

**THE ASSOCIATION  
FOR THE STUDY OF PEAK OIL AND GAS  
“ASPO”**

**NEWSLETTER No. 73 – JANUARY 2007**

ASPO started as a network of scientists and others, having an interest in determining the date and impact of the peak and decline of the world’s production of oil and gas, due to resource constraints. Now, independent national affiliates are in existence or formation in Australia, Austria, Canada, China, Egypt, France, Germany, Ireland, Israel, Italy, Japan, Korea, Mexico, New Zealand, Norway, Portugal, Russia, South Africa, Spain, Sweden, Switzerland, United Kingdom and the United States.

**Missions:**

- 1. To evaluate the world’s endowment and definition of oil and gas;**
- 2. To study depletion, taking due account of economics, demand, technology and politics;**
- 3. To raise awareness of the serious consequences for Mankind.**

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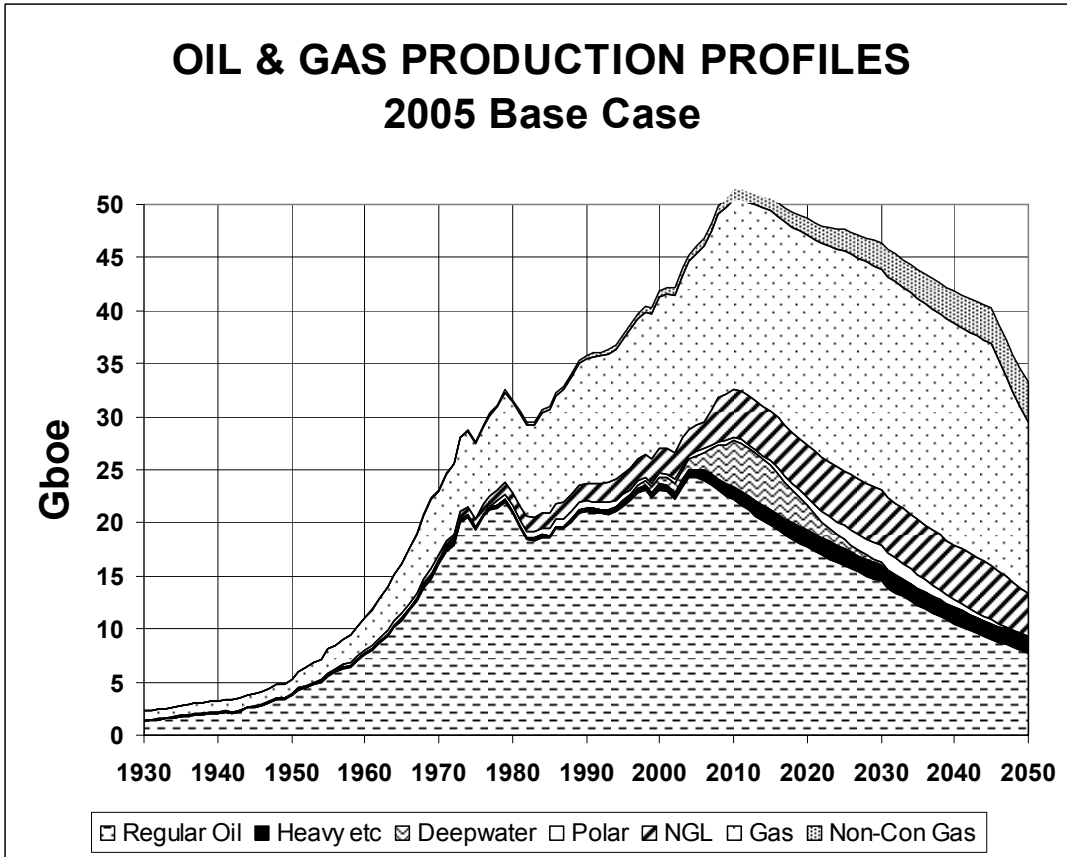
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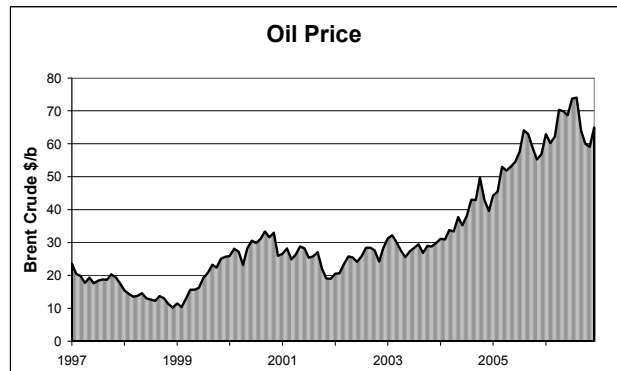
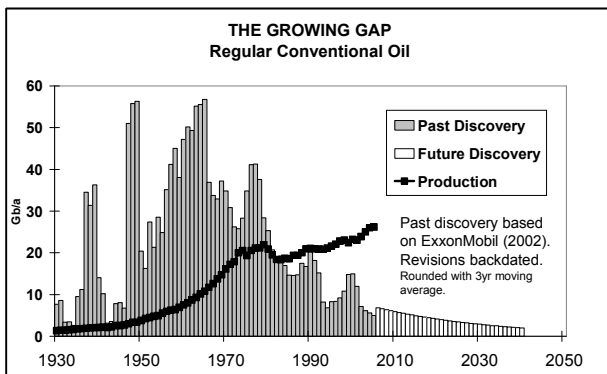
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*The General Depletion Picture*



