

– This is the last tutorial. We will discuss it during the lecture. –

1. From the article “*Designer Seeds*”

<http://www.beyonddiscovery.org/includes/DBFile.asp?ID=58>

we seek to discuss the following factors (among others) in scientific advances:

- (a) personal use of imagination;
- (b) tradition;
- (c) connoisseurship;
- (d) conviviality; and
- (e) serendipity.

Due to copyright issues, it is best for you to download the article from the website. A link has also been set up in the IVLE webpage. Read the article and consider the following.

(a) As primitive as it is, traditional plant breeding does provide useful information for later development. From the plant disease *crown gall*, known for almost a century, what information was obtained that was significant for future applications? Highlight the use of imagination and speculation.

(b) In the late 1960s, a useful molecular tool came to the scene (See also “*Human Gene Testing*” in **Beyond Discovery**), thanks to a series of studies by Werner Arber, in Switzerland, and Hamilton Smith, at Johns Hopkins University. These investigators were studying what at first seemed to be an *unrelated problem*. They were interested in understanding how some bacteria resist invasion by viruses.<sup>1</sup>

Back in history, an outbreak of *Bt* in 1901 wiped out silkworms in Japan.

Discuss how serendipity was involved on applying the above events into designing seeds.

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<sup>1</sup>Virus attacks by injecting DNA into a cell. When viral DNA enters some bacteria, it is cut into small pieces and inactivated by enzymes in these bacteria.