

Futurewatch

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An information service about international perspectives on our futures, prepared by futures scanner, **Jennifer Coote**. Annual dates in last two digits.

COMMUNICATIONS/TRANSPORT

The Human Face of Web 2.0

Millions of participants are engaged in Second Life, the alternative reality created and run by Linden Labs. San Francisco, whose goal was to create a self-governing community where residents would be empowered to act on the things they feel strongly about and adjudicate such disputes. But the hope is in jeopardy as maverick behaviours, not all malicious, are leading to disputes being taken into real-life justice systems, usually over property and profits. Not all virtual entrepreneurs regard their operations as fantasy. There are serious questions about the sexual interactions of child-like avatars, while gambling, formerly widespread in Second Life, but illegal in US reality, has already been shut down. **New Scientist, 1 Sept, 07, pp 28-29.**

R. Schroeder, Oxford Internet Institute, *Futures August, 07*, provides an overview of ethical and social issues in shared virtual environments. It is necessary to define what is meant by shared virtual environments (SVEs) in relation to other technologies and media. Current systems and usages will be most relevant to development of SVE ethics, with guidelines for research and development, with suggestions and desirable usages for gaming and socialising.

Human Relations, April 07, is devoted to virtuality and emotion, particularly how emotions are constructed, modified or suppressed within such environments, and whether they are poor substitutes for those in reality, or developments in their own right. It seems likely that in virtual environments, more people will confront cultural understanding about their virtual experiences. Instructors in the virtual classroom are challenged in expression of feelings in relation to their students, because emotions play complementary roles in sense making process, especially in highly contentious situations.

W. Roush, *Technology Review, July/Aug 07*, delves into the potential for the enormous spread and population of Second Life to overlap with "virtual globes": programmes such as Google Earth, World Wind and Virtual Earth. Along with their digital counterparts Web Maps, these are getting more personal and immersive, where user-created content, such as travel photos, are pinned to specific locations. Within a decade there could be a great Metaverse, in some ways foreseen by the

SciFi novel Snow Crash. It will be accessible both through its immersive virtual-reality form and through peep-holes in cell-phones in daily reality.

There will be several Worlds in this system, owned by different organisations, built on different platforms with community standards about the connections and open-source software which carries the user between the systems. The Metaverse will be the Central Station common to all. Google Earth already has systems of sensors monitoring real-time data from a variety of sites and with millions more users can receive real-time visual and atmospheric data etc which transforms their experience, blurring the line between reality and the virtual representations. See also (technology review.com/second earth).

A Crowd of One: The Future of Individual Identity, J. H. Clippinger, Public Affairs, 07. A strategic thinker on artificial intelligence and computer linguistics explores the boundaries which need to be renegotiated as the human-digital interface intensifies. Through neuroscience, evolutionary biology and other disciplines, human understanding of the self is changing, but the constant is always that we become ourselves through social interaction. He believes that the digital revolution will be beneficial, empowering humans to make right decisions without fear, force and intimidation.

Finnish Futurist **M. Mannermaa**, *Journal of Futures Studies*, May 07, reports from a EU Conference in Espoo, 2006, on the Information Society Part Two. This envisages a ubiquitous network society where wireless data transfer and networking is made possible for anyone, anywhere and time using different devices. It involves the learning society, knowledge society, new economy, third wave, and dream society. "In the ubiquitous society intelligence will be everywhere and the objects involved will communicate between themselves." A significant aspect is that Some Brother controls, knows and never forgets; it is not a single player, and it has many, many addresses. People live an aquarium life.

On the Machine Side

Artificial general intelligence, called the Holy Grail of computer science, is still beyond reach after half a century of research, reports senior editor, **P. Tucker**, *The Futurist*, March-April 08. The broad end of automated utility systems and the narrow end of automated cars have been achieved, but a radical intellectual breakthrough is needed for general AI. Since the technologies and raw computing power exist, two paths are suggested by experts:- continue to develop narrow AI until the systems are generally competent, or specifically engineer a system that can learn and think. These positions are summarised as "Neats", scientifically minded, seeking a single elegant solution; and the "Scruffies", who focus on building systems and writing write narrow codes and make little advancements.

