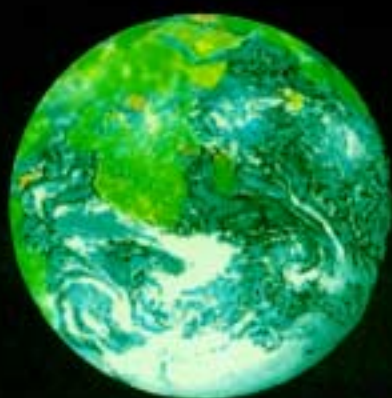


OECD International Futures Programme



**Looking back
at looking forward**

**Foresight through
the centuries**



I CERTAINLY DIDN'T EXPECT THAT...

"I will ignore all ideas for new works and engines of war, the invention of which has reached its limits and for whose improvement I see no further hope."
Sextus Julius Frontinus, Chief Military Engineer during the reign of the Emperor Trajan, 98-110 AD.

AS MARK TWAIN POINTED OUT, *"The art of prophecy is very difficult - especially with respect to the future."* So why bother? A simple way to avoid all the trouble is to deny that there is anything to predict. This is often reported to be the attitude adopted by the head of the US patent office at the end of the 19th century, who apparently suggested to President McKinley that the office should be closed, since everything that could be invented had already been invented. The list, it is true, was impressive. *"Discoveries which seem approaching their ultimate condition are telephony, photography, illumination and apparently labor-saving machinery in some of its fields, since the performance of some machines appears to have practically reached perfection...We cannot, indeed, well conceive of a greater activity of invention and a more rapid unfoldment of new processes than we have had before us in the nineteenth century... While the twentieth century may be as active in the development of mechanism as the nineteenth has been, it seems unlikely to be more so, and in succeeding centuries, inventive activity must decline for want of fields in which to exercise itself."* Charles Morris, *The Marvelous Record of the Closing Century*, 1899.

A point taken up by a *Washington Post* editorial in 1901: *"We have sanitation, surgery, drainage, plumbing—every product of science and accessory of*

luxury. It seems impossible to imagine any improvement on what we have." We also had cars, but once again, *"That the automobile has practically reached the limit of its development is suggested by the fact that during the past year no improvements of a radical nature have been introduced."* Reported by *Scientific American*, in January 1909.

ECONOMICS

Economists are infamous for disagreeing among themselves about everything (if you want three opinions, ask two economists). Therefore it is encouraging to learn that many economists, politicians and business leaders shared an analysis of the most celebrated event of the 20th century economy in this domain, the Great Depression (even though some might argue that the relatively short-term nature of economic forecasting makes it easy to get things right). In October 1929, economist Irving Fisher warned against blind panic. *"There may be a recession in stock prices, but not... a crash."* This view was justified by the fact that *"Stocks have reached what looks like a permanently high plateau."*



This was undoubtedly due to the wise governance of president Hoover, who could claim with pride in 1928 that *"We in America today are nearer to the final triumph over poverty than ever before in the history of any land. We have not yet reached the goal but, given a chance to go forward with the policies of the last eight years, we shall soon with the help of God be in sight of the day when poverty will be banished from*

this nation." The expression "profit warning" had yet to be invented, maybe because it was not needed. Thomas Watson, founder of IBM looked forward "*with confidence to the progress of business in 1929*". Such a cheery outlook was good news for the working man too, and the US Department of Labor's, *New Year's Forecast* published towards the end of 1929 calculated that "*1930 will be a splendid employment year.*"



This optimism seems to have been crash proof. Following Black Friday, the Chairman of the Continental Illinois Bank of Chicago realised that "*This crash is not going to have much effect on business.*", and Paul Block, an editorial writer, backed this view: "*In most of the cities and towns of this country, this Wall Street panic will have no effect.*" Of course it wouldn't. After all, Samuel P. Amot, illustrious president of the no less illustrious Chicago Board of Free Trade announced in his new year's message for 1930 that "*This nation has entered an era of vast industrial expansion.*" Harvard Economic Society's *Weekly Letter*, January 18, 1930, agreed. "*With the underlying conditions sound, we believe that the recession in general business will be checked shortly and that improvement will set in during the spring months.*" The *Letter* went bankrupt shortly afterwards.

