

province. More than a hundred Roman coins of this period have been recovered (some are pierced and were probably used as jewellery) as well as faceted angled Saxon pottery of an early type and one particularly significant belt tab of a type characteristic of the uniform of *Foederati*, Saxon mercenaries of the Romans. Towards the end of the fourth century, it became imperial policy to settle invaders, who initially came to plunder, on the borderlands of the Empire and to give them land in exchange for military service. It may well be that the Saxon settlement at West Stow began in this way. Certainly the Saxons there must have co-existed with Romans and Romano-Britons, for at Icklingham, only two miles away, a contemporary Roman villa has been excavated.

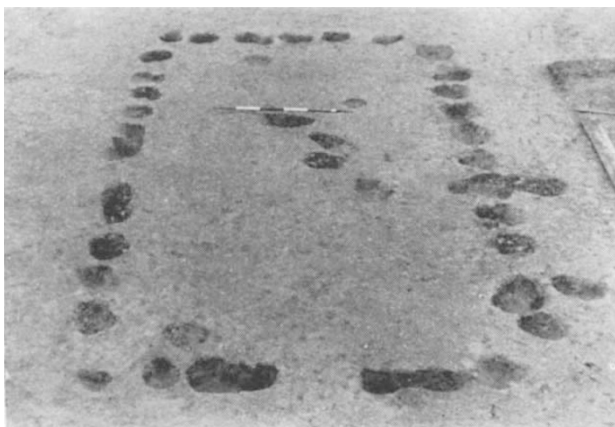


Fig. 2. Post holes of one of the small halls at West Stow. The doorway was probably on the south (right) side.

As Roman civilization decayed after 436, the Saxon settlement continued to flourish until about 650. Apart from potsherds a complete range of domestic objects including bone combs, loom weights, spindle whorls, brooches, rings, iron knives and shears and bronze spoons and many animal bones, have been recovered. It seems that the village had many more sheep than any other domestic animals and weaving must have been an extremely important part of its economy. When all the animal bones have been statistically analysed, they should provide much detailed information on the animal husbandry of the period. As well as domestic animals, the Saxons ate deer, fish and many wild birds including the European crane, now extinct in Britain. The village seems to have made its own pottery, for pottery stamps made of antler horn matching the decorations on some of the potsherds have been found. There is also some evidence of limited metal work in the village, which must have been basically a self-sufficient unit.

At first sight, it may seem surprising that only one spear and a few arrowheads have been excavated, but weapons were usually buried with their owners. In the 1850s, a pagan cemetery was excavated on the nearby heath, and many weapons were found, some of which are now in museums at Oxford and Bury St Edmunds; this must have been the village cemetery. In the middle of the seventh century, West Stow was abandoned, perhaps because it had become too small. There is no evidence of any violent end to the occupation. By the eleventh and twelfth centuries the site

was ploughland, and a fascinating sideline of the main excavation has been the uncovering of the medieval ridge and furrow system and the plough lanes. These appeared beneath the present sandy topsoil and it seems that some time in the late twelfth or early thirteenth century a dust blow suddenly deposited a foot or more of sand on top of the field which has remained covered ever since.

BRITISH ASSOCIATION Beating the Breast

from our Special Correspondent

Dundee, Monday

THERE seems to be a strong if not quite unifying theme running through this year's meeting of the British Association, which with its wealth of rival attractions and celebrities seems to be providing a counterpart to the other festival in nearby Edinburgh. After Dame Kathleen Lonsdale's presidential address "Science and the Good Life", in which she discussed some of the good and bad effects of science, many other speakers have taken a similar theme and applied it to their own branch of science. The resulting impression is that the meeting is very much concerned with the relevance of science to life. Both the general symposia, being held for the second time after their success last year, and this year's innovation—the public lecturers—have been concerned with this theme. Members of several of the special sections have also been discussing the social and economic value of their specialisms.

The three plenary symposia in the programme have been on regional planning and transport development, factory farming and disasters. In the first symposium, four experts on planning and transportation described how they have collected data about travel habits and needs, and have used them to build and modify a model from which the best transport system for East Central Scotland can be selected. One of the problems seems to be that it is very difficult to produce a streamlined and coordinated transport system when so many vested interests have to be accommodated. The report on the transportation study has yet to be presented to the local steering committee, and any number of difficulties could arise. Apparently it is often difficult to translate the planner's language into a form acceptable to the lay members of local councils. Even some of the audience at the symposium were clearly worried by the incomprehensibility of such technical jargon as "travel desire characteristics which exhibit universal stability". The chairman, Professor Johnson-Marshall of Edinburgh, suggested that there should be more courses to initiate councillors into the planners' world, and perhaps more meetings at which the public could make their views known, however impractical they might be.

This symposium had an interesting supplement in the form of an evening meeting when four local and obviously prosperous industrialists explained some of the advantages and disadvantages of locating industry in East Scotland. The principal advantages emerged as the ready availability of an able and loyal labour force, the financial support given by the Government for factories to be set up in this development area and the attractiveness of the region. The principal

disadvantage for industry in this area is poor communications.