Creating a machine that can learn is the essential first step towards a machine that think. Such machines may be basically rational but they have a knowledge and structure acquired by experience. The key is understanding what the brain does with words. Current development of search engines is evolving from matching key words, to machines which can interact fluidly with humans, because the machine can match the meaning of a question with the meaning of a document. This natural language technology may reach such a tipping point in five years time.

Science, 31 Aug, 07, pp 1178-11179, outlines two reports on information privacy, from the US National Research Council and UK Royal Academy of Engineering. The former includes a recommendation for a Federal Privacy Commissioner, which is likely to prove controversial. The latter, UK report emphasises in light of human rights laws, that organisations maintaining systems that use personal information should be accountable for designing them to ensure privacy. This is in line with the new paradigm developing by which system designers conduct privacy risk assessments and incorporate privacy as a fundamental design parameter.

Technology leaders are responding to research which confirms the rocketing energy demands by data centres and computer systems by collaborating efforts to green IT, such as the Green Grid, *New Scientist*, 5 Jan 08, pp 20-21. This is pioneering more energy efficient systems for data centres. All aspects of computer operations are being scrutinised to improve energy efficiency. In future, computers could adjust their energy use according to their level of activity, though it is not certain that this will be enough to reduce the growing energy demand of the coming decades.

B. J. Hesse, *Current History*, May 07, explores the extraordinary proliferation of cell phones in Africa, where growth is faster than anywhere else, from an estimated 63 million in 2003 to 155 million in 2006. The 63% coverage today is likely to reach 85 % by 2010. Service provision is very challenging in chaotic countries, such as the Congo. Infrastructure costs are much greater, maintenance in the rainforest areas is a headache, electricity supply is haphazard, generators gulp fuel, theft is frequent, trained staff is limited because of limited education and AIDS-related absenteeism, corruption, red tape and ever-changing laws are further complications. The service providers, mostly S. African or Arab, are ingenious in both coping with the practical challenges and in the types of services such as incorporating banking services, which are attractive when standard banks are scarce.

The insatiable growth of mobile phones is also affecting the supply of coltran, a heat-conducting mineral essential for cellphones, largely found in the Congo. Highly organised coltran exploitation is rampant in the region as prices surge, and mining spreads the gorilla reserves, threatening these animals.

The spread of the technology is helping to bridge the digital and socio-economic divides, and around the cellphones themselves a host of entrepreneurial services are developing.

Knowledge, Open or Protected

Wired Shut: Copyright and the Shape of Digital Culture, **T. Gillespie**, MIT Press, 07, provides a clear examination of the development and issues involved in the impact of digital culture on copyright law. "The choices made now will help decide whether we will be active participants in our culture and creative users of our technology, or passive recipients content to quietly embrace what is sold to us."

The Right to Know: Transparency for an Open World, **Ed A. Florini**, Colombia Univ Press, examples from a variety of countries and institutions illustrate the ongoing struggles of citizens for improved disclosure in government decision making, corporate conduct and international governmental procedure. Fundamental human rights, improved policy effectiveness and reduction of corruption are assumed

to gain thereby. Powerful forces are opposed: entrenched habits, protection of privilege, and fear of how newly released information might be used. Making the transparency process work requires hard work from policy makers and citizens.

Transparency: The Key to Better Governance, eds C. Hood, D. Heald, O.U.P, 06, offers a diversity of contributions in a comprehensive survey, from origins to problems and solutions. Greater nominal transparency has not proved effective, thwarted partly by the trend to privatisation and outsourcing. See also same Authors, **What Happens When Transparency Meets Blame Avoidance?** *Public Management Review*, Vol9/2 07.

By the Sea and the Sky

The shipping industry is facing up to the need for greater energy efficiency, *Nature*, 20 Sept 07, pp 272-273, although cargo ships are overall far more energy efficient than land transport and emit an estimated 2.7% of global greenhouse gases. Innovations are squeezing more efficiency out of existing ship designs, together with new ideas such as attaching kite-like sails to ship bows to reduce fuel consumption, or pumping air beneath hulls to provide a floatation cushion, and the possible switch to using natural gas in fuel cells which would reduce harmful emissions.