"Speaking movies are impossible. When a century has passed, all thought of so-called speaking movies will have been abandoned. It will never be possible to synchronize the voice with the picture." Director DW Griffith, three years before the release of "The Jazz Singer", the world's first "talkie".

The 1929 crash and its impacts are only one example of just how optimistic the dismal profession can be. The IMF provides another example. In 1959, it collected its data, adjusted its parameters, fine tuned its models, and announced to a rejoicing planet that *"In all likelihood, world inflation is over"*.



With inflation officially abolished, *Time* magazine, writing in 1966, warned its readers that the future

would have its own problems. *"By 2000...how to use leisure meaningfully will be a major problem."* Problems are sometimes a matter of definition. Where *Time* talks of the leisure society that mass mechanisation of production would bring, M.W. Thring, in *Man Machines and Tomorrow*, (1973) took a darker view. *"In reaching a saturation point in the demand for possessions, we are already facing unemployment. This could rise to 50 percent of the population by the year 2000. Fifty percent of all people could then feel degraded, discontented and anxious, and be, therefore, easily roused to find a solution in war"*.

TRADE

Enlightened thinkers looked to free trade for the answer. Naturally, they had to overcome protectionist sentiment, but their arguments were convincing. In 1954, Secretary of State John Foster Dulles dismissed talk of cheap foreign imports flooding the country, and supported granting Most Favored Nation status to Japan. What difference would it make? *"The Japanese don't make anything the people in the US would want."* Certainly not cars. As *Business Week* emphasized in 1979, *"With over 50 foreign cars already on sale here, the Japanese auto industry isn't likely to carve out a big slice of the U.S. market."*

Not that they had any intention of doing so anyway. *"Japan should not resume passenger car production, since it would be more economically practical to rely on foreign supply as an international division of labour, especially in view of the overwhelming dominance of*

the Big Three auto makers." Hisato Ichimada, head of the Bank of Japan.



Nobody will ever want to buy one of these

By 2000, we would develop
*"a method that will let
people decide, before they
doze off, what they want to
dream about."* Futurist
Herman Kahn talking to US
News and World Report in
1967

The Big Three themselves knew they had nothing to fear from foreign rivals. *"The question has been raised whether the cost of manufacture in a country like Germany might reach the point where, through evolution, motor cars could be produced and sold in competition in the American market... In my opinion it is impossible to reach the conclusion that competition from without can ever be any factor whatsoever.* General Motors President Alfred P. Sloan, 1929.

GENDER MAINSTREAMING

The middle classes were not the only ones threatened. Writing in *New Scientist* in 1964 about the world in 20 years time, Professor MW Thring underlined the fact that progress can be a two-edged sword. *"Men will be working shorter and shorter hours. It follows that the housewife will also expect to be able to have more leisure in her life without lowering her standard of living. It also follows that human domestic servants*

will have completely ceased to exist." This is not quite accurate, but it is true that new technology would revolutionise housework. In 1950, *Popular Mechanics* offered this idyllic vision of the year 2000 to any housewife who read it. *"When the housewife cleans house she simply turns the hose on everything. Why not? Furniture, rugs, draperies, unscratchable floors, are made of synthetic fabric or waterproof plastic. After the water has run down a drain in the middle of the floor (later concealed by a rug of synthetic fiber) she turns on a blast of hot air and dries everything."*



This vision of the housewife actually having to do so much was too old-fashioned for the *Wall Street Journal* in 1966. *"By 2000... Sonic cleaning devices and air-filtering systems will banish dirt and just about eliminate dusting, scrubbing and vacuuming. Combination freezer-microwave ovens will take care of the cooking automatically. Dishwashing will be a thing of the past, since disposable dishes will be made from powdered plastic for each meal by a machine in the*

kitchen." It is important to note that vacuuming will not be completely banished, but for those difficult stains other cleaners can't remove help was at from the Lewyt vacuum cleaner company, whose president announced to *The New York Times*, in 1955 that "Nuclear powered vacuum cleaners will probably be a reality within 10 years."

