

Oligopoly, Inc. *Concentration in Corporate Power: 2003*

Issue: Over half of the world's 100 largest economic entities are transnational corporations (TNCs), not nations (see page 14).¹ TNCs have unprecedented power to shape social, economic and trade policies. Corporate hegemony is usurping the role and responsibilities of national governments, threatening democracy and human rights. Over the past two decades ETC Group (formerly as RAFI) has monitored corporate power and trends in the “life sciences.” Consolidation, technological convergence and non-merger corporate alliances are among the trends examined in this issue of *ETC Communiqué*.

- **PHARMA:** The top 10 companies control an estimated 53% market share of the world's leading 118 drug firms, p. 3.
- **BIOTECH & GENOMICS:** The top 10 firms account for 54% of the biotech sectors' \$42,000 million (\$42 billion) revenues, p. 3. (All currency in US\$ dollars.)
- **ANIMAL PHARMA:** The top 10 companies control 62% of the \$13,400 million world market, p. 5.
- **SEEDS:** The top 10 companies control one-third of the \$23,300 million commercial seed market, p. 6.
- **PESTICIDES:** The top 10 firms control 80% of the \$27,800 million global pesticide market, p. 9.
- **FOOD RETAIL:** The top 10 control 57% of the total sales of the world's leading 30 food retailers, p. 9.
- **FOOD & BEVERAGE PROCESSING:** The top 10 companies account for 37% of the revenues earned by the world's top 100 food and beverage companies; the top 20 account for 53% of the top 100's total, p. 10.
- **NANOTECH:** Public & private sector investment in nanotechnology is an estimated \$5,000-\$6,000 million per annum, p. 10.

Impact: Over the past two years, high-profile corporate crimes (e.g., Enron, WorldCom, Tyco International) have brought to light outrageous examples of systemic fraud, corruption and greed. The corruption is so widespread that *The Washington Post* offers an on-line photo gallery called “Corporations Gone Awry” where viewers can see business-suited CEOs on their way to court, or to jail.² In the absence of challenges to corporate hegemony, however, reform of corporate governance is focused on individual “bad guys” and meaningful reform remains a distant mirage. Transnational firms continue to overwhelm governments and subvert national sovereignty. When governments serve corporate interests rather than the interests of citizens, democracy is undermined, diversity is destroyed and human rights are jeopardized.

Players: This *Communiqué* provides a sector-by-sector analysis of the life sciences industry, including pharmaceuticals, biotechnology, genomics, seeds and agrochemicals. Moving higher up the food chain, we also examine the world's largest food & beverage processors and the mega-grocery retailers. This year ETC Group expands its analysis to include *nanotechnology*, the newest sector of the life sciences industry.

Policy/Fora: Corporate consolidation and converging technologies are driving economic, social and political issues that range far beyond the borders of any single country. The international community – through the United Nations – must have the capacity to monitor and regulate corporate governance. Beyond governance, the international community must create the capacity to track, evaluate and accept or reject new technologies and their products through an International Convention on the Evaluation of New Technologies (ICENT).

Consolidation, Convergence and Cooperation:

For the past two decades ETC Group (as RAFI until mid-2001) has monitored trends in corporate power and the so-called life sciences industry. In earlier reports we noted that it is increasingly difficult to distinguish between industry sectors. Today, the boundaries between seeds and agrochemicals, pharmaceuticals, genomics and biotech continue to blur.

After decades of mergers and acquisitions, extraordinarily powerful corporations are using new tools to expand geographically and to reinforce oligopolistic control of markets. In a world where a handful of global technopolies dominate, patents become less relevant because other tools of monopoly are cheaper and more far-reaching. Some corporations are eschewing the merger and acquisition strategy in favor of alliances and “non-merger mergers.” As one industry analyst notes: “*Cooperation is becoming as common as competition among the industry’s leading corporations.*”³ In other words, it can be far more profitable for companies to cross-license technologies and bury the patent-litigation hatchet in order to create “global technology cartels” that operate below the radar screen of anti-trust regulators.⁴

Today we are witnessing not only corporate convergence, but also *technological convergence*. In the 1990s, for example, the Gene Giants combined molecular biology and information technologies to create a new platform for developing drugs, agrochemicals, plant breeding, food and more based on genomics research. Today, within the field of nanotechnology, the quest to integrate science and technology is taking a giant step down – from genomes to atoms.

Nanotechnology refers to the manipulation of matter at the level of atoms and molecules, the building blocks of the entire natural world. Whereas biotechnology gave us the tools to break the species barrier (to transfer DNA to and from unrelated organisms), nanotechnology enables scientists to shatter the barrier between living and non-living. At the nanoscale the same atoms can be rearranged to construct a gene (the basic unit of genetic code) or to construct a bit (the basic unit of digital information) or to construct a neuron (the basic unit of brain function). Because of this “material unity at the nano-scale,” the investment in nanotech R&D is not

limited to life industry players and nanotech is attracting more public funding than any single area of technology.⁵ Nanotech blurs the boundaries between *all* industry sectors. The world’s largest companies – from military, mining and manufacturing to energy and electronics, to food processing and chemicals are all major players. (See chart, “Multinational Matter Moguls” on p. 12.)

- Today, transnational corporations often have revenues far exceeding the total GDP of the countries where they do business. Fifty-one of the world’s 100 largest economic entities are transnational corporations. Of the world’s 50 largest economies, 14 are corporations (28%). Last year Wal-Mart broke into the world’s top 20 economic entities, a hair behind Belgium, but well ahead of Sweden. The Home Depot, a hardware and building-supply retail store, is a bigger economic entity than New Zealand. Of the oil-rich countries in the Middle East, only Saudi Arabia and Iran made it into the top 100, but six oil companies appear on the list.
- Combined sales of the world’s 200 largest corporations accounted for 29% of world economic activity in 2002, but the top 200 corporations provide only a tiny fraction of the world’s jobs.⁶ In 2002, the top 200 multinational firms employed less than 1% (0.9%) of the world’s workforce.⁷ Combined sales of the world’s top 500 corporations in 2002 were equivalent to 43% of the world’s GDP.⁸ These companies collectively employed only 1.6% of the world’s workforce.⁹

Trends in corporate concentration are mirrored by growing disparities between rich and poor, both within and between OECD nations and the South.

- Though not an adequate measure of poverty, more than 1.2 billion people—one in every five on Earth—survive on less than \$1 a day.¹⁰
- Overseas Development Assistance (foreign aid to poor nations) totals approximately \$50,000 million per year worldwide. By contrast, global military expenditures in 2002 were estimated to be at least \$700,000 million.¹¹
- OECD countries provide more than \$300,000 million in agricultural subsidies each year. Subsidies to the US cotton industry equal more than triple the amount of US government aid to sub-Saharan Africa.¹²
- At the end of 2002, the number of jobless people in the formal sector worldwide reached a record high of 180 million, and the situation is

“deteriorating dramatically,” warned Juan Somavia, the Director-General of the International Labour Organization.¹³ The ILO’s unemployment statistics do not include the informal sector and the “working poor” who live on \$1 or less a day (again, a less than perfect measurement of poverty).

Pharmaceutical Industry

World’s Top 10 Pharmaceutical Corporations

Company	2002 Pharma Sales US\$ millions	% of global pharma market share	Pharma profit margin
1. Pfizer/Pharmacia (<i>pro forma</i>)	\$42,281	12%	46% (Pfizer only)
2. GlaxoSmithKline	\$26,979	8%	29%
3. Merck & Co.	\$21,631	6%	47%
4. AstraZeneca	\$17,841	5%	22%
5. Johnson & Johnson	\$17,151	5%	34%
6. Aventis	\$15,705	5%	19%
7. Bristol-Myers Squibb	\$14,705	4%	16%
8. Novartis	\$13,497	4%	29%
9. F Hoffman-La Roche	\$12,630	4%	19%
10. Wyeth	\$12,387	4%	28%

Source: ETC Group, based on *Scrip’s Pharmaceutical League Table 2003*.

- According to *Scrip’s Pharmaceutical League Table*, the world’s leading 118 pharmaceutical corporations had combined sales of \$342,289 million in 2002.¹⁴ The top 10 companies account for 53% of global drug sales.
- The top 20 companies account for over 75% of all pharmaceutical sales.
- The pharma profit margin (calculated as net earnings divided by revenues) for the top 10 companies in 2002 averages 29%.

