

mixture formed. A small addition of sublimate solution fixes the iodine, as may be seen by the immediate bleaching of the iodine solution, and confirmed by the subsequent addition of starch paste, which produces no blue coloration. One part by volume of sublimate solution (1 in 1,000) is just sufficient to fix the whole of the free iodine in four parts by volume of iodine solution (tr. iod. B.P. 5j in Oj.) N.B.—This forms a rough and ready test for the strength of sublimate solutions.

2. *Corrosive Sublimate and Soap*.—An insoluble soap is produced even when a neutral soap solution is used. This is of special importance in consideration of the small admixture with soap which is required to throw down the whole of the mercury from solutions of the strength usually employed.

3. *Carbolic and Iodine*.—An exceedingly small admixture with phenol is sufficient to fix the whole of the free iodine as in (1). One part by volume of carbolic solution (1 in 20) removes the whole of the free iodine from 2,000 parts by volume of iodine solution of the strength indicated above.

4. *Carbolic and Cond.*—This is perhaps the most generally recognised of these incompatibilities. Admixture with phenol immediately turns permanganate brown.

5. *Carbolic and Olive Oil*.—This is of importance and of special interest when taken in conjunction with the researches of Koch, of Berlin, who has shown that bacillus spores are capable of living and developing after having been immersed in carbolised oil (1 in 20) for four months. The oil appears to enter into some combination with and to fix the phenol. If a drop of tr. ferri perchlor. B. P. be shaken up in a test tube with carbolised oil (1 in 20) no change is found to have been produced in the iron as it gravitates to the bottom. Moreover, if carbolised oil be shaken up with a few drops of water, the water allowed to separate out at the bottom of the tube and a drop of iron solution conveyed into it, the characteristic purple coloration with phenol is not produced unless the shaking has been very prolonged and energetic, and then only to a slight degree. By strongly heating the carbolised oil phenol is again set free, and the above reaction can then be obtained.

6. *Iodine and Soap*.—No action is produced by neutral solution, but ordinary soap, which contains an excess of alkali, once removes the free iodine.

7. *Salicylic Acid and Cond.*—A very dilute

salicylic acid solution (1 in 800) slowly removes the color from permanganate.

8. *Salicylic Acid and Soap*.—A drop of dilute salicylic acid solution gives a white precipitate even when a neutral soap solution is employed.

9. *Cond. and Olive Oil*.—When permanganate solution is shaken up with olive oil its violet color is changed to brown.

10. *Cond. and Glycerine*.—When permanganate solution is added to glycerine its color slowly changes.

11. *Cond. and Soap*.—The incompatibility is also generally recognised. Soap, even when a neutral solution is employed, readily turns permanganate brown.

I do not pretend to any precise knowledge of the bodies produced, some of which may, for all I know, possess powerful antiseptic properties, but until this point is settled by direct observation, when chemical incompatibility exists, the antiseptic properties of the original solution must be regarded as weakened, if not wholly destroyed.

The moral conveyed by the above experiments is obvious; avoid as far as possible the admixture of antiseptic agents and their contamination with lubricants and with soap when incompatibility exists. For instance, in employing corrosive sublimate it is advisable to use the same solution for disinfecting the hands (carefully avoiding contamination with soap) and for cleansing instruments* as for irrigating the parts, to employ a mercurialised lubricant and to use alembroth dressings. If for any reason it becomes requisite to substitute one antiseptic agent for another, a second should be chosen which is not incompatible with the first, and the same precautions should be observed throughout the series.

The above observations deal with one phase only of the subject. I am content to leave to more able hands the elaboration of further details. The second question—the chemical nature of the bodies produced—is for the chemist to answer; the third point—the antiseptic value of these bodies—still remains for the germiculturist to determine. When these points have been settled and acted upon, less scepticism as to the value of antiseptic agents

* Here, again, a caution is requisite, for copper and steel, unless nickel plated, are apt to decompose the solution and to cause precipitation of the mercury in a free state.