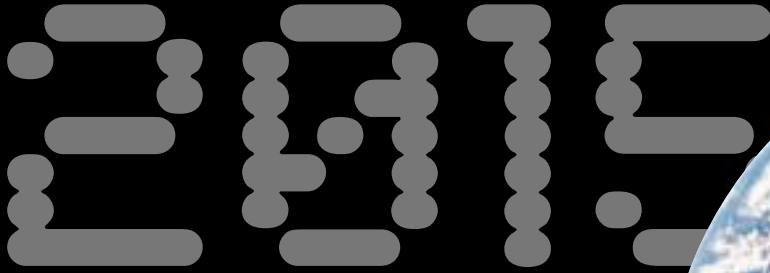


The World in 2015



Anthony Byatt

It often seems that each new newspaper, magazine or television documentary heralds a whole host of new issues for us to think about: AIDS, global warming and overheating economies, holes in the social security net and the ozone layer, the too-low price of oil, the too-high price of oil, the Information Revolution, how to beat Tiger Woods at golf, and so on. This mesmerizing catalog of concern would have been impossible for the average citizen of fifteen years ago to predict.

So, which issues will face the world in 2015? (Assuming, of course, that the world will still be here in 2015 and not have been destroyed by an apocalyptic conflict, giant asteroid, disease or some particularly pernicious software bug.) Which topics will be on the covers of the

leading magazines? What will be the main themes on Tonight's News?

Certainly, many current issues will be still with us. Discontent with the ruling government, the woeful performance of your favorite football team (which you could manage better), not enough will be spent on health, and your salary will be ludicrously low considering the wonderful job you think you do.

But new central topics will replace those of today. Energy will be a major talking point. Water will replace oil as the liquid of contention. The penetration of intelligent mini-robotics into every corner of our life will feature regularly in everyday conversation. Global demographics will become a critical issue for all. These topics will be inextricably linked.

Out of the Atom Age

Today, most of our energy is supplied by large, central power stations that use non-renewable fuels. Technological breakthroughs, large and small, over the next few years will completely change this situation. Wind power will become cheap due to low-cost power electronics which will enable windmills to be connected efficiently to local electricity grids. New cable technology will allow us to dispense with many of today's familiar overhead lines and run grid cables underground.

Other small, widely-scattered power sources, such as mini gas turbines in the basement of apartment blocks (perhaps using garden compost as a fuel source), fuel cells and highly efficient photovoltaic units which turn the sun's rays into electricity will be linked and managed by computers to form a 'virtual' distributed power station. These same computers will also negotiate on an instantaneous, international spot market for power and seek out the best deal for the individual consumer. Renewable power will be available for all and unsightly power generation and transmission equipment will gradually fade from the landscape.

The effect of this distributed power generation on global demographics cannot be overstated. For the first time, it will be possible for remote regions to have a high-quality, low-loss, low-cost, environmentally friendly power supply. Coupled with the widespread availability of on-line education (the necessary infrastructure, computers and satellite data links will cost very little), this will mean that these regions will be able to establish and build up the education base necessary to found advanced industries.

The sudden rise of these regions will completely change our *Weltbild*, requiring us to rethink and rebuild many accepted concepts, and will spawn many related topics for debate. Another catalyst for discussion will be the shift from oil to water as the world's most desirable liquid.

The energy business and water

Today's oil majors will find most of their future business in water technologies and

renewable energy. The move from oil to water will come naturally, both being valuable liquids that have to be found, extracted, transported and processed.

The oil majors will still be involved in oil and gas production, especially offshore. However, the days of oil platforms dotting the sea surface will be long gone. Most offshore fields will be in deep water and there will be few surface facilities. Reservoirs will be fully kitted out with sensors and instrumentation, such as miniature multiphase flow meters, distributed temperature and pressure monitors, reservoir characterization sensors and downhole separators to optimize the recovery of oil and gas. Advanced processing of microseismic data will complete the suite of gadgets giving engineers a fine-grained 3D image of the reservoir.

Subsea facilities will regularly release tiny metal 'bubbles' which will float to the surface and release a packet of status data to a central control via the myriad of satellites circling the earth.

In some cases, the oil and gas will be refined or processed on the surface in a compact mini-refinery and only the finished products will be transported to the market. Such refineries will be possible due to efficient new microcatalysts that have huge, self-regenerating, multiple-function active areas which pack multiple process steps in one small region.

Most significantly, where the field is located closer to shore, the produced fuel will be used directly in new, more efficient desalination plants. The increasing demand for dwindling accessible

water stocks and the decline of the oil hegemony will have made fresh water a more desirable commodity than oil. Having the energy-intensive desalination process close to the fuel source will be very efficient.

Water will be such a precious substance that huge scientific resources and debate will be devoted to new fresh water technologies, mostly using microstructures. By 2015 several Nobel prizes will have been won in this area.

Demographics (You can feed all of the people all of the time)

The boon of having large, and convenient, quantities of freshwater for consumption and agriculture, and thus better health and plentiful food, will provide further impetus to the demographic changes affecting the globe. The more remote regions, already equipped with on-line education, cheap IT and reliable power, will be able to leapfrog the traditional centuries of incremental 'three steps forward and two steps back' type progress and rise to achieve the same living and technology standards as today's 'first' world.