Drug Industry Trends:

- *Concentration*
- *Patent Expiration Panic*

“**P**” is for **Pill Power**: Pfizer and Pharmacia officially merged in April 2003, creating the world’s largest drug company.¹⁵ The combined operations give Pfizer 12% of the world market – 50% more than its closest rival – re-shaping the competitive playing field for big pharma. Industry analysts predict that the Pfizer/Pharmacia merger will spark a

new round of industry consolidation – with GlaxoSmithKline and Merck, suddenly a distant number two and number three, scrambling for new acquisitions. Contrary to conventional wisdom, one analysis of drug industry mergers suggests that bigger is not better for the bottom line. According to Datamonitor, no company has thus far improved return on investment in sales and marketing or R&D by increasing size.¹⁶

“The pharmaceutical industry’s productivity continues to be dismal,” claimed *Chemical & Engineering News* recently.¹⁷ Even with advances in combinatorial chemistry and more sophisticated gene-sequencing technologies, the blockbuster-drug pipeline remains sluggish.¹⁸ Patent expiration and competition from generic drugs are major worries for pharma giants, but loom especially large during the present drug-discovery drought. Twenty-three of the world’s top drugs are coming off patent by 2008, which will amount to losses of \$46,000 million dollars in annual revenue.¹⁹ As a result, pharmaceutical companies have been clambering to find ways to extend patent protection on top-selling drugs. One low-cost strategy is to claim effectiveness for infants and children, which can buy six extra months of patent protection.²⁰ Another route to extended patent protection is to reduce the ingredients of an existing drug to the nano-scale and claim increased solubility and bioavailability (see *Nanotechnology* section below).²¹

Biotechnology and Genomics

World’s Top 10 Biotech Companies

Company	2002 Sales \$US millions
1. Amgen	\$5,523
2. Genentech	\$2,212
3. Amersham	\$2,305
4. Serono	\$1,546
5. Genzyme	\$1,329
6. Chiron	\$1,276
7. Biogen	\$1,148
8. MedImmune	\$848
9. Invitrogen	\$649
10. Cephalon	\$507

Source: *Scrip’s 2003 Pharmaceutical Company League Tables*²²

Biotech Industry Trends:

- *Concentration*
- *Militarization of R&D*

The biotechnology field is inhabited by a few elephants and a dwindling number of ants. As one industry survey puts it, “the ranks are thinning and profits are shrinking.”²³

Nature Biotechnology's survey of 416 publicly-traded biotech firms shows combined 2002 biotech revenues of \$41,782 million.²⁴ The top 10 biotech companies accounted for 54% of the combined biotech revenues.²⁵ On the whole, the biotech sector in 2002 was hemorrhaging red ink, with losses totaling over \$15,000 million for all publicly-traded biotech companies combined.²⁶

Nature Biotechnology's survey of 416 publicly-traded biotech companies summarizes the industry's 2002 performance:

- The biotech industry as a whole was unprofitable; the size of the industry-wide loss tripled in 2002.
- Worldwide, only 13 biotech companies went public in 2002. (By contrast, in 2000, there were at least 70 biotech initial public offerings [IPOs]).²⁷ More IPOs were withdrawn than completed last year.
- 70% of the 416 public biotech companies are US-based.
- In 2002, European biotech companies saw a downturn in total revenues for the first time.
- 24 companies were forced out of business since the 2001 survey and there were five biotech mergers in 2002.
- There are more biotech products in the pipeline than ever before – 370 are in clinical trials or awaiting regulatory approval.

Industry analysts are optimistic that biotech's outlook is brightening in 2003. Biotech companies (public and private) raised nearly \$11,800 million in new funds in the first three-quarters of the year – with prospects that 2003 will turn out to be the second-best fund-raising year ever.²⁸

Warbucks: Militarization is also boosting the US biotech industry. George W. Bush's 2003 budget, for example, included \$5,900 million to fight biological terrorism and approximately \$6,000 million will be spent over the next ten years on the purchase of drugs or vaccines for smallpox, anthrax, botulinum toxin and other pathogens that could be made into biological weapons.²⁹

Biotech's Billion Dollar Best Sellers: Genetically Modified Drug Products – 2002

Product/Company	2002 sales \$US millions	Therapeutic use
Procrit/Johnson & Johnson	\$4,269	Red blood cell stimulant
Intron-A/Schering-Plough	\$2,736	Hepatitis B & C
Epogen/Amgen	\$2,300	Kidney failure
Neupogen/Amgen	\$1,400	Treat infection in cancer patients
Remicade/Johnson & Johnson (Centocor)	\$1,297	Rheumatoid arthritis
Rituxan/Genentech	\$1,163	Non-Hodgkin's lymphoma
Avonex/Biogen	\$1,034	Multiple Sclerosis
Humulin/Eli Lilly	\$1,004	Diabetes

Source: ETC Group, based on sales figures compiled by *Signals Magazine*, www.signalsmag.com

Genomics: Speed-Reading Genes – From Microbes to Plants, People to Poodles:

Over the past decade, the automation of gene sequencing, new algorithms and super-computers have drastically reduced the time and money needed for sequencing the entire genomes of plants, animals, microorganisms and people. Consider the following examples:

- It took 12 years and over 250 people to complete the publicly-funded effort to sequence the *Escherichia coli* bacterium genome from start to finish. By contrast, a genomics subsidiary of CuraGen announced in September 2003 that it had used a novel method to sequence a whole viral genome in under two hours.³⁰

“Any genome center can do a virus, but not in one hour 45 minutes!” – Richard Begley, CEO of 454 Life Sciences, quoted in *Bio-IT World*, October 2003, p. 20.

- In 1998, scientists decoded the first animal genome, a nematode worm, with over 100 million base pairs. The project took over eight years to complete. In September 2003, Dr. J. Craig Venter of the Center for Advancement of Genomics announced that researchers had deciphered a rough draft of his dog's 2.4 billion genetic letters in only a few months. (That Venter would sequence his own poodle's genes came as little surprise. While at Celera Genomics, Venter led a commercial venture to decode the human genome using the DNA of an

anonymous donor; he later revealed that it was his own DNA that was sequenced. It turns out that Venter and his dog have a lot in common – there are dog-gene matches for three-quarters of known human genes.)³¹

- It took the publicly-funded Human Genome Project 10 years and \$2,700 million to sequence the 3.12 billion letters of our own genetic code. In October 2003, Affymetrix announced that it is accepting orders for its “human genome on a chip” that will cost around \$500 each.³² About the size of a thumbnail, the whole genome chip will allow scientists to “speed-read” all 30,000 or so genes in a human tissue sample to determine which genes are active.

The ultimate goal, of course, is gene-guided drug development, or what the pharma industry calls “personalized medicine.” Most drugs available today have only a 30-40% chance of being effective for a particular patient. Genetically targeted medicines would, in theory, avert allergic or other adverse reactions – the bane of the pharmaceutical industry.³³ The ability to scan thousands of human genes and instantly pinpoint DNA variations that render people genetically different – or genetically susceptible to disease – could become a genomics industry goldmine.

Animal Pharmaceutical Industry

Top 10 Animal Pharmaceutical Companies

Company	2002 sales (\$US million)
1. Pfizer/Pharmacia (<i>pro forma</i>)	\$1,625
2. Merial (joint venture Aventis & Merck)	\$1,501
3. Intervet	\$1,020
4. Bayer	\$802
5. Elanco	\$693
6. Schering-Plough	\$677
7. Fort Dodge	\$653
8. Novartis	\$622
9. Virbac	\$347
10. Alpharma	\$322

Source: ETC Group, based on data from Animal Pharm Research

Trends in Animal Pharmaceutical Industry:

- *Crossover Products*

- *Increased Pressure to Reduce Antibiotic Use in Factory Farming*
- *Cloning and Glowing Coming to Market?*

In 2002, the total “animal health” market was \$13,400 million, including pharmaceuticals, biologicals, and medicated feed additives.³⁴ The top ten companies control 62% of the total worldwide market.