Maritime engineers are reviving use of electric drives for ships, *The Economist Technology Quarterly*, 8 Dec 07, pp 25-26. Powerful electronics capable of handling huge flows of current and smaller, more powerful electric motors can be integrated into power systems which can both drive the ship and provide its on-board power. Electricity from multiple sources is routed to wherever wanted and at the voltage needed. Both US and UK navies are deploying such vessels, while cargo ships and big cruise liners are likely to be fitted for electric drives.

The Economist, Survey, Air Travel, 16 June 07, reports that aircraft are steadily improving in designs to save on energy consumption, utilising better engine design and materials with more efficient flight systems and aerodynamics. Incremental gains mount up. Since aircraft emissions still will account for a large share of carbon emissions budgets, still greater improvement is needed. Electric drives using fuel cells are being considered, as well as radical redesign of the body of the aircraft and the wings.

ECONOMICS/BUSINESS

On Economic Ideas

D. Rodrik, One Economics, Many Recipes: Globalization, Institutions, and Economic Growth, Princeton Univ. Press, 07, urges policy makers to keep their focus on basic principles rather than on particular policies, because the former can be met by a variety of settings according to the particular country. He offers a framework for diagnosing impediments to growth, which can be adapted according to the particular problems of a given economy. He also argues that international economic growth has not served developing economies well although the growth and poverty reduction in some developing economies is unprecedented. Sustaining growth over time is very difficult to achieve without deep institutional reform.

Univ. E. Anglia socio-economic environmental researchers **R. K. Turner, B. Fisher**, *Nature*, 8 Feb 08, pp 1067-1068, examine global economic growth which has lifted many into unprecedented luxury, but it also has severely degraded ecosystems and the cost is disproportionately borne by the world's poor.

Globalisation and the Wealth of Nations, **B. Easton**, Auckland Univ. Press, 07 discusses this oft explored topic in four sections:- Diminishing Distance; The Nation State and Diminishing Distance; Economic Development; and The Future. The first three sections are further examined with specific reference to a wide range of fourteen, diverse, national types, plus a further range of twelve economic sectors, institutions, economic models and companies. Future options may encourage mergers of national economies or new groupings. These have strong disadvantages, and though it may be very challenging, the microstate has a role, though mini micros may need patrons. The EU model, rather than a more closely federated system, is most feasible. Five economies are likely to lead the emerging multipolar world, a situation which may be uncomfortable for USA.

N.Klein, *Harper's*, Oct, 07, explores "disaster capitalism", as illustrated by the Baghdad Green Zone, where the challenges of living without a functioning public infrastructure are addressed by a multiplicity of private, commercial suppliers, protected by thick walls, for a privileged minority, leaving the Iraqi people in the Red Zone with little protection and spasmodic, limited services. Similar distinctions are developing elsewhere as natural disasters occur now with increasing frequency and intensity. New Orleans, in a rich economy with supposedly robust infrastructure, illustrates how a major catastrophe, itself the exacerbated by the effects of free-market ideology, has been radically reengineered, socially and economically, into Green and Red Zones. As key pieces of infrastructure, themselves frail and aging, are knocked out with natural disasters, they may not be repaired or rebuilt, especially as before.

Privatised disaster response is one of the hottest industries in S. USA. Roads, river control, airports, oil wells, schools, border control, surveillance and even disaster evacuation are merging into a segregated society, with a capable state, privately owned and profitable, within a frail state which provides the finance. A market has to be protected, and if possible, expanded. A recent corporate report noted, "the compassionate federal impulse to provide emergency assistance to the victims of disasters affects the market's approach to managing its exposure to risk." All must pay for protection or suffer. Or alternatively, if citizens insist that the state faces up to its responsibilities, then the corporate disaster services will be rented back to whoever can pay. See also **N. Klein, The Shock Doctrine**, Metropolitan Books, 07.

Recent research on the metabolism of cities has been found to conform to an equation previously applicable to a vast range of different animals, according to **J. Lehrer**, *Seed*, July/August 07. This metabolic rate increases on a scale three-quarters to that of the mass. A similar quarter-power exponent is found in many biological activities. Applied to cities, it shows that they are more economical with size; a city can double its mass without doubling its resource consumption, because less energy is needed per citizen. Though large biological organisms can reach a point where they stop growing, cities can continue to grow because their dense populations have much denser interactions, and they innovate. To maintain this innovative growth, cities need the fuel of education and research.