ESTIMATED PRODUCTION TO 2100									End 2005			
Amount			Gb	Annual Rate - Regular Oil					Gb	Peak		
Regular Oil				Mb/d	2005	2010	2015	2020	2050	Total	Date	
<b>Past</b>	<b>Future</b>	<b>Total</b>		US-48	3.6	2.8	2.2	1.7	0.4	200	1971	
Known Fields	New			W.Europe	5.0	3.4	2.3	1.6	0.2	75	2000	
967	788	145	1900	Russia	9.2	8.5	6.9	5.7	1.5	220	1987	
	933			ME Gulf	20	19	19	19	11	680	1974	
<b>All Liquids</b>				Other	29	27	23	20	8	725	2004	
1043	1457	2500		<b>World</b>	<b>66</b>	<b>61</b>	<b>54</b>	<b>48</b>	<b>21</b>	<b>1900</b>	<b>2005</b>	
<b>2005 Base Scenario</b>				<b>Annual Rate – Other Categories</b>								
M.East producing at capacity (anomalous reporting corrected)				Heavy etc.	2.3	3	4	4	4	150	2021	
Regular Oil excludes Heavy Oils (inc. tarsands, oilshales); Polar oil; Deepwater oil, & gasplant NGL				Deepwater	3.6	12	11	6	0	69	2011	
				Polar	0.9	1	1	2	0	52	2030	
				Gas Liquid	6.9	12	13	14	11	354	2035	
				Rounding		1	2		-2	-25		
Revised	20/08/2006			<b>ALL</b>	<b>80</b>	<b>90</b>	<b>85</b>	<b>75</b>	<b>35</b>	<b>2500</b>	<b>2010</b>	



### 777. Regional Assessment – THE EAST

This Region comprises a number of countries from the southern margin of the Eurasian landmass to Australasia, which are conveniently treated together although lacking any particular geographical common denominator. As so defined, it covers a land area of 19 M km<sup>2</sup>, with a population of 2.2 billion, having a high density of 115 people per sq. km. The fertility rate is about three children per woman, leading to an unsustainable population growth.

In historical terms, the Region supported the rich early civilisations of Japan, India, and Indo-China, of which the latter two subsequently fell within the orbits of the British and French Empires. The island arc of Indonesia had diverse tribal peoples, being subject to Indo-Chinese (Malay) influences before being incorporated in the Dutch Empire, while Australia and New Zealand in a more temperate region to the south became members of the British Commonwealth. These countries have been settled over the past two centuries by immigrants from Europe, who have more or less replaced the indigenous people. The people of India followed the Hindu faith, while Arab traders brought Islam to the Indian borderlands and Indonesia. The Japanese, for their part, belonged to the Shinto and Bhuddist faiths. In general terms, it could be said that the region enjoyed some two centuries of stability and progress under colonial administrations until the Second World War.