"It doesn't matter what he does - he will never amount to anything." Albert Einstein's teacher to his father, 1895



The problem might be that you live in a dirty area. There is no need to tolerate this. Just fly your house somewhere nicer. This will be possible by 2000 according to Arthur C. Clarke, writing in 1966. "Houses

will be able to fly... The time may come when whole communities may migrate south in the winter, or move to new lands whenever they feel the need for a change of scenery."

TRANSPORT

This time is not likely to come soon, though. Mr Clarke and other would-be aeronauts overlooked one simple fact. *"It is entirely impossible for man to rise into the air and float there. For this you would need wings of tremendous dimensions and they would have to be moved at a speed of three feet per second. Only a fool would expect such a thing to be realised."* Wrote Joseph de Lalande of the Académie française, 1782, a year before the first balloon flight from the Château de la Muette.

It is easy to be wise after the event, but it takes a rare form of genius to fail to predict what has actually happened. So a special mention goes to the Engineering Editor of the *Times*, who, three years after the Wright brothers' first flight, informed the cream of British society that *"All attempts at artificial aviation are not only dangerous to human life, but foredoomed to failure from the engineering standpoint."* By 1910, the engineering standpoint had been modified, but Jackman and Russell's *Flying Machines: Construction and Operation* contained a useful caveat on using trend extrapolation as a tool in technological forecasting: *"It is idle to look for a commercial future for the flying machine. Some will argue that because a*

"We just won't have arthritis in 2000." Dr William Clark, president of the Arthritis Foundation, 1966

machine will carry two people, another may be constructed that will carry a dozen, but those who make this contention do not understand the theory".



"Cavalry will never be scrapped to make room for the tanks; in the course of time cavalry may be reduced as the supply of horses in this country diminishes. This depends greatly on the life of fox-hunting." Journal of the British Royal United Services Institution, 1921.

The theory of breathing limited the development of another promising breakthrough: the railway. Dionysius Lardner, author of *The Steam Engine Familiarly Explained and Illustrated* and of *Railway Economy* put his double competence to good use in warning that *"Rail travel at high speeds is not possible because passengers, unable to breathe, would die of asphyxia."* The perils were not only physical. In 1833, the Provost of Eton College objected to plans to build the Great Western Railway on the grounds that the line would be *"injurious to the discipline of the school and dangerous to the morals of pupils"*.



Death and depravity were major, but not insurmountable, obstacles. A more serious objection concerned the limited utility for freight transport. *"Railways can be of no advantage to rural areas, since agricultural products are too heavy or too voluminous to be transported by them."* FJB Noel from an 1842 pamphlet entitled: *"The Railroads will be Ruinous for France and Especially for the Cities Through Which They Go."*

Perhaps it would be better to stick to technologies that had proved their worth, had an excellent safety record, and would not produce any nasty surprises. Sea transport, for example, *"I cannot imagine any condition which could cause this ship to founder. I cannot conceive of any vital disaster happening to this vessel. Modern shipbuilding has gone beyond that."* Captain EJ Smith of the *Titanic*, whose sister ship the *Britannic* (originally called the *Gigantic*) sank in the Aegean on a sunny day in 1916 after a coal bunker exploded, enabling her to break the world record for the fastest sinking of an unsinkable ship (an impressive 55 minutes compared to over three hours

for her more photogenic predecessor) .



