such systems show some very interesting behaviour they cannot account for the sodium concentration profile in the renal medulla.

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THE discrepancy between our results and those of Dr. Stephenson arises from our assumption that in the model there is continuity of interstitial fluid concentration through site beta. This assumption appeared both natural and necessary at the time but, as Dr. Stephenson has pointed out, does not follow from other features of the model. However, it seems unlikely that any physical system would exhibit the interstitial fluid concentration profile described by Dr. Stephenson. At the present time we are investigating the conditions under which, in the purview of physical reality, jump discontinuity of interstitial fluid concentration may be eliminated.

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FAILURE OF HEXACHLOROBENZENE TO CONTROL COMMON BUNT OF WHEAT

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HEXACHLOROBENZENE, the active constituent of several seed-dressing products, is generally accepted in Australia as well as elsewhere to be one of the most effective fungicides for control of common bunt (*Tilletia caries* (DC.) Tul. and *T. foetida* (Wallr.) liro) of wheat[1–3].

Hexachlorobenzene and organically combined mercury were included as reference treatments in wheat seed-dressing trials in the 1964–65 season in South Australia and Victoria in which a number of chemicals were tested for their ability to control seed- and soil-borne bunt. For the seed-borne bunt trials wheat seed (var. 'Olympic') was inoculated by ball-milling it for 20 min in glass jars with 0·5 per cent by weight of teliospores of *T. caries* and *T. foetida*. Inoculated and non-inoculated (soil-borne bunt) wheat was dressed in the same way with the treatments at the rates given in Table 1. The 'No-Bunt', being a slurry, had to be diluted with the same amount of water to obtain satisfactory coverage.

The Northfield, Sydenham, Corop and Natimuk trials were laid down with a commercial combine. Each of these trials consisted of two randomized blocks with single-row plots about four chains long. A sample of 1,000 heads was taken from the total collected harvest of each of the plots and assessed for bunt. At Silvan, sowing was done by hand to 12-ft. long row-plots in a four-times replicated randomized block trial for each seed- and soil-borne bunt. The complete yield per plot—about 200 heads—was assessed for bunt. The results of the trials for seed-borne bunt are given in Table 1 and those of the trial for soil-borne bunt in Table 2.

The ineffectiveness of hexachlorobenzene in these trials was most unexpected, and in connexion with this the following facts are relevant:

(1) Since three different proprietary products of hexachlorobenzene were used, the possibility of a faulty batch can be excluded.

(2) The trial in South Australia was organized by an independent co-operator. Furthermore, the aliquots of seed for each of the Victorian trials were prepared separately. Thus, the chance that an inaccuracy in experimental procedure has been carried through the six different trials can be ruled out.

(3) Hexachlorobenzene was included as a reference treatment in one trial only in 1963–64, when it was quite inferior to 'Ceresan'. This was then thought to be a chance result. In this trial 'Insignia' wheat was used.

(4) The inoculum originated from a naturally infected wheat crop (var. 'Insignia') near Quambatook (Vic.) and was procured in 1963. It carried about 900 spores of *T. foetida* per grain only and was therefore inoculated with teliospores of *T. caries* at 0·5 per cent of the weight of the seed for use in the 1963–64 trials. The bunted ears of these trials were saved and were used to inoculate the seed wheat of the 1964–65 trials.

(5) The history of the Quambatook crop could be traced and it appeared that the seed wheat for it had been treated with 30 per cent hexachlorobenzene at 1 oz./bushel.

(6) Information from various sources indicates that during the 1964–65 season especially, bunt has become troublesome in certain areas of Australia and it has appeared more difficult to control. Three farmers who had bunted crops that season advised that their seed wheat had been well pickled with hexachlorobenzene. One of them had applied it at double the standard dosage, since his crop was bunted the previous season despite dressing with hexachlorobenzene.

(7) Excellent results with hexachlorobenzene as 'Hexcebunt' at 2 oz./bu. were obtained in the 1964–65 trials conducted by the Department of Agriculture of Victoria.

Table 1. RESULTS OF TRIALS FOR CONTROL OF SEED-BORNE BUNT AT FIVE DIFFERENT LOCATIONS

Treatment	Mean percentage bunted heads				
	Northfield, S.A.	Sydenham, Victoria	Corop, Victoria	Natimuk, Victoria	Silvan*, Victoria
Control	52·05	77·30	53·65	54·20	7·86
'Ceresan'†	0·60	0·35	0·15	0·15	0·48
HCB‡	39·15	24·10	11·75	17·00	3·13

* The low take of the disease was probably due to sowing late in the season when the soil temperature would have been above optimum during the infection period.

† In the Northfield trial, I.C.I.'s 'Ceresan' (1·5 per cent Hg as phenylmercuric acetate) was used at 1·5 oz./bu.; in the other four trials it was applied at 2 oz./bu.

‡ The wheat in the Northfield trial was dressed with Union Carbide's 'Hexcebunt' (30 per cent HCB) at 1 oz./bu.; in the Silvan trials, ICIANZ's 'Buntosan G' (30 per cent HCB) was used at 2 oz./bu.; and in the remaining three trials dressing was done with Chipman's 'No-Bunt' (40 per cent HCB) at 1·5 fl. oz./bu.

Table 2. RESULTS OF THE SILVAN TRIAL FOR CONTROL OF SOIL-BORNE BUNT

Treatment	Mean percentage bunted heads
Control	34·21
'Ceresan'*	20·00
HCB*	16·24

* For dressing rates see footnotes to Table 1.