

## Answers for Phil2070 Quiz 1

Below are fairly comprehensive answers to each question. In each case I elaborated on Leopold's thinking to help assess student answers. Students are not required to provide all of this information in their answers. For each question I have indicated the main points that should be hit upon to receive full marks.

### 1. What is the "pesticide treadmill"? (2 pts).

This is described on pages 108-9 of the Carson article. Basically, the pesticide treadmill is a kind of arms race between insects and humans. The introduction of a pesticide will typically kill most members of an insect species, but not all of them. A few individuals who possess a natural immunity to the insecticide will remain. These resistant individuals will then experience an advantage due to decreased competition, causing them to proliferate. This in turn requires the introduction of other, more powerful pesticides. This cycle continually repeats itself resulting in ever more toxic pesticides but no fewer pests.

Students should explain how this basic mechanism works and why it is in a sense futile to receive full marks. Part marks can be assigned if the students identify that pesticides become more toxic over time without decreasing the number of pesticides. However, they should explain the evolutionary mechanism behind this.

### 2. After clearing a wilderness area for agricultural use, Leopold notes, the 'biotic organism' becomes less robust and less productive. Yet, he also notes that crop yields have not decreased over time. What explains this? (2 pts).

Leopold offers two suggestions. First, he notes that humans have artificially supplemented natural plants, animals and nutrients in the soil with imported plants, animals and fertilizers. The latter are more fragile and therefore a poor substitute for their natural counterparts.

Second, he suggests that the land has a certain amount of built up energy that humans are drawing upon but not replacing. In this respect he thinks we are heading for an eventual crash.

Leopold also notes that some rare regions like Northern Europe have practiced agriculture for extended periods without depleting their environment. He sees these as exceptional cases and admits that he doesn't understand them. So, a third possible answer to the question is that cases in which crop yields have not decreased are exceptional and should not be taken as the rule.

Students do not need to hit on all three points. One of them is fine. Part marks should be assigned if a student gets part of the answer correct.

### 3. Leopold divides conservationists into two camps, calling this division the "A-B Cleavage". Briefly, explain how these camps differ in attitude and motivation (3 pts).

In Leopold's words (pages 258-260)

"Group A regards the land as soil and its function is commodity production... Group B regards the land as biota and its function is something broader".

In a forestry context, "Group A is quite content to grow trees like cabbages... It feels no inhibition against violence, its ideology is agronomic. Group B, on the other hand, sees forestry as fundamentally different from agronomy because it employs natural species and manages a natural environment rather than creating an artificial one. Group B prefers natural reproduction on principle... Group B feels the stirrings of an ecological conscience."

To summarize:

Group A conservationists:

- 1) Value nature only as an instrumental good.
- 2) View nature as a commodity.
- 3) Are motivated to maximize economic output.
- 4) Do not prioritize natural species over introduced species

5) Are motivated to protect nature only insofar as this suits human desires and needs.

Group B conservationists:

- 1) Value nature as an intrinsic good.
- 2) View nature as something with inherent beauty and majesty.
- 3) Are motivated out of, "a conviction of individual responsibility"
- 4) Prioritize natural species over introduced species.
- 5) Are motivated to protect nature out of a sense of duty or responsibility regardless of the benefit to humans.

Students should get 2 marks for identifying how each group values nature (one point for A one point for B). They do not need to use the words "instrumental" or "intrinsic", but they should convey those basic ideas. A third point should be assigned for identifying how these two value systems lead to different perspectives on, for instance, the preservation of non commercially valuable species.

4a. Leopold offers a thumbnail sketch of what it means to view land as an "energy circuit". What are the three components of this view? (3 pts).

This idea of an 'energy circuit' is Leopold's attempt to clarify the balance of nature concept. Students need not mention this, but if they do mention it at least you'll get a sense of whether they know what they are talking about. The key claim is that, "when a change occurs in one part of the energy circuit, many other parts must adjust themselves to it" (254). Leopold thinks that change in the energy circuit is natural. However, "... Man's invention of tools has enabled him to make changes of unprecedented violence, rapidity and scope" (254).

On page 255 he provides a thumbnail sketch of the energy circuit. These are the three claims that supposedly justify the previous claim

- 1) The land is not merely soil (it is composed of microorganisms, plants and animals that cycle energy).
- 2) Native plants and animals kept the energy circuit open, others (i.e. introduced fauna and flora) may not. (note that by "open" Leopold seems to mean "flexible" or able to accommodate change.
- 3) Man made changes are of a different order than evolutionary (natural) changes, and have effects that are more comprehensive than is intended or foreseen.

Students should get a point for each of these three components.

4b. Why does Leopold think that economic incentives are inadequate for conserving wildlife? In a word, what is the key concept that Leopold offers in place of the economic perspective? (3 pts).

Leopold admits that the majority of species in a natural community have no direct economic value. Economic incentives therefore will fail to protect the majority of species. However, because species are highly interdependent, he claims, eliminating those without direct economic value will negatively impact the system as a whole. This argument is nicely summarized on page 251. The concept that Leopold proposes in place of the economic perspective is "community". By viewing humans as a part of a community that includes plants and animals in addition to fellow humans, we will arrive at a superior and ultimately more sustainable value system than one based on economic considerations alone.

Students receive 2 points for the argument about most species lacking economic value yet being necessary for ecosystem functioning, 1 point for identifying the community concept