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DHAKA FRIDAY JULY 17, 1987

THE BRITISH Library has come up with a revolutionary technique, which if it can scale up to a batch process, will strengthen the paper in books.

An alarming problem for Librarians around the world is that many of the books they must care for, as part of the national or academic heritage, are disintegrating. At the British Library in London and at the Library of Congress in Washington, for example, the problem runs into millions of valuable volumes. The chief cause is that, since the middle of the 19th century, manufacturers have increasingly made paper by mechanically mashing wood into a pulp. The paper tends to yellow from the effects of the lignin left within the wood pulp. Absorbing acid from the lignin or from air for example, also causes the paper fibres to become shorter and shorter, so that the paper eventually disintegrates.

The Industrial Chemistry Group at the University of Surrey worked on the problem on behalf of the Preservation Service of the British Library (BL). Its technique consists of treating a whole book in a reaction chamber with mixtures of ethyl acrylate and methyl methacrylate in the proportion of 5:1 followed by exposure to a gamma-ray source to make the chemicals polymerise. For the polymer to give strength, it must be polar in nature and flexible at room temperature. The polymer deposits itself throughout the core of the fibres of the paper as well as on and between fibre surfaces. Bonding between fibres provides the stability. The pages do not stick together.

Early results suggest that the

Library Aims for 'Long-life' Books

technique increases the strength of the paper by a factor of 10. Feasibility studies proved that the procedure can be done in batches of up to five complete books. The next phase is to ensure the consistency of the polymer, and to increase the batch size to between 50 and 100 books at a time. "Our target is to perfect a process that will strengthen books at no more than £5 to £6 per book, and which can handle up

At present, the least expensive way of preserving literary archives is to microfilm them. The average cost of doing this is around £20 and it confers a life span of 80 to 100 years. Films are comparatively easy to copy. Optical discs may hold potential in the conservation of archives, but they are currently more expensive and are thought to have a life span of only 10 to 20 years.

The Library of Congress (LC)

BOOKS

to 100,000 volumes a year," says David Clements, director of the BL's Preservation Service.

"At the moment, it costs us more than £50 a book to conserve them by the time-held process of stripping, washing deacidifying and laminating the paper, and then rebinding. It's skilled work, and takes time. Things are not helped by the government's restrictive funding policy. We're lucky to get 2 per cent extra cash, but real costs are going up now at 4.5 to 6 per cent per annum."

supports a batch deacidification process based on vapourised diethyl zinc (DEZ). This aims to neutralise the acid in the paper and deposit an alkaline buffer to stop deterioration. The process is performed in a vacuum chamber and the complete cycle takes around eight days. Direct costs are said to be between US\$3 and \$4 per book for labour and materials. Unfortunately, DEZ is notoriously difficult to handle—it blows up if exposed to water or air. Early in 1986, a pilot facility using

Facility which it plans for Fort Detrick. The batch process has the potential, when working at full scale, of deacidifying a million books a year.

Backed by both Canada and France, the Public Archives of Canada is using a liquid-based, non-aqueous process with magnesium methyl methoxide for deacidification. The process currently treats up to 40,000 books a year at between Canadian \$3.5 and \$4 each. The plant costs, however, are said to be around \$500,000. There is also concern that, because the active compound is a magnesium salt of methanol, any free methanol will cause inks to run and affect glues in the bindings.

The best hope for academic books with "long-life" is that their publishers will use papers meeting strict standards. Such papers would need to be from 100 per cent wood-free, bleached pulp. It would contain an alkaline filler, such as calcium carbonate, and have a surface coating made from alkaline size (a glutinous substance used to treat the fibre surface). The US has approved such a standard and it will carry the "sign of infinity".

Supporters of permanent paper claim that it should be no more expensive than those of comparable quality which the publishers have hitherto used. A typical comment from a paper manufacturer is "That would be so if enough publishers could be persuaded to use such papers. Permanent paper should last for many hundred years. However, at present such grades of paper are at the top of the quality league and of course are more costly." — R.F.