latter formula, according to which acid potassium phosphate was used, gave a clear solution as reported by Thom.[1]

On being heated to a high temperature in the autoclave, the milky product settles down as a bulky precipitate. The precipitate consists of magnesium phosphate with traces of iron. Thom[1] and later, Thom and Currie[4] have also noticed traces of precipitated magnesium phosphate.

In this note an attempt is made to study the chemical reactions of the constituent inorganic salts and the effect of the high autoclave temperature on the reactions. One per cent. solutions of pure salts in distilled water were used.

Magnesium sulphate and di-potassium hydrogen phosphate react only at the boiling temperature, when magnesium precipitates as the phosphate. The presence of sodium nitrate alone or with potassium chloride has no effect on the reaction. But the presence of ferrous sulphate even in traces has its part in the reaction and iron is also precipitated along with magnesium even at the ordinary temperature as well as at the boiling or autoclave temperature.

Magnesium sulphate and sodium nitrate or potassium chloride in the absence of di-potassium phosphate do not give a precipitate either at the ordinary temperature or on boiling, even when potassium chloride is present. But when ferrous sulphate is present, slight milkiness is produced, which, on boiling, disappears. When subjected to the high temperature in the autoclave ferric oxide is precipitated.

Ferrous sulphate reacts with di-potassium phosphate at the ordinary temperature even in the absence of magnesium sulphate or potassium chloride and gives a precipitate of ferrous phosphate.

Sodium nitrate and ferrous sulphate do not give any precipitate but in presence of potassium chloride some milkiness is produced which disappears on boiling.

Even in aqueous solution ferrous sulphate changes at the temperature of the autoclave into ferric oxide.

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Sterility of Crop-Plants and a Study of Their Root-System.

STERILITY in crop-plants is fairly well known indeed; it, therefore, does not need any special elucidation. Suffice it to mention that the phenomenon is attended with abundant vegetative growth and as a consequence the sterile plant or branch, in habit looks bushy (Figs. 3 and 4). Studies based on *Trifolium alexanderinum* L. (berseem),[1]

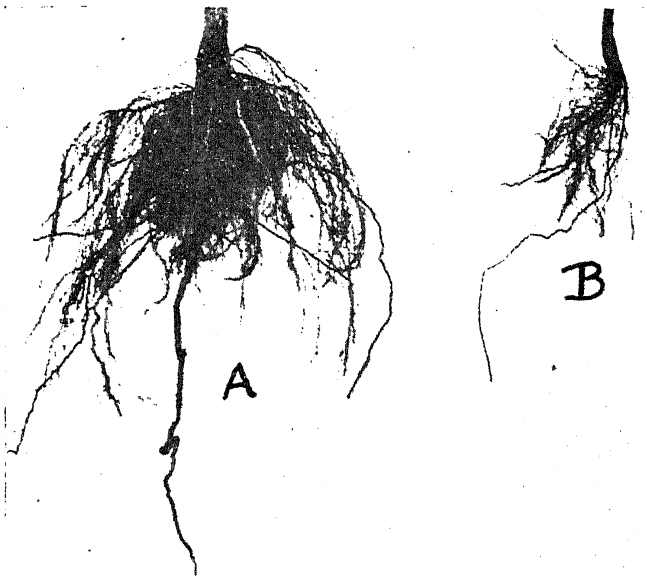

Fig. 1.

Sesamum indicum Linn. A—root-system of a healthy plant; B—root-system of a sterile plant. × 1/6.

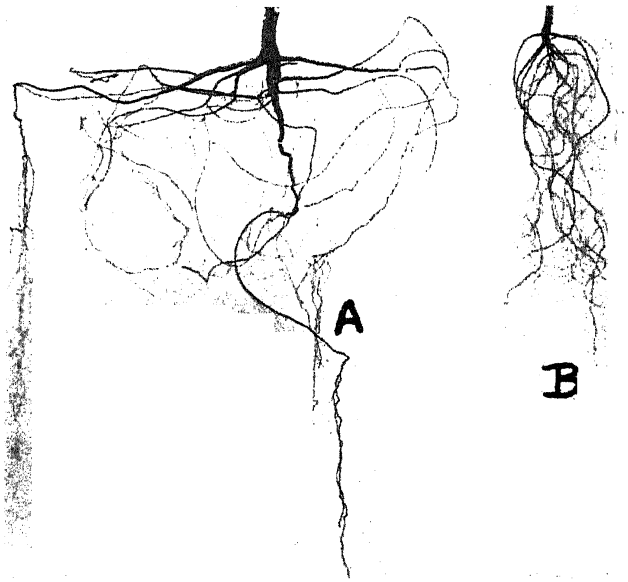

Fig. 2.

Cajanus indicus Spreng. A—root-system of a healthy plant; B—root-system of a sterile plant. × 1/20.

