

that it is concerned that these bodies subscribe only three per cent of its annual income, which comes mostly from national sources.

Power Politics

THE row over British fuel policy, which started as a general rumble of discontent, has recently become more shrill. The opponents of the Government's policies have found a focus for their irritation—at Seaton Carew, in County Durham, where the Central Electricity Generating Board wants to build a power station. So far, the choice of fuel for the station has not been decided, and it looks as if the supporters of coal intend to make a test case of it. Seaton Carew is in the heart of a mining area, and the coal lobby, led by Lord Robens of the National Coal Board, and ably supported by a band of mining Members of Parliament, is determined that Seaton Carew power station will burn nothing but coal.

The result of this may be that the station will not be built at all. The CEGB is determined to build a nuclear station at Seaton Carew, almost certainly an advanced gas cooled reactor, and is not willing to consider anything else. If it is balked, its reaction will be to cancel the station altogether and go ahead with an advanced gas cooled reactor at Heysham, in the north-west, where the problems of coal are not so keenly felt. Ironically, the rationale for this may have been supplied by Lord Robens himself, by his offers of coal at knock-down prices to the aluminium smelters. It now seems likely that three smelters will be built; Rio Tinto Zinc will build one in Anglesey, British Aluminium will get a site at Invergordon, and Alcan will be offered a site in the north-east, near Blythe. Lord Robens has already promised Alcan coal at cheap rates (probably 3.25*d.* per therm), and the original intention was to ship the coal from the north-east to Invergordon. Spared of the need to ship the coal, the Coal Board should be able to offer even more competitive rates for a smelter in Northumberland. This would take the edge off the argument about Seaton Carew, and any surplus electricity at Blythe could be exported to the national grid, thereby further reducing the need for the Seaton Carew station.

In fact the CEGB could well do without a new power station. After two mild winters, and an industrial recession which has reduced the growth of electricity consumption, it is almost embarrassed by its excess capacity. Power stations, of course, take a long time to build, and by the time any power station started now was finished, the situation could be very different. Optimists believe that when the current recession ends, the growth of electricity consumption will return to traditional rates. In the meantime, however, it would be quite possible for the CEGB to delay starting new stations for a little while without putting itself in any danger.

Launching Ships

LLOYD'S Register of Shipping has been asked by the shipbuilding industry to look into the problems of launching very large ships, especially the new generation of oil tankers, because of the damage which may be sustained by a large ship as it is launched down a slipway. The chief ship surveyor of Lloyd's Register,

Mr Jack Roberts, points out that this is an old problem; the new factor is the advent of very large ships, which means that damage sustained during launching can be costly to put right.

One of the factors involved is that during the launching of a ship down a slipway the after end is partially waterborne and there are supports at the bows, but the middle of the ship may not be supported at all. Another problem is connected with structures known as "ways" which are attached to the hull in the shipyard. When a ship is launched, the temporary ways fixed to the hull slide over broad longitudinal surfaces on the slipway, so that the ways do the sliding rather than the ship. The trouble is that the pressure of the ways on the ship during launching can lead to buckling of the hull.

The trend toward the building of ships in dry docks, so that when the hull is finished the dock is flooded and the ship floated out, surmounts the problems associated with slipway launchings. Alternatively, large ships can be launched in two halves. Ships built to pass the assessment of classification societies such as Lloyd's are inherently strong enough to survive the launching process without damage, however, so British shipyards are unlikely to have to invest in costly building docks. For example, Swan Hunter, the Tyneside shipbuilders, plan to launch two 240,000 ton tankers on order for Esso down slipways.

According to Mr Roberts, Lloyd's are unlikely to make rules for the launching of ships, because there are so many factors involved. It is more likely that Lloyd's will simply advise the industry on launching procedures.

Astronomy in Scotland

THE Royal Observatory in Scotland is celebrating 150 years of Scottish astronomy. A brief ceremony to mark the occasion, attended by the provost and by a number of astronomers working in Scotland, was held in the observatory on April 25.

Astronomy in Scotland got under way in the early years of the nineteenth century, chiefly because of the influence of the Astronomical Institute of Edinburgh. This society decided to build a scientific observatory in Edinburgh, which was started 150 years ago in 1818, and finished six years later. This was the main building of the observatory on Calton Hill, still a familiar landmark in the centre of Edinburgh. Because of the cost of building and equipping the observatory, the society ran into financial difficulties. It was unable to afford the staff to run the observatory and to produce the star catalogue—the chief project of the society at the time.

The city authorities and the university were approached for help. The society suggested that the professor of practical astronomy in the university should be appointed to run the observatory and it put forward the title "Astronomer Royal for Scotland". Until then the professorship had been a sinecure, because there were no astronomical instruments in the university. The first Astronomer Royal for Scotland was Thomas Henderson, the only Scot to have held the post. Professor H. A. Brück, professor of astronomy in Edinburgh university, holds the title at present.

