ETC Group
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www.etcgroup.org

The Precautionary Prince II

Prince Charles' cautionary note brings "control and ownership" of nanotechnology, social issues and impacts on the South to the fore

"Prince Charles' thoughtful article in the *Independent on Sunday* (UK) is an impressive service to society and science in the unfolding public debate on nanotechnology," according to Jim Thomas of the ETC Group's Oxford office. "Not only does the Prince set aside the fictional notion of 'grey goo,' but he also sensibly reminds us that there are important unanswered questions relating to the control and ownership of these technologies," said Thomas.

Go here to view the Prince's article on nanotechnology:
http://argument.independent.co.uk/commentators/story.jsp?story=539977

From ETC's international headquarters in Ottawa, Canada, Pat Mooney, Executive Director, adds, "It is especially significant that the Prince highlights the need for a precautionary approach, the need for a wider societal debate and draws attention to what nanotechnology may mean for the gap between rich and poor nations."

ETC Group is concerned about the potential for emerging technologies to destabilize the economies of poor countries in the global South, which could imperil the livelihoods of workers and basic producers everywhere. Until now, points out Mooney, the debate has focused narrowly on health and environmental concerns. "As important as these issues are, the regulations that will address them will no doubt be heavily influenced by whoever owns and controls nanotech. When 26 governments met in Washington last month to discuss nanotechnology development, [http://www.etcgroup.org/article.asp?newsid=466], the emphasis was on environmental safety regulations and not on the regulations needed to prevent new corporate monopolies and technology cartels; nor to critical new issues related to human rights, privacy, and military applications." In the view of the ETC Group, the Prince's article sets out the global landscape that will engage not only the United Nations but also all of civil society in the debate on this new technological revolution.

The ETC Group dismisses the threat of "grey goo" – where self-replicating nano-scale robots run amok – as a red herring. But serious attention must focus on the rapidly advancing field of *nanobiotechnology*, the current darling of nanotech venture capitalists. Nanobiotechnology refers to the merging of the living and non-living realms at the

nano-scale to make hybrid materials and organisms. Researchers aim to harness nature's self-replicating 'manufacturing platform' for industrial uses – rather than try to engineer robots to mimic it. According to ETC Group, it's the spectre of "Green Goo" – not "Grey Goo" – that poses an urgent need for foresight and caution. For more information, see: http://www.etcgroup.org/documents/livingcolorfinal.pdf

In his article, Prince Charles asks if there is a danger of awarding patents on Nature. "The answer is yes," according to Hope Shand, Research Director of ETC Group based in Carrboro, North Carolina, USA. "We're already seeing monopoly patents on the building blocks of nature." Glenn Seaborg, the Nobel Prize-winning physicist, set a dangerous precedent when he won US patent #3,156,523 for the chemical element *Americium* (element no. 95 on the periodic table) in 1964. A front-page article in the *Wall St. Journal* last month reports on the "intensifying race" to file nanotech patent applications. In the US alone, the number of nanotech patents awarded annually has tripled since 1996.[1] Major nanotech patent holders include IBM, L'Oréal, Dow, Xerox, Philips Electronics, Sony, Proctor & Gamble, University of California and Rice University, among others. The US government predicts that nanotech markets will exceed $1 trillion by 2011.

"With governments worldwide spending [US]$5-6 billion per year on nanotech R&D, virtually all Fortune 500 companies involved, scores of products on the market and hundreds more in the pipeline, the questions raised by Prince Charles – such as who wins and who loses? what are the risks and who will bear them? – are extremely relevant," adds Shand.

From GMOs to AMOs?

In 1996 Prince Charles brought public attention to his concerns about genetically modified organisms (GMOs) and agriculture. What impacts will nanotech's atomically modified organisms (AMOs) have on food and agriculture? Though it has escaped public notice, the food and agriculture sector is among the most intensely researched areas of nano-scale science. These applications will extend the reach of industrial agriculture and alter the way our food is grown and produced, processed, packaged and even eaten. According to Helmut Kaiser Consultancy, some 200 transnational food companies are currently investing in nanotech and are on their way to commercializing products. The list includes many of the world's largest companies, such as: Ajinomoto, Campbell Soup, ConAgra, General Mills, H. J. Heinz, Kraft Foods, McCain Foods, Nestlé, PepsiCo, Sara Lee and Unilever.

