



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Jane A. Halahan	Project Number S1408
Project Title Does the Percentage of Calcium Carbonate in Bird Eggshells Change with Different Environments?	
Abstract Objectives/Goals The purpose of this experiment is to determine if environmental effects are threatening the strength of eggshells. DDT, PCBs, and Dioxin are all threats to eggshell strength; however, my project will only research one of these effects, DDT. Methods/Materials I will test eggshell strength using the titration process to calculate the amount of calcium carbonate in eggshells from free-range and caged birds. These birds will include quail and chickens. The percentage of DDT can be determined using one of several specialized tests, however, these are beyond the scope of this experiment. Eggshell strength will be measured by using an acid/base titration to find the percentage of calcium carbonate in eggshells. The titration will use Hydrochloric acid to convert all the calcium carbonate to calcium chloride. Using this technique the percentage of calcium carbonate in the eggshell can be determined. These measurements will be made on free-range eggshells, caged eggshells, and quail eggshells. Results The results are that quail eggshells have the highest percentage of calcium carbonate at 69.63%. The free-range chicken eggshells only have 63.75% calcium carbonate, where as, caged chicken eggshells were found to have 69.58% calcium carbonate. Conclusions/Discussion My hypothesis is correct in that caged chicken eggshells were stronger than the free-range chicken eggshells. There is speculation as to whether the quail eggshells were from a caged or free-range environment.	
Summary Statement The purpose of this experiment is to determine if environmental effects are threatening the strength of eggshells.	
Help Received My father and I researched chemicals, equipment, and laboratories. We then purchased the chemicals and equipment. My mother helped me in egg-preparation such as boiling the eggs, removing the eggshells, and grinding the eggshells into a fine powder.	