

dealing with the problem and, since 1968, has spent £250,000 (half of which is being paid for by the government) on investigations which have included the commissioning of a 400-foot concrete model of the Thames at the Hydraulics Research Station (see *Nature*, **221**, 507: 1969), computer predictions of surge tides which might be expected in the future, measurements of silting and water movement in the river, and other field studies. Of all the various types and locations of a fixed barrage or a movable barrier which could be used in conjunction with a raising of the riparian walls in places, the council favours a tide-control barrier in the Woolwich/Limehouse area just upstream of the Royal Docks; or failing this, a similar barrier in the Crayfordness area farther downstream. The barrier in either site would operate by closing at times of great risk between September and March at a point during the ebb tide, reopening on the following flood tide unless there was a warning of a surge, when it would remain shut. It would be provided with a lock so that medium-sized ships could pass through. It is estimated that the Woolwich barrier would take about 7 years to build at a cost of about £50 million; at Crayfordness, the barrier would take about 11 years to build and would cost about £60 million.

While the GLC's suggestions for flood protection have been generally welcomed, there are fears about the extra cost to shipping if the barriers are built—reckoned to be £250,000 a year in the case of a Woolwich barrier, and £1 million through shipping delays if the Crayfordness barrier is built—and that the barrier if built at Woolwich would be an eyesore. Presumably, these economic and environmental matters will be sorted out in the next stage of the GLC's investigations.

#### ARCHAEOLOGY

### Cargo of Mortars

It is original of the Gollcher Foundation administered by the National Museum of Malta to choose as the subject of the first publication in its archaeological monograph series an underwater wreck site. Captain Olof Gollcher, a Swedish nobleman and Knight of St John who died in 1962, left his home in Malta and its contents as a national collection and established a fund in support of archaeological studies. He was an enthusiast of underwater archaeology, so it is appropriate in several ways that the first volume of the Gollcher series deals with a wreck off Malta studied by Miss Honor Frost, who has won her international reputation in this exacting science through work in the Mediterranean. *The Mortar Wreck in Mellieha Bay*, just out from the Appleton Press (ECL) (38 pp., 25s), deals with a second century Roman wreck. The ship was apparently bound from southern Italy to North Africa when it was blown by a *gregale* (north-easterly wind) on to "rocks awash", as they are currently labelled on the marine chart, in the middle of the bay.

The prime cargo consisted, rather improbably, of mortars of various sizes but distinctive manufacture. Into the paste was mixed, before firing, sizable grits to give "bite" in the pounding up of pulses and grains. The grit material has been identified as *andularia*, a type of feldspar of very limited distribution in Europe.

Piedmont appears the most likely source in this case. That Roman merchants had an export trade of mortaria to the colonies is surprising. But they have been found on land in places as far apart as Syria, Jerusalem, Strasbourg and even Newcastle. Some of the Mellieha wreck mortars are 1.3 metres across. The cargo also included glass, the dating and analysis of which have proved a valuable contribution to the history of glass technology.

Miss Frost observes that the scholarly value of wreck sites is still scarcely appreciated, largely because of slow and inadequate publication. Wrecks, being "closed groups", are important both for dating and for deducing the provenance of antiquities. When their controlled excavation becomes the rule, they should be such a reliable source of information that archaeologists debating attributions may one day ask: "Is such and such a view confirmed by findings from wreck excavation?" At least Miss Frost cannot be faulted on publication.

#### INDUSTRIAL RESEARCH

### Keep Technology Pure

THE translation of ideas from pure research into technology must occur in a research environment, according to Dr A. P. Speiser, the director of research of Brown, Boveri and Company, speaking at the Institution of Electrical Engineers in London recently. He explained how Brown, Boveri, which is an international concern, has been applying this concept in the design of its new research centre in Switzerland, and why it is vital to get the right balance and coupling between the pure and applied aspects of a company's research effort.

Dr Speiser was quite critical of some of the methods used to select research projects in industry. A common pitfall, he said, was to justify the lack of scientific content in a piece of research by its possible practical benefit, and to justify the lack of the latter by possible scientific benefit. He thought that some work on controlled nuclear fusion fell into this category. An important criterion for evaluating the worth of a project should be the standing of the group involved, he said, and it is also a good test if the research workers are well respected in university circles.

A sound test of the value of a technological project is whether it fits in somehow with the overall strategy of a company, Dr Speiser said. Close personal contacts between research and production departments are vital for this, but he was still convinced that the majority of technologists in a firm should work within the research laboratories.

Brown, Boveri has an annual turnover of about £400 million, most of which comes from Switzerland, West Germany and France. Dr Speiser pointed out that it had been the aim of his company to concentrate its whole research effort into the new research centre, but that in practice this policy is a hindrance in attracting government grants and in dealing with national orders. But a major proportion of the £2-4 million being spent on research by Brown, Boveri would still be channelled into the new centre, he said, leaving perhaps 30 per cent of the total research budget to be divided between smaller research departments in France and West Germany.