The war had a major impact on the region and is worth reviewing in greater detail. It was preceded by the Sino-Japanese conflict which had its origins in the First World War when Japan, having sided with the Allies, invaded a German-leased territory in China. An influential militaristic caste developed, and the early industries of the 20<sup>th</sup> Century were dominated by the arms industry. It sought to match the Industrial Revolution of Europe and America, expanding its influence into China, partly with the construction of railways. This led to the occupation of parts of Manchuria on the mainland. Attempts at further expansion met Chinese resistance, partly under Communist influence. Japan sided with Germany on the outbreak of the Second World War, and the fall of Holland and France in 1940 led it to eye their colonies in Indonesia and Indo-China. A year later, the United States moved to block this expansion by stopping the export of oil and scrap metal, essential to the war effort, which in turn prompted the Japanese to attack the US fleet in Pearl Harbour on Hawaii on December 7<sup>th</sup> 1941, which raised sufficient popular domestic support for the United States Government to declare war. During the following year, the Japanese did successfully invade Indo-China, Indonesia, the Philippines and New Guinea, coming uncomfortably close to Australia. However, as time passed, Allied successes in Europe released more forces to fight Japan, which eventually surrendered in August 1945, after the receipt of two atomic bombs, vaporising Hiroshima and Nagasaki.

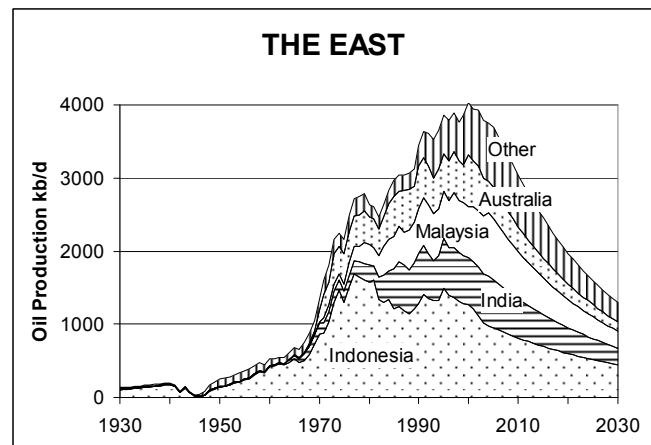
The Second World War marked the end of the British, Dutch and French empires, with independence being granted to the various territories in a somewhat arbitrary fashion, which in some cases stimulated new tensions, including those associated with the secession of Pakistan and Bangladesh from India. Japan soon recovered from the war, enjoying a period of economic prosperity, helped in part by American financial aid. It now boasts the world's leading motor and computer manufacturers. Australasia for its part has stood somewhat outside the rest of the region with its immigrant European population. The Cold War was reflected in the Region by the Korean and Viet Nam conflicts to counter a growing Chinese communist expansion and influence.

Although political independence has come to the Region after its relatively benign and responsible imperial past, it now finds itself subject to the global market, driven solely by the profit motive, knowing neither national boundaries nor social responsibility. Even so, it generally seems to have entered the present century in a state of reasonable stability and prosperity, although various tensions simmer at or beneath the surface, as for example the rising of the Tamil Tigers in Sri Lanka or the secession of Christian East Timor from Indonesia.

The Region is not in general particularly rich oil territory, primarily because it lies in a convergent plate-tectonic setting, lacking the prime source-rock developments. It was however the scene of early oil developments in the 19<sup>th</sup> Century in Myanmar (Burma) and Borneo, the latter being the birthplace of Shell Oil. Other important finds were made in Sumatra during the Second World War, followed by the opening of the offshore during the 1960s which delivered important finds in Indonesia, Australasia, India, and Malaysia. It remains to be seen if the last frontier of the Deepwater domain will yield significant results but the prognosis is not particularly promising, again for source-rock reasons. Certain deltas do extend into deepwater, but have to rely on such sources as are present in the delta-fronts themselves, which tend to be lean and gas-prone.