On Trade

Recent research using longitudinal data 1938-2003 throws new lights on the real impact of globalisation on global trade, *Business Review Weekly*, 1-7 Nov, 07, pp 54-55. During this period the density of international trade has remained at about 10%, which suggests that there has been an increase in flow, but not in interconnectedness. The pattern of highly connected hubs and many poorly connected poor countries has been remarkably stable, indicating that economic development is not particularly sensitive to globalisation. There has been a variation in the level of connectedness of individual countries and these have also experienced major changes in their GDP. Policy implications indicate that Free Trade Agreements need closer scrutiny and broader evaluation, because such agreements with a dominant partner are likely to limit smaller partners' international interconnectedness when improvement in their long-term growth needs development of more trade connections. It would make better sense for developing countries to create strong regional trading networks before linking to large economies.

J. True, *Pacific Review*, March 08, examines the role of the Women Leader's network in the operations of the Asia Pacific Economic Cooperation (APEC) to make it more accountable to women as political and economic actors. Though decisions made in such international arenas deeply affect citizens, the latter have little voice and influence. Moreover, multilateral trade and security negotiations are largely masculine preserves. Transnational feminist networks such as WLN have the political and ethical resources to achieve some accountability, though in a limited degree.

J. Wotton, Editor, *NZ Investment Journal*, Feb 08, reports that carbon will be the world's biggest commodity market. As more governments regulate their national emission and more companies voluntarily endeavour to limit their own, the demand for available carbon credits is going sky high together with the price. There are several trading systems:- the Clean Development Mechanism (CDM); the European Emission Trading Scheme (EU ETS); and the smaller Chicago Climate Exchange. Large investment firms are pouring billions into projects to generate Certificates of Emission Reduction from the CDM, offering consultation and risk mitigation strategies. Negawatts is the term for promising opportunities for emissions-related profit in energy efficiency and demand-side management.

R. Seymour discusses the rivalry between the US dollar and the Euro, in trading for oil, *Middle East*, Nov, 07. There were suggestions that a key reason for the invasion of Iraq was as a consequence for Iraq having changed to oil payments in euros, not dollars. The payment was quickly reversed after the conquest. There are speculations that possible military force applied to Iran could depend upon that country attempting similar change. While at present it serves the world's major nations to allow dollar domination this, could change if the disruption from such a change is outweighed by the advantages.

Listing

B. Lomborg, Danish business professor, accepts the conclusions of the 2007 IPCC report, *Cool It: An Environmentalist's Guide to Global Warming*, Alfred A. Knopf, 07. He questions whether it makes more sense for high expenditure now to

reduce global future warming by suppressing carbon emissions, or a reduced expenditure which would leave more for dealing with the many ills afflicting the most vulnerable humans. Such mitigation would increase global wealth, reduce human vulnerability, then enable expenditure to be ramped later to cope with the full brunt of climate change.

ENERGY/MINERALS

Long Term Views and International Policies

Energy Challenges: The Next Thousand Years, Exec. Summary, Foundation for the Future, 07, workshop proceedings (www.futurefoundation.org) This specialist organisation for very long range thinking engaged sixteen experts in near term or (21st C), medium ,and long-term thinking. They agreed that in the near-term, non-renewable fuels would collapse. Policy decisions will need to focus on promoting renewable fuels especially solar and tidal, strong conservation technologies and practices, plus pursuit of carbon dioxide remediation. The medium term focus would be for space solar power, requiring low-cost space transport; utilization of nanotechnology; and zero-point energy, which is the sea of energy pervading all of space. Fusion capture from the sun is the long term prospect.

Poisoned Wells: The Dirty Politics of African Oil, N. Shaxson, Palgrave, 07, is a readable, balanced exploration of the impact of oil production on African states, the culpability of irresponsible oil companies and the corruption of African governments. The real problem reaches into the global financial architecture and the gaps between the countries where the real money lies, not only in tax havens but in the main global financial centres. Western governments could help by reducing fuel consumption, closing the gaps between states where oil profits are allowed to flow out of the reach of citizens, and reform of international organisations such as WTO, and UN. Revenues also need to be redistributed away from politicians to benefit citizens and society.