Crotalaria juncea L. (sunn-hemp), *Cajanus indicus* Spreng. (rahar), *Sesamum indicum* L. (til) and *Cicer arietinum* L. (gram), have

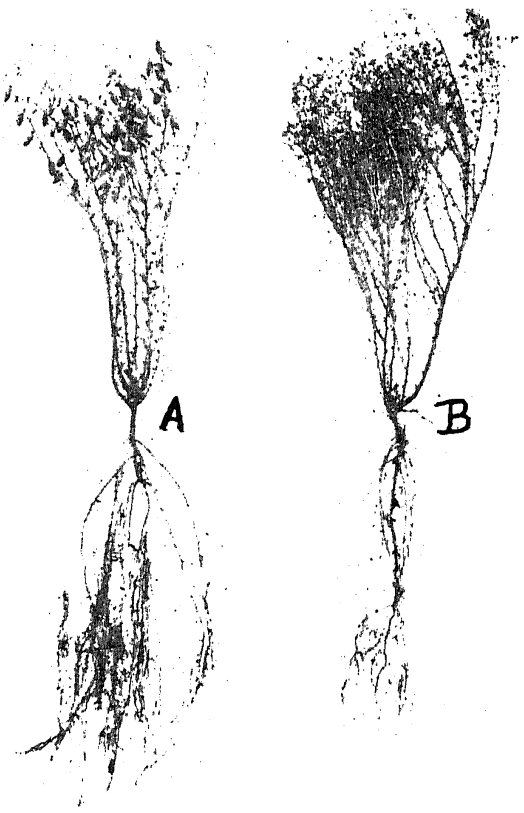

Fig. 3.

Cicer arietinum Linn. A—a normal plant with its strongly developed root-system; B—a sterile plant with its meagrely developed root-system. Note the bushy habit of the plant B. × 1/12.

shown beyond doubt that sterility observed in these is due largely to sepaloidy of petals and transformation of essential organs into very much branched shoots and leaves.[2] An extreme case, however, is found in *Cajanus indicus* Spreng. (rahar) where matters are not so clear as stated above.

A careful study of these sterile plants has evoked some interest. It has been noticed as a result of a number of root-washings that the display of root in sterile specimens is comparatively very poor, the tap- and secondary-roots being very weak and inadequate (Figs. 1-3). In addition, the number and size of root-nodules are also much smaller in the case of leguminous specimens. Whereas, in normal healthy plants, the development of the roots and nodules is fairly strong and profuse (Figs. 1-3).

This correlative study of the sterile plants and their root-system gave rise to the suspicion whether the phenomenon was not purely of a physiological nature rather than genetical as known in other crops, *e.g.*, rice.[3] At a time when this tentative conclusion was arrived at, all the crops had been harvested except *rahar* in which a number of sterile plants were available. Experiments could, therefore, be started only on one crop.

Sets of sterile *rahar* plants were treated as follows and controls were maintained as usual:

(*a*) Plants were irrigated at regular intervals with a very weak solution of pyro-phosphate of soda with a trace of potassium chloride.

(*b*) Plants were irrigated at regular intervals with very weak solution of metaphosphate of soda with a trace of potassium chloride.

(*c*) Two of the strong lateral roots in a plant were cut *in situ* and irrigated with well-water.

Fig. 4.

Crotalaria juncea Linn., a sterile shoot showing the characteristic bushy habit. × 1/6.

No difference was, however, noticed in the treated plants for about a couple of weeks after which curiously enough all of them started flowering. The control was without any flower.

These preliminary results have indicated the suspicion to be correct. It is proposed, therefore, to repeat this experiment on *rahar* and extend it to other crop-plants during the ensuing season.

I am much indebted to Rao Bahadur Viswanath (Imperial Chemist, Imperial Institute of Agricultural Research, Pusa) for certain useful suggestions.

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A New Variety of Black Gram or *Urid* (*Phaseolus mungo*, Linn.).

TWENTY-FIVE types of black gram (*Urid*) have been described by R. D. Bose.[1] In the course of the examination of certain pulses at the Millets Breeding Station, Coimbatore, a new type from Malabar not described by Bose was met with. It is classifiable under "Section 2.—Black seeded types, sub-variety Niger (Bose)". The following is a detailed description of this type.

Habit: Semi-erect, profuse branching, stem furrowed, covered with long brownish hairs pointed downwards, stems green with purple splashes here and there. *Leaves*: Trifoliate, small, ovate, acuminate, leaflets ovate, entire, light green, petioles—long, hairy, channelled, sometimes purple streaked. *Flowers*: In axile racemes, peduncle purplish. Flowers lemon-yellow, back of standard purple tinged at the top, calyx purple tinged. *Pods*: Erect to sub-erect, cylindrical, unripe pods dark purple with a green tinge at the tip. Pods covered by brownish hairs pointed upwards. Dry pods dark brown in colour. *Seeds*: Oblong, small about $\frac{1}{6}$ of an inch long, flattened at both ends, black, dull, (grey back-ground with heavy black marbling).

It will be noticed that this type is characterised by its purple pods. Purple colouring on the pods of pulses is common. Some red grams have this whole or in bands. Similarly in *Dolichos lablab* this colour is whole or localised in the periphery of pods. In green gram, purple along the suture line is noted. In cowpea purple podded varieties are common especially from Malabar. These manifestations of pod purple are mendelian in behaviour. It is therefore interesting to record this new purple podded variety in black gram of potential use in hybridisation.

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A Rare Instance of Poly-Embryony in *Arachis hypogœa*, Willd.

THE occurrence of more than one embryo in a seed has been recorded by various authors from as early as 1719. Many species of various families in both Dicotyledons and Mono-cotyledons have been known to exhibit the phenomenon. It is prevalent among the common species like *Syzigium jambolanum* (*Myrtaceæ*), *Syzigium* spp. (Tiwary, 1926), *Citrus aurantium* (*Rutaceæ*) and *Mangifera indica* (*Anacardiaceæ*). In *Papilionaceæ*, poly-embryony has been noted in *glycine hispida* (Owen, 1928). But it has

A. Germinating groundnut seed showing two main roots.

not been noticed, till now, in the groundnut, even though about a million groundnut plants have been examined during the last five years. Earnst (1918), Coulter, Barnes, Cowles (*Text-Book of Botany*) recorded a number of instances of poly-embryony.