Table 1. Effect of Chlorpromazine and 2 : 4 Dinitrophenol on Systems deficient in Adenosine Diphosphate and Phosphate

Additions	Chlorpromazine (2×10^{-4} *M*)	Oxygen uptake (μ atm.)	
		Deficient in adenosine diphosphate	Deficient in phosphate
Nil	−	4·5	1·1
Nil	+	3·6	2·1
2 : 4 Dinitrophenol ($3 \cdot 3 \times 10^{-5}$ *M*)	−	8·1	6·0
2 : 4 Dinitrophenol ($3 \cdot 3 \times 10^{-6}$ *M*)	+	3·1	3·6

System: ATP, 0·0017 *M*; KCl, 0·025 *M*; $MgSO_4$, 0·0067 *M*; cytochrome *c*, 2×10^{-5} *M*; L-glutamate, 0·01 *M*; inorganic orthophosphate, *p*H 7·2, 0·01 *M* in adenosine diphosphate-deficient system and 0·0017 *M* in phosphate-deficient system. *Tris* buffer, *p*H 7·2 at 0·067*M*. Mitochondria in 0·25*M* sucrose, 1·0 mgm. nitrogen. Final volume, 3·0 ml. Temperature, 38° C. Gas phase, air. Incubation time, 10 min.

Table 2. Effect of Chlorpromazine on the Exchange Reaction Phosphorus-32–Adenosine Triphosphate

	Counts/min. incorporated into adenosine triphosphate	Inhibition (per cent)
Control	3,150	Nil
Chlorpromazine (2×10^{-4} *M*)	1,460	54

System: ATP, 0·0017 *M*; inorganic orthophosphate buffer, *p*H 7·2, 0·0033 *M*; $MgSO_4$, 0·0067 *M*; KCl, 0·025; *tris* buffer, *p*H 7·2, 0·03 *M*; versene, 10^{-3} *M*; phosphorus-32 equivalent to 15,000 counts/min. added. Time of incubation, 15 min. Temperature, 20° C. Specific activity of phosphorus-32, 1,000 counts/min./μmole.

phosphorylation at a point prior to that which is sensitive to 2 : 4 dinitrophenol. We suggest, for example, a modification of the scheme of Chance and Williams[2], as follows:

$$(1)\quad B + iP \rightleftharpoons B.P$$
$$(2)\quad AH_2 + B.P \rightleftharpoons A + BH_2 \sim P$$
$$(3)\quad BH_2P + X \rightleftharpoons X \sim P + BH_2$$
$$(4)\quad X \sim P + ADP \rightleftharpoons ATP + X$$
$$(5)\quad BH_2 \sim P \rightarrow BH_2 + iP$$
$$(6)\quad X \sim P \rightarrow X + iP$$

In this scheme, AH_2 would represent reduced diphosphopyridine nucleotide and *B* oxidized flavoprotein. *X* is the unknown intermediate postulated by Chance. In this scheme chlorpromazine would interfere with reaction (3) and 2 : 4 dinitrophenol with $X \sim P$ of reaction (4). Reaction (5) would be relatively slow, reaction (6) relatively rapid.

These results are being published in full elsewhere[3].

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Separation of Glucose-1-Phosphate and Glucose-6-Phosphate by Paper Chromatography

Glucose-1-phosphate and glucose-6-phosphate are not readily separated by the solvent systems normally used for the analysis of the naturally occurring phosphoric esters on paper chromatograms (for example, propanol – ammonia – water, *t*-butanol – picric acid – water, etc.[1]). Though very similar in structure, the esters differ in that glucose-6-phosphate has two *cis*-hydroxyl groups available for substitution and the addition of boric acid to some of the solvent systems previously described enables glucose-6-phosphate to be differentiated clearly from glucose-1-phosphate[2].

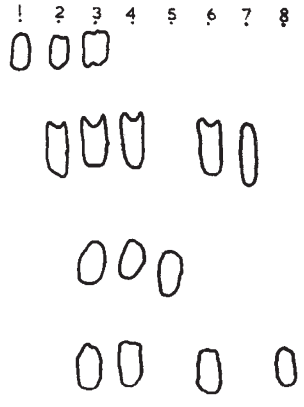

Fig. 1. Chromatogram of phosphoric esters and orthophosphate: (1) fructose-1,6-diphosphate; (2) fructose-1,6-diphosphate + glucose-6-phosphate; (3) fructose-1,6-diphosphate, glucose-6-phosphate, free orthophosphate and glucose-1-phosphate; (4) glucose-6-phosphate, free orthophosphate and glucose-1-phosphate; (5) free orthophosphate; (6) glucose-6-phosphate + glucose-1-phosphate; (7) glucose-6-phosphate; (8) glucose-1-phosphate. Temperature, 20° C.; running time of chromatogram, 48 hr. The paper was equilibrated overnight before the addition of solvent and had been previously washed with acetic acid, distilled water and ammonia (ref. 4)

The addition of boric acid to saturate methyl cellosolve–methyl ethyl ketone–3*N* ammonium hydroxide (7 : 2 : 3 v/v)[3] gives a sharp separation of glucose-6-phosphate from glucose-1-phosphate and from fructose-1,6-diphosphate and inorganic orthophosphate (Fig. 1).

This work was carried out with Dr. F. A. Isherwood at the Low Temperature Research Station, Cambridge.

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Spatial Summation for Heat-Pain

The report of an experimental study by Greene[1] on this topic reached me too late for reference to be included in my recent communication[2].

Greene used three methods of stimulation. Two of these—needle-scratch and cold immersion—produced no significant amount of spatial summation. In his third method, of thermal radiation, he used a bank of six 500-W. quartz infra-red lamps so arranged as to produce an even field of radiation over a large area, and found a mean temperature difference in pricking-pain sensation thresholds of 1·1° C. as between an area of 7·8 cm.^{2} and one of 2·5 cm.^{2}.

This represented a statistically significant degree of spatial summation, but less than that which I reported for the water-heating method, the difference being probably due to two main variations in the