Wickramaratne, M. R. T. and B. C. Lamb. Influence of some environmental factors on recombination.

The effects on recombination of temperature of incubation of the conidiating parent, conidiol age, age of the crossing medium and heat-shock of conidia and protoperithecia were studied, using the asco mutant of N. crassa. Media and general methods were those of Lomb (1966 Genet. Res. 7: 325).

Incubation of conidiating cultures at 8, 15, 17.5 or 37°C for six days prior to conidiation produced second division segregation frequency (SDSF) values not significantly different from control values (incubation at 25°C) even at the 20% level of probability. Since little cytoplasm is contributed by the conidia, any temperature-sensitive "effector compounds" (Lomb 1969 Genetics 63: 807) present in conidiol cytoplasm would need to be effective in extremely low concentrations at meiosis, to be detected.

An investigation of the effect of ageing of conidial cultures on recombination indicated paternal age effects. Storage of conidial cultures at room temperature (about 20°C) for two months resulted in significantly lower SDSF values which were statistically homogeneous with each other but significantly different from the control value. Ageing may cause the following effects, amongst others: (1) Mutation of regulator genes present in conidial nuclei; this is possible as Auerbach (1959 Heredity 13: 414) estimated that the number of conidia carrying one class of mutation (recessive lethals) increased by 0.3% a week during storage. (2) Accumulation of recombination inhibitors with age: the passage of such inhibitors from conidia to protoperithecia could cause lowered SDSF's but, like temperature-sensitive effecton, these inhibitors would need to be effective in extremely low concentrations at meiosis. A reduction in SDSF with increasing age of protoperithecial culture at conidiation war found by Lomb (1971 Genet. Rer. 18: 255) but the protoperithecia do contribute nearly all the cytoplasm in the cross. The result of ageing conidia for two months at 25°C was unexpected in that it produced SDSF values homogeneous with the controls. This may be because the process of ageing differs with temperature.

The age of medium (old medium was used for both protoperithecial and conidial cultures) also seemed to affect recombination. The use of stale or freshly mode but repeatedly autoclaved medium for crossing produced SDSF values significantly different from controls made using fresh medium. Ageing or repeated autoclaving probably caused alteration of the chemical composition of the medium by hydrolysis and decomposition. However, these results differ from those of Towe and Stadler (1964 Genetics 49: 577); using the asco mutant of N. crassa, they observed that chemical alteration of the crossing medium resulted in significant increases in SDSF but caused no significant decrease.

Heat-shocking either protoperithecial or conidial cultures at 60°C for *60* seconds produced no significant difference in SDSF, as compared to control values. Heated sterile paraffin oil was used to heat-shock protoperithecial cultures. Conidia were heat-shocked in sterile distilled water at 60°C. Results from heat-shack experiments ore in agreement with those of Mitchell (1957 Symp. on Chemical Basis of Heredity, p. 94, McElroy and Glass (edr.), Johns Hopkins Press, Baltimore).

- - - Department of Botany, Imperial College, London SW7 2BB.