Notes on writing reports with examples from the first report.

The first thing you must do is identify the model you will use to treat the problem. State your assumptions and what might be less than perfect about them. For example, "I will assume this population grows exponentially with a constant growth rate. The exponential model was derived for bacterial populations and might be less applicable to organisms for which the young must mature before reproducing themselves."

Next you must provide supporting evidence for your proposed solution. In this problem you calculate the two parameters of the exponential model and plot the model against the data. You must document how you carry out this work; explain your calculations. In this case you also should plot the logarithm of the population versus time because this is supposed be a straight line and straight lines are easy to judge.

Now decide whether your assumption is valid or not. In this case it is not a good assumption. The actual population is about 300 million while the model produces about 586 million. It does not make good sense to calculate how much bigger the population would be for a 2 percent higher growth rate when the growth rate is so inaccurate in the first place.

Even if you just press on with this bad solution, you must at least make the observation of the vast discrepancy.

But the right thing to do is think of a way to overcome the difficulty. This requires you to be creative; it is the challenging and fun and gratifying part of your job.

Assuming then you have in hand an acceptable model, now proceed to use it to answer the given questions. Again you must document your work.

Present your results. Note that they must be in the terms of the original problem. Here the original problem concerned dates from 1790 to 1990, you cannot show results for 0 to 200. Shifting the dates down by 1790 is an artifact of your solution and not a part of the original problem.

Also, in stating your results, the reader should not be made to do mental calculations to understand them. You cannot say, "for a 2 percent higher growth rate the projected population is ...." What is that 2 percent higher growth rate? The reader should not have to look back and find the original rate, and then mentally multiply that by 1.02 to see what grow rate you actually used, meanwhile making assumptions about what was the original rate you used and whether you calculated 1.02 times that rate correctly.

In this problem there are two parameters, or more, depending on your

solution; besides the growth rate, there is also the y_0 parameter. The value you used for that must be given too.

Finally you must make observations and draw conclusions regarding your results. The obvious observation here is that small changes in the growth rate makes very big changes in the population size over time.