



From: Toby Johnson
Institute of Cell, Animal and Population Biology
University of Edinburgh

Report to James Rennie Bequest Committee on SSE Meeting in Vancouver, June 1998.

Due to a generous grant of £400 from the James Rennie Bequest, I was able to attend the 1998 joint meeting of the Society for the Study of Evolution (SSE), the Society of Systematic Biologists, and the American Society of Naturalists. This was held over June 20-24 at the University of British Columbia, Vancouver, Canada.

The costs of attending the meeting were as follows:

Return bus journey Edinburgh-Glasgow	£ 10
Return flight Glasgow-Vancouver	£459
Membership of Society for the Study of Evolution	£ 22
Registration (SSE member student rate)	£ 60
Accommodation (5 nights)	£ 70
Medical Insurance	<u>£ 22</u>
TOTAL	£643

The balance was met by a personal contribution of £243.

The presentations at the meeting covered a wide range of subjects, but were generally interesting and of a high standard. Much of my current work concerns the evolution of mutation rates, which is a somewhat obscure field, so I was surprised by the number of people with whom I was able to discuss this topic.

There were a large number of talks on estimating mutation rates, in a range of organisms. This is interesting to me as the results from experiments like these constitute much of the data on which my theoretical work is based. In the last couple of years a growing number of workers have challenged the orthodox belief that rates of selectively disadvantageous mutations are high (of the order one per genome per generation). It is becoming increasingly apparent that the conditions under which fitness is measured are critical in determining the outcomes of these experiments. This is an area where data is rapidly accumulating, and therefore it was exceedingly useful for me to attend the conference rather than to acquire the information as it is published in six or twelve months time.

I was particularly interested in two sessions of talks, which were on evolution and genetics of microorganisms. I am currently developing some theoretical population genetic models specific to asexual microorganisms, and the sessions provided a great deal of general background knowledge. Two talks were of more specific interest.

Dr. Cliff Zeyl presented results from long-term mutation accumulation experiments in yeast (see above). He has recently started a number of other long-term evolution experiments with yeast, and this is interesting to me because it is probably the only experimental system with which one could test a number of theoretical predictions concerning the evolution of mutation rates in sexual vs asexual populations. An interesting discussion revealed that there are considerable practical difficulties in maintaining a strictly sexual population of yeast, which would be crucial to the experiments which I was suggesting.

Prof. Rosie Redfield presented interesting and somewhat controversial arguments concerning the evolution of mutation rates in bacteria, which are not well known amongst theoreticians (like myself) working on this topic.

Of great relevance to my own work was a presentation by Dr. Paul Sniegowski, entitled 'Evolution of Mutation Rates in *E. Coli*', which was part of a symposium 'New Directions in Experimental Evolution'. Although the twenty minute talk covered mostly ground I was already familiar with, some new theoretical results were presented. After his talk, Paul Sniegowski and I had a number of long discussions. During these I learned a lot more about his work, and we exchanged opinions on a number of recent developments in our field. In particular, I was able to point out that differences between some recent theoretical[1] and empirical[2] work might be reconciled by considering a multi-locus model, which I have now started working on. It is likely that I will visit Paul at the University of Pennsylvania this winter to discuss the results of this work.

My own talk seemed to be well received. It was unfortunately scheduled in the last session on the last day, so there was only limited opportunity for any discussion afterwards. The majority of feedback which I received was actually from people based at Edinburgh, who had not seen any of the talks I have given within the University! Preparing and giving the talk, and discussing it afterwards, helped me to focus on the important results and on the best ways of explaining them, and after returning from Vancouver I was able to very quickly make some large improvements in the accompanying manuscript, which has now been submitted to *Genetics*.

References

1. Taddei, F., *et al.*, *Role of mutator alleles in adaptive evolution*. *Nature*, 1997. **387**: p. 700-703.
2. Sniegowski, P.D., P.J. Gerrish, and R.E. Lenski, *Evolution of high mutation rates in experimental populations of E-coli*. *Nature*, 1997. **387**(6634): p. 703-705.