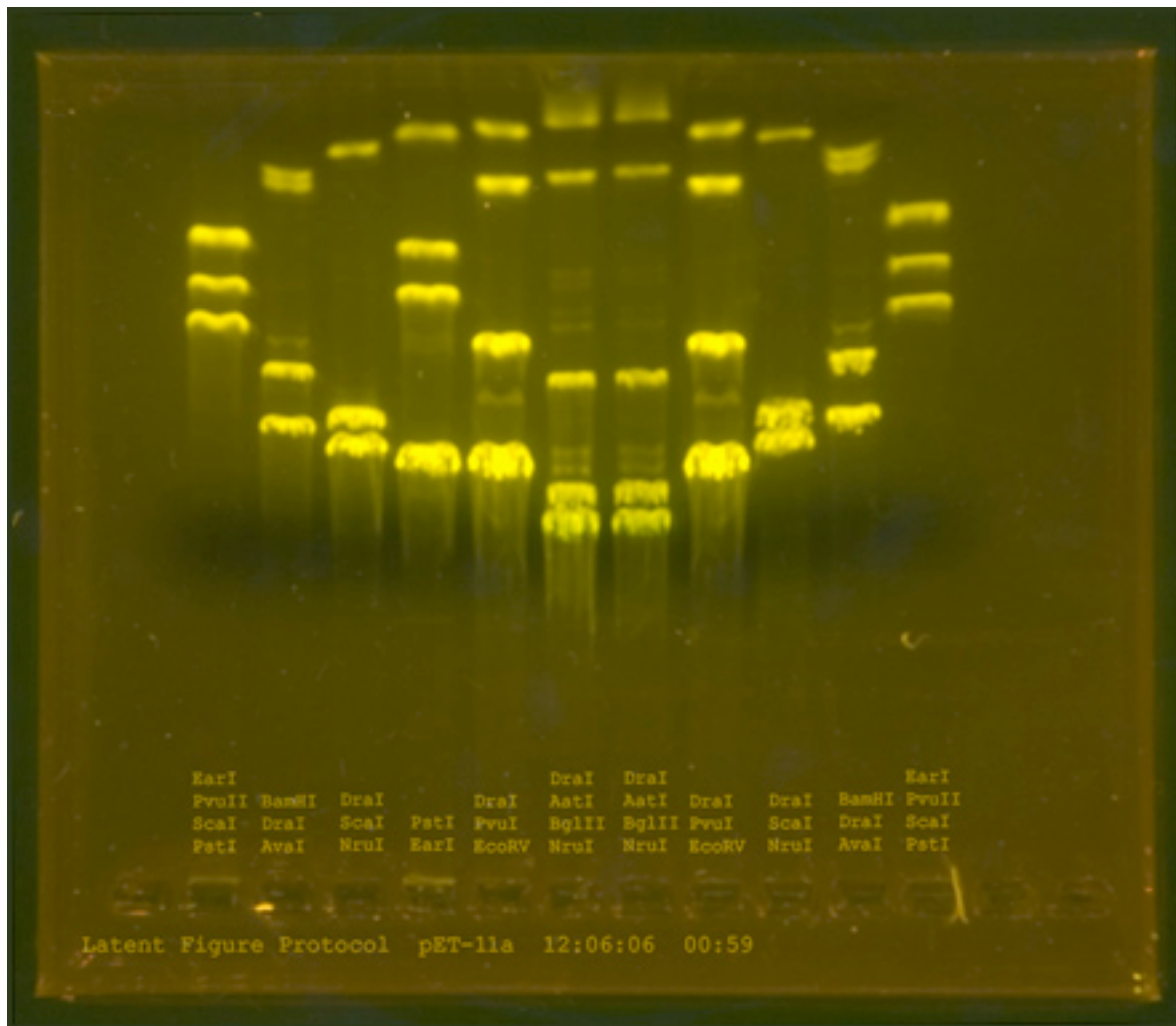


Patients, Patents and Protocols. Paul Vanouse, Filter Magazine, Australian Network for Art and Technology, Autumn 2007.

--The following article was written for an edition on the Open Source movement.



(Image from “Latent Figure Protocol”, Paul Vanouse, 2007
www.contrib.andrew.cmu.edu/~pv28/lfp.html)

Getting started:

Lets begin with the image above; this is a “gel electrophoresis” image made with DNA and often called (though the expression is a mis-nomer) a “DNA Fingerprint”. It is presented with a name of the DNA donor at the bottom (“pET-11A”) and list of enzymes (such as “EcoRI”, etc.) in each column of the image. This is an image with the algorithm for its production inscribed within it. It describes the process of taking a few micrograms of DNA, subjecting it to the enzymes listed in the column and then inserting it into the column (then repeating for each column of the image). You will then arrive at

the corresponding barcode-like pattern, after submitting the entire gel to an electrical field and staining it.¹

Such an image is possible because the organism in question, pET-11A, a patented biological bacterial plasmid is sold for research with a list of each of its 5677 bases. In a sense, this is practically an open-source plasmid (its DNA sequence is public), from which I have created an open source image (I have included the list of enzymes needed to manufacture it).² The image, portraying the universal copyright symbol, is meant to evoke the broader issues of patents and ownership within biotechnological research—which have profound importance to human health.