The second plenary symposium on factory farming had the added interest of providing the audience with the opportunity of hearing some directly opposing views. Mrs Ruth Harrison, author of the book *Animal Machines*, had to defend her allegations of cruelty to calves, pigs and poultry against three farmers who pointed out that free range farming could be described in terms just as lurid as those which she used to describe slatted floors, dim lighting and tethering. Dr W. Weeks of the University of Newcastle upon Tyne was of the same view and roughly denied that there is any cruelty at all.

Inasmuch as they have brought about contact between specialists of differing opinion and given non-specialists an opportunity to join in, these two symposia have obviously been successful. But they might have provided a greater service if there had been much more time for discussion. Half a day is probably too short, and perhaps the full day to be devoted to disasters will prove more exciting.

The relationship between noise and deafness was pointed out by Dr D. E. Broadbent in his public lecture "Noise and People", and he also explained that noise may improve the quality of work done by men who have been kept without sleep, but may impair work in men who are fully alert. Noise increases the level of arousal—in the sleepy men to a level at which efficiency is increased, and in the more alert men to a level which is beyond the threshold for most efficient work.

An economist's view of the impact of technical change on life was expressed by Professor E. M. Hugh-Jones in his presidential address to the economics section. He pointed out that the greatest threat of technical innovation is not to people already employed, for if their jobs disappear others will open up, but to those who have not yet entered industry. The vital problem now is to find the right form of training for aspiring industrial workers. Professor Hugh-Jones suggested that it is not a fanciful idea that computer programming should be an A-level subject, with Fortran, Algol or Cobol included as languages other than English.

The section that deals with general matters has been concerned with another of the topics that Dame Kathleen Lonsdale deplored in her address: the migration of scientists, particularly from the less to the more developed nations. Sir Gordon Sutherland began his presidential address by explaining that this is no new problem. From 500 to 200 BC there were large migrations of scientists to Athens, and later from Athens to Alexandria, presumably because the Ptolomies wished Alexandria to surpass Athens as a centre of learning. In the Middle Ages the situation became so desperate at the University of Bologna that an edict was passed in 1274 forbidding anybody from trying to induce scholars to leave the city. Today the problem seems to be just as serious, but the cure is less easy to find. The nations of Asia, Africa and Latin America are affected most severely; in 1966, 9,534 qualified scientists, engineers and physicians emigrated to the United States, and of these 4,390 came from developing countries. Consequently these countries have to beg foreign aid so that scientists from the developed countries can visit them and help cope with their problems.

Sir Gordon concluded that the principal cause of the worldwide migration of scientists is the failure of the United States Government to realize that its research and development plans cannot be fulfilled without drawing on manpower from other countries. But Sir Gordon did suggest that if all countries applied themselves to checking their flow of immigrant scientists, engineers and technicians, the problem could be brought under control. The first step should be taken by the United States so that the other developed countries can reduce their intake of foreign scientists, thus freeing the developing countries of the burden of large scale migrations.

For a more cheerful view of science in Dundee this week it is only necessary to visit the Science Fair, where pupils from many local schools are exhibiting and demonstrating projects which should give heart to anyone who thinks that modern ideas have not penetrated to the classroom. It is a pleasure to find science tackled with so much obvious enthusiasm and explained with such expertise. Pupils of Inverkeithing primary school have made a study of lighthouses and reveal that the first "lighthouse" was the Colossus of Rhodes, while the first real lighthouse recorded in history was built by Sostratus for Ptolemy II, and stood on the island of Pharos near Alexandria.

Other projects are more sophisticated, most of them electronic and some even computerized. None, however, is more impressive than models which demonstrate, with the aid of a judiciously placed vacuum cleaner, how the original Tay Bridge came to fall in the face of the wind. The fact that pupils and teachers have given up so much time, in and out of school, to these projects testifies to their enjoyment of imparting and learning science in this way, for there is no element of competition in this Science Fair.

As a final confirmation that science has not brought only ills to the world there is the exhibition "Science and the Home", a theme suggested by Dame Kathleen Lonsdale, who is, of course, the association's first woman president. Various organizations are displaying their contributions to the domestic revolution that science and technology have made possible. The Housing Centre Trust has a photographic exhibit showing a hundred years of progress from Victorian slums to the most modern labour-saving homes. ICI Ltd has an exhibit which explains the scientific background to domestic equipment such as polythene bottles, non-stick frying pans and weed killers, while BP is displaying its new discovery—protein obtained by growing yeast on oil. And at the Ministry of Technology stand the visitor can weigh himself in metric units.

This exhibition is apparently attracting considerable interest from the local residents, despite the bus strike, as well as from visitors to the British Association meeting. Clearly one of the troubles with these meetings is that the participants are of such different levels of academic attainment that it is probably impossible to satisfy everybody. Either the specialist scientists are irritated by the slowness and lack of originality of the proceedings, or the less scholarly participants are lost in incomprehension. Anything, such as "Science and the Home", which can appeal to all comers therefore seems to be a good thing and should be encouraged in future years.