Facing Hard Truths About Energy: A Comprehensive View to 2030 of Global Oil and Natural Gas, National Petroleum Council, 07. This advisory committee to the US Secretary of Energy proposes five essential core strategies to help markets meet the challenges to 2030:- moderate growing energy demand and increase efficiency, expand and diversify production from more energy sources; integrate energy policy into trade, diplomatic, environmental and security goals, enhance science and engineering capabilities for long-term opportunities, develop a legal and regulatory framework for carbon capture and sequestration, together with an effective global framework for carbon management.

As PetroChina moves past ExxonMobil to become the world's biggest quoted company by market capitalisation, *Financial Times*, 9 Nov 07, p 6, international oil companies (IOCs) are facing fundamental challenges regarding their future. Most of the world's resources are now controlled by countries who are in varying degrees sceptical about the need to offer western companies a share of the proceeds. How then to access the oil and gas supplies needed to grow? IOCs need to show that they have something worthwhile to offer; such as securing access to markets and enabling exploitation of difficult resources, or production in deep water, or the Arctic, which

would be otherwise inaccessible. They also have the greatest ability to manage large, complex, capital-intensive projects.

The member states of the Gas Exporting Countries Forum (covering 60% of global exports) are studying possibilities for a Gas Exporter's Cartel, in the longer term, *Middle East, Aug/Sept 07, pp 45-48*. Championed by Russia with support from Venezuela and Iran, the proposal does not have universal support from the sixteen members, though the Gulf States are signalling keenness to keep all geopolitical options open, review the utility of the US as a sole security guarantor, and consider a collective security mechanism with international players. There is strong opposition from European nations who rely on Russian and Algerian gas.

Keeping the Lights On: Towards Sustainable Electricity. W. Patterson, Chatham House/Earthscan, 07, opens up for general readers the world of distributed electricity. Policy, not markets, is the deciding factor in electricity prices. Up to now, the policy framework has conceptually misunderstood the physical uniqueness of small, local distributed energy systems. It is time to rethink the fundamentals.

New Horizons-King Coal

Carbon capture is the promising technology for managing climate change while retaining use of the fossil fuels on which societies are so dependent. *Financial Times, Energy Survey, 14 Nov 07, p 14*, outlines the main types which divide into those where the carbon is removed before, or after, it is burnt. Pre-combustion carbon capture combines the fuel with oxygen, air or steam, to produce a gas consisting mostly of carbon monoxide and hydrogen, which can then be separated off. Post-combustion techniques involve separating the carbon dioxide from the flue gas. The pre-combustion method requires more energy, is bulkier and suitable for new power stations, while post-combustion methods can be retro-fitted on to existing plants. While the methods are yet to become commercial, US is making strong progress.

More experimental technology is the use of bioreactors which utilise photosynthesis from the sun to grow algae from exhaust gas from fossil fuel power stations, *The Economist: Technology Quarterly, 8 Sept 07, p 6*. The result can be turned in to biodiesel.

Australia, which has massive coal reserves, has no alternative but to use them, according to its energy Minister, *Dominion Post, 5 April, 08, p C5, and 2 April 08, p C7*, as he opened the world's largest demonstration of deep geological storage for carbon dioxide. Carbon sequestration plants also operate commercially in Canada, Norway and Algeria. NZ commercial coal interests have supported the new venture.

Innovative Technologies

Infinite Energy, (New Energy Foundation, NH, USA), *May-June 07*, T. Valone reports on a range of unrelated solar-cell breakthrough in the past year which constitute a revolution. They include:- a European polymer solar battery which can recharge itself in natural or indoor light; synthetic photosynthesis from a Massey Univ. lab generates electricity extremely cheaply from synthetic dye-sensitised solar cells made from simple organic compounds; a US system which passes photons through solar cells using "Photonic Crystals" with far better efficiency than anything before; a Los

Alamos lab shrinking cell elements to nanometers, enabling a double charge to be generated; nanotech solar cells from another US lab with greater efficiency and low cost materials; and a Japanese system focusing sunlight with fresnel lens onto super-efficient solar cells.