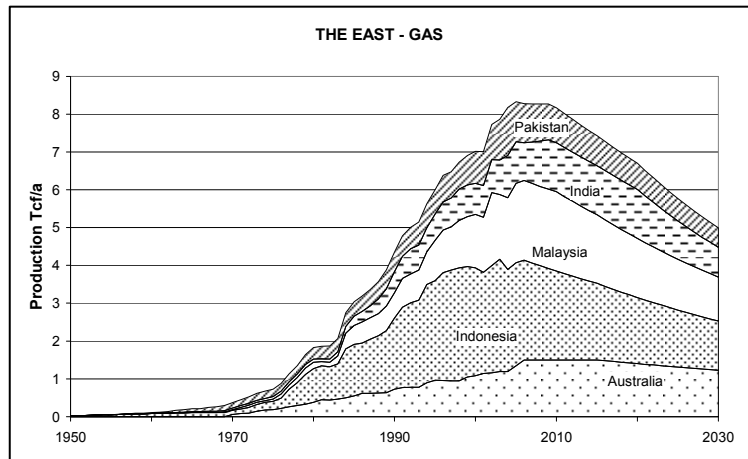
Production commenced in the 19<sup>th</sup> Century and remained at a modest level until the opening of the offshore in the 1960s and 1970s when it rose steeply, dominated by Indonesia, which peaked in 1977. The Region as a whole passed its peak in 2000, thirty-three years after the corresponding peak of discovery in 1967, and is now set to decline at a Depletion Rate of about 4% a year. Consumption stands at 8.7 Mb/a, compared with production at 1.4 Mb/a, making it a major importer on a rising trend that will prove to be unattainable. On a per-capita basis, the Regional average of consumption is about 4 b/a, with Australia and Brunei being far above average at 15 and 12 b/a respectively.

The Region also has substantial deposits of natural gas, but the data and assessment remain very uncertain. Overall



production amounts to 12.7 Tcf/a, while consumption stands at about 11 Tcf with the balance being presumably exported in the form of LNG. The five major producers are Australia, Indonesia, Malaysia, India and Pakistan with a combined endowment of about 500 Tcf, producing 10.9 Tcf and consuming 12.7 Tcf. As of to-day, production appears to have passed a peak in 2004, but that may be overtaken by an overall peak around 2010 before the terminal decline sets in. The major consumers are Japan (2.94), Australia (1.91), India (1.29) and Malaysia (1.23), as measured in Tcf/a. On a per capita basis, Singapore leads at 55 bcf/a, followed by Malaysia (44.5), Australia (44.5) and New Zealand (36), with the regional average being 5.4 bcf/a.

Looking ahead, it is evident that the looming energy crisis will have a severe impact, due particularly to the excessive population. Australia which is relatively under-populated will no doubt come under pressure to admit more immigrants from the region. Indonesia, which has no good reason to remain a member of OPEC, may move to conserve its remaining oil and gas reserves, and may well see the emergence of separatist movements as the diverse people of the archipelago seek greater control of their own destiny. Both Australia and India have substantial coal deposits, whose production will no doubt be stepped up, possibly with an adverse impact on the climate, and they may well develop nuclear power. But overall, region has been largely spared the excesses of the Age of Affluence, and is relatively well prepared to revert to simplicity. Japan, Australia and New Zealand probably face the greatest challenges in adapting to the Second Half of the Age of Oil.



### 778. Signs of Recession

Oil prices seem to have resumed their upward trajectory, after the temporary retreat which coincided with the US election. Commentary in several quarters seems to hint at the onset of recession reflected in falling property values in Australia, Britain and the United States, undermining the validity of the massive debt behind it. The dollar too weakens. A further surge in oil prices, reflecting the capacity limits, may trigger more recession, sufficient to cut oil demand in which case prices may collapse, heralding a sequence of vicious circles made up of price shock – recession – price collapse – economic recovery – price shock which is likely to mark the post-Peak transition.

