1. Patents on life

To patent an object the inventor must prove that it has never been made before, involves a 'non-obvious' inventive step, and that it serves some useful purpose. Until recently, these criteria excluded living organisms, which were always regarded as discoveries of nature and therefore unpatentable.

In 1980, however, this all changed. In the landmark case of Diamond versus Chakrabarty, the US Supreme Court ruled that a living organism, a bacterium that could digest oil, could be patented. Chief Justice Warren Burger declared that the "relevant distinction is not between animate and inanimate things but whether living products could be seen as human-made inventions". (1)

This extraordinary decision by the US Supreme Court heralded a new era where living organisms could be patented, and paved the way for the enclosure of the biological commons. Once a shared heritage, the gene pool of plants, animals and humans was now a commodity waiting to be bought and sold.

The significance of this decision was not lost on corporate investors. A few months later, on 14 October 1980, a recently formed biotech company called Genentech offered a million shares of stock to the market at $35 per share. After just 20 minutes, the shares were being sold at $89. By the end of the day, the company had raised $36 million. Genentech had not yet introduced a single product onto the market. In the words of Jeremy Rifkin, president of the Foundation on Economic Trends, genes had been identified as the "raw resource for future economic activity". For those with the necessary technology and capital, the race to patent life had begun. (2)

A patent, which usually lasts for 17-20 years, gives the patent holder exclusive rights to exploit an invention for commercial gain. What this means in the case of genetically engineered crops is that farmers have to pay a license fee and royalties for the use of genetically engineered (GE) seed and all seed produced from the plants for duration of the patent.

Can a living organism properly be regarded as a human invention? Genetic engineers do not create life; they manipulate genes. As a group of British scientists pointed out: "if this principle had been applied in chemistry, the elements would have been patented". (3)

References:

2. Broad species patents

By 1990, 50 percent of plant patent applications in Europe were coming from just eight multinational corporations, and a third from just three companies: Monsanto, Ciba-Geigy and Lubrizol. (1)

Since 1985, these companies have been pushing the boundaries of patent law even further, staking territorial claims to cover entire species of plant and animals, consolidating their dominant position as a means to block research and competition.(2)

According to the Wall Street Journal, in the US at least one company has been created whose "main business is buying up broad patents and then suing other companies for alleged infringements". (3)

For example:

* In 1994, the company Agracetus was awarded a European patent that covered all GE soybeans. Rival companies, including Monsanto, were outraged and immediately challenged the patent, saying that it would result in just one company having an effective monopoly over all GE soybeans. Monsanto argued that "the alleged invention lacks an inventive step" and was "not ... novel". In the end the solution for Monsanto was to buy Agracetus, together with the patent, and drop the complaint. As well as the patent on soya, Monsanto now holds a patent in Europe and the US on all GE cotton (4).

* Plant Genetic Systems, a biotech company now owned by Aventis, has been granted a patent in the US for all GE plants containing the Bt toxin. A patent has been taken out in Europe by the American company Mycogen, which covers the insertion of "any insecticidal gene in any plant." (5)

* A patent is issued to Sungene in the US for a variety of sunflower, which has a high oleic acid content. Not only does the patent include the genes involved in the oleic acid content, but also to the characteristic itself. Sungene has notified other breeders that the development of any variety of sunflower high in oleic acid will be considered an infringement of the patent. (6)

It is extraordinary that a company can make a single genetic alteration to a plant and claim it as its invention, when the very plants that are being engineered result from thousands of years of careful selection and breeding by farmers around the world.

"The granting of patents covering all GE varieties of a species . . . puts in the hands of a single inventor the possibility to control what we grow on our farms and in our gardens. At the stroke of a pen, the research of countless farmers and scientists has potentially been negated in a single, legal act of economic highjack."

-Dr. Geoffrey Hawtin, Director General of the International Plant Genetic Resources Institute (7)

References:


RAFI (1999) Bioprospecting / Biopiracy and Indigenous Peoples, Communiqué published by the Rural Advancement Foundation International


Also 'Species patent on transgenic soybeans granted to transnational chemical giant W.R. Grace', RAFI Communiqué, 1994 <www.rafi.org/communique/19942.html>

3. Biopiracy

Genetic diversity is at its richest in tropical countries, which are estimated to contain over 95 percent of the world's genetic resources. (1) In what the industry calls 'bioprospecting' and others call 'biopiracy' scouts are sent to these areas to seek out valuable organisms or plants, often drawing upon the wisdom of indigenous peoples. They then take samples back to laboratories where they isolate active ingredients or genetic sequences and patent them as their own inventions.

Traditional knowledge systems, and the people who have cultivated biodiversity over thousands of years, count for less in patent law than routine laboratory procedures. Communities could now end up having to pay multinational corporations for the right to use something that was previously part of their legacy.

