communication between the government, the universities and the electronics industries. But in his inaugural speech last week, the new president of the IERE, Mr Harvey Schwarz, said he thought the NEC should also advise on education, manpower and exports. Mr Schwarz, the managing director of Decca Navigator Co., Ltd, and a director of Decca Ltd and Decca Records Ltd, also spoke in favour of private enterprise for stimulating developments in electronics and against large scale mergers which he called "gadarene swinemanship".

The IERE spent £6,000 more than its income of £130,000 last year, chiefly because of increased expenditure on computer services, postage and telephone and the institution publications. This may mean increases in the fees for conferences, the price of the journals and perhaps subscriptions next year.

WILD LIFE

Dead Birds and Hot Air

A REPORT that some of the dead seabirds from the Irish Sea contained "possibly significant" quantities of polychlorinated biphenyls was one of the few positive results to emerge from a meeting to discuss progress in investigating the 10,000 deaths held at the Natural Environment Research Council in London on October 24. No single cause, however, will yet account for the situation. Much of the meeting's value lay in stopping paths of speculation—apparent false alarms of dead seals or effects on fish and plankton—and emphasizing instead the continuing search for infection or pollution.

The evidence for the biphenyls, which are industrial wastes, came from the Nature Conservancy's Monks Wood Experimental Station. One of the difficulties in assessing whether the materials may be involved is the lack of information about their distribution and toxicity, but it so happens that Monks Wood conducts routine monitorings of concentrations in guillemot eggs from the Irish Sea area. These measurements provided a background against which the amounts (of the order of hundreds of parts per million) in dead guillemots have stood out sharply, and so have justified the ascription of significance.

There is, however, controversy over the question of just what is signified. It is clearly not possible to draw general conclusions, because only nine birds have been analysed. The issue is whether the concentration that has been found could be regarded as toxic. One investigator thinks that biphenyls may be merely a fashion—a new compound has turned up, so everybody is making a fuss, although, given sufficiently sensitive measurements, practically any industrial compound could be found. Certainly no direct link has been identified between biphenyls and the present deaths, but, on the other hand, there is evidence from elsewhere that may point at least towards a correlation.

This concerns measurements reported in *Nature* (**224**, 247; 1969) of biphenyls in white tailed eagles from the Baltic. The population of this species is falling, the birds analysed were dead and the biphenyl concentration was of the same order as that in the samples from the Irish Sea. What is not clear, however, is the relationship between toxic concentrations for eagles and guillemots, and there are still no grounds for anti-pollutionists to proclaim a new scapegoat.

In the United States the Monsanto Company, which manufactures products containing PCBs, has investigated their toxic effect on rats, and during 90 day studies a concentration of 100 parts per million apparently gave no adverse results. This, of course, need imply nothing about what happened to guillemots with a similar dose. Present work at Monks Wood on the toxicology of these compounds to birds may give some of the answers. The pathologists, however, have yet to come up with details of possible infections among the birds, and the London meeting also pointed to the likely role of severe gales coinciding with the auks' moulting period, so that PCBs may turn out to be another dead end.

The lack of organization surrounding the whole affair, reflected in the slowness of getting results (first reports of deaths were in mid-September), does raise the question of whether there should have been some kind of emergency service to coordinate investigations, which have been mainly voluntary. For example, should NERC itself employ someone to be responsible for linking suitable establishments to look into any large-scale natural disaster as soon as the first evidence appears? This time, much of the initiative originated with the Royal Society for the Protection of Birds, and only after work was well under way of its own accord were the participants officially brought together.

ELECTRICITY

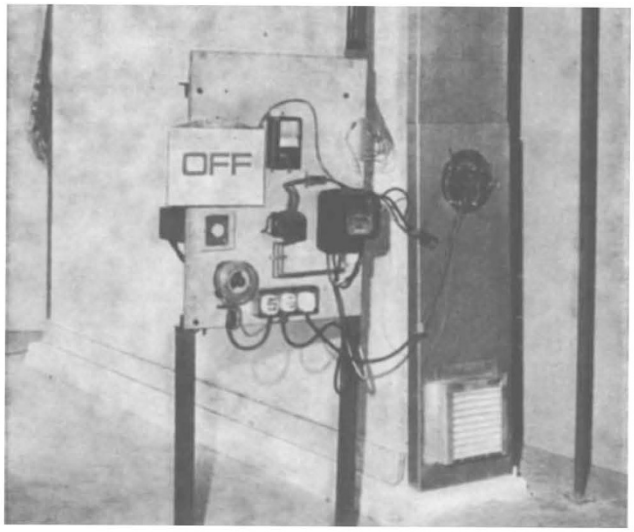
Responding to Change

from our Special Correspondent

Capenhurst, Cheshire, October 24

THE sagging fortunes of the electric-arc furnace should revive if the trials being mounted by the Electricity Council and the British Steel Corporation with pre-reduced iron bear out their initial promise. The critical shortage of scrap steel which is jeopardizing the industrial future of the electric-arc furnace has led to a determined effort to find an alternative charge, and pre-reduced iron, produced by concentrating iron ore and heating it in the presence of a reducing agent, seems to be a promising alternative. It can be produced cheaply as pellets or briquettes and then can be fed continuously to the furnace once the required temperature has been reached. Adjustments to the quality of the steel can be made during the feed, thereby eliminating the refining process. Plant trials with both pellets and briquettes are said to have been encouraging, and the Electricity Council and the BSC are now studying the economics of a complete furnace system.