The following examples offer a preview:

Nanoseeds: In Thailand, scientists at Chiang Mai University's nuclear physics laboratory have rearranged the DNA of rice by drilling a nano-sized hole through the rice cell's wall and membrane and inserting a nitrogen atom. So far, they've been able to change the colour of the grain, from purple to green.

Nanoparticle pesticides: Monsanto, Syngenta and BASF are developing pesticides enclosed in nanocapsules or made up of nanoparticles. The pesticides can be more easily taken up by plants if they're in nanoparticle form; they can also be programmed to be "time-released."

Nano Chicken Feed: With funding from the US Department of Agriculture (USDA), Clemson University researchers are feeding bioactive polystyrene nanoparticles that bind with bacteria to chickens as an alternative to chemical antibiotics in industrial chicken production.

Nano Ponds: One of the USA's biggest farmed fish companies, Clear Spring Trout, is adding nanoparticle vaccines to trout ponds, where they are taken up by fish.

Little Brother: The USDA is pursuing a project to cover farmers' fields and herds with small wireless sensors to replace farm labour and expertise with a ubiquitous surveillance system.

Nano foods: Kraft, Nestlé, Unilever and others are employing nanotech to change the structure of food – creating "interactive" drinks containing nanocapsules that can change colour and flavour (Kraft) and spreads and ice creams with nanoparticle emulsions (Unilever, Nestlé) to improve texture. Others are inventing small nanocapsules that will smuggle nutrients and flavours into the body (what one company calls "nanoceuticals").

Nano packaging: BASF, Kraft and others are developing new nanomaterials that extend food shelf life and signal when a food spoils by changing colour.

Coming Soon: Nanotech for Tummies
In the coming months, ETC Group will release a series of *Communiqués* on the socio-economic impacts of nanotech, including a primer on the implications of nanotechnology for food and agriculture, "Nanotech for Tummies."

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Notes to Editors:

The Action Group on Erosion, Technology and Concentration, formerly RAFI, is an international civil society organization headquartered in Canada. The ETC Group is dedicated to the advancement of cultural and ecological diversity and human rights. www.etcgroup.org

For a basic introduction to nano-scale technologies and an analysis of their implications, see *The Big Down, From Genomes to Atoms: Technologies Converging at the Nano-scale*
http://www.etcgroup.org/documents/TheBigDown.pdf

For an 8-page introduction to nano-scale technologies, an abbreviated version of *The Big Down*: http://www.etcgroup.org/documents/littlebigdown.pdf

For a critique of the strategy of converging technologies and an analysis of its implications, see "The Little BANG Theory" http://www.etcgroup.org/documents/comBANG2003.pdf

For an introduction to the issues surrounding the toxicity of engineered nanoparticles, see "No Small Matter!" and ETC Group's Occasional Paper "Size Matters!" for a more detailed analysis and a list of products containing nanoparticles. http://www.etcgroup.org/documents/Occ.Paper_Nanosafety.pdf

For a short list of the most worrying scientific findings involving nano-scale technologies, see Ten Toxic Warnings in "Nano's Troubled Waters" http://www.etcgroup.org/documents/GT_TroubledWater_April1.pdf

For a brief analysis of nanotech governance, see "26 Governments Tiptoe Toward Global Nano Governance" http://www.etcgroup.org/documents/globalgovfinal.pdf

For ETC Group's most recent *Communiqué* (May/June 2004) on the policy debate surrounding nanotechnology health and safety issues, see: http://www.etcgroup.org/documents/livingcolorfinal.pdf

To view an unofficial document generated by the US Environmental Protection Agency (EPA) listing well over 100 commercial products based on nanotechnologies, see: http://www.etcgroup.org/documents/nanoproducts_EPA.pdf)

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ETC Group also has offices in Carrboro (USA), Mexico City (Mexico) and Oxford (UK).

Endnote

[1] Antonio Regalado, "Nanotechnology Patents Surge as Companies Vie to Stake Claim," *Wall Street Journal*, June 18, 2004; Page A1