Having read Whitley & Starkweather's paper several times, my overall impression was, "What's an essentially genetic algorithms paper doing in a neural network conference proceedings?" The essence of their message is that the parallelized version of their GENITOR variation of the genetic algorithm works better than the standard version (to be found in Goldberg, 1989, for example). (I recommend Goldberg's book as an excellent and readable introduction to the principles of genetic algorithms—the best in the literature.) Whitley and Hanson wrote a longer (6-page instead of 4-page) version of this paper for the Third International Conference on Genetic Algorithms (Whitley & Hanson, 1989) which says much the same things. I suppose that Whitley and Starkweather thought that if they applied their improved genetic algorithm to a neural network application (rather than to the usual, non-neural network optimization problems) it might get accepted at a neural network conference. Well, it did, but that doesn't change my opinion that their 4-page paper is a genetic algorithms paper in disguise. (Publish or perish, right?!) Still, it's not a bad paper. It is well written, clear, and reads easily. I had (I hope) no trouble with it (as a genetic algorithms paper!). What they are saying is that the standard genetic algorithm can be improved by replacing the traditional approach to crossover (i.e., creating two progeny by swapping portions of two parent chromosomes, which are destroyed in the process) by allowing the two parents to continue to exist in the population, and randomly choosing one of the two (crossed) progeny and using it to replace the lowest ranking chromosome in the population.

There is a second variation in the GENITOR approach. Instead of parents reproducing the next generation with a probability proportional to their fitness (i.e., a measure of the quality of the "solution" to the problem encoded in the chromosome, which is usually a binary string), they do so in proportion to their rank. Whitley & Starkweather make no mention of the usual technique of scaling as a means to prevent premature convergence. (Scaling is linearly transforming fitness scores such that the best (transformed) value is a (user specified) constant times larger than the average value.) Scaling (and ranking) prevents early high fliers from squeezing out other members of the population prematurely. Whitley & Starkweather's parallelized version of GENITOR (i.e., GENITOR II) uses quasi-isolated subpopulations, each with its own genetic algorithm. Occasionally, each subpopulation sends its best chromosome to another subpopulation (round robin style). The justification for all of the above is to retain genetic diversity in the whole population.

I was impressed by their results. They definitely got better evolutionary speeds and higher quality solutions than the traditional approach, and these results motivate me to want to try their ideas in my own work. However, their work raises two issues of importance. One involves