Nature, 8 Feb 08, pp 586-588, reports that smart meters are stepping stones to smart grids, networks of computing and telecommunications forming an Energy Internet. These enable utilities to view what is happening down to customer level and to match local supply to local demand. Already used in several countries, they are being improved, built to smart grid standards to ensure all networks and operating systems speak the same language, thus facilitating ever more sophisticated energy-management software. Denmark, the global leader in such systems, generates 50% of its electricity via such grids. Elsewhere, overcoming institutional and market barriers is the major issue.

Other Energy Options

S.Kidd, *Far Eastern Economic Review*, Sept 07, reports on the massive plans for nuclear power plant expansion underway in Asia. China has twelve to be constructed in 2009, and plans to add several thousand-megawatt reactors annually through to 2020. India is also investing in nuclear power plants and plans to ramp up use of these beyond 2020 as coal reserves run down.

As more nations plan to develop nuclear generating capacity in the Middle East and Asia, there are rising concerns about troubling flaws in the international system for verification and monitoring procedures which safeguard against diversion of nuclear material to more sinister purposes, *The Economist*, 25 Aug, 07, pp 56-57. An international nuclear fuel bank has been proposed which would encourage nations going nuclear to forgo uranium-enrichment technology, but this has limited support. *Nature*, 24 Jan 08, pp 380-381. Another alternative is fuel leasing, with a specific facility to handle reprocessing.

Dominion Post, 16 April 08, p C8, reports on a major technological breakthrough as a Japanese state-backed, drilling company has extracted industrial quantities of natural gas from undersea methane hydrate deposits which are extensive around Japanese coasts. Despite huge environmental concerns, Japan welcomes a new, essential energy supply.

Third World Resurgence, No 200, 07, reports extensively on the impacts of the biofuels cultivation in the South. **G. Castro H**, a Latin American environmental history academic, summarises dimensions of the issue:-meeting the demand from the dominant economies for alternative fuels to sustain existing consumption, the control of transnational companies in the global economy, the current and potential impacts on rural economies and peasants in the South, and the intensification of rural linkages to urban economies. The debate raises fundamental questions about the structure of the global economy.

Nature, 21 June 07, pp 914-914, and article by **J.A Dumesic et al**, reports that a new approach to the making of biofuels from biomass heralds a second generation of biofuels. Traditional methods use either biological conversion to produce ethanol, or thermochemical methods to produce synthetic diesel. The new process blurs the traditional methods.

Jatropha fever is spreading in India, *Nature*, 11 Oct, 07 pp 652-655, where it is heralded as a valuable biomass for domestic energy supply. The government is encouraging extensive cultivation since this shrub is well suited to wastelands and eroded farmland, promising new income source for the rural poor, while local government bodies develop the product under the coordination of several government agencies. But much as yet to be researched about the plant, and how it adapts to cultivation.

Minerals

Environmentalists had hoped that deep sea mining was a long-distant prospect, but several companies are negotiating in PNG, Japan, Micronesia and NZ to explore, and even mine, their territorial waters in places such as hydro thermal vents, for sulphides well as for gold, silver and other minerals in concentrated form. Hard scrutiny will be given to the effects of disturbance of the seafloor and marine organisms. *Nature*, 17 May 07, pp 246-247; *Science*, 18 May 07, p 987.

Thanks to their role as essential catalytic converters in high temperature vehicle exhausts, the platinum group of metals, including palladium and rhodium, is facing such rising demand that prices are rising steeply. Manufacturers are trying to eke out more performance to economise on metal input as well seeking alternatives for low-temperature catalysts such as nickel. *Nature*, 15 Nov 07, pp 334-335.

