

The Infrastructure Road to Recovery

Solving Salinity

skills to inland Australia, nurture local communities, increase access to better services for residents, and generate more secure long-term employment."

Dr. Sparrow estimates that an early stage industry adding value to Murray-Darling salt could be worth \$200 million a year, as well as helping to lower the threat to the heartland's water quality and farming industries.

As noted elsewhere in this report, the use of the HTGR reactor for large-scale desalination would be inherently much more efficient than the solar-energy proposal of the CSIRO scientists, but their overall approach is enormously exciting. And the prospect of creating a world-leading titanium industry in the process, was elaborated by Dr. Rod Hill, chief of CSIRO's Minerals Division, in an article, "Dawn of the Titanium Age", in the *Australian Financial Review* of October 2, 2001. Dr. Hill is confident that Australia can halve the current world cost of producing titanium from the mineral sands in the Basin, while simultaneously solving much of the salinity problem:

Australia's heartland, the lower Murray basin, may become the site of literally a titanic mineral development. The Basin's ancient sediments are yielding mineral sands already worth \$13 billion, and the value is rising steadily.

The story begins with the Moravian Gulf, a huge marine intrusion the size of France which inundated the lower Murray-Darling Basin from Adelaide to Cobram and the Grampians to Broken Hill, six million years ago. Here wave action sorted and deposited the mineral-laden sands in serried rows along ancient beach-lines. The receding waters left a series of fossil strands, laden with ilmenite, rutile, monazite and xenotime eroded from the bedrock. Among these deposits, on the lower slopes of the Grampians south of Horsham, are some of the richest mineral sands on earth.

Collectively, these deposits equate with finding a world-class

orebody in raw material value. But, to Hill, the true opportunity lies in Australia being first to develop the low-cost process that will make titanium a 'household' metal, like aluminium or steel.

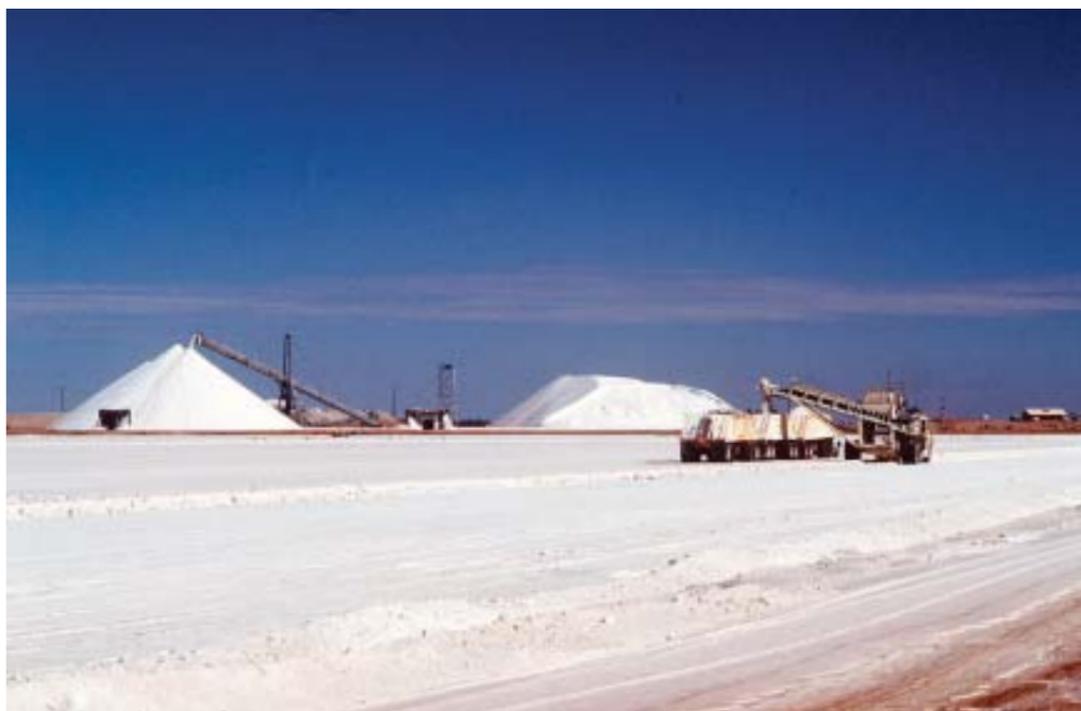
"The mineral sands of the Murray Basin are a treasure as they are—but if we can take them down the whole processing chain to titanium, they could be worth seventy times as much," he says.