The rate at which new players will crowd onto the world stage will astonish even the most optimistic observers. The positive feedback cycle of increased affluence leading to better health and education leading to more affluence will establish itself with a vengeance. It will have the suddenness of an Information Revolution.

The West, having long since been resource-limited, will itself receive a tremendous shot in the arm from the rise



of these new powerhouses. Regions that today have near-zero literacy rates will be the emerging tigers of 2015. The astonishing improvement in education, infrastructure and prosperity which technology will bring about will radically reduce the number of conflicts in the world. This, in itself, will free up vast resources that can be re-injected into this positive feedback cycle. The decline of the nation state and over-ferent national identification will further diminish grounds for conflict.

Science not fiction

In 2001 we can already see the first glimmers of a revolution in miniature. Technologists are rapidly realizing that if you build machines small, on the nanometer scale, they will be much faster and more efficient than their gigantic brothers.

The first prototypes of these nanomachines are emerging from the laboratories and are already with us – tiny motors, manipulators, even rocket engines and turbines whose total size is a few centimeters.

These tiny machines are the forerunners of devices that will utterly change our lives. They will reside in all our machinery – monitoring, adjusting, repairing and reporting. They will be injected into our bloodstream to check our health. Armed with video cameras, diagnostic tools and manipulators, they will perform medical operations, guided by a surgeon to cut, repair and emplace new 'parts' and stay there to monitor recuperation. Patients may have dozens in their body at any time.

Industrial processes will teem with these devices, examining and testing and communicating wirelessly (as most things

will do) with central controllers. Tiny rockets will carry even tinier payloads of instruments into space.

Other areas of science will proceed as rapidly. Ethics will have caught up with medicine and the *extent* to which human cloning should be allowed will be the debate of the day. Genetic engineering, rapidly evolving today, will have matured. Public debate of other significant but complex scientific issues will be hampered by difficulty of understanding the complex issues involved. A Doctor of Science degree will be almost mandatory to be able to comprehend the science news of the day.

Wherever I lay my hat...

Today, most people are citizens in their country of residence. But why should this be? If it is becoming increasingly

unimportant where people are actually located, why can't a country, which may not even have to exist physically, just have cyber-citizens scattered throughout the world?

The importance of National Government will, in any case, decrease. The EU 'subsidiarity' principle will, unnoticed and unannounced, establish itself everywhere. Most large sovereign states will still exist, but will play an ever less significant role in people's daily lives. Natural regional groupings will be the political bodies of most relevance to most people.

The political spectrum will creep upwards too. By 2015, NAFTA, ASEAN, the OAU and the EU will have expanded to include virtually all countries and regions of the world. Plans for merging these organizations into one global entity will be well under way.

The automation of much of national government bureaucracy will save huge sums of money and reduce the need and motivation for internecine and destructive party politicking. Information Technology will give the citizen far more access to government processes, facilitating participation in political and economic decisions. Cyber-government will give most citizens more, not less, freedom and more time to enjoy it. However, there will probably always be a small coterie of states that will usurp these potential benefits to maintain their dictatorial regimes.

This easing of the national straitjacket which today restricts ancient cultures and instincts will reduce tension within and between countries. This, coupled with

new global prosperity, will make war and revolution far less common.

Not all good news

Progress by 2015 will have its limits. Although one planet may have been visited and probes will be nearing neighboring stars, humans will still be confined to the inner solar system; technology will not have significantly shortened the unimaginable interstellar expanses.

Looking inwards, too, plenty of challenges will remain. Human lifespan will have been lengthened considerably, but old enemies, such as cancer, will still prey on humankind. Although basically understood, their variety and insidiousness will make them formidable adversaries for decades to come. Like the weather (which will also remain uncontrollable, especially on public holidays), observing and understanding is easier than fixing them.

The environment will be still a, literally, hot topic for discussion. Global warming will have slowed but continued, though the climate effects may be less severe than predicted. Sunbathing will be back on the agenda with a resuscitated ozone layer, but species extinction will continue at a dramatic rate. Vehicle pollution of breathing air will be no longer socially acceptable and dinner party talk will bemoan the incredibly wasteful way 20th century humankind wantonly burned its way through the global oil and coal stocks.

Que Sera Sera? What will not be

A major issue in 2015 will be discussion of what will be in 2115. The citizen in

2015 may imagine a common world language (quirky English?); a mathematical proof which puts a concrete numerical value on infinity (that *would* upset mathematicians, and engineers); the first practical applications of quantum mechanics (quantum tunnel for pedestrians?); easy learning by synapse programming (while you sleep, naturally); be paid in lifespan years instead of money; personal transportation obsolete; a Grand Unified Theory for physics and practical nuclear fusion less than 50 years away (as it always has been).

Always expect the unexpected

We must get used to a world where long-held, and not so long-held received wisdom is overturned very quickly, and on a regular basis. Recently, we have seen it with the fall of communism, the Information Revolution (now just starting) and the dazzling, but still primitive advances in electronics, genetics and other branches of science and technology.

That some regions will always lag behind, that the G8 countries will always dominate the globe, that national governments are here to stay – the totems of 2001 are doomed – and technology and knowledge will be the tools humankind will use to topple them.

Author

Anthony Byatt
Chief Editor, ABB Review
anthony.byatt@ch.abb.com