A new high capacity storage heater has also been developed at the Electricity Council's research laboratories here. It is based on a two layer concept first demonstrated two years ago and consists of an inner core of feolite, a sintered iron ore with a thermal capacity near that of cast iron, and an outer layer of barytes, which is a good insulator with a high thermal capacity. The idea is that the heat will be delayed by the barytes, so that the storage heater will radiate over a longer period. The Electricity Council claims that the system is thirty per cent more efficient than storage heaters now in use and that it should be capable of releasing heat even during the long English afternoon. The first batch of 350 feolite–barytes heaters is now being produced and should be available to the public within the next two years.



Heat by the wall.

More advanced ideas for domestic heating are also being fostered. Thus a system is being designed to capitalize on people's apparent ability to feel comfortable in a low ambient temperature provided there is plenty of radiant heat. The system requires highly reflecting walls containing aluminium with some pigment to remove the sheen, together with a series of carefully placed heaters that can be switched on when entering a room much in the way that electric lights are operated. It seems that a wall "paper" consisting of aluminium, polythene and rutile provides the best combination of high infrared reflectivity and low visual lustre. A variety of physical and psychological tests are also being carried out to gain a better understanding of what are the important ingredients of comfort.

The Electricity Council's preoccupation with ways of using off-peak electricity, now even cheaper, has also found outlets in the industrial sector. One of the more advanced projects at Capenhurst is the design of a process heater for the production of synthetic resins. This is apparently operational now, with a storage capacity of 520 kW and a charging time of eight hours.

A new way of cutting cloth using a plasma jet is also being investigated. The system uses a plasma torch in which the arc is struck between a central cathode and the interior of the nozzle, and the cutting is performed by a stream of argon which emerges from the nozzle at a very high temperature. The effects of varying several parameters such as the flame position are being studied, and it is felt that the technique could well prove valuable for materials such as linoleum, wallpaper and carpets as well as textiles. The chief advantage over oxyacetylene cutting is the lack of oxygen in the flame, so reducing the area of burning.

QUANTUM THEORY

Rocking the Boat

THE sport of trying to knock down quantum mechanics has been hanging on the periphery of physics ever since 1935 when A. Einstein, B. Podolsky and N. Rosen first put forward a paradox which led them to infer that quantum mechanics may not be a complete theory. Several theoretical physicists have latched on to the need for so-called "hidden variables" in the intervening years and a team from three universities in the United States has now suggested an experiment to settle one way or the other whether hidden variable theories are logically necessary or just a flight of fancy.

The experiment proposed by J. Clauser *et al.* (*Phys. Rev. Lett.*, **23**, 880; 1969) is an extension of an earlier experiment by Kocher and Commins on the correlation of polarizations between a pair of optical photons. In the earlier experiment, two optical photons emitted in a cascade process in calcium impinged normally on a pair of polarizers the planes of which were parallel, and the correlation of polarization was measured by standard coincidence techniques. Clauser *et al.* claim, however, that this arrangement cannot provide a proper test of a crucial inequality in the hidden variable theory. They suggest that a decisive test would be to modify the Kocher–Commins experiment to include observations at two appropriate relative orientations of the polarizers, and also with first one and then the other polarizer removed. On the assumption of using practical calcite polarizers, they have worked out what they consider the critical inequality to be verified in such an experiment, and they give a description of how this experiment should proceed.

There is some doubt as to whether it is really possible to design an experiment to substantiate a hidden variable theory which lacks any clear formulation, but it may nevertheless be possible to design an experiment which does extract the essential information to place quantum mechanics in jeopardy (or to be its salvation). Clauser *et al.* believe that their version of the two photon experiment will provide this opportunity.

REACTOR FUELS

Reprocessing Refinement

GOVERNMENT organizations and private industry in eight European countries have set up a company, Société de Fluoration de l'Uranium (SFU), to exploit a new process in the nuclear fuel cycle. SFU will convert uranyl nitrate into uranium tetrafluoride by electrolytic reduction, followed by precipitation of UF_4 with hydrofluoric acid. More established methods of producing uranium tetrafluoride, that used by the UK Atomic Energy Authority at Windscale and Springfields for example, employ a three stage process which is obviously more costly, and the countries participating in SFU are probably looking towards the market for enriched fuels which should be expanded when the advanced gas-cooled reactor comes into service.

The company, set up on the initiative of Eurochemic (the European Company for the Chemical Processing of Irradiated Fuels), will operate at the Eurochemic reprocessing plant at Mol in Belgium. Eurochemic reprocesses fuel from reactors in thirteen European countries, separating plutonium and converting the depleted uranium to uranyl nitrate, which is then fabricated into uranium fuel elements. Enrichment of the uranium is carried out by recycling uranium hexafluoride in a gaseous diffusion plant. To produce the hexafluoride, uranyl nitrate must first be converted to uranium tetrafluoride. SFU will therefore provide an important link in this chain.

The new company will have a capital of 9 million Belgian francs (£75,000), one-third being supplied by