Crossover Products – Adapting Human Pharma and Agrochemical Products for Pets: Over the past decade the dynamic growth sector in the animal pharmaceutical market was not health care for livestock, but for pets or “companion animals.” Americans spend over \$6,000 million a year on veterinary bills, and in the US and the UK, household pets account for over half the total animal health market.³⁵

Most of the leading animal veterinary companies are subsidiaries of pharmaceutical or pesticide firms. To avoid long and costly R&D efforts, these companies are taking existing products they’ve developed for humans and are adapting them for pets.³⁶ For example, Novartis markets an antidepressant developed for obsessive-compulsive disorder in humans, which it now sells under the brand name Clomicalm to treat “canine separation anxiety.” (Novartis Animal Health estimates that about seven million dogs in the US suffer one or more signs of separation anxiety!) Pfizer markets a drug to treat symptoms of Parkinson’s disease in humans; under a different brand name, the product is being used to treat cognitive dysfunction syndrome (and other geriatric behaviour problems) in dogs. There’s more to come, including research on a product to treat incontinence in cats and “thunder phobia” in dogs. One animal health researcher told *The Scientist*, “With this new attitude toward animals as family members rather than utilitarian chattels, people will spend more money on them. And now that there is a recognition of the magnitude of the behavioral problem, veterinarians are going to want solutions.”³⁷

Anti-Antibiotics: Campaigns led by public health and sustainable farming activists are altering factory farm livestock production and the future sale of some drug products for animals. There is mounting concern that over-use of antibiotics in animal agriculture will accelerate the onset of antibiotic resistant disease in humans. For example:

- In March 2002 the EU food safety commissioner recommended phasing out all antibiotics used as growth promoters in livestock by 2006.
- In June 2003 in response to a civil society campaign,³⁸ McDonald's announced that it would require some of its meat suppliers to restrict the routine use of antibiotics important for human health that are now used to promote growth production in livestock.
- In July 2003 two bills were introduced in the US Congress to phase out the use of medically important antibiotics in agriculture. The Animal Health Institute, an industry trade association, insists that decisions to curtail the use of antibiotics are not based on sound science.³⁹

Double Cheeseburger? In the last week of October 2003, the US Food and Drug Administration (FDA) released a draft report, "Animal Cloning: A Risk Assessment," concluding that "food products derived from animal clones are likely to be as safe as corresponding products from non-clones, or as safe as foods that we eat every day."⁴⁰ An advisory committee to the FDA (the Veterinary Medicine Advisory Committee [VMAC]) meeting in early November, however, concluded that more data are needed. The FDA expects to reach its final conclusions – and will possibly lift the voluntary moratorium on the sale of cloned animal food products if no food safety risk is found – by mid-2004.⁴¹ With conservative estimates that the semen from one cloned prize bull could be worth well over \$1 million *per annum*, clone producers are "thrilled" by the FDA's draft risk assessment.⁴²

Meanwhile, on January 5, 2004, a genetically modified (GM) animal is scheduled to go on sale in the USA for the first time. Scientists inserted a gene from the sea anemone into eggs of zebra fish to produce the vibrantly-colored GloFish. Alan Blake, the CEO of Texas-based Yorktown Technologies, the company that holds the exclusive US rights to the patented technology, said the company had consulted with the US FDA, the Department of Agriculture (USDA), the Environmental Protection Agency (EPA) and the US Fish and Wildlife Service. None of the agencies expressed "any regulatory concerns with an ornamental fluorescent zebra fish."⁴³ When genetically modified animals meet food derived from animal clones, *nouvelle cuisine* will get a whole lot newer.

Seed Industry

World's Top 10 (+ 1) Seed Corporations

Company	2002 Seed Sales US millions
1. Dupont (Pioneer) US	\$2,000
2. Monsanto (US)	\$1,600
3. Syngenta (Switzerland)	\$937 ⁴⁴
4. Seminis ⁴⁵ (US)	\$453 ⁴⁶
5. Advanta (Netherlands)	\$435 ⁴⁷
6. Groupe Limagrain (Vilmorin Clause) France	\$433 ⁴⁸
7. KWS AG (Germany)	\$391 ⁴⁹
8. Sakata (Japan)	\$376 ⁵⁰
9. Delta & Pine Land (US)	\$258 ⁵¹
10. Bayer Crop Science (Germany)	\$ 250 ⁵²
11. Dow (US)	\$200 ⁵³

Source: ETC Group

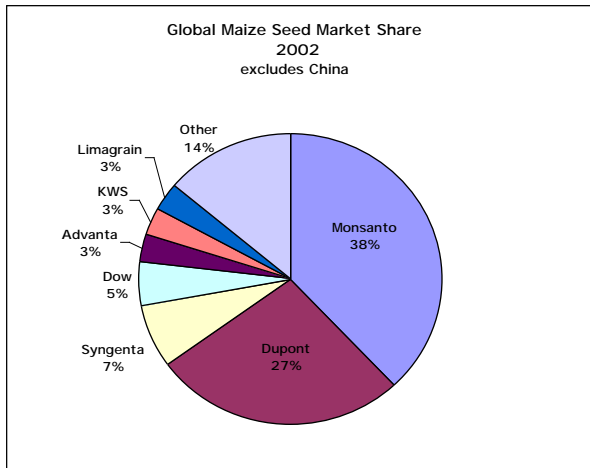
Seed Industry Trends:

- *Concentration in Market Share*
- *Non-Merger Mergers*
- *Transgenic Transformation*
- *Risky Business*

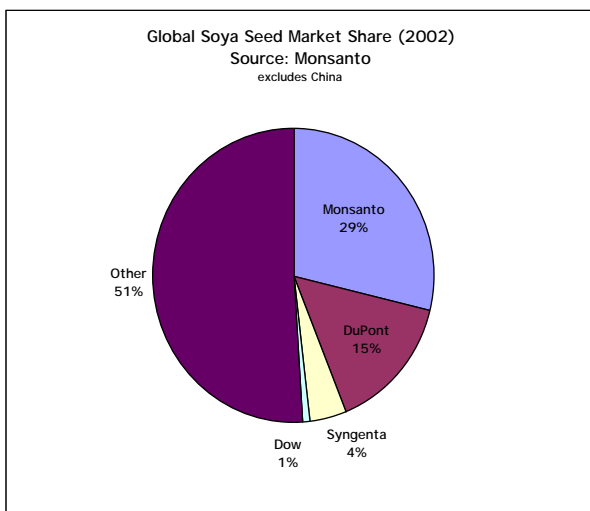
Consolidation: The top 10 firms accounted for combined seed revenues of over \$7,000 million dollars in 2002, or almost one-third (31%) of the world's commercial seed sales, valued at approximately \$23,000 million.⁵⁴

But the global picture obscures a much stronger market concentration in specific segments. After several decades of voracious mergers and acquisitions, the crop dust is settling and a handful of companies now hold a shocking percentage of the total world seed supply, especially in the commercial sectors of maize and soybeans – among the world's largest food crops.

Corn Kings: According to Monsanto, four companies control over three-quarters of the world's commercial maize seed market, excluding China. Seven companies control 86% of commercial maize germplasm worldwide.⁵⁵



Bean Behemoths: Four companies control 49% of commercial soya market worldwide, excluding China.⁵⁶



Non-Merger Mergers: In April 2002 the world's two largest seed corporations, DuPont and Monsanto, announced that they would agree to swap their key patented agricultural technologies and drop all outstanding patent lawsuits. The deal gives both Gene Giants cross-licenses to technologies for maize, canola and soybean crops, and mutual access to key gene transformation technologies and proprietary germplasm. The companies claim that the non-merger liaison will be a "win for farmers" and give them more technology choices.⁵⁷ The creation of "global technology cartels" that run below the radar screens of anti-trust regulators is likely to mean that farmers will have less choice, and less innovation for the same or higher prices.⁵⁸ Monsanto has since brokered similar deals with Dow Agrosciences (October 2002) and, more recently, with Bayer CropScience (October 2003).