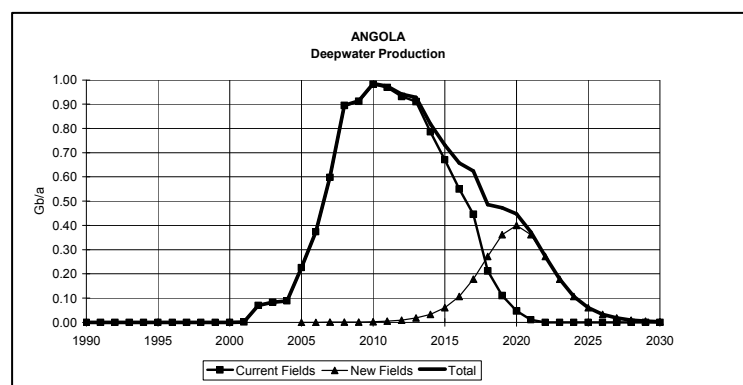
Europe meanwhile presses Russia to deplete her energy resources more quickly to keep it supplied, which would hardly be in her national interest. Britain announces parallel plans to rebuild its nuclear arsenal as its media publicise accusations that Russia was in some way behind the curious death of an exile who was found to be radioactive in London. The Government has declined to name the targets it has in mind for the nuclear weaponry, but it appears to be less than an efficient way to kill Afghan tribesmen or resistance fighters in other places. It may succeed, however, in supporting the arms industry and help counter recession.

### 779. Angola joins OPEC

In most regards OPEC has ceased to be a meaningful entity in so far as natural depletion now does the job of curtailing production to support price, which was its primary mission following the example of the Texas Railroad Commission, when the United States faced a glut.

Angola's deepwater fields gave it a second lease of life but are likely to peak soon and decline steeply, but it can remain an exporter for about another ten years since its consumption is only 50 kb/d (0.9 Gb/a).

Even so, a meaningful membership of OPEC probably can't last more than a few years. Perhaps it speaks of the Government trying to defend itself from possible pressure by the foreign countries, whose companies are developing its oil, some of whom are developing military bases in the vicinity.



### **780. The Bolivarian Revolution**

Ugo Chavez returned to power after a landslide victory at the polls in oil-rich Venezuela, and has now been joined by his friend Rafael Correa who won the election in Ecuador, having proposed to reject a regional free-trade Treaty. Ecuador's substantial oil revenues are currently wholly dedicated to servicing foreign debt, and the country even abandoned its own currency, the *sucre*, some years ago. Accordingly, some positive major changes may be in store for this beautiful country which straddles the Andes and extends over large tracts of the Amazon headwaters. It has ample natural resources to support its modest population of 13 million in a traditional sustainable way, with the banana crop being a useful earner of foreign exchange. Meanwhile Fidel Castro, who seems to have become something of an inspiration for Latin America, retreats from public life in ill-health at the age of eighty years, posing questions about the succession on the green island of Cuba.

### **781. Weapons of Mass Destruction**

President Bush and Mr Blair looked rather uncomfortable when they met the press in response to the recent US Government report by the Iraq Study Group which described the invasion of Iraq in less than enthusiastic terms. The President explicitly defended his decision to invade on the grounds of his concern for *energy supply*.

Countries presumably had the sovereign right to decide on the rate at which they deplete their resources but certainly any decision to restrict exports might have caused a form of *Mass Destruction* for the US economy as the country imports over 60% of its oil.

### **782. Depletion in Russia**

Russia's Minister of Natural Resources, Yuri Trutnev, stated on December 8<sup>th</sup> that some of the foreign companies operating in the country are producing oil at above agreed rates of extraction, with as much as 10% of the country's production being in violation. The rights granted to the foreign companies are of a fixed duration, giving them a motive to extract as fast as possible.

The Minister added that the recovery factor had fallen from 45% to 30% over the past ten years. If so, this would be the precise opposite of developments in other countries where reported recoveries have tended to improve, albeit in part as a consequence of being under-reported initially to comply with strict Stock Exchange rules. In general, reserves tended to be over-reported under the Soviet system, so in part the Minister's statement may reflect a correction.

It would appear from the statement that the Russian Government is aware of the underlying resource depletion imposed by Nature. If so, it has every good reason to restrict exports to preserve as much as possible for domestic use, even if some of its foreign customers are re-arming themselves with new nuclear weapons.

*(Mos.news.com 10.12.06 : reference furnished by John Busby)*

### **783. Peak Oil's Ancestor: the Peak of British Coal Production in the 1920s.**

By Ugo Bardi [www.aspoitalia.net](http://www.aspoitalia.net) [ugo.bardi@unifi.it](mailto:ugo.bardi@unifi.it)

Dec 10, 2006

We are just a few years away from *Peak Oil*; the moment when the worldwide oil production will start an irreversible decline. What should we expect to happen at the peak and afterwards? History is not a direct guide, since there are no past cases of an important global commodity, such as oil, peaking. However, there have been regional peaks which had global effects. The best known case is that of the US oil production that peaked in 1970 which brought the first great oil crisis in the years that followed. But that was not the first case of a major resource peaking and declining; there was another major peak almost half a century before: *Peak Coal* in Great Britain, in the 1920s.

