Understanding Science and Scientific Methods:
An Overview for Lawyers

SUMMARY – 17 October 2005

Class on 10 October 2005 Covered 2.d. (part) and 3.a.i. on the Syllabus

A. Agent Orange in the Courtroom:
      a. Can people who are unaware of their involvement in a class-action suit later argue that they were not properly represented?
      b. What standard should be used if those lawsuits are allowed?

B. Lessons for How Science Achieves Consensus
   1. Early consensus that TCDD was extremely dangerous based on animal studies (1960s and 1970s)
   2. Long period of additional studies of humans exposed to high levels of TCDD (1980s and 1990s)
   3. Emergence of consensus about danger to humans (late 1990s and early 2000s) – Appears to raise overall rate of cancer; if
you develop chloracne, the chances of further disease are much higher.

II. Bendectin and the *Daubert* (1993) Decision

A. What is *Scientific Knowledge* and when is it *reliable*? – (F & H p.1) --

1. **Observation** and quantitative **measurement** → formation of a hypothesis through **inductive reasoning** → testing the **predictions** of the hypothesis (e.g., experiments) → development of a **theory** that explains facts already known and predicts facts not yet known. Traditionally, **Observation, Experiment, Explanation, Prediction.** (Rudolf Carnap: “prediction is…as essential to everyday life as it is to science. Even the most trivial acts we perform during the day are based on predictions.”)

2. **Goal** – **Universal Laws**

3. **Inductive Reasoning** – “reasoning from particular facts to a **general rule or principle.**” [Deduction -- “A logical inference from a general rule or principle”]

4. **Creative Leaps** – One cannot simply follow a mechanical procedure based on fixed rules to devise a new system of theoretical concepts, and with its help a theory. Creative **ingenuity** is required….there cannot be an inductive machine.