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Direzione Scientifica

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My dear Professor,

I am eventually back to Italy after the Copenhagen meeting. I spent a short time in Germany, where I had the pleasure of seeing old friends, but a ~~poor~~ impression of scientific research (with few exceptions). The Copenhagen congress was on the whole good, we had five rather full days, with far too much biochemistry for a genetical meeting. From the purely genetical point of view there was little new, moreover bacteria were rather neglected to the advantage of the other microorganisms. The outstanding papers were concerned with transforming principles in pneumococci - Harriet Ephrussi-Taylor showing data which pointed out some sort of recombination between transforming principles -; with details of cytoplasmic effects in *Paramecium* antigens (Beale); ^{with} evolution in bacterial populations (Ryan) and the nature of the gene (Pontecorvo). Ryan postulates a sort of oscillating equilibrium in bacterial populations between wild type and mutant types. He showed that changes towards increased fitness occur at a very low rate (10^{-12}), the nature of the change being unknown; that when such changes occur in populations where a mutant ^{say R_-} is at a relatively low equilibrium rate, fixed by mutation and selection pressures, say 10^{-6} , the mutant will disappear due to the change of fitness occurring in the more abundant wild type ^(R_+); then will reappear by mutation of the fitter ~~type~~ ^($R_+ \rightarrow R_-$) wild type and reestablish itself at the same frequency as before, thus giving rise to oscillating equilibrium. whether such changes of fitness occur in a sequence or in a linear chain is not known.

Pontecorvo gave a summary of the known cases of complex genes, pseudoalleles etc. , in order to discuss where his new cases would

fit in the picture, and what can be said from ~~them~~ on the nature of the gene. The examples he has added where: the already published case of the three biotinless loci, less than 0.1 centimorgans apart; among the three loci, absolutely no physiological differences were detected so far. Two new cases were: two similarly behaving genes for paraaminobenzoic acid deficiency; and two adenineless mutants, very closely linked but with physiological differences.

I should like to keep you informed of ~~the~~ my future work. ^{At present} I have not obtained, so far, a clear cut complementary recombinant, and as to the crossing work in coupling and repulsion for three pairs of genes I think I shall try to obtain all the necessary strains by back mutation, according to an earlier plan which I have now put into operation. One plan I am considering is the possibility of extending the chloromycetin work to another drug, like sulphonamides for instance, which are far better known from the point of view of the mechanism of action and resistance, in view to start a research on the biochemical bases of polygene action, especially, of their interactions which seem rather peculiar. I am not very enthusiastic of this idea however, as I am afraid that the ^{degree of} generality of conclusions obtainable might not be satisfactory on the other hand I am stimulated to it by the idea that bacteria might ^(be) unusually useful organisms in this respect.

I hope you will not mind the length of this letter, which purports to give you a short and late summary of the Danish meeting. The week I spent in Cambridge was delightful and I only hope to be able to renew such stays often enough, ~~in the lack of longer stays~~. Although this will be a poor ^{substitute for my point of view} ~~arrangement for spending all the year in Cambridge~~ for full time work in your department, it will be the best I shall be able to do at present. With my best thanks for your hospitality on March,

Yours sincerely

Luca Cavalli