Transgenic Transformation: DuPont, Monsanto, Syngenta, Bayer and Dow currently derive sales from the biotechnology market worth approximately \$3,000 million in 2001, according to Phillips McDougall AgriService.⁵⁹ Despite public opposition and worldwide controversy over GM seeds, the Gene Giants are using marketing muscle and biotech-friendly US trade negotiators to penetrate new markets. A major domino toppled (at least temporarily) in September 2003 when Brazil's president Lula da Silva overruled popular opposition to GM crops and legalized the planting of transgenic soybeans (Lula's decision is being legally challenged in Brazil.) The world's second largest soybean producer, Brazil represents a vast potential market for Monsanto, because the company holds an exclusive monopoly on all GM soy technologies.

Given the level of concentration in major commercial seed markets, farmers in the three countries where GM crops are widely grown (US, Argentina and Canada) are already facing fewer non-GM choices for maize and soybeans.

The Gene Giants are continuing to shift their focus from conventional seeds and pesticides to the faster growing GM seeds and biotech traits market. According to *Chemical Market Reporter*, "aggregate growth of crop protection chemicals as well as conventional seeds is declining at 2 percent while the biotech seed and traits sector is growing at 16 percent."⁶⁰ To be clear, the Gene Giants are not forsaking pesticides for greener pastures, they are pursuing the more profitable breeding strategy of developing genetically modified crop varieties that require or depend on the company's chemical. In other words, GM seeds are engineered to reinforce the sale of proprietary chemical products. This is the lucrative model pioneered by Monsanto's RoundUp Ready gene and blockbuster weedkiller RoundUp. The company's trait for RoundUp tolerance is now grown on over 40 million hectares worldwide – and Monsanto collects royalties or technology fees on every single seed (or sues until they do!).

A new study prepared by the Northwest Science and Environmental Policy Center concludes that the planting of commercial GM crops in the US over an eight year period (1996-2003) has increased pesticide use by about 50 million pounds, primarily due to increases in the use of chemical weedkillers sprayed on herbicide tolerant soybeans.⁶¹ The study concludes that many farmers are spraying

incrementally more herbicides on GM soybeans in order to manage tougher-to-control weed species and the emergence of resistance in some weed populations.⁶²

A handful of multinational firms are engineering a transformation of the world's seed supply – a shift that is well underway. Consider the following trends at the top three firms:

Dupont (Pioneer), the world's largest seed corporation and the first ever to top \$2,000 million in annual seed sales, does not distinguish between GM seed sales and sales of conventional varieties in its financial reporting. But a glance at the company's newest offerings (for the US market) reveals a steady shift to GM seeds for the company's flagship crops, maize and soya:

- Dupont released 43 new corn hybrids for the 2003 growing season; 28 of those new hybrids (or 65% of the total) are genetically modified (insect and/or herbicide resistance).
- Dupont released 23 new soybean varieties for the 2003 growing season. Of those new varieties, 19 (or 82% of the total) had a biotech trait (herbicide resistance).

Monsanto will allocate 80 percent of its R&D budget for biotech and seeds this year, and only 20 percent to agrochemicals.⁶³ CEO Hugh Grant announced in September 2003 that Monsanto will earn, for the first time ever, more money from biotech traits and seeds than from sales of RoundUp. Considering that Monsanto held virtually no interests in seeds before 1996, this is a dramatic shift from agrochemicals to crop genetics.

Syngenta, the world's third ranking seed firm, allocated \$170 million of its R&D dollars (or 32% of the total) to biotech research in 2002, compared to \$527 million in R&D for agrochemicals.⁶⁴ In 2002, Syngenta's sales of genetically modified seeds accounted for 17% of total seed sales – approximately \$160 million.⁶⁵

Risky Business: The Gene Giants are putting more and more of plant breeding efforts in the biotech basket. Given the opposition and uncertainties plaguing GM markets worldwide, biotech remains a risky business. The industry's strategy, of course, is to hold out long enough to develop a third generation of biotech products that will offer real or perceived benefits to consumers – the key ingredient

missing in the first and second generation of GM products.⁶⁶ Among the trends confronting the beleaguered agbiotech business:

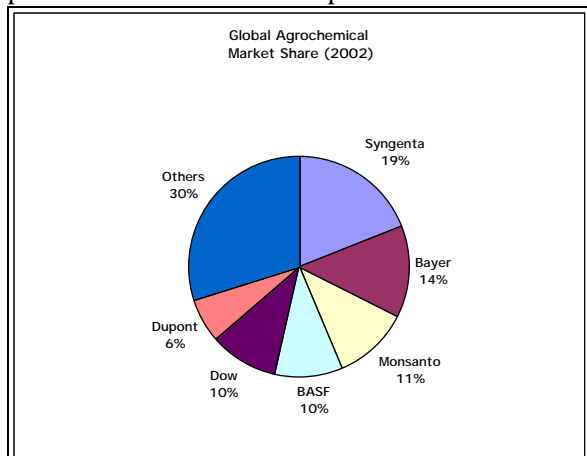
Traveling Transgenes: The Achilles Heel of agbiotech is unwanted gene flow. Neither the Gene Giants nor government regulators have been able to control or contain gene flow from GM crops to neighboring plants or related wild species. GM crop contamination is becoming increasingly widespread – even in regions where it is illegal to grow GM crops – and the consequences for farmers, biodiversity and the environment are largely unknown.⁶⁷

Industry jaw-boning on the future benefits of Generation 3 products was abruptly silenced late last year when the US Department of Agriculture announced that 500,000 bushels of soybeans destined for human consumption had been quarantined due to contamination by maize genetically engineered to produce a vaccine to control diarrhea in pigs. The obvious concern is that crops now being engineered to produce drugs, contraceptive gels, industrial chemicals or plastics will accidentally enter the food supply. The company growing the experimental pharma crop, Prodigene, was eventually fined over \$3 million. But the incident continues to undermine confidence in the entire biotech industry. A representative of the Grocery Manufacturers of America, a trade group for the powerful food retailers, told the *New York Times*, “The incident over all just reaffirms our concerns.” Ten US food industry groups are asking the US government to halt “bio-pharm” crops until stricter regulations can be put in place to prevent accidental contamination of other crops or the food supply.

Not surprisingly, a recent survey of five major insurance companies in the United Kingdom found that none would be willing to cover farmers growing GM crops for potential liability resulting from GM contamination of neighboring fields.⁶⁸ The insurers were also unwilling to insure farmers growing non-GM crops when GM material finds its way in their fields. The companies surveyed said that too little was known about GM crops' long-term effects on health and the environment.

As if to underscore the high-risks of agbiotech, Monsanto made a surprise announcement in mid-October 2003 that it is pulling out of the European

cereal business, and will abandon efforts to produce pharmaceuticals in GM crops.⁶⁹



Source: ETC Group, based on data provided by Agrow World Crop Protection News

Agrochemical Industry

World's Top 10 Agrochemical Firms

Company	2002 Agchem Sales US millions
1. Syngenta (Switzerland)	\$5,260
2. Bayer (Germany)	\$3,775
3. Monsanto (US)	\$3,088
4. BASF (Germany)	\$2,787
5. Dow (US)	\$2,717
6. DuPont (US)	\$1,793
7. Sumitomo Chemical (Japan)	\$802
8. Makhteshim-Agan (Israel)	\$776
9. Arysta LifeScience (Japan)	\$662
10. FMC (US)	\$615

Source: Agrow World Crop Protection News⁷⁰

- The global agrochemical market in 2002 was \$27,800 million.⁷¹
- The top 6 pesticide firms accounted for 70% of the global market, and the top 10 control 80% of global agrochemical sales. Bayer's acquisition of Aventis CropScience saw the leading group of seven agrochemical firms dwindle to six. Bayer leaped from sixth to second place, behind Syngenta.

Global agrochemical sales continued to decline in 2002, falling 1.5% compared to a 4.1% decline in 2001. Industry analysts blame sagging sales on poor weather, competitive pricing and greater emphasis on genetically modified traits (see discussion under seed industry trends).

Food Retail Industry

Top 10 Global Food Retailers

Company	2002 Sales US millions
1. Wal-Mart (US)	\$246,525
2. Carrefour (France)	\$64,979
3. Royal Ahold (Netherlands)	\$59,455
4. Kroger (US)	\$51,759
5. Metro AG (Germany)	\$48,714
6. Tesco (UK)	\$40,387
7. Costco (US)	\$38,762
8. Albertson's (US)	\$35,916
9. Safeway (US)	\$34,799
10. Ito-Yokado (Japan)	\$27,606

Source: ETC Group, based on data provided by IGD Grocery retailers are solidly on top of the global Food-Chain-Gang, dwarfing even the food and beverage processors in revenues and market power.

