Tubes of Mass Destruction

by Simon Henderson **(/experts/simon-henderson)**

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As the advance towards war against Iraq continues, the Bush administration has started lobbing missiles at hardline liberals ever unconvinced about the threat Saddam Hussein poses to his region and the world. The administration's game presumably is to make these diehards change their minds and to win over skeptical members of the public.

One of the latest missiles involves aluminum tubes. But the story here is complicated, and thus might confuse rather than clarify the danger of Saddam.

On September 8, the New York Times reported: "In the last 14 months, Iraq has sought to buy thousands of specially designed aluminum tubes which American officials believed were intended as components to enrich uranium. American officials said several efforts to arrange the shipment of aluminum tubes were blocked or intercepted but declined to say, citing the sensitivity of the intelligence, where they came from or how they were stopped."

Having leaked the story, the administration ran with it. September 8 was Sunday, and Vice President Cheney, speaking on NBC's "Meet the Press," referred to the aluminum tubes. "What we have seen recently is that [Saddam Hussein] is trying through his illicit procurement network to acquire the equipment he needs to be able to enrich uranium."

A September 10 analysis by the BBC's defense correspondent, Paul Adams, mentioned Cheney's comments but noted pointedly, "Experts say the shipment does not necessarily prove anything." The BBC quoted John Wolfstahl, deputy director of the Non-Proliferation Project at the Carnegie Endowment, as saying: "It's disturbing but by no means a smoking gun." A further quotation came from David Albright, president of the Institute for Science and International Security in Washington: "It's a weak indicator. A lot of people disagree with Cheney."

One hopes these experts did not do the public a disservice. After all, the New York Times story also said: "The diameter, thickness and other technical specifications of the aluminum tubes had persuaded American intelligence experts that they were meant for Iraq's nuclear program." It seems a strong indicator.

For the perplexed, a short science lesson is necessary. An atomic bomb can be made from either plutonium, obtained from reprocessed fuel rods in a nuclear reactor, or from highly enriched uranium. Normal uranium is no

good, as it contains only 0.7 percent of the fissile isotope U-235. Centrifuges are one way of extracting the U-235 and bringing it up to the 90 percent strength needed for a bomb.

Building such a centrifuge is an engineering challenge. It works on the same principle as fairground rides in which the young and foolhardy are spun around and pinned against the wall by the centrifugal force. In an enrichment plant, a gaseous form of uranium is introduced into a centrifuge spinning about 1,000 times per second. Some separation is achieved from the more dominant U-238 isotope before the gas is passed to another centrifuge to repeat the process. After the uranium passes through a thousand or more centrifuges, known as a cascade, a dribble of highly enriched uranium emerges. Left operating for about a year, a cascade can produce the 25 kilograms or so required for a nuclear bomb.

Aluminum centrifuges are old-tech, even by Iraqi standards. When United Nations inspectors went in after the Gulf War they discovered that Iraq had been trying to build centrifuges made from a much stronger specialty steel, known as maraging steel, and even carbon fiber, which is lighter than steel and can be even stronger (explaining why many yachts now have carbon fiber masts). Because these materials are so strong, centrifuges made from them can spin faster, making separation of the U-235 isotope many times more efficient.

The weapons inspectors destroyed the centrifuges they found, along with the rest of Iraq's enrichment infrastructure, but apparently Saddam is trying again. And as in the 1980s, he seems prepared to use old technologies if they are available. Back then, using declassified U.S. data, Saddam's scientists were also building calutrons, a method considered by the Manhattan Project but rejected because enrichment by that route took too long.

By contrast, the technology for aluminum centrifuges -- developed in Europe to produce reactor fuel for power plants and submarines -- is still highly classified. Iraq obtained its plans for maraging steel centrifuges from a disaffected and greedy German scientist, since prosecuted. Pakistan, meanwhile, built its first centrifuge cascade using aluminum devices, with help from a Pakistani scientist formerly employed by the European enrichment consortium.

So the question is: Has Iraq obtained plans for aluminum centrifuges from a less-than-secure European industrial archive, or did Pakistan supply them? Back before Iraq's invasion of Kuwait, according to intelligence officials, Pakistani nuclear scientists visited Iraq, and Iraqis visited Pakistan's unsafeguarded enrichment plant at Kahuta, outside Islamabad. It seemed surprising that U.N. weapons inspectors never discovered a Pakistan connection when searching Iraqi facilities.

If the plans did come from Pakistan, were they handed over before 1990 or more recently? And what was the quid pro quo? (Pakistan is believed to have swapped its centrifuge technology with Beijing in 1983 for a design of a nuclear weapon and enough highly enriched uranium for two bombs in order to jump-start its nuclear arsenal.)

One wonders what President Musharraf of Pakistan was thinking when he sat in the United Nations in New York on September 12 listening to President Bush lay out the case for action against Iraq and the responsibility of the international community. On message, the president again mentioned aluminum tubes.

When are we going to hear more about these Iraqi procurement efforts? Perhaps in the British dossier on Iraq, expected to be released by President Bush's closest (and so far only) ally, British prime minister Tony Blair, before Parliament meets for a special Iraq debate on September 24. The officials quoted by the New York Times cited the sensitivity of intelligence as the reason for withholding details of when or where illegal cargoes were detected. That's the normal formulation for intelligence material uncovered by a foreign country. Perhaps the Iraqi buying network has been operating in Britain, or at least Europe.

There are other concerns involving Pakistan, in whose lawless border region with Afghanistan al Qaeda operatives (and maybe bin Laden) are lurking. Before September 11, 2001, two retired Pakistani nuclear scientists with detailed

knowledge of the other nuclear explosive, plutonium, were in contact with bin Laden. And a few weeks ago the London Sunday Times reported that Pakistan had been trying to buy more maraging steel from a British company. Officials had ordered the company to cancel the contract, but in a farcical confusion, the shipment was still sent. (Technical note: Aluminum centrifuges are built in sections, with maraging steel joints to provide flexibility. Otherwise they shatter at high speed.)

So producing more details on aluminum tubes would help the Bush administration convince doubters, but could open a Pakistani can of worms. It could confuse the message about the unique threat posed by Saddam Hussein -- or prove it. Unfortunately, there appears to be little time to play with. ❖

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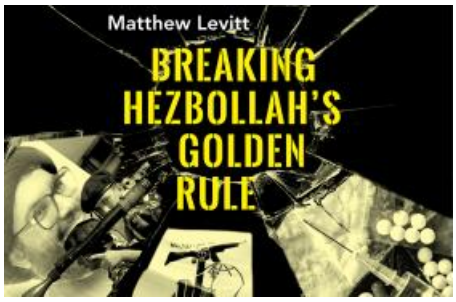

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