Is copper the cure for cross-infection?

A curious comment in the April issue of *Chemistry World* discusses the possibility of using copper in helping to overcome the serious and recurrent question of controlling cross-infection in our hospitals and nursing homes. The old saying that "where there's muck there's brass" has been inverted to argue that where there's brass, muck cannot flourish.

A hospital in Birmingham is trying to eliminate its cross-infection problem by replacing metal fittings with copper ones. The idea arose in the University of Southampton three years ago when it was discovered that the notorious methicillin-resistant *Staphylococcus aureus* (MRSA) dies within an hour or so on a copper surface whereas on stainless steel it may persist for days.

Even more effective is the copper-zinc alloy we know as brass. Since door handles play a significant role in transmitting MRSA, which every year affects thousands of patients in UK hospitals, sometime fatally, it might prove a godsend to make such handles of brass and so potentially reduce the cross-infection rate. In the Birmingham hospital selected for a trial, not only door handles, but also taps, toilet flushes and handrails will be replaced with the alloy under test.

The antibacterial potential of copper is nothing new. Silver has a similar but more powerful potential, and has been found effective. The medical use of copper has a history stretching back into prehistoric times. The ancient Egyptians reacted copper metal with vinegar fumes to make the acetate, which they incorporated into ophthalmic ointments for eye infections. In a papyrus dating from about 2600BC, copper salts are recorded for sterilising drinking water and dressing wounds.

The Greeks obtained copper from Cyprus and mixed its oxide with honey as an antiseptic. It has also featured as antifungal in protecting grape vines. Pliny found copper oxide effective in treating stomach infections and killing intestinal worms. Paracelsus lauded copper sulphate as a medicinal agent. More recently, copper salts have been found to be anti-inflammatory: copper derivatives of aspirin and ibuprofen have been effective in treating arthritis and other rheumatic conditions. Today there is a widespread belief that a copper bracelet or anklet helps keep the joints in good condition.

The background to copper doorknobs is therefore of venerable antiquity, and it is intriguing to find that it continues. The role of zinc in intensifying copper's usefulness is not entirely clear, but it offers fresh hope to sufferers of a wide range of complaints.

Egyptian mystery pots held scented ointment, not embalmed organs

An interesting excursion into the habits of the old rulers of Egypt and an investigation into their raw materials appears in *New Scientist* for 17 March. Some turquoise-blue canopic jars bearing the name of Rameses II and supposed to contain embalmed organs of the pharaoh have been on display in the Louvre Museum in Paris for a century but now prove not to be what they were previously supposed. Analysis by French chemists has now revealed that the four pots covered in hieroglyphs in fact contained cosmetics of a much later date.


Pots on display at the Louvre Museum, Paris

Traces of material from the pots were submitted to mass spectrometry and chromatography, using techniques employed in the petroleum industry to identify complex organic mixtures. No evidence was found of beeswax, bitumen or other materials commonly employed in Egyptian embalming. The ratio of non-radioactive carbon isotopes was found to be typical of animal fats. The fatty acids matched pig fat and there were unusual compounds of fatty acids with aromatic oils found in pine or cedar woods that were imported by Egypt from the Levant.

The investigators concluded that the jars had probably contained a scented ointment made by heating aromatic wood with fat, of the type that the Egyptians employed to anoint their heads and sacred images. Radiocarbon dating produced a figure of about 1035BC, and Rameses died in 1213BC. A yellowish powder from the jar packaging was found to be pure resin made from the mastic tree.

The Louvre's experts now believe that the pots in question were made for a temple to the sun god, Amun-Ra, built by Rameses and intended to hold ritual ointments, but afterwards used for containing resin-embalmed remains.

Presidential election highlights future of scientific research in France

Much discussion has been reported in the 19 April issue of *Nature* on the serious issue of the future of scientific research in France.

In the opening round of the French presidential election, the three leading candidates, Nicolas Sarkozy, Ségolène Royal and François Bayrou, all expressed promising visions for the future, pledging substantial increases in spending on research aimed at reversing the cuts made during the term of office of Jacques Chirac.

The new president — to be chosen in a run-off between Mr Sarkozy and Ms Royal on 6 May — will have to support much needed reforms of the whole science system in France, because such advances have been resisted for more than two decades. The scientific community has come to a broad conclusion over the nature of the reforms needed. For example, France's fragmented life sciences research must be a priority. The science ministry must be upgraded to a par with agriculture, finance and foreign affairs. Salary structures must be adjusted to allow French institutions to compete internationally in such areas as information technology. Skilled immigrants should welcomed rather than discouraged. The research agencies should be transformed into research councils funding laboratories within an autonomous university system. However, at the moment, French universities tend to be physically dilapidated, badly managed and weakened by nepotism when it comes to appointments.

France's share of world patents, particularly in the important US market, fell by some 14 percentage points between 1999 and 2004 to 2.5 per cent. Part of the drop has been explained by the effect of emerging economies in Asia. However, hopes are expressed that scientific innovation in France will eventually recover.