For over a generation the Mallee, Wimmera and Riverland regions and surrounding pastoral and irrigation country have staggered under the boom-bust cycles of agriculture, and stared down the barrel at the looming menace of salinity and landscape decline. In Rod Hill's vision, mineral sands offer an antidote not just to economic and community woes, but to environmental ones as well. The new industry can be used, not just to pay for but actually to repair, the damaged landscape....

Hill's view is that Australia is perfectly placed to develop a global-scale industry in industrial-grade titanium, using new metal production and fabrication processes that can deliver metal mill products at around \$US5 a pound, compared with the present figure of \$US10 a pound. If that still sounds dear compared with steel, it's because it overlooks the essential qualities of titanium. It's 43 per cent lighter than steel, stronger, more flexible, more corrosion-resistant. What really counts is the volume of metal you use for a given task—not its weight.

The big market opportunities for industrial-grade titanium, Hill says, are in major global industries such as transport, where it can provide superior structural components for cars and trucks, construction, where it can furnish girders, frames, supports and even cladding of greater durability, beauty and toughness, chemical processing and desalination, where its corrosion-resistance is a major plus, and marine construction.

One of the advantages of mineral sands production is that those environmental blues of the 70s and 80s have made it one of the cleanest, greenest, resource industries in



Salt harvesting at Port Hedland in Western Australia. With the development of precious-mineral extraction technologies for the saline ground water of the Murray-Darling Basin, these salt harvesting operations could yield much more than just sodium chloride. Photo: AAP/Muchenberg

business today. The art of extracting the small proportion of valuable minerals from these sands and then restoring entire living landscapes of farmland, forest or native vegetation is so mature it is fast becoming one of Australia's proudest exports in its own right.

Environmental issues particular to the Murray basin that may arise are that the mineral sand containing formation is also an aquifer for the saline waters, and that radioactive thorium is associated with some of the deposits. Solutions will need to be developed for both.

But there is a breathtaking possibility: mining and processing the mineral sands of the lower Murray Basin could make inroads into the salinity problem which now threatens vast areas of the catchment, making money and creating jobs into the bargain.

The salty groundwaters used in mineral extraction can themselves be "mined" for everything from common salt to low-, medium- and high-value minerals and chemicals—most of which Australia currently imports at high cost.

The salt extracted from saline water can be treated to produce byproducts used to extract minerals. One is sodium hydroxide, which is used in the production of zirconia, zirconium metal and partially stabilised zirconia (PSZ), the super-hard ceramic now used in everything from false teeth to engine parts. A second is hydrogen chloride, used in the production of titanium dioxide, on the pathway to making titanium metal.

The salt which is poisoning Australia's landscape may thus become a key condiment in the recipe for a new advanced materials industry, Hill argues. That's not all. Salty groundwaters also contain a host of other useful dissolved minerals and chemicals, the so-called "Bittern fraction". These can be extracted by evaporation for making cements, fertilisers, dust-suppressants and simple or sophisticated industrial chemicals.

This way, a mineral sands industry could help in the fight against salinity not only by creating the economic wherewithal—but also by actively exploiting the enemy

itself, Hill asserts....

The benefits are not confined to southeastern Australia. Opportunities also exist in southwest WA, along some parts of the eastern seaboard and in central Australia in the Musgrave ranges on the WA/NT border where major new ilmenite and nickel deposits have been found.

The combination of these products and processes can establish Australia as world light metals leader, adding a third leg to the remarkable developments in aluminium and magnesium, Rod Hill believes.⁴

In addition to Prof. Endersbee's proposal for the Murray-Darling Basin and the CSIRO proposal just cited, there is an interesting range of other research underway on salinity, including the use of crops specially adapted to salinity, and the strategic use of perennial plants to counter salinity and waterlogging. These and other research projects underway may well prove complementary to such larger, top-down approaches as the Endersbee/CSIRO proposals.

Footnotes

1. National Airborne Geophysics Project National Report as seen at the National Dryland Salinity Program webpage at:

<http://www.ndsp.gov.au/NAGP/nrcport/nrchap1.pdf>

2. The \$600 million estimate is from a CSIRO media release, July 3, 2000. <http://www.pi.csiro.au/Media/MediaReleases/2000/MR03-07-00.htm>

3. On the Prince Philip-founded Australian Conservation Foundation, see footnote 10 of the Introduction to this feature. Prince Philip's personal hatred of great water projects was exemplified in his flying to Tasmania in the early 1980s in an attempt to stop the construction of the Franklin Dam, as well as in ACF honcho Tim Fischer's threat that ACF activists were prepared to "die in a ditch" to stop a dam on the Fitzroy River in the Kimberleys.