Global Food Retailing Trends:

- *Concentration*
- *"Wal-Martization" of the World*

The combined revenues of the world's top 30 food retailers exceeded \$1 trillion in 2001, according to IGD.⁷² The top 10 grocery retailers account for 57% of the combined revenues for the world's top 30 food retailers. Wal-Mart alone accounted for 21%.

Store Wars: Wal-Mart is the world's largest industrial corporation and the world's largest food retailer. (Its revenues reflect total sales of all products, not just food.) Wal-Mart started selling food in 1988; today it is the world's biggest grocer, with \$50,000 million in food sales in the US alone. Its revenues are nearly four times the size of its nearest competitor and bigger than the combined sales of the next four leading grocery retailers. Canada, Mexico and the UK account for 80% of Wal-Mart's sales outside of the US. But in 2002 Wal-Mart entered the world's second largest economy, Japan, with a minority purchase of Seiyu. Industry analysts refer to Wal-Mart's debut in Japan as the "most significant event in global retailing of the last two years."⁷³

Given Wal-Mart's titanic presence in global retailing, its corporate conduct affects how the entire world does business. In the United States, Wal-Mart typically sell grocery products at prices 14% lower than competing grocers, in part because the company

is a nonunion, low-wage employer, allowing it to hire clerks who make below-poverty wages.⁷⁴ Since 1995, at least 60 complaints have been filed against Wal-Mart in the US alleging illegal anti-union activities.⁷⁵ The *New York Times* recently opined that the “Wal-Martization of the work force...threatens to push many Americans into poverty.”⁷⁶

Food & Beverage Processing Industry

Top 10 food and beverage companies

Company	2002 food & beverage sales \$US millions
1. Nestle S.A.	\$54,254
2. Kraft Foods, Inc.	\$29,723
3. Unilever plc	\$25,670
4. PepsiCo Inc.	\$25,112
5. Archer Daniels Midland Co.	\$23,454
6. Tyson Foods	\$23,367
7. Cargill Inc.	\$21,500
8. ConAgra Inc.	\$19,839
9. Coca-Cola Co.	\$19,564
10. Mars Inc.	\$17,000

Source: *Food Engineering*, November 2003, www.foodengineeringmag.com

Trends in Food & Beverage Industry:

- *Non-merger mergers*
- *Obesity backlash*

As we’ve seen in the ag biotech industry, companies are seeking non-merger alliances as profitable alternatives to competition. In the food and beverage industry as well, partnerships and strategic deals are replacing mergers and cash transactions. The November 2003 issue of *Food Engineering* mentions the following examples, among others:

- H.J. Heinz transferred 8 factories and several brands worth \$1,100 million in annual revenues to Del Monte in what the company described as “a reverse acquisition.”
- Proctor & Gamble spun-off its Jif peanut butter and Crisco brands to J.M. Smucker Co.
- General Mills is partnering with Nestle to gain a distribution network for General Mills’ breakfast cereals outside of North America.
- Coca-Cola and Groupe Danone joined forces to launch a new bottled water business in the US, to compete with Nestle’s growing market share.

“Cooperation is becoming as common as competition among the industry’s leading corporations.” – Kevin T. Higgins, Senior Editor, *Food Engineering Magazine*⁷⁷

Food Industry Choking on Obesity Backlash

Two-thirds of Americans are now overweight or obese. Over the last twenty years, obesity rates have doubled in adults and children and tripled in teens.⁷⁸ In December 2001 the US Surgeon General warned that “obesity may soon cause as much preventable disease and death as smoking.”⁷⁹ The obesity pandemic is not restricted to OECD countries. In March 2003 the World Health Organization examined the globalization of obesity: “Paradoxically coexisting with undernutrition, an escalating global epidemic of overweight and obesity – ‘globesity’ – is taking over many parts of the world. If immediate action is not taken, millions will suffer from an array of serious health disorders.”⁸⁰ While neither the US Surgeon General nor the WHO finger the food industry for its role in promoting commercially-induced malnutrition, the food industry has become a super-size target. Over the past year, the fast-food industry and food manufacturers have faced an outbreak of obesity liability lawsuits. While some of the high-profile cases have been dismissed, the food industry is feeling the heat. According to industry analysts cited by *Food Engineering* magazine, “Anti-obesity measures will curb (food manufacturers’) ability to grow revenues in the future.”⁸¹ Meanwhile, the food industry is catering to desperate dieters with new products like low carbohydrate beer and ice cream.

Nanotechnology

The Gene Giants have been filling up Nanotech’s dance card for a few years now. They’re betting that nanotechnology, the science of manipulating matter at the level of atoms and molecules, will provide a new technology platform for launching new products and modifying existing ones. Across the board – whether it’s developing toxin-sensors for the food and beverage industry or extending big pharma’s IP protection through reformulating existing drugs or coming up with better, less expensive bio-markers – nanotech could be the antidote to the Gene Giants’ every ailment. The US National Science Foundation predicts that nanotechnology will account for half of all pharmaceutical sales within a decade.

Nanotech is attracting more public funding than any single area of technology.⁸² Public and private sector nanotech funding combined is currently between \$5,000 million and \$6,000 million a year. Venture capitalists are also eagerly investing in nanotech's colossal potential.⁸³ Nanotech is an integral part of corporate R&D across a wide range of industries.⁸⁴ According to an enthusiastic Mike Roco of the US National Science Foundation, "If a company does not enter nanotechnology now – in five years it will be too late – it will be out of business."⁸⁵

"In fact, nanotechnology is on course to become the largest government-funded science initiative since the race to put a man on the moon." Mark Veverka, "The Next Big Thing is Really Amazingly Small," Barrons, July 21, 2003.

According to Mark Modzelewski, the executive director of the US-based NanoBusiness Alliance, it would be hard to name a Fortune 500 company that's not investing in some area of nanotechnology.⁸⁶ ETC Group's survey of nanopatent activity gives just one indicator of the public and private sector's investment and commitment to nanotech. The table on the following page shows the number of patents and patent applications won by multinational firms, US universities receiving funds from the National Nanotechnology Initiative, and some branches of the US military.

Militarization and the threat of chemical and biological warfare are helping to propel nanotech R&D. In FY 2001, the US National Nanotechnology Initiative budget gave more nanotech funding to the National Science Foundation than any other government agency and 35% more than the Department of Defense.⁸⁷ For FY 2003 (post 9/11), the Department of Defense was allotted more nanotech money than any of the ten agencies receiving government funds and 10% more than the National Science Foundation.⁸⁸

Multinational Matter Moguls

Company or Institution followed by 2003 Global Fortune 500 rank, if applicable	# of Nano Patents, granted in US and Europe *	# of Nano Patents, granted in US and Europe in last two years **	# of Nano Patent Applications in US and Europe in last two years ***
United States Army	28	1	0
United States Navy	72	19	7
United States Air Force	27	2	1
Total: US Armed Forces	127	22	8
IBM (19)	117	28	22
Samsung (115)	23	16	26
Hewlett-Packard (40)	36	20	21
Motorola (156)	26	7	22
BASF (123)	27	6	10
L'Oréal (373)	61	12	4
Dow (145)	50	12	11
Xerox (304)	46	8	16
DuPont (67)	14	2	4
Sony (32)	13	5	24
Toyota (8)	3	0	3
Mitsubishi (10)	9	5	3
Unilever (66)	16	0	0
Procter & Gamble (86)	12	3	26
Degussa	6	2	7
Philips Electronics (124)	25	5	4
Altria Group (30) [Kraft, Philip-Morris, Miller]	1	1	2
Rice University	5	4	49
Northwestern University	13	3	15
Rensselaer Polytechnic University	4	2	9
Cornell University	20	4	3
Columbia University	2	4	7
University of California (all campuses)	73	15	22
Massachusetts Institute of Technology (MIT)	33	35	15
Princeton	5	6	5

Source: ETC Group, using Delphion Patent Database

Patent search on Delphion using search term nano in abstract and company name as patent assignee, with duplications eliminated.