The geological past left to Great Britain an endowment in coal unparalleled in any other region of Europe. Exploitation started in the Middle Ages and, already in early 18<sup>th</sup> Century had become an exponentially growing industry. Coal fuelled the British industrial revolution, and was also connected to political power, allowing Britain to construct the first, and so far the only, truly world empire in history. The importance of coal is hard to over-estimate. During the period of expansion of the industry, a British miner could produce almost 250 tons of coal per year (Kirby 1977). Even taking into account that about 20% had to be used for mining more coal, the productivity of a coal miner, in energy terms, was hundreds of times larger than that of an agricultural worker. At the height of its empire, Britain employed more than one million miners (Kirby 1977). It was the superpower of the time, being challenged only by other coal-producing States. In the First World War, British coal fought against German coal: British coal won.

But coal couldn't last forever, even for the richly endowed Britain. Already in mid 19<sup>th</sup> Century, William Stanley Jevons had predicted, in his *The Coal Question* (1856), that depletion would one day make British coal too expensive for British industry. Jevons did n't state explicitly the concept of *Peak*

*Coal* but, in a qualitative sense, his analysis was similar to that of Marion King Hubbert for the oil production in the United States (Hubbert, 1956). And Jevons had been right: the peak of British coal production occurred in 1913. The British coal industry struggled to maintain production but couldn't reach that level again. The strain on the industry is also shown by the two miners' general strikes of 1921 and 1926 that caused a temporary fall of production. The downward trend became evident in the 1930s and could not be stopped. The British production followed a classic *bell-shaped* curve in good agreement with Hubbert's model, with a best fit of the distribution giving a peak in 1923, only ten years after the actual. Today, coal production in Britain is less than one tenth than it was at its peak.

The peak of the British coal production was a turning point in history; never before had a major energy producing region started its decline. There are impressive analogies for the case of the British *Coal Peak* of 1923 and that of the American *Oil Peak* of 1970. In both cases, the countries were producing at peak about 20% of the world total. In both cases, the worldwide consequences were important. Before the peak, Britain was exporting about 25% of its domestic production, and this amount had been growing exponentially together with production. After peak, exports started to decline, causing a shortage of coal in the world market. In the case of the US, oil exports were not important before the peak (DOE 1993). But, after the peak, the US oil imports soared rapidly, leading also to shortage on the world market. The

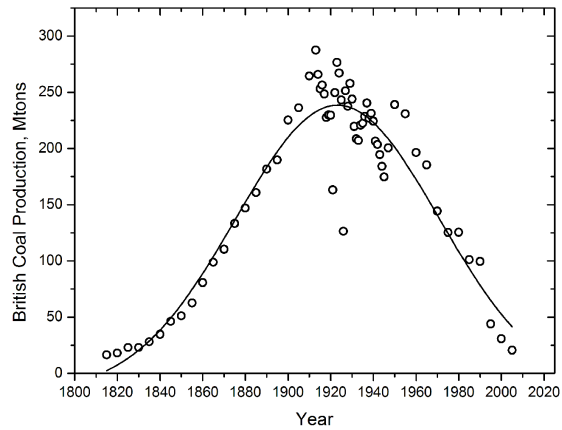


Figure 1. British coal production from 1815 to 2004. The data from 1815 to 1860 are from Cook and Stevenson, 1996. The data from 1860 to 1946 are from Kirby 1977; the data from 1947 up to present are from the British Coal Authority (accessed 2006). The production data are fitted with a Gaussian function which approximates the Hubbert curve. The maximum historical production is in 1913 with 287 M tons, the maximum of the fitting curve is in 1923.

oil shortages in the 1970s gave rise to the price spikes causing the *Great Oil Crisis*. A similar spike took place in the 1920s for coal (Australian Gov., 2006) although it was less pronounced. Most likely, the coal spike was less abrupt because the price controls that had been put in place during the war were only slowly relaxed in the 1920s. Coal prices stayed high in the 1920s, but fell with the market crash of 1929.

