Chalk River got there first

SIR — Carlo Rubbia's proposal for an accelerator-driven energy amplifier[1] seems to have overlooked earlier work here at the Chalk River Laboratories of Atomic Energy of Canada Ltd (AECL). What Rubbia and, separately, Los Alamos propose is a version of a concept studied here for more than four decades, but which has hitherto been rejected on economic grounds.

The original concept was due to W. B. Lewis[2] in 1952, and entailed the use of spallation neutrons, generated by the bombardment of heavy metals by high-energy protons, to convert fertile into fissile fuel. Spallation neutrons had then only recently been reported[3–4], but the first experiments at Chalk River used cosmic-ray protons to measure spallation yields. Lewis[5], in the early 1960s, then advocated the Intense Neutron Generator (ING), based on a 1-GeV, 65-mA proton beam from a linear accelerator and a molten lead–bismuth target, as a source of neutrons for many research applications[6].

Work on fuel breeding continued in parallel. Lewis[5–6] discussed the economics of thorium conversion into fissile ^{233}U using the ING design as a source of neutrons. But funding for ING was not forthcoming; the project was cancelled in 1968.

Interestingly, it was appreciated from the start that reprocessing could be an issue. A report[7] in 1973 noted that Canadian CANDU reactors would run as well on ^{233}U from thorium as on ^{235}U from natural uranium and suggested that thorium fuel pins could be directly irradiated by spallation neutrons. The same document also raised the possibility that a "sophisticated fuel management scheme" might allow the return of intact but partially spent fuel pins to the reactor after upgrading by the spallation source.

It was also recognized that the energy cost of accelerating protons could be at least partly offset by the heat generated in the spallation process. It was estimated[7] in 1973 that 62 per cent of the energy required to operate the accelerator could be derived from heat recovered from the target. In the early 1980s, consideration of alternative target designs suggested[8] that the spallation heat-gain could be as much as a factor of five, which is great enough to allow all the accelerator power to be obtained from the target heat. In the course of the later ZEBRA project[9], a conceptual design optimized for fuel conversion suggested that there would nevertheless be a surplus of 110 MW of electrical power from the target assembly.

Apart from the work at Chalk River, the notion of electronuclear breeding has been studied at Livermore[10] (in the 1950s) Brookhaven[11] and at Los Alamos[12] in the United States, as well as in Russia and Japan.

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French blood test

SIR — After reading your recent articles on the "second" French blood affair[1], based on articles I wrote for *Libération*, I would like to make two corrections.

You write: "While Seytre claims that the French test was unreliable until June 1985, Françoise Brun-Vézinet of the Claude-Bernard hospital in Paris — whose data are cited by Seytre — says that, although there was some variability between batches, the quality of the test itself was not a problem. . . . 'We were still testing it in April', says Brun-Vézinet."

What I actually wrote was: "Until April 1985, the Diagnostics Pasteur test gave a high number of false negative results." I also specified that the defective batch was batch no. 86 and added, "all the kits produced by Diagnostics Pasteur at that time were not as poor . . . the quality varied significantly from one batch to another." Rather than contradicting what I wrote, the quotation from Brun-Vézinet confirms it.

I am also concerned that you identify me as "the translator of Robert Gallo's book". This translation is only one of seven translations I have done and it is completely irrelevant to my work as a scientific journalist and to my recent articles on the blood scandal.

The articles I wrote and to which you refer are direct products of research that I have been conducting over the past several years on the history of AIDS in association with INSERM Unit 158 (the French National Institute for Health and Medical Research), currently with a grant from the ANRS (National Agency for AIDS Research). Moreover, these articles are a continuation of the work I did for a book published last May on the history of AIDS research[2].

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Not so puzzling

SIR — Jorge L. Sarmiento[1] notes that there has been an unprecedented slowdown in the accumulation of atmospheric CO_2 and searches for geophysical answers to the puzzle because "fossil fuel emission, estimated from the most recent United Nations Statistics" show a slight increase and " . . .there is no reason to believe that the past year and a half were unusual".

The past few years have indeed been unusual. The former second biggest fossil CO_2 emitter — the Soviet Union — has undergone drastic contraction, along with the loss of additional large CO_2 contributions from the Central/East European countries. Sarmiento really has unwarranted faith in the data, which from these areas during this time have been of questionable reliability. Alternative estimates from recent BP data[2], using coefficients previously developed with the aid of industry sample analysis[3], indicate that the decline was dramatic enough to reverse by 1991 the previous rapidly rising trend in global emissions. Global (fossil-fuel) CO_2 emissions in 1992 were still below the peak 1990 levels (the estimates for global total emissions being 6,037, 6,081, 6,014, and 6,028 million tonnes of carbon for the years 1989–92 respectively).

Deforestation is also a significant source and although data are notoriously unreliable there are indications of a decline driven by dramatic reductions in Brazil since 1988. There may be no need to hunt for geophysical causes; let's try and check the emissions data first.

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