

waterpoints

Chlorine replaced by copper sulphate?

Copper is an effective inhibitor of many water-borne organisms, from bacteria to algae. So why is it not being widely used to disinfect contaminated water in the South?

Copper sulphate dissolves quickly in water and tends to combine rapidly with naturally occurring carbonates. Once combined, copper carbonate is formed, which then precipitates and loses its anti-bacterial effectiveness. In addition, copper sulphate, although essential for the body to function normally, is poisonous in high doses.

Now, a UK-based company has come up with a product which, its manufacturers claim, solves these problems. ECOL2000 is a simple solution: copper sulphate pentahydrate, bound to a non-toxic carrier. Already extensively tested in North and South America and Europe, it is proving to be a non-toxic, effective disinfectant of water-borne bacteria that, once applied, disperses naturally and stays in solution in the entire body of water.

The copper component binds irreversibly to the cellular components necessary for the function of the bacterium's metabolic processes. The bacteria, therefore, cannot divide, produce toxins, or remain infective, and are rendered harmless or killed directly. If cholera, streptococcus, shigella, salmonella, e.coli or other bacteria are present in drinking-water, ECOL2000 will eliminate viable organisms in 30 minutes or less.

The manufacturers claim that the solution is completely non-toxic to humans or animals in the effective dosages (1-2 mg/litre)¹ and will be particularly effective as a practical water disinfection agent in developing countries because:

- once water is treated, disinfection of all water-borne bacteria occurs within 30 minutes and the product remains effective for up to 30 days;
- there is no taste at doses up to five times the recommended level — taste indicates unsafe copper levels copper, safeguarding against overdosing;
- water will not become recontaminated — if a contaminated cup is placed in a disinfected bucket of water, the water in both the cup and the bucket are disinfected;

- one litre of ECOL2000 treats 60 000 litres of water (at 1 ppm) the equivalent of 20 litres per day for 3000 people at a cost of 0.1 pence per person per day. In an emergency situation, the current recommended dosage of chlorine is 90.7 litres to effectively treat 300 000 litres of water. To treat the same volume of water, only five litres of ECOL2000 are needed, or 1/20th of the chlorine needed;²

- it is easy to use. It is supplied in liquid form, and a dosing mechanism has been developed for buckets, five-gallon containers, community water tanks, semi-urban cisterns or urban water-treatment plants; and

- the product inhibits the growth of algae and fungi, a common problem in water storage containers.

The manufacturers — who are currently developing plants in South Africa and the Middle East — want to develop partnerships with local organizations, NGOs and aid agencies to provide field-testing and community training in how to use the product in conjunction with hygiene and sanitation training. For more information on ECOL2000, or on conducting field tests, contact: Ingrid Sbacchi Bairstow at Aqua Pro Vitae, 2 Queensdale Place, London W11 4SQ, UK. Tel: +44 171 603 5050. Fax: +44 171 602 6896.

1. The safety margin has been established by the United States Environmental Protection Agency (1.3 mg/litre) and the World Health Organization (2.0 mg/litre).

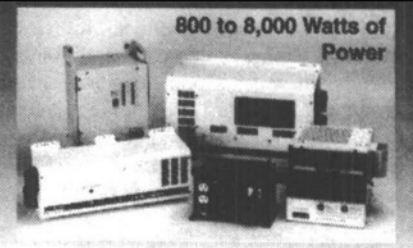
2. Davis, Jan and Robert Lambert, *Engineering in Emergencies: A practical guide for relief workers*, IT Publications, London, 1995.

Pricing challenge

SANEX: it could be a divorcees' support group or a brand of toilet issue, but SANEX is actually an expert system software being developed to help 'decision-makers in the developing world' find appropriate sanitation solutions. A preliminary working version should be available by the end of the year, and it is already capable of rating the implementability and sustainability of sanitation alternatives involving 27 decision criteria.

But there is one final — and difficult — hurdle left to jump: costing. Which is why the software developer, Thomas Loetscher, is asking *Waterlines* readers for information or references on the costing/estimating of any of the following systems (capital as well as

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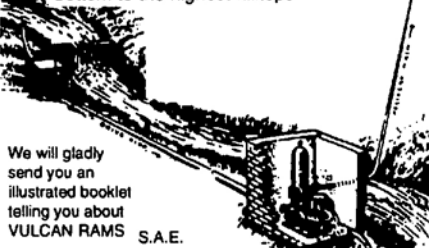
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Contact Thomas Loetscher at the Advanced Wastewater Management Centre, Department of Chemical Engineering, University of Queensland, Brisbane 4072, Queensland, Australia. Fax: +61 7 33654726. E-mail: Thomasl@cheque.uq.oz.au

Face the facts

Since the mid-1970s, the United Nations Commission on Sustainable Development has been expressing concern that much of the world is facing a severe water crisis. In an attempt to both quantify and qualify this, scientists from different countries and agencies were invited to prepare background documents.