Many regions of Europe depended on British coal, so the lack of coal was felt everywhere. Several events that followed the British coal peak may be related to the reduction of the availability of energy: the decline of the British Empire, the *Great Depression* of the 1930s, as well as the general political upheaval of Europe in the 1920s and 1930s. The Italian newspapers of the 1920s and 1930s are full of insults against Great Britain for not sending to Italy the coal that Italians felt entitled to have. It reflects the kind of attitude that western countries adopted against the Middle East oil producers in the 1970s. But, if British coal was dwindling in the 1930s, German coal was still on the increase; its peak would only arrive in the 1940s. Germany never produced as much hard coal, namely the best quality, as did Britain, but in the 1930s it had the advantage that it could still increase its production, whereas Britain's was declining. In the 1930s, Italy abandoned her traditional ally, Britain, for Germany because only Germany could provide the coal that the Italian industry needed at a price that Italians could afford. Only later on, would they realize that the price of German coal was to be much higher than it had seemed.

In the 1950s, after the turmoil of the Second World War, the problems caused by the British coal peak were solved — for a while — by switching to oil. Likewise, after the turmoil of the oil crisis of the 1970s, the problems caused by the US oil peak were solved — for a while — by switching to other productive regions. In both cases, neither the public, nor the politicians, nor the economists saw the relationships between the political and economic events of the time which were related to the peaking of oil and coal production. In the 1930s, whole books were written on coal (Neuman 1934) but the word *depletion* was hardly mentioned. In 1977, Kirby wrote more than 200 pages on the history of the British coal industry during the peak period without ever mentioning the question of depletion. Apparently, people could not grasp why, while there was still coal to be extracted, production would decline. They didn't understand that it is not physical availability that counts, but the cost of extraction that increases with progressive depletion. It was a concept that Jevons had already understood almost a century before but had not survived in mainstream economics. The case of the US oil peak was similar; peaking was generally ignored by economists, even though Marion King Hubbert had predicted it correctly. All that happened afterwards was attributed to political causes. Both peaks were soon forgotten.

Today, it is global oil production which is peaking. It is something we are all seeing, but it is not *politically correct* to mention the fact. Peaking is a momentous event, but it hints at a reality that most people would rather ignore: the finiteness of mineral resources. We may well ignore the global peak, too, just as most people ignored the British coal peak of the 1920s and the US oil peak of 1970. Yet, we won't be able to ignore its effects.

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#### 784. *Final Frontier for Investors*

The December 8<sup>th</sup> issue of the CIBC World Markets report, published by this prestigious Canadian bank, opens with an article entitled *The Final Frontier*. It explains how the decline of *Regular Conventional* oil production can be offset for a few years by the costly tar sands of Canada, offering investors a *final* opportunity. It is noteworthy that this investment house, which sees the Peak Oil issue more clearly than most, evidently — to judge from the figure credits — relies in part on the Wood MacKenzie industry database which is relatively reliable.

The investment community generally prefers to hunt in packs, but a pack needs a leader. It looks as if CIBC is a good candidate although it has rivals including Charles Maxwell of Weeden & Co on the New York Exchange, who also clearly grasps the Peak Oil situation, offering sound advice.

(Reference furnished by Chris Skrebowski)

#### 785. *Depletion in Iran*

*Business Week* of December 11<sup>th</sup> carries an interesting article on the flagging output from Iranian fields, which, with soaring domestic demand, may curtail exports. The article emphasizes that its fields are old and heavily depleted, but is misled by exaggerated official reserves, as reported in the *BP Statistical Review*, which leads it to suggest a simplistic solution in the form of new investment. No doubt, modern technology can lift production, but at the cost of accelerated depletion, which may be far from the national interest. That said, it evidently does need additional refining capacity as it spends \$5 billion a year on product imports. The reality of its oil situation may explain its interest in developing nuclear energy to meet its future needs.