As the CEC documented in its 1998

pamphlet, "Stop the British Crown plot to crush Australia's unions," both the ACF and National Competition Policy were spawned by Rio Tinto, behind which stands the company's dominant shareholder—the Queen. For instance, the 1992 Hilmer Commission, which initiated the whole "national competition" scam had three members, two of which, chairman Fred Hilmer and Mark Rayner, had been longtime top figures at Rio Tinto. The company is also a major funder of such hotbeds of Mont Pelerin economic rationalism as the CIS, IPA, Tasman Institute, etc. Together with "Aboriginal land rights"—another Crown/Rio Tinto project—the purpose of such ideological fronts is to splinter Australia, to stop its further development as a sovereign nation-state.

So, it is no surprise that the Rio Tinto-financed ACF has repeatedly endorsed

National Competition Policy as a way to stop any significant water projects. Nor, given their common oligarchical sponsorship, that the "leftwing" ACF and the "rightwing" NFF would prepare a joint report, "Repairing the Country," which calls for spending \$65 billion over ten years to "repair environmental damage", which would be more of a huge tax on the economy, than anything else. (On the Crown's role in setting up "land rights", see "Aboriginal 'land rights': Prince Philip's racist plot to splinter Australia", CEC, 1997, 48 pp.)

Whereas some CSIRO scientists have proposed exciting, and even highly profitable plans to solve the salinity crisis (see text), CSIRO Land and Water Division head John Williams has proposed to solve the problem by simply wiping out most of Australia's farmers. For example, on ABC's 7:30 Report on June

14, 1999, presenter Justin Murphy, who claimed that 15 billion trees had been wiped out since settlement, asked Williams: "Does this mean that we're growing the wrong things in the wrong place, in the wrong way?" Williams replied, "There has to be a radical change. We're talking about afforestation of large elements of the landscape." Murphy: "With the farmers either leaving or being helped to do something else?" Williams: "Leaving or helped to do something else, or the forestry enterprise itself. That has enormous social implications."

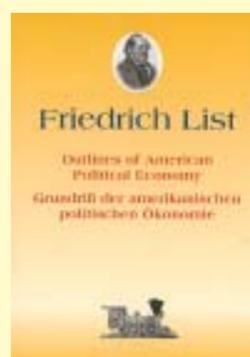
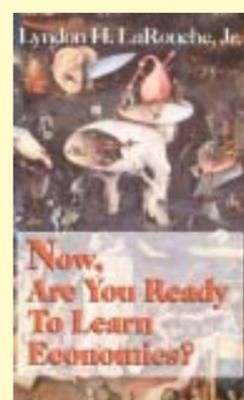
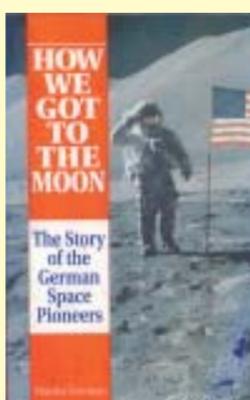
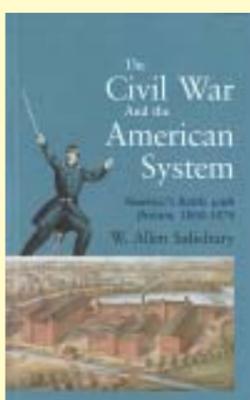
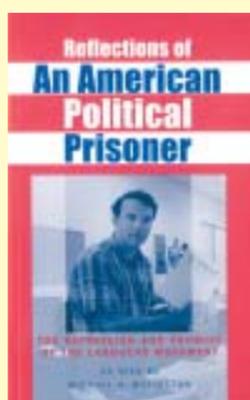
Williams' enthusiasm for replacing farmers with billions of trees, would seem to be shared by Australia's largest wine producer, Southcorp, which in July 2000 announced it was financing ACF activities on salinity. Southcorp managing director and CEO Graham Krahe called for planting "40 billion trees" to solve the

problem. Southcorp has also allied itself with the economic rationalist fanatics, the NFF.

Besides wiping out most farmers, planting billions of trees to deal with salinity is a dubious business in the first place, particularly when one considers the overwhelming evidence that Australia at the time of European settlement was characterised by vast plains of rich grassland with minimal tree cover, and that the trees were only planted later. See the historical accounts cited by Dr. Christine Jones (as well as her own thought-provoking contributions to the salinity debate, which run directly contrary to the prevailing dogma on the matter), in her articles in the 5-part series "The Great Salinity Debate" available at www.landholderstripod.com/index.htm.

4. For the full text, see <http://www.csiro.au/html/featureArticle/TitaniumAge.htm>

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