Korolev and Kozerenko[2] claimed to have detected traces of smythite in a synthetic mixture of pyrrhotite and marcasite. The temperature of this synthesis was 150° C. But because they reported that this experiment was not repeatable, some doubt must be cast on this result.

This work forms part of an extensive research programme investigating the aqueous chemistry of the iron sulphides. During this programme griegite, Fe_3S_4, mackinawite, FeS, pyrite, FeS_2, and pyrrhotite, FeS_{1+x}, were synthesized by the reaction between a dissolved sulphur species and dissolved ferrous or ferric iron or one of the iron oxyhydroxides. Experiments along similar lines by other investigators have also failed to produce smythite[1,3,4]. It seems therefore that the initial presence of siderite is a necessary factor in the formation of smythite.

There are insufficient data available about the natural occurrence of smythite to allow an examination of the validity of this experimental conclusion for the origin of smythite in the natural environment. In the two occurrences from which smythite has been reported, however[5], there is evidence that it was formed at low temperatures and in close association with rhombohedral carbonates.

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BIOPHYSICS

Measurements of Potassium Ion Activity in the Cytoplasm of the Characeae as a Test of the Sorption Theory

The recent measurements of the potassium ion activity in the cytoplasm of cells of *Chara australis*[1] are of greater significance than the author suggests, because measurements of the ionic concentrations in the cytoplasm of other fresh water Characeae have already been made[2,3]. Comparison of activities and concentrations provides information about the state of the ions in the cytoplasm which may be used to test the "membrane" and "sorption"[4,5] theories of ion transport.

The proponents of the sorption theory claim that most of the water in the cytoplasm of living cells is maintained in an ice-like state by its close association with protein and that this reduces the ionic solubilities. The rest of the water is said to be freely accessible to substances in the external solution and therefore the high internal ionic concentrations, compared with fresh water, could only be accounted for by binding of the ions to the cellular constituents. Furthermore, to explain the observed accumulation ratios, potassium would have to be bound preferentially to sodium. A consequence of this theory is that the intracellular ionic activities, particularly of potassium, should be very low compared with their activities in a purely aqueous solution of similar ionic strength. On the other hand, proponents of the membrane theory hold that most univalent ions exist in a freely diffusible state in the cytoplasm and that ionic selectivity is a result of the differential permeability of the cell membrane combined with a "pump" which uses metabolic energy to move sodium out of the cell and potassium inwards.

It has often been pointed out that the sorption theory could not account for the accumulation of ions in the vacuoles of the Characeae because they contain little, if any, protein. It is not surprising therefore that Vorobiev[1] finds good agreement between the measured activity of potassium in the vacuole of *Chara australis* and that estimated from the measured concentration. More interesting is his measurement of the activity of potassium in the cytoplasm (115 ± 10 mM) which is great enough to suggest that most of the potassium is unbound even if no figures for cytoplasmic concentrations were available. Measurements have been made, however, on other fresh water Characeae with similar vacuolar potassium concentrations and tonoplast membrane potentials. The values obtained were 119 mM for *Nitella translucens*[2] and 125 mM for *Nitella flexilis*[3]. Assuming that the activity coefficient is 0·75, this leads to a calculated potassium activity of about 90 mM for these two species. This is sufficiently close to the measured value for *Chara australis* to suggest that practically all the potassium in the cytoplasm is unbound. This conclusion is consistent with similar observations on muscle cells[6] and is in direct contradiction to the sorption theory.

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PHYSIOLOGY

Effect of Tranquillizing Drugs during Pregnancy on Activity of Offspring

Injection of certain tranquillizing drugs during pregnancy produces defects in maze learning[1], defects in both the acquisition and extinction of a conditioned avoidance response[2], and lower weight[1,2] in the offspring of the injected animals. These effects vary according to the period of administration, as well as the drug involved[3]. All the tranquillizing drugs which were used had some adverse effect, but this was not uniform. In this communication we describe attempts to extend the scope of previous work on the effects of these drugs on activity, emotionality and reaction to stress (ulceration).

In the first exploratory study, we used twelve groups of male rats in a 4×3 factorial design. One independent variable, the drug administered, involved four groups of experimental subjects the mothers of which were given reserpine (Res), meprobamate (Mep), chlorpromazine (Chl), or distilled water (control) during pregnancy. The three tranquillizing drugs are representative of three different chemical groups, respectively *Rauwolfia* derivatives, substituted propanediols, and phenothiazine derivatives. The second independent variable was whether the drug was administered in early, mid or late pregnancy.

The mothers were obtained from the Sprague–Dawley company, Madison, Wisconsin, and were of standard Sprague–Dawley stock. The sixty experimental animals