**Patent search conducted on October 28, 2003.

***Patent search conducted on October 28, 2003; includes WIPO/PCT publications, with duplications eliminated.

Follow the Money: *Nanobiotechnology* often refers to the development of nano-scale materials with biomedical applications such as drug delivery or cancer detection. Nanobiotechnology also refers to the merging of the living and non-living realms to make hybrid materials and organisms. The idea is to integrate biological building blocks and synthetic matter to create new materials and devices. Since 1999, 52% of the \$900 million in venture capital funding for nanotech has gone to nanobiotechnology startups.⁸⁹ According to Lux Capital, while the total pool of venture capital declined from 2001 to 2002, investment in nanobiotechnology increased by 313%.⁹⁰ The merging of biotech and nanotech gives

researchers unprecedented potential to modify existing non-living material but also to create living organisms that have never existed before.

Nanotech's fundamental principle of material unity at the nano-scale means that biological molecules such as DNA can be seen as chemical entities with particular physical and electrical properties that may serve a specific function better than non-biological molecules. This kind of research is advancing in a direction that may best be described as the "coming-to-life" sciences.

Top 10 Nanobiotechnology Companies Ranked by Amount of Venture Capital Raised

Company	Funds Raised (US millions)	Description of Company	No. of patents applied for in the last 2 yrs.††
1. Immunicon(USA)	\$86	Diagnostic screening using nanoparticles	0
2. Quantum Dot (USA)	\$44.5	Semiconductor nanocrystals for biological assays	13
3. Surface Logic (USA)	\$38	Miniature biological assays for drug discovery	0
4. Genicon Sciences (USA)	\$34	Nanoscale signal for diagnostics	9
5. PicoLiter (USA)	\$27	Nanoparticle manufacturing	18
6. US Genomics	\$27	Single molecule analysis assays for drug discovery	2
7. Nanosphere	\$23.5	Diagnostic nanoprobe and image analysis	12
8. Advion Biosciences (USA)	\$15	Nanoelectrospray bioanalysis using biochips for drug delivery	13
9. Ferx (USA)	\$15	Drug delivery using magnetic forces	4
10. Nanogram Devices	\$9	Nanomaterials for biomedical application	16

Source: ETC Group, based on table appearing in *Nature Biotechnology*, prepared by Lux Capital

††Using Delphion patent database; includes WIPO/PCT, and EPO and US PTO searches, with duplications eliminated.

Recent Milestones of the “Coming to Life” Sciences:

- In 2002, researchers at Stony Brook (the high-tech institute at the State University of New York) synthesized the poliovirus’s genome using published gene sequence information and off-the-shelf, commercially-available DNA material. The project took two years and was funded by the US Department of Defense’s (DOD) Defense Advanced Research Projects Agency (DARPA)⁹¹
- In November 2003, researchers at the Institute of Biological Energy Alternatives (Craig Venter, of Celera Genomics fame is the Institute’s founder) took just two weeks to build from scratch an artificial virus with the same genetic code as a virus known to infect and kill bacterial cells. The project was funded by the US Department of Energy.⁹²
- Also in November 2003, researchers at the Howard Hughes Medical Institute announced that they had designed and constructed a functional protein that is not found in nature, which they dubbed “Top7.”

The researchers say that being able to specify and design artificial proteins will allow them to engineer artificial protein enzymes for use as medicines or industrial catalysts.⁹³

- In October 2003, Stanford University researchers reported they had created an expanded molecule of DNA with a double helix wider than any found in nature.⁹⁴ The new “xDNA” is more heat-resistant than natural DNA and it glows in the dark. The researchers hope that “one day it could be the genetic material for a new form of life, maybe here or on another planet.”⁹⁵

Conclusion: Reforming corporate governance is a Herculean task. Because the system works quite nicely for the rich and powerful it’s an agenda that is fervently sidetracked and distorted. We are likely to hear more about corruption in Third World governments than about systemic corporate crimes – because the executives who pay the bribes are the ones who are reporting on corruption! It’s safer to focus on the

scandalous behaviour of a few rotten executives than to admit that the system is rotten to the core. The first step in a long process of reform is to document corporate power. That is the goal of this *Communiqué*. Meaningful challenges to corporate hegemony will ultimately require citizen participation and debate at all levels – local, national and international. Because transnational businesses operate beyond the boundaries of any single country, however, reform will also require debate, oversight and monitoring at the United Nations level. In 1974 the United Nations formally created the Centre on Transnational Corporations – but its programme withered and the Centre ceased operations in 1993.⁹⁶ The international community must re-gain the capacity to monitor and even regulate the activities of transnational enterprises. Beyond governance, the international community must also create a new body with the mandate to track, evaluate and accept or reject new technologies and their products through an International Convention on the Evaluation of New Technologies (ICENT). In future issues of the *ETC Communiqué* we will report on efforts to bring ICENT before the United Nations.

The Global Economy: Who's Got the Power?

Over half of the biggest 100 global economies (51) are corporations.

	Company or Country	2002 GDP (countries) or 2002 Revenue (companies) US\$millions
1	United States	10,416,818
2	Japan	3,978,782
3	Germany	1,976,240
4	United Kingdom	1,552,437
5	France	1,409,604
6	China	1,237,145
7	Italy	1,180,921
8	Canada	715,692
9	Spain	649,792
10	Mexico	637,205
11	India	515,012
12	Korea, Rep.	476,690
13	Brazil	452,387
14	Netherlands	413,741
15	Australia	410,590
16	Russian Federation	346,520
17	Switzerland	268,041
18	Belgium	247,634
19	WAL-MART	246,525
20	Sweden	229,772
21	Austria	202,954
22	Norway	189,436
23	Poland	187,680
24	GENERAL MOTORS	186,763
25	Saudi Arabia	186,489
26	Turkey	182,848
27	EXXONMOBIL	182,466
28	ROYAL DUTCH/SHELL	179,431
29	BP p.l.c.	178,721
30	Denmark	174,798
31	Indonesia	172,911
32	FORD MOTOR CO.	163,871
33	Hong Kong, China	161,532
34	DAIMLER CHRYSLER	141,421
35	TOYOTA MOTOR	131,754

	Company or Country	2002 GDP (countries) or 2002 Revenue (companies) US\$millions
36	GENERAL ELECTRIC	131,698
37	Finland	130,797
38	Thailand	126,407
39	Portugal	121,291
40	Ireland	119,916
41	Israel	110,386
42	MITSUBISHI	109,386
43	mitsui & CO., LTD.	108,631
44	Iran	107,522
45	South Africa	104,235
46	Argentina	102,191
47	ALLIANZ AG	101,930
48	CITIGROUP	100,789
49	TOTAL FINA ELF	96,945
50	Malaysia	95,157
51	Venezuela	94,340
52	CHEVRONTEXACO	92,043
53	Egypt	89,845
54	NIPPON TELEPHONE	89,644
55	ING GROEP N.V.	88,102
56	Singapore	86,969
57	ITOCHU	85,856
58	IBM	83,132
59	VOLKSWAGEN	82,204
60	Colombia	82,194
61	SIEMENS AG	77,205
62	Philippines	77,076
63	SUMITOMO	75,745
64	MARUBENI	72,165
65	Czech Republic	69,590
66	Puerto Rico	67,897
67	VERIZON	67,625
68	AMERICAN INTER. GROUP	67,482
69	HITACHI, LTD.	67,228

	Company or Country	2002 GDP (countries) or 2002 Revenue (companies) US\$millions
70	US POSTAL SERVICE	66,463
71	Hungary	65,843
72	HONDA MOTOR	65,420
73	CARREFOUR SA	64,979
74	Chile	64,154
75	ALTRIA GROUP	62,182
76	AXA	62,051
77	SONY	61,335
78	NIPPON LIFE INSURANCE	61,175
79	MATSUSHITA ELECTRIC	60,744
80	Pakistan	60,521
81	ROYAL AHOLD	59,455
82	CONOCOPHILLIPS	58,384
83	HOME DEPOT	58,247
84	New Zealand	58,178
85	NESTLE S.A.	57,279
86	MCKESSON HBOC	57,129
87	Peru	56,901
88	HEWLETT-PACKARD	56,588
89	NISSAN MOTOR	56,041
90	Algeria	55,666
91	VIVENDI UNIV.	54,977
92	BOEING	54,069
93	ASSICURAZIONI GENERALI	53,599
94	FANNIE MAE	52,901
95	FIAT S.P.A.	52,613
96	DEUTSCHE BANK	52,133
97	CREDIT SUISSE	52,122
98	MUNICH GROUP	51,980
99	MERCK & CO, INC.	51,790
100	KROGER	51,760

Source: ETC Group, based on World Bank (World Development Indicators database, July 2003) and on Fortune Global 500 database 2003.

