that the Swedish Government had approved a grant of 100,000 Swedish crowns (about £8,000) towards the provision of suitable premises for the collections. Linnaeus was of course a Swede, and the impetus for the gift seems to have come from the Royal Swedish Academy of Sciences at the instigation of Professor S. O. Horstadius, a foreign member of the Linnean Society. Other gifts from Sweden have come from HM the King, the University of Uppsala and the Swedish Match Co., as well as the Academy of Sciences.

The most generous single British donations have come from the Royal Society (£4,970) and from the Drapers Company (£5,000) towards the cost of a new council room as a memorial to the late Sir Frederick Stern, former master of the company and treasurer of the society. In its report on the appeal the society notes that the response of industry and commerce has been reasonable in view of the present financial climate and the rather specialized nature of the appeal. BP and ICI were the most generous donors, giving £1,000 and £500 respectively. Many scientific societies have also contributed, and the Linnean Society hopes that some of them will be able to make use of the modernized rooms for their meetings.

The work already completed or under way in the basement, which as well as the strongroom includes the provision of new cloakrooms and heating and ventilation systems, will cost about £42,000. Further plans have been drawn up for improvements to the library and lecture room and the provision of a council room and offices. This work, due to begin soon, will cost more than £30,000, and so the appeal is by no means closed. If sufficient funds are available there are a few more improvements, particularly to the library, which the society would like to see effected.

The library of the Linnean Society has considerable historical interest, because it is founded on the libraries of Linnaeus himself and J. E. Smith, the wealthy friend of Sir Joseph Banks, who bought the collections and books for £1,088 5*s* from Linnaeus's family in 1783. The Linnean Society was formed five years later, meeting at the Marlborough Coffee House in London, with Smith as one of the seven founder members. After Smith's death in 1828 the society bought the collections and books from his executors, and has had them ever since.

CARNEGIE OBSERVATORIES

Rechristening Mount Wilson

THE Mount Wilson and Palomar Observatories in California are in future to be known jointly as the Hale Observatories. This was announced recently by the Carnegie Institution of Washington and the California Institute of Technology. The immediate benefit of the change will be that innocents will not in future fall into the trap of calling Palomar Mountain Mount Palomar, but it is also intended that there should be a new method of planning work at the observatories, which will separately be known by their old and separate names. The director of the observatories will remain Dr Horace W. Babcock, but the new arrangements specify that there should always be a director from one of the observatories and an associate director from the other. In fact, Dr J. Beverly Oke has been appointed associate director of the Hale Observatories. The allotment of observing time will be entrusted to an observatory committee of eight people.

The permanent staff of the observatories is now more than 120 strong and includes nineteen astronomers, many of whom are also members of the faculty at the California Institute of Technology. The naming of the observatories after George Ellery Hale is of course appropriate—Hale founded not merely the Mount Wilson and Palomar Observatories but also those at Kenwood and Yerkes. Although experienced people say that seeing conditions at Mount Wilson have never been as good as in the years during the war when Los Angeles was blacked out, the two observatories remain remarkably usable. The 200-inch Hale telescope on Palomar Mountain, for example, had 238 complete nights of seeing in 1968 and 62 nights when it could be used for part of the time.

LONDON

Preventing a Flood

by our Planning Correspondent

WHILE the British Government has not yet firmly committed itself to the form or the location of a barrage or barrier across the River Thames as a defence against a tidal flood, it has agreed that London and Lower Thames-side must be protected in some form, although it does not regard the likelihood of a serious flood with quite the same alarm as does the Greater London Council. Nevertheless, the Minister of Housing and Local Government, Mr Greenwood, did say in a written parliamentary answer on January 20 that no time should be lost in completing the further studies called for in a report on various defence systems which the GLC has just submitted to the minister, and that the government and the responsible authorities "will then decide as a matter of urgency on the nature and siting of the defences required".

The GLC report to which the minister referred contains the council's preliminary conclusions from a detailed study into what it believes to be the growing threat of a flood caused by a combination of circumstances—the sinking of the south-east at the rate of about a foot a century; the increasing height of the tides in the Thames (about 3 feet a century at London Bridge) compared with the general sea level; the reclamation of low lying land alongside the river over the centuries which has stopped the build-up of silt; and the channelling of the river through the building of flood walls which has raised the general level of water. A high spring tide, a "surge" of moving water from the North Atlantic, an adverse wind, heavy rainfall and drainage off the land could, in the council's opinion, cause a disastrous flood.

The council has worked on the basis of providing protection against a high water level six feet above the levels reached by the Thames in the floods of 1953, taking into account the sinking of the land, the increase in tidal range and so on. This new high water level, the council says, would put the risk of flooding at about 1 in 10,000 in 1980, about 1 in 6,000 in 2010 and about 1 in 4,000 in 2030. At present, 55 square miles of London, with a population of 1,200,000 people, are below this new level. Walls an extra six feet high along the river banks would, however, be unacceptable from the amenity point of view in most parts of London. The council has therefore looked into other ways of

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 (EC1) (38 pp., 25*s*), 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 Mellicha 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.