"The abolition of pain in surgery is a chimera. It is absurd to go on seeking it today. Knife and pain are two words in surgery that must forever be associated in the patient's awareness."
Dr Alfred Velpeau in 1839, seven years before the introduction of anaesthesia.

ENVIRONMENTAL IMPACT ASSESSMENT

Clearly, what was needed was a safe, environmentally sustainable form of transport. Such a saviour was at hand, and for once the experts clearly understood its benefits, as this article in the July 1899 edition of *Scientific American* shows. *"The improvement in city conditions by the general adoption of the motor car can hardly be overestimated. Streets clean, dustless and odorless, with light rubber-tired vehicles moving swiftly and noiselessly over their smooth expanse, would eliminate a greater part of the nervousness, distraction, and strain of modern metropolitan life."*



Unfortunately there would be a negative impact on biodiversity, but in those less ecologically-aware days, this was actually presented as an advantage: *"If there are no stables in the city and no horses on the streets, there will be no flies. A good portion of the filth of the city will go with the horse..."* Ralph W. Pope, Secretary of the American Institute of Electrical Engineers.

THE KNOWLEDGE ECONOMY

Working conditions in the no-fly zones would be very pleasant, although there was some disagreement about the details. While starry-eyed optimists like Arthur Pack foresaw the two-hour day for their generation (*The Challenge of Leisure*, 1932), some of his contemporaries were not convinced, e.g. John Langdon-Davies, in *A Short History of the Future*, 1936 suggested that *"By 1960 work will be limited to three hours a day"*.

Men would still, of course, be competing in the post-industrial market place, and not only with each other. Female labour participation rates would grow in the

knowledge economy, with disastrous results. On the eve of the First World War, Berlin University professor Hans Friedenthal warned the world of the coming danger. *"Brain work will cause the 'new woman' to become bald, while increasing masculinity and contempt for beauty will induce the growth of hair on the face. In the future, therefore, women will be bald and will wear long moustaches and patriarchal beards."*

"The actual building of roads devoted to motor cars is not for the near future, in spite of the many rumors to the contrary." Harper's Weekly, August 1902



Women's chins were not the only thing that would disappear, occupational employment trends were also worrying in some sectors. As always, the warning signs had been around for some time, but most people chose to ignore them. Not so John Herbert who, in the 1890s, predicted that within a hundred years: *"All forests in the United States will be gone. Lumber will*

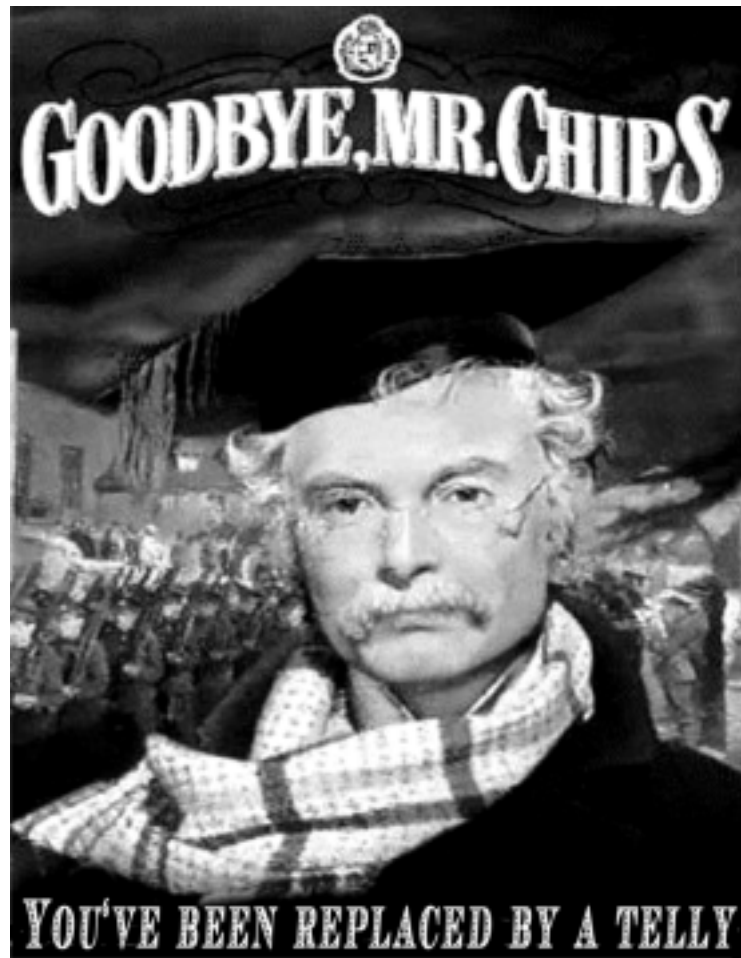
be so scarce that stone, iron, brick, slag, etc. will be largely used in the construction of houses. As a result, fires will be almost unheard of, and insurance companies will go out of business."