FUTURES THINKING

A Master of Anticipation

P. Crabtree, *The Futurist*, Sept-Oct 07, examines the forecasts of **H. G. Wells in Anticipations: Of the Reaction of Mechanical and Scientific Progress Upon Human Life and Thought**, 1901. 1.-Decline of steam-powered transport, rise of motorised transport and systems, and even moving sidewalks, plus the telephone and mechanical, household appliances. This leads to 2.-Expansion of cities, with suburbs. 3.-Social stratification will produce four recognizable classes; non-managerial property; a persistent underclass; a productive range of skilled, educated, technical, scientific, engineering, medical and defence personnel and a non-productive class engaged in trade, organisation, promotion, etc. 4.-In the home and family commonly accepted moral standards will decline and diversify, with a variety of family types. 5.-After a possible period of control by a very powerful group of financiers and intellectuals, democratic systems will decline because they cannot cope with the challenges of modern warfare and politicians fail to provide reality-based leadership. The media will become increasingly entertainment focused. 6.-New modes of warfare will be machine and science based and wars will be between peoples as well as their military. Increasingly effective small arms will enable guerrilla movements to flourish. 7.-Improved communications and transport will promote dominance of some languages, particularly English and the decline of others, with a world encyclopaedia of human knowledge available for all. 8.-Building on existing economic global integration, political and cultural assimilation will lead to three overarching political-cultural regions: English speaking; European, including Russia; and Far Eastern. States such

as Germany will try to dominate. 9.-A globally interconnected state will form from the growth of international corporate self-awareness among the powerful technocratic groups. Religions will be almost fundamentalist in emphasis on individual responsibility and free will, but with a utilitarian basis. The state will assume responsibility for health, education and general welfare of children.

Preparing for our Futures

Catastrophe, Creativity and the Renewal of Civilisation, T. Homer-Dixon, Souvenir Press, 07. Five tectonic stresses are accumulating beneath our societies: population, energy, environment, climate and economic. Two multipliers, speed and global connectivity, can cascade shocks to all parts of the global system. Potential breakdowns are examined in detail. To cope, the human mind must develop "prospectively" which is comfortable with radical change, surprise and even breakdown. We also need to develop "catagenesis", the creativity to renew technologies, institutions and societies.

Futures, June 07, provides insights into a wide range of mostly grassroots, transformative initiatives, movements and strategies which are already offering the necessary creativity for such renewal:- the ICPP; people's planning; the World Social Forum; decentralised green power; empowering associations of self-employed, poor women; social entrepreneurship; bush mechanics; socially responsible investing; and the city of Auroville. **K. Dahle** provides typologies of really transformative initiatives.

Mind Matters

H. Gardner argues that the twenty-first century students will need to develop five special types of mind which support capacities which up till now have been optional. In **Five Minds for the Future**, Harvard Business School Press, 07, he identifies these:- the disciplined mind, schooled in basic subjects but also a master of one area; the synthesising mind which makes sense of disparate pieces of information; the creating mind, which asks new types of questions and finds imaginative answers; the respectful mind which appreciates different cultures; and the ethical mind which enables responsible behaviour in workers and citizens. The last two are just as important as the others if we are to survive in the global village. Education which develops these types of mind deals with forms of knowledge which cannot be subject to testing. *Harvard Business Review, March 07*, presents a conversation with **Gardner** on the **Ethical Mind**.

Modern neuro-imaging shows that our minds are the products of brain activity and that even when we have the conscious experience of deciding, our brains have already taken the decision for us. **Conversations on Consciousness: What the Best Minds Think About the Brain, Free Will and What It Means to Be Human, S. Blackmore**, OUP, 07, explores the implications of these discoveries for our systems of morality, and crime and punishment.

Tools

2007 State of the Future, J. C. Glenn, T. J. Gordon (The Millennium Project), World Federation of UN Associations, with CD, 07. This 11th Report in an annual

series summarises research and input from several hundred futurists, scholars and decision makers, in a wide range of project areas. The CD provides an exhaustive elaboration of the projects and the cumulative work since 1996. It includes global scenarios for the next Millennium. The Summary covers fifteen global challenges, a State of the Future Index, a special study on Education and Learning Possibilities to 2030, and Emerging Environmental Security Issues.

Six Rules for Effective Forecasting, P. Saffo, *Harvard Business Review*, July-Aug, 07, is a succinct guide for beginners:- Define the Cone of Uncertainty; Look for the S Curve; Embrace the Things that Don't Fit, Hold Strong Opinions Weakly; Look Back Twice As Far As You Look Forward; Know When Not to Make a Forecast.