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- ¹ ETC Group, based on World Bank (World Development Indicators database, July 2003) and on Fortune Global 500 database 2003.
- ² www.washingtonpost.com/wp-dyn/photo/business/G18179-2002Aug14.html
- ³ Kevin T. Higgins, "The World's Top 100 Food & Beverage Companies," *Food Engineering Magazine*, November 1, 2003.
- ⁴ See, for example, ETC Group, News Release, "Dupont and Monsanto – 'Living in Sinergy'?" April 9, 2002. Available on the Internet: www.etcgroup.org
- ⁵ M.C. Roco and W.S. Bainbridge, *Converging Technologies for Improving Human Performance*, June, 2002 p. ix.
- ⁶ According to Fortune's Global 500, combined sales of the world's top 200 corporations in 2002 were \$9,312,821 million. Worldwide GDP, according to the World Bank, was \$32,252,480 million.
- ⁷ According to the most recent statistic available, the International Labour Organization's estimate of the world's work force is 2,957,744,000 – or nearly 3 billion. The world's top 200 corporations employed 27,062,417 people in 2002, according to the Fortune Global 500 database.
- ⁸ According to Fortune's Global 500, combined sales of the top 500 corporations in 2002 was \$13,729,042 million.
- ⁹ According to the most recent statistic available, the International Labour Organization's estimate of the world's work force is 2,957,744,000 – or nearly 3 billion. The world's top 500 corporations employed 46,492,660 people in 2002, according to the Fortune Global 500 database.
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- ¹¹ Mary Robinson, from a speech given at the International Symposium on Human Rights, Development and Business in Basel, Switzerland, 27 November 2003. For the full text of her speech, see *South Bulletin* No. 69, produced by the South Centre, Geneva, 30 November 2003.
- ¹² UNDP, "Millennium Development Goals: A compact among nations to end human poverty," *Human Development Report 2003*. Available on the Internet: www.undp.org/hdr2003/
- ¹³ International Labour Office, Press Release, "New ILO Report on Global Employment Trends 2003," 24 January 2003.
- ¹⁴ *Scrip's 2003 Pharmaceutical Company League Tables*, edited by Daniel Barry, PJB Publications.
- ¹⁵ Pfizer News Release, "Pfizer and Pharmacia Combine Operations, Creating World's Largest Research Based Pharmaceutical Corporation," April 16, 2003. On the Internet: http://www.pfizer.com/are/investors_releases/mn_2003_0416.cfm
- ¹⁶ Peter Barfoot, BioPortfolio, Ltd., "Pfizer/Pharmacia: Moving the goalposts." The article summarizes the Datamonitor report, *Pharmaceuticals: Survival of the 'Fittest' – Can Competitive Advantage be Sustained Without M&A in the Wake of Pfizer/Pharmacia?* Available on the Internet: http://www.bioportfolio.com/news/report_8.htm
- ¹⁷ A. Maureen Rouhi, "Rediscovering Natural Products," *Chemical & Engineering News*, October 13, 2003. p. 77.
- ¹⁸ According to FDA Commissioner Mark McClellan, new chemical entities approved by FDA reached an all-time low of 21 in 2002 (42 were registered in 1996); 12 biopharmaceuticals were approved in 2002 (27 were approved in 1998). See Rick Mullin, "Drug Discovery Perspectives," *Chemical & Engineering News*, Aug. 18, 2003, p. 14.
- ¹⁹ Robert Paull, Josh Wolfe, Peter Hébert and Michael Sinkula, "Investing in Nanotechnology," *Nature Biotechnology*, October 2003, p. 1146.
- ²⁰ Among others, patents on Merck's Vasotec, Pepcid and Zocor, on Eli Lilly's Prozac, and on Schering-Plough's Claritin have all been extended in this way. Rachel Zimmerman, "Child Play: Pharmaceutical Firms Win Big on Plan to Test Adult Drugs on Kids --- By Doing Inexpensive Trials, They Gain 6 More Months Free From Generic Rivals --- FDA: Law Does Some Good," *Wall Street Journal*, February 5, 2001.
- ²¹ "Downsizing" worked to extend Wyeth's patent on Rapamune, an immunosuppressive drug. See Edd Fleming and Philip Ma, "From the analyst's couch: Drug life-cycle technologies," *Nature Reviews Drug Discovery* 1, 751-752 (2002); doi:10.1038/nrd926.
- ²² *Scrip's 2003 Pharmaceutical Company League Tables*, edited by Daniel Barry, PJB Publications, Table 28, pp. 233-237.
- ²³ Riku Lähteenmäki and Laura DeFrancesco, "Public biotechnology 2002 – the numbers," *Nature Biotechnology*, Vol. 21 (no. 6), June 2003, p. 607.
- ²⁴ *Ibid.*
- ²⁵ *Nature Biotechnology* uses a broad definition, and its top 10 list differs from that of *Scrip's Pharmaceutical League Table*. Nature Biotech's top 10: Amgen, Monsanto, Genentech, Quintiles, Celera, Elan, Chiron, Biogen, Genzyme and Shire.
- ²⁶ Riku Lähteenmäki and Laura DeFrancesco, p. 612.