(Reference furnished by Walter Youngquist)

#### 786. *Population*

Society has always had taboo subjects that are unmentionable in polite circles. One has been to question the scale of the holocaust which has landed several people in jail ; another has been population ; and a third has been *Peak Oil* although it now becomes mentionable, despite cries of disgust by the flat-earth community. The following Open Letter by William Stanton touches on one of the taboos, which diplomatic editors avoid, but it does seem worth including, despite the risks, on account of its relevance to *Peak Oil*.

Letter to the Editor, *New Scientist*  
 22 November 2006

Issue number 2578 of *New Scientist*, celebrating 50 years of the magazine, features *the latest thinking on the biggest questions* (editorial, p 5). Forty-six *leading scientists*, invited to predict “the biggest breakthroughs of the next 50 years”, speculate on matters such as gravitational waves and parallel universes. Not one of them, surprisingly in view of Earth's current environmental and energy crises, addresses the even bigger question: *will vastly expensive and energy-hungry scientific research survive until 2056?*

Your supplement: *Fifty Years of New Scientist* illustrates the problem. In 1962 Sir Julian Huxley called for “control of the present excessive rate of population increase” (p 14). As he spoke, world population was about 3.2 billion. His warning went unheeded. Political correctness ruled that the subjects of his lecture, overpopulation and eugenics, quickly became taboo in the West.

Forty-three years later, Fred Pearce lamented (p 32) *Time is running out, and fast. Rising carbon dioxide levels and higher temperatures will soon set in motion potentially catastrophic changes ....* Pearce did not mention that world population had reached 6.4 billion, and was growing by 80 million a year.

Now that humans are pressing so hard on the global environment that climate change (probably) and mass extinction of species (certainly) are well under way, one would expect constructive discussions, working out how to avoid Pearce's catastrophic changes, to figure largely in your pages. They do not. Reducing greenhouse gas emissions, a subject that you do address, is a no-brainer. They will never be significantly reduced as long as the number of emitters is growing by a billion every 13 years.

Jack Parsons of the Optimum Population Trust has exposed the BBC's long-term avoidance of the subject of population growth in his book *Treason of the BBC* (2006). *New Scientist* has been equally irresponsible. As a reader/subscriber for 30 years I have noted that the urgent need to reduce population almost never features in your pages. Since 1986 I personally have sent you 18 letters about the dangers of overpopulation. None were published or acted upon. You did issue a token forecast, "Judgement Day" (28 April 2001), but it avoided drawing conclusions.

In 2003 *New Scientist* refused to review my book: *The Rapid Growth of Human Populations 1750 - 2000; Histories, Consequences, Issues, Nation by Nation*, which brings Malthus up to date. Your review editor, Maggie McDonald, told me that other subjects were more deserving of the magazine's limited space.

Malthus has always been right. The population crisis he predicted has been delayed, not cancelled. Darwinian competition between billions of people trying to survive on dwindling resources, especially fossil fuels, will have to reduce world population by more than 90 per cent before it can settle down at sustainable, pre-Industrial Revolution, levels. Whether the reduction is achieved by classic Malthusian agents: war, famine and pestilence, or in less painful ways organised by human intelligence, depends on us. Can we, *in extremis*, face and debate reality, or will we, as usual, take refuge in denial?

*Dr William Stanton*

### Calendar - Forthcoming Conferences and Meetings

ASPO members and associates [shown in parenthesis] will be addressing the subject of Peak Oil at the following conferences and meetings. Information for inclusion in future newsletters is welcomed.

December 1 National Assembly, Korea, [Alekklett]

December 12 COFORD Forest Energy Conference, **Tullamore**, Ireland [Higgs]

#### 2007

January 19 Lecture, Bayreuth University, **Bayreuth**, Germany [Campbell]

January 20-24 Conference, **Nairobi**, Kenya [Alekklett]

January 26 One Planet Agriculture, **Cardiff**, Wales [Campbell]

February 10 Local Community Meeting, Co. Kerry, Ireland [Campbell]

February 21 Boole Lecture, University College, **Cork** [Campbell]

March 10 Minerals, Energy & the Environment, ASPO-ITALIA, **Florence**, Italy [Bardi]

May 28-30 Planning for Oil Depletion ASPO-SOUTH AFRICA Conference **Cape Town** [Ratcliffe]

September 17-18 ASPO-6 International Conference, Ireland

### NOTE

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