The result of 20 years of research is the *Comprehensive Assessment of the Freshwater Resources of the World*, recently published by the World Meteorological Organization on behalf of the UN, UNDP, UNEP, FAO, UNESCO, World Bank, WHO, and UNIDO. There are three main chapters:

- the supply, availability, and use of the world's freshwater resources;
- the water challenge: a 30-year outlook; and
- conclusions and policy options.

To obtain a copy, or for more technical information, please contact Wulf.Klohn@fao.org

Crime on tap

Environmental pollution makes a big contribution to violent crime and anti-social behaviour, according to a provocative new analysis by an American political scientist. He believes that toxic chemicals, in particular metals in water supplies, can disrupt the neurological control mechanisms that normally inhibit our violent urges. Other experts are intrigued but want to see more evidence.

Roger Masters of Dartmouth College in New Hampshire analysed a wide range of statistics including crime figures, and information on industrial discharges of lead and manganese, both into water and into the atmosphere. After controlling for conventional variables such as income and population density, he found that environmental pollution seems to have an independent

books

Reflected in Water: A crisis of social responsibility

Colin Ward

Cassell, London, 1997.

160pp. Pbk. £12.99.

ISBN 1 304 33568 1.

Is water a common property, or a commodity? In fluent prose, Colin Ward takes the reader through a plethora of issues surrounding the ownership and management of water. His thesis is that water must be treated as a common good, managed by society with fairness and equal access for all, in a reciprocal relationship that ensures that what is taken is returned. 'Water is an essential element for life, a constantly renewed but not inexhaustible resource, belonging to everybody, not just to those who have taken over the control of supplying it to others.'

Ward has obviously read widely and well; he draws on the wisdom of a wide range of writers on the management of natural resources, in particular, water. The main issues he tackles include: the conflict over water for agriculture, industry and domestic use; the advantages of small-scale water management over large-scale supply; 'marketizing' and privatization; inequality in water allocation, access and control; and the role of women in water management — and the need to strengthen their voice.

He links the growing power of the water companies in Europe to a falling away in both social consciousness and public awareness of the need to conserve a precious natural resource; and questions the increase in water costs that have resulted from privatization.

Ward recognizes the role played both by those individuals and groups who make a living from

supplying water to others: the water-sellers of Bangladesh, the Water Tribunals of eastern Spain — each made up of eight farmers who manage irrigation canals covering 2300 acres; and the traditional forest and water management systems of the Saward River in Nepal. His examples are persuasive evidence that the 'tragedy of the commons' does not happen if local societies are given the opportunity of managing a finite natural resource.

He does point out that larger-scale water management and supply systems, such as dams or massive irrigation schemes, cannot permit a communal interest, because they serve huge, disconnected groups of people. A large population cannot plan and manage together, and it cannot hope to represent the collective interest of their families, friends and neighbours.

The book points out that, in urban areas, it is usually the wealthy who are served by public utilities, while the poor have to buy water, often at grossly inflated prices. In fact, in many countries in developing countries, notably in South America, water-management systems divert capital away from collective investments for all, into privately managed businesses for some.

I recommend this book to anyone involved in water-policy development and management strategies. Ward's arguments are heavily biased towards common property, but he argues the case clearly and has convinced this reader! *Reflected in Water* is essential reading for those interested in the possibility of alternative, socially managed solutions.

The book is very readable, and provides a glimpse of the most crucial issues affecting the crisis of water management — that we are faced not with a technical problem, but with a crisis of social responsibility. Good bibliographies at the end of each chapter will enable interested readers to further their knowledge on specific issues.

Sarah Gelpke, *Overseas Policy and Evaluations Manager, WaterAid*

effect on the rate of violent crimes. Counties with the highest levels of lead and manganese pollution typically have crime rates three times the national average, says Masters.

When brain chemistry is altered by exposure to toxic metals, Masters

argues, our natural violent urges may no longer be restrained. 'It's the breakdown of the inhibition mechanism that's the key to violent behaviour,' he claims. He thinks that a major source of lead and manganese is the pipes that carry water to houses.