissected off portions about a quarter of an inch in diameter and one-sixteenth of an inch thick in the centre. I passed a single stitch through each graft and through the granulation tissue, suturing each graft in careful apposition; in all I planted about thirty-five grafts in this way. Again I sprayed with an atomizer a solution of zoel upon the grafted wound, and then dressed the whole with gauze soaked in sterilized paraffin, so that the dressing should not dry and tear off the grafts or cause bleeding when it was changed.

The paraffin dressing was left on for forty-eight hours without removal, but was moistened from time to time with fresh paraffin in order to prevent it from sticking. At this period the dressing had begun to smell, and the edges of the dressing had become green. I therefore re-dressed the wound, and sprayed it again with a 2 per cent. solution of zoel, afterwards again placing over the surface gauze soaked in paraffin. This procedure I repeated from time to time on the average every twenty-four hours, and at the end of twelve days every graft had not only taken but had spread to more than twice its original area.

I have used this method on other cases, of which that quoted is typical, and the success of the technique I ascribe to three outstanding conditions:

1. The fixing by means of sutures of the grafts, so that, although in an awkward position, they cannot be removed when the wound is dressed.
2. The use of liquid paraffin as a medium for the dressing, which prevents any adhesion, and hence movement of the grafts.
3. The use of an antiseptic spray which is efficient in its germicidal powers, and yet non-irritant and non-poisonous to such delicate tissues as skin grafts; this last is, without doubt, the most important of the three.

A NOTE ON SKIN GRAFTING.

BY

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THERE appears to be a tendency among surgeons to avoid the operation of skin grafting chiefly because, with the usual methods adopted, no great measure of success is obtained. With proper care and attention to certain details there should be very few, if any, failures. The details to be attended to are:

1. The raw surface must be in a good condition for skin grafting—that is, it must be covered with healthy granulations and as free as possible from discharge. If there is much discharge many pieces of grafted skin are raised and so fail to "take." To prevent this the wound should be dressed with 1 in 1,000 flavine for four to seven days before operation. In the cases I have treated by this method