Patience patients:

The Human Genome Project, an endeavor to sequence every single base-pair in human DNA, began in 1980 under the rationale that this vast dictionary would lead to the eradication of bunches of genetic diseases. Completed in 2000, the technologies developed in the process have led to the sequencing and subsequent vaccines for a few diseases (such as hepatitis and stomach ulcers), however these vaccines have been discovered at a much slower rate than other decades of the nineteenth century; and with far less dispersal. I don't blame the Genome Project for the slowdown, rather the corporate bio-pharma complex of which it sits alongside; freely accessible genomes for many organisms are probably why some things were cured. During the comparable period of 1955 to 1980, vaccines for at least six diseases were developed including polio, measles, mumps and rubella; and small pox was completely eradicated. The boom years of capital investment in biotechnology from 1980 to 2005 have not yielded a proportionate value for public health, but have instead served to impede creation and delivery of such vaccines. It is precisely the corporate patents, copyright, monopolies, restricted usage, etc., that have suppressed both the scientists seeking cures and adequate dispersal of medications.

An example of how corporations and patent laws suppress the creation of vaccines is the long struggle of 2005 Nobel Laureates Warren and Marshall, to have their ulcer cure recognized and approved. Opposition came from manufacturers of drugs such as Tagamet with a vested interest in treating the symptoms of the disease temporarily rather than curing it; interestingly Tagamet was becoming the first drug to break \$1 billion in annual sales. Warren and Marshall had been attempting to publish on their actual cause and method to cure the disease for nearly twenty years but were out-funded and out-manuevered legally. This example highlights the pharmaceutical industry's parasitic relationship to disease—a successful parasite doesn't kill its host (the ulcer).

The case of the 39 large pharmaceutical companies taking the South African Government to court over patent infringement in 2000 is a good example of how corporations and patent laws suppress distribution. South Africa had begun importing lower priced generic AIDS medication in an effort to widen access to treatment. Eventually the drug companies had to relent due to pressure from activist groups; similar struggles are now underway in Thailand.

¹ This is a slight simplification, as some columns in the image require two separate DNA reactions prior to insertion.

² Admittedly, I'm using "open source" in an overly literal manner in this first example when I describe an organism as open source because the company publishes its genome even when they specify that the purchaser cannot re-distribute altered versions.

Open Source Biology?

So given the problems of development and distribution, how does the open source software model map onto biology? Eric Raymond's pre-2K article on open source software "Homesteading the Noosphere" seems analogous to the situation in biology and medicine, in that if "free-market capitalism is the globally optimal way to cooperate for economic efficiency; perhaps in a similar way, the reputation-game gift culture is the globally optimal way to cooperate for generating (and checking!) high-quality creative work."³ Or simply put - sharing will produce better results than hoarding. While other simple analogies like "life is code", fundamentally oversimplify the similarities between biological and computational systems, the problems in their production systems will benefit from a similar "open source" revision.

Organizations such as the CAMBIA institute's Biological Open Source Initiative (BiOS) are doing just this. Modeled upon the GNU Linux license agreements, their goal is to "create and validate new business models, licensing and distributing collaboration mechanisms that have resonance with the open source software movement, but tailored for biological innovation."⁴ The organization makes a distinction between the "tools" of innovation and the "fruits" of innovation as much of the innovation slowdown in modern biotechnology comes from patented methods, protocols and even simple organisms necessary to do basic research and development.

Ending thoughts:

Just as the open source software movement has been victimized by dis-information smear campaigns (for example claiming that greater openness will leave software more prone to malicious hacks and security holes) the open source biology movement will have even greater obstacles, particularly within the fearmongering of the "war on terror". For instance, one opponent states that "With free instructions on how to cook up new and improved toxins, open-source biology could pose a threat to homeland security."⁶ said David Seagrest, a fellow at the Center for Strategic and International Studies who focuses on biology and terrorism. In fact, the main reason that most of the nastiest strains of Anthrax aren't extinct is because they were incubated in top-secret US government laboratories, and the only known attack (in 2001 targeting Democratic congressmen) was perpetrated by a one of their employees. It doesn't compute that the open-source advocates are the problem.

Software and biology entail completely different media that should not be conflated as "molecular biology is just programming with genes. The two areas involve hugely different ethics, mechanisms and material realities. However, when it comes to issues of intellectual property, copyright, patent etc., the open source software movement is a productive model for biological researchers and public health advocates. While the "Latent Figure Protocol" image seeks to ferment and inform this discussion, there are fascinating emerging global collaborative networks being formed to actually implement the model.

³ http://www.firstmonday.org/issues/issue3_10/raymond/index.html

⁴ <http://www.cambia.org/>

⁶ "Open-Source Biology Evolves", David Kohn, Wired Magazine, January 17, 2005.