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- ²⁷ Initial public offering refers to the first time a company raises money through the sale of public stock in the company. The IPO count changes slightly depending on how *biotech* is defined. Nancy Weil, "Biotech IPOs 'Not for the Squeamish,'" IDG News Service, Boston Bureau, November 7, 2003; available on the Internet: www.bio-itworld.com/news110703_report3694.html
- ²⁸ Jennifer Van Brunt, "Financing on Target for a Stellar Year," *Signals Magazine*, originally published October 2, 2003. Available on the Internet: www.signalsmag.com
- ²⁹ Frank DiLorenzo, *Standard & Poor's Industry Surveys: Biotechnology*, May 15, 2003, pp. 6-7.
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- ³² Andrew Pollack, "Human Genome Placed on Chip; Biotech Rivals Put it Up for Sale," *New York Times*, October 2, 2003.
- ³³ David Stipp, "Speed-Reading Your Genes: Using Biochips, Perlegen could turn our genetic uniqueness into gold," *Fortune*, August 11, 2003.
- ³⁴ According to the Animal Health Institute, biologicals are products that work by affecting the immune system to prevent, control or treat disease, including vaccines, antibodies, immunostimulants, and diagnostic kits (<http://www.ahi.org/animalHealthProducts/index.asp>).
- ³⁵ "Companion Animals: A new market for human pharmaceutical and insecticides," *Animal Pharm Reports*, November 7, 2002, published by PJB Publications. Executive Summary available on the Internet: <http://www.pjbpubs.com/cms.asp?pageid=1332#exec>
- ³⁶ *Ibid.*
- ³⁷ Steve Bunk, "Market Emerges for Use of Human Drugs on Pets," *The Scientist*, 13[8]:1, Apr. 12, 1999.
- ³⁸ The Keep Antibiotics Working campaign (www.KeepAntibioticsWorking.com) is a coalition of health, consumer, agricultural, environmental and other advocacy groups with more than nine million members dedicated to eliminating a major cause of antibiotic resistance: the inappropriate use of antibiotics in farm animals.
- ³⁹ David Barboza and Sherri Day, "McDonald's Seeking Cut In Antibiotics In Its Meat," *New York Times*, June 20, 2003, p. C1.
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- ⁴¹ Kendall Powell, "Regulators equivocate on safety of clones," *Nature Biotechnology*, vol. 21 (12), December 2003, pp. 1415-1416.
- ⁴² *Ibid.*
- ⁴³ Quoted in Kenneth R. Weiss, "From Biogenics Lab to Home Aquariums, It's the GloFish," *Los Angeles Times*, November 22, 2003.
- ⁴⁴ http://www.syngenta.com/en/ar2002/sales_overview.aspx
- ⁴⁵ Savia SA sold a 75% share of Seminis to investment group Fox Paine & Co. in June 2003 for almost \$225 million. Alfonso Romo will continue as Seminis's chairman and chief executive.
- ⁴⁶ Seminis reports fiscal 2002 results, Jan. 16, 2003.
- ⁴⁷ <http://www.advantaseeds.com/servlet/nl.gx.advanta.client.http.GetFile?id=58735> 419 million Euros = \$435 million dollars (419 x 1.038)
- ⁴⁸ www.hoovers.com/free
- ⁴⁹ KWS annual report 2001/02. In US \$. New report due out Dec. 2003.
- ⁵⁰ Hoover's Online, 2002 sales, \$375.7 million
- ⁵¹ Delta & Pine Land, FY end 2002 financial results, press release, Oct. 15, 2002.
- ⁵² <http://www.press.bayer.com/News/News.nsf/id/C65A003D6A59FACAC1256D950044129E> (conversion of 240 million Euros = \$249 million dollars)
- ⁵³ Personal communication with high-ranking official at Dow Agrosciences, January 9, 2003.
- ⁵⁴ According to the International Seed Federation, the estimated commercial seed market for 49 countries worldwide is approximately US\$24,000 million. <http://www.worldseed.org/statistics.html> The ETC Group uses the lower figure of \$US23,000.
- ⁵⁵ <http://www.monsanto.com/monsanto/content/investor/monsanto-overview.pdf>
- ⁵⁶ *Ibid.*
- ⁵⁷ Monsanto and DuPont *News Release*, "DuPont and Monsanto Reach Agreement that Brings New Technologies to Farmers Worldwide," April 2, 2002. Available on the Internet: <http://www.monsanto.com/monsanto/layout/media/02/04-02-02a.asp>
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- ⁶⁵ Syngenta News Release, February 5, 2003. Available on the Internet: <http://www.seedquest.com/News/releases/2003/february/5364.htm>
- ⁶⁶ For more information, see *ETC Communiqué*, "Biotech's Generation 3," Issue #67, November/December 2000. Available on the Internet: <http://www.etcgroup.org>
- ⁶⁷ For background information, see documents on Mexican maize contamination on ETC Group web site, www.etcgroup.org
- ⁶⁸ Victoria Fletcher, "GM 'could be another Thalidomide,'" *Evening Standard*, 7 October 2003, Available on the Internet: <http://www.thisislondon.co.uk/news/articles/7053333?source=Evening%20Standard>
- ⁶⁹ Andrew Pollack, "Monsanto Overhauling Businesses," *New York Times*, October 16, 2003.
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- ⁷¹ According to Allan Woodburn Associates, cited in Kerri Walsh, "Weather Rains on Agchem Demand," *Chemical Week*, March 5, 2003, p. 23.
- ⁷² IGD is the Institute of Grocery Distribution, based in the UK, the leading analyst of global grocery retailers. www.igd.com IGD points out that the true proportion of global market share for the leading 30 food retailers is likely to be somewhat lower than this given the inclusion of "non-grocery" turnover for a number of retailers on the list. Source: *Global Retailing 2003*, IGD.
- ⁷³ IGD, *Global Retailing 2003*
- ⁷⁴ Anonymous, "The Wal-Martization of America," *New York Times* Editorial, November 15, 2003.
- ⁷⁵ *Ibid.*
- ⁷⁶ Anonymous, "The Wal-Martization of America," *New York Times* Editorial, November 15, 2003.
- ⁷⁷ Kevin T. Higgins, "The World's Top 100 Food & Beverage Companies," *Food Engineering Magazine*, November 1, 2003.
- ⁷⁸ See Center for Science in the Public Interest (www.cspinet.org) and the July 31, 2003 news release, "Everyday Signs that Obesity Rates Are Increasing," <http://www.commondreams.org/news2003/0731-01.htm>
- ⁷⁹ U.S. Department of Health and Human Services, "The Surgeon General's call to action to prevent and decrease overweight and obesity," Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General; 2001.
- ⁸⁰ Joint WHO/FAO Expert Report On Diet, Nutrition And The Prevention Of Chronic Diseases, 2002: Geneva, Switzerland. Available on the Internet: http://www.who.int/nut/documents/trs_916.pdf
- ⁸¹ Kevin T. Higgins, "The World's Top 100 Food & Beverage Companies," *Food Engineering Magazine*, November 1, 2003.
- ⁸² Cientifica, "Nanotechnology Opportunity Report, 2nd Edition: Executive Summary," June 2003.
- ⁸³ Robert Paull, Josh Wolfe, Peter Hébert and Michael Sinkula, "Investing in Nanotechnology," *Nature Biotechnology*, October 2003, pp. 1144-1147.
- ⁸⁴ *Ibid.*, p. 1147
- ⁸⁵ Quoted in Ronald Bailey, "The Smaller the Better – The limitless promise of nanotechnology – and the growing peril of a moratorium," *reason magazine*, December 2003. Available on the Internet: <http://reason.com/0312/fe.rb.the.shtml>
- ⁸⁶ Presentation by Mark Modzelewski at the Rockefeller Foundation in New York City, October 6, 2003.
- ⁸⁷ <http://www.nano.gov/2002budget.html> (accessed November 25, 2003).
- ⁸⁸ http://www.nano.gov/nni04_budget_supplement.pdf
- ⁸⁹ Robert Paull, Josh Wolfe, Peter Hébert and Michael Sinkula, "Investing in Nanotechnology," *Nature Biotechnology*, October 2003, p. 1146.
- ⁹⁰ *Ibid.*, p. 1146.
- ⁹¹ Anonymous, Stony Brook News Release, "First *de novo* virus synthesis," available on the Internet: <http://www.sunysb.edu/ovprpub/tsc/polio.html> (accessed November 25, 2003)

⁹² Anonymous, "Researchers create artificial virus in war against real thing," Associated Press, November 14, 2003. Available on the Internet: <http://www.redding.com/news/national/stories/20031114nat004.shtml> (accessed November 25, 2003).

⁹³ Anonymous, "Researchers Design and Build First Artificial Protein," Howard Hughes Medical Institute News Release, November 20, 2003. Available on the Internet: <http://www.hhmi.org/news/baker3.html> (accessed November 25, 2003).

⁹⁴ Anonymous, "Researchers Create 'Supersized' Molecule of DNA," October 31, 2003. Adapted from a Stanford University news release and available on the Internet: <http://www.sciencedaily.com/releases/2003/10/031031064709.htm> (accessed November 25, 2003.)

⁹⁵ *Ibid.*

⁹⁶ A Commission on Transnational Corporations, to which the Centre on Transnational Corporations reported, was created at the same time. The Commission was discontinued in 1993 and its responsibilities were transferred to the United Nations Conference on Trade and Development's (UNCTAD's) Commission on Investment, Technology, and Enterprise Development.

"When the international human rights framework began to be shaped at the end of World War II, the responsibility for protecting the rights and welfare of all citizens was explicitly assumed by national governments. Now, in many areas, power has shifted from the public to the private, from national governments to multinational corporations and international organizations. This has resulted in a gap in accountability for human rights protection and an absence of transparency and broad public participation in critical policy decisions. In developing countries in particular, people increasingly perceive their respective national governments to be unwilling or unable to stand up to or influence their political and economic conditions, which are shaped more and more by the policies of rich nations, powerful non-state actors, and international rules and institutions. Dealing with this situation is a central challenge of our times." — **Mary Robinson**, former President of Ireland and former UN High Commissioner for Human Rights, 27 November 2003.

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. The ETC group is also a member of the Community Biodiversity Development and Conservation Programme (CBDC). The CBDC is a collaborative experimental initiative involving civil society organizations and public research institutions in 14 countries. The CBDC is dedicated to the exploration of community-directed programmes to strengthen the conservation and enhancement of agricultural biodiversity. The CBDC website is www.cbdcprogram.org