A young person looking for a career would be well advised to look elsewhere. The legal profession had always been a safe bet, but as the 20th century dawned, even this door was closing. "*Law will be simplified and brought within the range of the common people. As a result, the occupation of two-thirds of the lawyers will be destroyed*" warned (promised?) Thomas Dixon Junior. How about financial services then? Be careful. "*By 1980 losses on credit cards will overwhelm the industry and they will become extinct.*" This could be predicted with confidence since the fatal day was only three years away when Ray Zablocki of the Stanford Research Institute informed *Forbes* magazine in 1977.

EDUCATIONAL INNOVATION

In the English-speaking world, the hairy harridans' brain work would be simplified thanks to the evolution of the language. In December 1900, the Ladies Home Journal predicted that "*By the year 2000, there will be no C, X, or Q in our every-day alphabet. They will be abandoned because unnecessary. Spelling by sound will have been adopted, first by the newspapers. English will be a language of condensed words expressing condensed ideas.*" This did not quite come about, but learning methods would be revolutionised. Just as the Internet abolished the need for teachers

and books at the end of the 20th century, so with the cinema at the start. *"I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks."* Thomas Edison, 1922.



"...interesting toys, but no military value." Maréchal Foch, talking about airplanes in 1911. The French navy later named an aircraft carrier after him.

He was wrong, of course, since it was the television, not the cinema, that killed off the old educational system. *"By 1990, the TV will allow students to attend school three days a week, letting them learn at home on the other days over two-way television."* Cetron

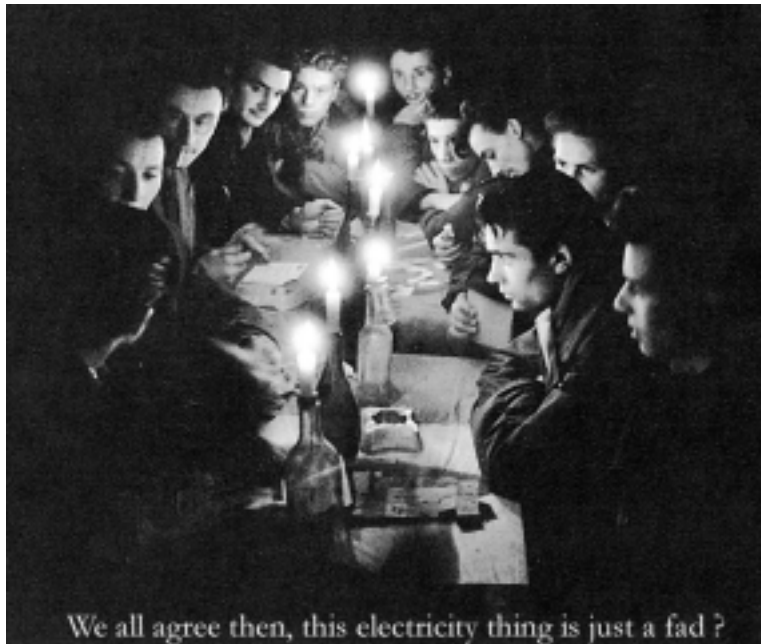
and O'Toole, explaining in *Encounters with the Future* (1982) what kids are watching in their rooms all day. This, despite the fact that prototypes demonstrated at the 1939 World's Fair revealed a fundamental weakness of the medium: "*The problem with television is that the people must sit and keep their eyes glued on a screen.*" Which was why movie mogul Darryl F. Zanuck could confidently predict that "*Television won't be able to hold onto any market it captures after the first six months. People will soon get tired of staring at a plywood box every night.*"