For example:

• The Neem tree has been used in India for thousands of years and is valued for its antibacterial and insecticidal properties. Since 1985, US and Japanese corporations have taken out over a dozen patents on these long-appreciated properties of the plant. (2)
• The j'oublie berry from the Gabon in West Africa contains a sweet compound, which is patented by the University of Wisconsin in the hopes that it will make money in the lucrative sweetener market. Despite the fact that the sweet taste of the berries is well known in West Africa, the university claims that the sweet compound (brazzein) is its own invention and admit to no connection with the Gabon. (3)

• According to an article in Business Week, when employees of Novo Nordisk go on holiday, they take along soil-collection kits to gather exotic microorganisms. The father of one scientist who worked for the company collected a soil sample from Indonesia, which yielded an enzyme that is now widely used by soft-drink suppliers to change starch into sugar. (4) A spokesperson for Monsanto said that the company was recruiting employees "who are traveling somewhere exotic and wouldn't mind digging up a few soil samples for the sake of science" for Monsanto's agricultural screening programs. "You never know what you're going to find or where you're going to find it . . . nothing's off limits." (5)

References:


Hirsh M. (26 September 1995) 'Fight For the Miracle Tree', Bulletin, pp.70-71


4. Fair trade

Many modern pharmaceuticals are derived from tropical plants. Knowledge about their properties often comes from indigenous communities that have a rich understanding of medicinal plants in their native habitats.

The biotech industry argues that this knowledge only becomes valuable once money has been spent on research and commercial products have been developed. This is used to justify the fact that the lands and communities from where these plants originate rarely receive any compensation. The following quote, however, shows that traditional knowledge is worth more to the biotech industry than the above argument suggests.
"When we decide to develop a drug, it's already been used in human beings for a long time, in some cases, hundreds of years or more. We have a reasonable assurance that there's less liability as far as safety problems [are concerned]...and when you're working on small molecules, that's always a very significant potential problem and an unknown until you get into some pretty expensive animal work or into humans themselves."

-G. Kirk Raab, board chairman and advisor to Shaman Pharmaceuticals (1)

A report commissioned by Christian Aid estimated that biopiracy was cheating Third World countries out of US $4.5 billion a year. (2) On the rare occasions that the biotech industry pays for genetic resources, the terms of trade remain unequal and disproportionate.

For example:

* In 1991, Merck Pharmaceuticals signed a contract in Costa Rica, which is estimated to be home to between 5 percent and 7 percent of the world's species. In exchange for exclusive rights to screen, develop and patent new products from plants, microorganisms and animals in the Costa Rican rainforests, Merck paid $US1.1 million towards a local biodiversity programme (3). With an estimated 500,000 species in Costa Rica this payment works out at about $US2 per species - not much for a company that had a revenue of $US8.6 billion that year (4). Merck also agreed to give back an unspecified percentage (believed to be 1-3 percent) of any royalties earned from new products developed from these rainforests. This agreement, which has been touted by the US government and World Bank as a "model" for Third World countries, has many of the qualities that have characterised colonial-style trade over the last 500 years. Some attitudes have changed little since European settlers gave gifts to American Indians in exchange for ownership of the island of Manhattan. At Merck's rate of exchange, the world's genetic resources could be bought for 20 million US dollars. (5)

References:


GATT (April 1993) Focus 98, pp.1-4

In 1993 half a million Indian farmers in Bangalore protested against plans to implement an international system of intellectual property rights favoured by transnational corporations.

This agreement, the Trade-Related Aspects of Intellectual Property Rights (TRIPS), was eventually signed in 1994 and will be administered by the World Trade Organisation (WTO), whose primary agenda is to remove perceived barriers to 'free-trade'.

Any countries ignoring the statutes of the WTO are liable to be prosecuted and may be subject to severe punitive action including sanctions or fines.

TRIPS was the brainchild of a coalition of corporations that called themselves the Intellectual Property Committee. It was vigorously opposed by the resource-rich countries of the Third World because it legitimises biopiracy, enshrines it in international
law and undermines community rights. Monsanto's James Enyart describes how this happened:

"Industry identified a major problem for international trade. It crafted a solution, reduced it to a concrete proposal, and sold it to our own and other governments...the industries and traders of world commerce have played simultaneously the role of patients, the diagnosticians, and the prescribing physicians." (1)

TRIPS does not require biotech companies to ask for prior consent before accessing biological resources or does it demand that patent holders share their benefits with the people or lands from which the genes originate. Under the agreement, countries are obliged to bring their patent laws into line with the industrialised nations by extending them to include living organisms or by setting up equivalent systems of intellectual property rights.

