forceps from a compartment without uncovering more than three compartments. A screen covering tends to shade the plants, preventing them from thriving.

It has not been necessary to use biological water. Newts do equally well in tap water, and I have raised them in the city water of New York City and Chicago.

Most investigators who employ newts feed each one individually by offering it meat with a pair of forceps; this occupies considerable time. I find that if small pieces of ground muscle are placed in the water once a week the newts will eat readily; only 10–15 min. a week is then required to feed a hundred or more newts.

By employing the principles of the aquarium described above, many more newts can be studied at less expense of time and money than by the methods generally used.

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Release of Phosphate from Soil Minerals by Hydrogen Sulphide

In this laboratory it was observed that some colonies of soil bacteria and fungi, grown on carrot-extract agar containing 0·1 per cent ferric phosphate in suspension, turned the particles of phosphate in their vicinity black. Blackening occurred only when hydrogen sulphide was produced by these organisms, some of which formed it anaerobically but others aerobically. Bromfield[1] showed that hydrogen sulphide was produced by several strains of *Bacillus megaterium* in apparently well-aerated soils. These results suggested that sulphides in soil may reduce ferric phosphate to black ferrous sulphide and release available phosphate.

The influence of 24-hr. treatment with hydrogen sulphide at room temperature was determined on phosphates of ferric iron (isomeric with metastrengite) of calcium (hydroxy apatite, octa phosphate and a trace of brushite) and of aluminium (amorphous by X-ray analysis), and also on ferric and calcium phytates.

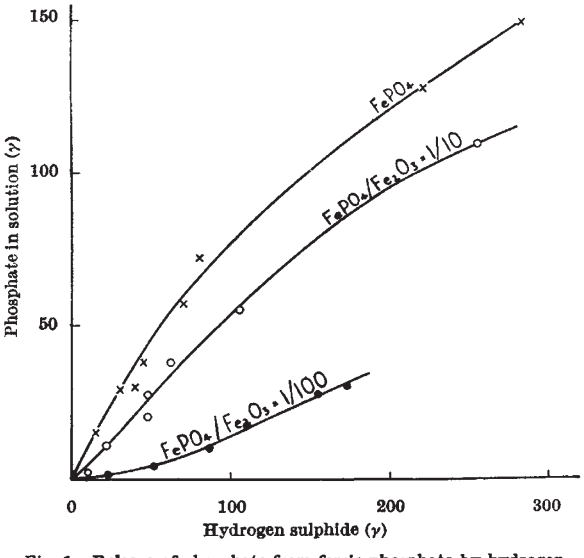

Fig. 1. Release of phosphate from ferric phosphate by hydrogen sulphide in the presence and absence of iron oxide

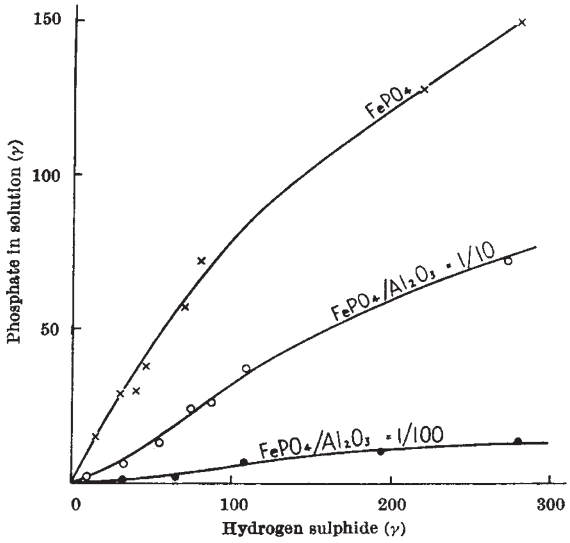

Fig. 2. Release of phosphate from ferric phosphate by hydrogen sulphide in the presence and absence of aluminium oxide

Phosphate was released from ferric phosphate by much lower concentrations of hydrogen sulphide than from tri-calcium and aluminium phosphates or from ferric and calcium phosphates. It was considered that most soils would not contain sufficient hydrogen sulphide even under anaerobic conditions to attack any phosphate other than ferric phosphate. Since most soils contain sesquioxides which might compete with ferric phosphate for any hydrogen sulphide formed, additional treatments were included to test the effect of hydrogen sulphide on ferric phosphate mixed with either iron oxide (hæmatite) or aluminium oxide (boehmite) in the ratios of 1 : 10 and 1 : 100.

Increasing amounts of sulphide increased the quantity of phosphate in solution, measured colorimetrically[2] as shown in Figs. 1 and 2.

At all sulphide-levels the amount of phosphate in solution was suppressed when sesquioxides were present, particularly by the finely crystalline aluminium oxide, but less so by the coarser iron oxide. The level of phosphate in solution reached a maximum after several hours and thereafter fell steadily, suggesting refixing of phosphate on the surface of sesquioxide particles.

Sesquioxide would greatly hinder release of phosphate, but in waterlogged siliceous soils, low in sesquioxides but high in hydrogen sulphide, release of phosphate might be of importance.

I thank Dr. R. J. Swaby for helpful suggestions during this work.

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