ENERGY

If Lewyt had cared to carry out some research before promising their revolutionary vacuum cleaner, they would have realised that atomic-powered anything was impossible, because, as Robert Millikan, 1923 Nobel prizewinner for physics explained: "*There is no likelihood man can ever tap the power of the atom. Nature has introduced a few foolproof devices into the great majority of elements that constitute the bulk of the world, and they have no energy to give up in the process of disintegration.*" Once the atom had been split, Lord Rutherford, the father of atomic physics, accepted that there would be some energy, but "*a very poor kind of thing. Anyone who expects a source of power from the transformation of the atom is talking moonshine.*" Within a few years, nuclear power stations were supplying electricity to millions of homes. At first you had to pay for it, but Lewis L. Strauss, chairman of the US Atomic Energy Commission in 1954 had a vision. "*It is not too much*

to expect that our children will enjoy in their homes electrical energy too cheap to meter."

"I do not think that the wireless waves I have discovered will have any practical application."
Heinrich Rudolf Hertz



Apart from the fact that there would be no profit from producing some forms of electricity, there were also technical disadvantages to its use when compared with gas, which is why Werner von Siemens concluded that *"Electric light will never take the place of gas."* Mr Keates, giving evidence to the British House of Commons Select Committee on Lighting in 1879 agreed. *"I do not think there is the slightest chance of its competing, in a general way, with gas. There are defects about the electric light which, unless some essential change takes place, must entirely prevent its application to ordinary lighting purposes."*

Once the idea had been accepted in principle, there remained the question of standards: AC or DC. Edison's company had developed a DC system to

compete with Westinghouse's AC design, so, not surprisingly, he argued that: *"There is no plea which will justify the use of high-tension and alternating currents, either in a scientific or a commercial sense. They are employed solely to reduce investment in copper wire and real estate... My personal desire would be to prohibit entirely the use of alternating currents. They are unnecessary as they are dangerous... I can therefore see no justification for the introduction of a system which has no element of permanency and every element of danger to life and property"*. To prove his point, he organised a public demonstration of the dangers of the rival technology. In a stunt that makes the Benetton adverts of the 1990s look like the epitome of good taste, Edison electrocuted Topsy the elephant at the Coney Island amusement park using AC current.



"A child born in the year 2000 has good prospects of not dying at all... The immortals are necessary, but how can they be chosen from among mortals? That will be the big question of 1984." Jacques Bergier, *Impossible Possibilities*, 1968

DEMOGRAPHY

Those lucky enough to survive AC power in their homes were doomed anyway by secular trends. "I have found that there is scarcely one tenth as many people on the earth as in ancient times. What is surprising is that the population of the earth decreases every day, and if this continues, in another ten centuries the earth will be nothing but a desert."



Montesquieu's 1721 pronouncement was rubbished by the Lumières in their Encyclopédie three decades later. "The population is constant in size and will remain so right up to the end of mankind." Unless, of course,

famine wipes us out, as seemed likely to Paul Ehrlich in his 1968 book *The Population Bomb*: "*The battle to feed all of humanity is over. In the 1970s the world will undergo famines— hundreds of millions of people are going to starve to death in spite of any crash programs embarked upon now.*"

Ehrlich's mistake was to ignore technological progress and the possibility of substitution. Today, nobody is surprised at the idea of "*huge steam or diesel or perhaps nuclear 'artificial whales' gathering the krill by the shipload to add to the larders of the world...*" but when Professor Hardy outlined this solution in 1964, the common view was that we would soon be swallowing a pill rather than eating a meal.