References:


6. Animal patenting

In 1987 a Harvard biologist was granted the first patent for an animal. The 'oncomouse' was genetically engineered to predispose it, and all its offspring, to develop cancer so they could be used for research. (1) The patent on the oncomouse, which is licensed to DuPont (the corporation that financed the research), extends to any other animal genetically engineered to contain genes that cause cancer. (2)

By 1997 over 40 animals were patented, including turkeys, nematodes, mice and rabbits. Hundreds of other patents are currently awaiting approval, including patents on pigs, cows, fish, sheep and monkeys. (3)

For example:

* Tracey the sheep has had human genes introduced into her mammary glands so she produces a human blood-clotting agent called alpha-1-antitrypsin in her milk. The patent is held by Pharmaceutical Proteins Ltd (PPL). Their spokesperson described sheep like Tracey as "furry little factories walking around in fields." Tracey's success was said to provide "a strong impetus to the further exploitation of transgenic sheep as bioreactors for the production of large amounts of pharmacologically active proteins". (4)

* PPL have also applied for a broad patent covering all cloned mammals. Dolly the sheep was the first mammal to be successfully cloned. In February 1997 a nucleus taken from a cell from the udder of an adult sheep was implanted into an egg, which had its own nucleus removed. This egg was then transferred into another sheep where it developed into Dolly, who is genetically identical to the sheep which the udder cells were taken. The Scottish research team who cloned her applied for a broad patent, which would give them exclusive patent rights over all cloned animals. (5)

References:

Raines L. (March 1989) Of Mice and Men and Tennis Balls, Across the Board, p.46


Testimony of Michael Glough, US Congress, Office of Technology Assessment, Before the Subcommittee on Intellectual Property and Judicial Administration House Committee on the Judiciary, 20 November 1991, on 'Patents and Biotechnology'


7. Human patenting

It is difficult to estimate how many human genes are patented but one company estimates that the US Patent and Trademark Office has issued more than 1,250 patents on human gene sequences (1)

In 1991 the European Patent Office granted a patent on a human gene for the first time, defending its position to the European Parliament by arguing that 'DNA is not life'. The EU then came under intense pressure, in particular from US-based multinationals eager to market and expand their business in Europe, to endorse such patents and harmonise European patent law with countries such as the US.

As a consequence, the 'Directive on the Protection of Biotechnological Inventions' was eventually passed in July 1998. The industry managed to persuade the European Parliament that patents for human genes and cell lines were essential for innovation and progress in the field of medical research. In many cases, however, patents allow companies to profit from research done in the public sector-nearly three-quarters of patents taken out by US corporations in recent years were based on publicly financed research. (2)

Rather than promote medical research for the good of all, patents have the potential to change what was once a field that encouraged the sharing of information and resources into a commercial sector of closely guarded secrets.

For example:
A poll of American laboratory directors, published in December 1999, found that a quarter of them had received letters from lawyers acting for biotechnology companies ordering them to stop carrying out clinical tests designed to diagnose Alzheimer's disease, breast cancer and a number of other disorders. Half the laboratories questioned in the survey had been forced to stop the development of screening tests because they knew a patent had been licensed or was pending.

A Massachusetts corporation called Athena Diagnostics, wrote to laboratories informing them of its "exclusive rights to certain tests in the diagnosis of late-onset Alzheimer's disease. These tests are covered under US patent number 5,508,167, a copy of which is enclosed." Athena went on to say that it would be pleased to perform the tests for the published price of $195 per specimen. That is more than twice the price previously being charged by some university medical laboratories, and way beyond the means of some of the researchers operating on government grants, who examine hundreds of samples in the search for new mutations and possible therapies.

Another company, Myriad Genetics, which holds exclusive patents for mutations linked to breast and ovarian cancer (the BRCA 1 and BRCA 2 genes), is reported to have sent letters to a number of laboratories ordering them to stop screening women for these mutations.

The quest for patentable products may also use funds that could better be used for research into preventative health measures. It has been estimated, for example, that at least 90 percent of human breast cancers are not caused by breast cancer genes, but are triggered by environmental pollutants, diet and lifestyle factors. The belief that genes are the key to understanding and treating disease, however, means that alternative approaches to reducing illness or encouraging health get little or no funding.

A US-based company called Biocyte holds a patent on all umbilical cord cells from foetuses and newborn babies. The blood cells in the umbilical cord are an important source of stem cells, stem cells being the progenitors of all types of cells in the blood, and are used in therapeutic treatments such as blood and marrow transplantation, and in gene therapies. The patent was awarded simply because Biocyte was able to isolate the blood cells and freeze them. It gives them the right to demand fees from anyone extracting or using umbilical cells from newborn babies, or using any other therapies developed in connection with their use, and also the right to 'refuse access' to the umbilical cells for anyone who is unwilling to pay for the privilege. In June 1999, Biocyte's European patent on the cord cells was revoked after a legal challenge brought by the 'European Campaign On Biotechnology Patents'.

References:


2. Borger J. (15 December 1999) Rush to patent genes stalls cures for disease, The Guardian <www.guardianunlimited.co.uk/Archive/Article/0,4273,3941983,00.html>


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