carried out to purify the growth-promoting principles present in adult tissue.

Minced heart muscle of sheep or fowl was extracted with five parts of physiological saline solution and the extract precipitated with four volumes of 96 per cent alcohol. The precipitate was centrifuged and then dried over calcium chloride *in vacuo*. The dry product represents about 5 per cent in weight of the original material. It is slightly soluble in Ringer, better in Tyrode, and more readily in 0·01 N ammonium hydroxide. The growth of fibroblast cultures in a medium to which the solution of the alcohol precipitate in Tyrode is added is stimulated to the same degree as the growth of cultures treated with the original heart muscle extract. Repeated extraction of the dried alcohol precipitate with either acetone, ether or petroleum ether led to improvement of the stimulating power. Dialysis of solutions of the alcohol precipitate against Ringer did not affect their activity.

An ammonia solution of the alcohol precipitate was neutralized and precipitated by half-saturation with ammonium sulphate. The sediment was dissolved in dilute ammonia, carefully dialysed, and the solution evaporated *in vacuo* to dryness. The product thus obtained was almost entirely soluble in Tyrode and displayed good growth-promoting properties.

These experiments are only a first step. Nevertheless, their publication seems desirable, as during the course of this work alcohol precipitates possessing great cell-promoting power have been obtained. These preparations may represent a particularly appropriate material for experiments in wound healing. It combines with high potency the following practical merits: its preparation does not require sterile precautions except at the final stage; its storage is convenient and its stability is unlimited.

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[1] Nature, **150**, 23 (1942).

Preservation of Plant Material

Preservation of botanical material for teaching purposes is frequently necessary and is commonly achieved by keeping the material in alcohol. With whole plants, or bulky organs, for example many succulent fruits, large quantities of alcohol are required.

Satisfactory preservation may be obtained with many types of material by using a solution of sulphur dioxide, and this method has much to recommend it on the scores of convenience and economy. The use of sulphur dioxide as a preservative of fruits and fruit products for domestic and industrial use is well known. For domestic use "Campden Tablets", consisting of sodium or potassium metabisulphite, may be employed, each tablet as purchased containing the equivalent of 4 grains of sulphur dioxide, so that when dissolved in water (½ pint or 10 oz.) a solution containing approximately 0·1 per cent sulphur dioxide is obtained. This solution preserves most succulent fruits required for morphological studies satisfactorily. It has also proved adequate as a preservative of material required for anatomical work by elementary classes. Any slight hardening effect of the solution is not a disadvantage when herbaceous material is employed, and sections of the preserved material stain normally with common stains such as aniline chloride, iodine and phloroglucin. Anthocyanin pigments present are 'bleached' by the solution, but the blackening to which some plants, for example broad beans, are prone is prevented.

Directions for the use of the "Campden Tablets" include instructions to cork the bottle tightly, and to seal with wax. In fact, tight corking is generally sufficient, but frequent opening of the container in order to remove material is not permissible, as this allows oxidation of the sulphur dioxide and subsequent growth of mould. This is not a disadvantage when preservation of material for use on a subsequent single occasion is required, and even this trouble might be obviated by the addition of a tablet of preservative whenever the bottle has to be opened. Occasionally with fruits containing little free acid slight fermentation occurs[1] but fruits, flowers, stems and leaf material in freshly made solution, and in tightly corked containers, have all kept satisfactorily here.

In field use the method is convenient as the tablets are easily carried, and bottles of ½ pint (10 oz.) capacity or some multiple of this are obtainable in almost every locality and need only to be filled with water and tablets added at the rate of one to each ½ pint of water.

Clearly the adoption of this method of preservation results in the saving of an appreciable amount of alcohol, and at present this alone may well outweigh slight disadvantages that the method possesses.

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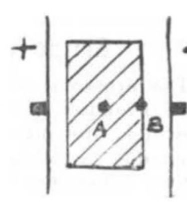
[1] Crang, A., "Preserving Fruits with 'Campden' Fruit Preserving Tablets". Ann. Report Agric. and Hort. Research Station, Long Ashton (1941).

Validity of the Clausius-Mosotti Formula

In a paper published in 1940[1] I threw doubt on the validity of what is now called the Clausius-Mosotti formula and put forward another which, if correct, would considerably affect present values of the dipole moments of many substances.

In that paper I stressed the confusion between macroscopic and microscopic treatments of the problem. The difficulty may, perhaps, be seen more clearly from the following treatment of the usual case of a plane slab of polarizable material placed in the uniform field of a charged condenser as shown in the figure.



Consider the alternative cases, (1) the molecules are uniformly polarized; (2) the molecules are not uniformly polarized.

(1) If the molecules are supposed all uniformly polarized (and this can be proved only on the macroscopic view), there is no difference between the polarizing field at A and that at the boundary B. There is therefore no need to calculate the force E at A and say that, if the polarizability is α, then the moment of a molecule at A is αE. The moment at A is the