By 1966, the Rand Corporation had rallied the kelp camp, but with a slightly different solution. "*Huge fields of kelp and other kinds of seaweed will be tended by undersea 'farmers' - frogmen who will live for months at a time in submerged bunkhouses.*" Others, such as John Smith writing in *Science Digest* in 1967, dismissed the need for kelp farms, given that we could eat our old underwear. "*By 2000, sawdust and wood pulp will be converted into sugary foods. Discarded paper table linen and rayon underwear will be bought by chemical factories and converted into candy.*" Recycling would clearly be needed, because the world would run out of gold by 1981, mercury by 1985, tin by 1987, zinc by 1990, petroleum by 1992, and copper, lead, and natural gas by 1993, according to the Club of Rome's 1972 study *Limits to Growth*.



INFORMATION TECHNOLOGY

One area where growth would be possible was in electronic brains. Although the Astronomer Royal had dismissed Babbage's analytical engine as "worthless" in 1842, a century later it was clear that the potential was huge. In 1966, the *Wall Street Journal* and manufacturers RCA both predicted that in 2000, there could be a market for over 200,000 units in the US alone, a far cry from the 5 units worldwide supposedly mentioned by IBM's Thomas Watson in 1958. However, to realise this potential, radical progress was needed. *New Scientist* noted in 1964 that "computers [are not] going to get much faster, but other parameters could change, and especially size".

Popular Mechanics anticipated the drive to

miniaturisation in 1949. *"Where the ENIAC is equipped with 18,000 vacuum tubes and weighs thirty tons, computers in the future may have only 1000 vacuum tubes and perhaps weigh ten and a half tons."* In the late 1940s, the industry was still in its infancy, so some over-optimism is natural. In 1970, Professor Desmond King-Hele, the world expert on orbital mechanics at the Royal Aircraft Establishment pointed out the limits to shrinking in his book *The End of the 20th Century*. *"Most computers will probably still occupy a large room, however, because of the space needed for the ancillary software, the tapes and cards to be fed in, the operating staff, and the huge piles of paper for printing out the results."*



Size alone would prevent computers from ever being a product of mass consumption, and besides, as Ken Olsen, President of Digital Equipment pointed out in 1977, *"There is no reason for any individual to have a computer in their home."* Nor would business see much use for them. *"I have traveled the length and*

breadth of this country and talked with the best people, and I can assure you that data processing is a fad that won't last out the year." Explained the editor in charge of business books for Prentice Hall in 1957

In short, the computer was to go the way of such interesting curiosities as the "tele-phone": "*An amazing invention, but who would ever want to use one of them?"* in the words of US President Hayes to Alexander Graham Bell in 1876. Who indeed? Perhaps foreigners, but certainly not Her Britannic majesty's loyal subjects according to Sir William Preece, chief engineer of the British Post Office. "*The Americans have need of the telephone, but we do not. We have plenty of messenger boys.*" He was right. Following an 1876 demonstration, the mayor of one US town was so impressed that he predicted that "*One day there will be one in every city.*" AT&T could not be accused of such extravagant claims. In 1984, they rejected a free opportunity to enter the mobile phone market because their forecasts indicated that it was not worth bothering about.

CONCLUSION

Albert Einstein claimed that he never thought about the future because: *..."it comes soon enough"*. Unfortunately, if we are not prepared, it comes too soon. As these examples show, forecasters usually get it wrong. But this should not prevent us from trying to identify the underlying trends and driving forces and exploring the options for action, in order to be able to shape the future instead of simply waiting for it.