

Department of Genetics,
The University,
Edgbaston,
Birmingham, 15.

2nd May, 1953.

Dr. J. Lederberg,
Department of Genetics,
College of Agriculture,
University of Wisconsin,
Madison 6,
Wisconsin, U.S.A.

Dear Lederberg,

It was a great pleasure to receive a letter from you and to hear how E. coli is getting along. Although I try to read the various papers as they appear, especially the reviews, I do not find it easy to keep up with all the advances in bacterial genetics. It is a fascinating subject and I only wish I had more time to give to it personally. I am trying to do the next best thing. Jinks, who is a very bright young man, has been chiefly concerned with fungal genetics, but he is now going to Cavalli for a time so as to gain some experience with the methods and problems of bacterial genetics. While I do not say that bacterial genetics will then become his chief interest, at least he should be able to keep up with the subject and to keep the rest of us at least moderately up to date also.

I passed your letter on to Rees and Jinks and I have discussed it with them. We are not clear what would be involved in detail in a system of random fluctuations of nuclear ratio with selective proliferation of those hyphae which come to have, by chance, the most adaptive ratios. It seems to us, however, that the system as Rees and Jinks saw it in Penicillium can hardly have this element of randomness in it, because of the highly coordinated divisions of the nuclei in the tip cells of the heterokaryons, these being the only cells in which, so far as we can see, division occurs. The existing nuclear ratios must be preserved, at least to a very close approximation, by such a system of coordinated division. It might be assumed, of course, that the adaptive ratio came into being by selection for a random group, even though, when once attained, it was maintained by coordinated division; but such an assumption would seem to us to be gratuitous, for if cytoplasmic control can coordinate division in one set of circumstances, it would surely not be unreasonable to suppose that it would adjust it in another. Furthermore, such a control of division by the cytoplasm (which itself is what the nucleus or nuclei have made it) offers a very reasonable way of understanding why, as we have observed it in Penicillium, the nucleus which in a homokaryon divides faster (the homokaryon itself growing faster) on a particular medium is the one which predominates in a heterokaryon on that same medium.

Oves.

I trust that these notes will have helped to clarify the way we have come to look at heterokaryons.

I hope that all goes well with Mrs. Lederberg and yourself.

Best wishes to you both.

Sincerely yours,

Kenneth Mather

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Sender's name and address:-

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