The observatory was handed over to the Government in 1847 to become the Royal Observatory of Scotland. In 1895 the Royal Observatory moved to its present

site at Blackford Hill on the outskirts of Edinburgh, a move prompted by the continuing search of astronomers for clear skies, and the observatory on Calton Hill became the property of the city. It was used by the city as an observatory until 1937, when it was taken over by the Astronomical Society of Edinburgh. It is now run for the benefit of the public, and the Astronomical Society uses it for extra-mural classes and lectures for schools.

For the second time in the 150 years of astronomy in Edinburgh, astronomers are moving their telescopes to avoid the city lights. Only last year an observing station of the Royal Observatory of Scotland was opened at Monte Porzio, near Rome, which should benefit from the clear skies of Italy.

Weather Satellites

COMMUNICATIONS satellites are turning out to be a boon to meteorologists, comparable with photographic satellites. There is a wide variety of plans in the offing to use satellites to collect measurements transmitted from automatic weather stations in remote regions and to relay the measurements to data collection centres. The prospect of more information from inaccessible areas, such as the oceans and polar regions, is particularly attractive. An experiment at present under way in the United States has a different emphasis, however. Its purpose is to test the feasibility of transmitting meteorological information from a meteorological centre to widely scattered stations by means of a communications satellite. Called the WEFAX, for weather facsimile experiment, its aim is the dissemination rather than the collection of information.

The object is to transmit weather data from certain meteorological centres in the United States to receiving stations in the Pacific Ocean and within the United States. The system can handle weather charts, weather forecasts and cloud cover photographs from satellites, and is in facsimile format. In the experiment, which was begun in December 1966, the transmissions are relayed by the satellite ATS I, which is in a synchronous orbit over the Pacific Ocean. Weather maps and cloud cover photographs of the Pacific area are converted into a suitable format at the National Environmental Satellite Center, Maryland, or at the World Meteorological Center, Washington, and then sent by land-line to Mojave in California.

A camera on the ATS satellite itself takes photographs of clouds over the Pacific, which are transmitted to the ground station at Mojave, where they are mailed to the National Environmental Satellite Center for transmission over the WEFAX network. The ATS camera works by focusing an image of part of the Earth through a pin-hole aperture on to a photo-multiplier tube. A controlled spin of the satellite together with mechanical movement of the camera means that as the Earth is scanned across the photo-multiplier tube a picture can be built up. In this way a large part of the Pacific can be scanned in about 2,000 revolutions of ATS I, taking something like 20 minutes.

The ATS satellite, together with the WEFAX system, can also be used to forecast floods. It is proposed to collect readings from automatic river level and rainfall gauges in the United States by transmitting

measurements from the gauges to the satellite. The satellite then relays the information to the Mojave ground station, which transmits the readings to Washington via the WEFAX land-line. The hydrological gauges are made to transmit readings by commands radioed from the Mojave station via ATS I. An experiment along these lines was started last August, using four automatic gauges at locations in the United States.

One of the strong points of the WEFAX system is that a large number of stations throughout the world are potentially able to receive facsimile information, largely because of the several conventional weather satellites now in service. This means that any suitably equipped station in the line of sight can receive cloud cover photographs from the satellite. The British Meteorological Office at Bracknell, for example, has for some time been receiving photographs taken by the satellite ESSA 6. All that is necessary to convert these stations to the WEFAX system is to modify them to receive the right frequency.

BA at Dundee

THIS year the British Association for the Advancement of Science is to hold its annual meeting in Dundee. The meeting will take place from August 21 to 28, and the preliminary programme, as massive as ever, has now been published. Following the innovation of last year, the association will be holding three general symposia which are intended to appeal to scientists of all disciplines and to members of the public. The most interesting looks like being an all-day meeting on disasters—their prevention, control and social effects. The demands of technology, and the benefits of large scale operation, leading to giant tankers, air-buses and nuclear power stations, have increased the scale of potential disasters. There is a need for a corresponding improvement in safety precautions. The meeting will be chaired by Dr H. M. Finnieston, a deputy chairman of the British Steel Corporation, and Lord Robens, chairman of the National Coal Board, will be among the speakers. The other two symposia will be on regional planning and transport development, and factory farming.

A series of public lectures has for the first time been included in the programme; these will be illustrated and open to non-members. The programme includes Professor D. Michie on computers and the future, Dr D. E. Broadbent of the MRC Applied Psychology Research Unit at Cambridge on noise and people, and Professor R. J. Taylor of the University of Sussex on the origin of elements. But the meat of the association's programme will again be the sectional programmes. There are now fifteen sections, covering all fields of science. The engineering section includes discussions of electronics in medicine, economies of scale, and ultra-strong materials, and the general section will have a presidential address from Sir Gordon Sutherland on the brain drain.

Forestry Commission Reports

THERE have been important changes in the structure of the Forestry Commission since the seventh report from the Estimates Committee in 1963–64. The changes—described in the commission's *Progress Report 1960–65*, prepared for the Commonwealth Forestry