"ECOLOGICAL considerations are less important than the need to free Israel of dependence on oil producers for her energy supplies," a Government spokesman recently stated in reply to objections from environmentalists to plans for two new power stations, one to be fuelled by coal and the other by enriched uranium. Both represent departures for Israel, where hitherto all power plants have been fuelled by bunker oil. Naturally both pose environmental problems.

First to come into operation will be the plant at Hadera, midway between Tel Aviv and Haifa, which is equipped to burn coal and bunker oil alike. It will eventually have four generators with an output of 1,400 megawatts, roughly equivalent to 80% of Israeli generating capacity today.

Although coal has been discovered in Sinai, its quality is evidently not very high nor is it available in sufficient quantity. More likely sources of supply are Australia, South Africa and the United States. Despite the distances of these countries from local ports, the price of imported coal, presently about \$33 a ton (including transportation), would still be less than oil at \$50 a ton. Officials of the Electric Corporation, which will operate these power stations as it does all others, have promised to tackle coal-related pollution problems by, among other measures, the installation of electrostatic precipitators to remove flyash.

The public is certainly more concerned about the ecological implications of the nuclear power plant than the coal fuelled one, even though, in the perhaps biased words of a physicist involved, "the latter will create pollution problems 100 times more serious than the former."

Public concern has been heightened by the recent statement of nine leading American scientists, five of them Nobel Laureates, urging President Ford to re-evaluate the US Administration's nuclear power programme in the wake of potentially serious accidents at the Decatur, Alabama nuclear power station—accidents that could occur here.

Nevertheless, the 600-megawatt station will almost certainly be built, the most likely site being along the Mediterranean shore some 15 miles south of Tel Aviv. Talks are now going on with firms in the US and Europe about the purchase of a reactor, while the enriched uranium required to fuel it (if, as seems almost certain, it will run on enriched uranium) will presumably come from America in accordance with an agreement signed last year between the government of Israel and the US Atomic Energy Commission. The estimated cost of the installation at to-

day's prices is \$500 million with 60% of the sum, says the Ministry of Commerce and Industry, to be spent in Israel itself on construction, equipment and labour.

● The nuclear engineers required to operate the new installation will be mainly graduates of the Haifa Technion, which has an excellent Department of Nuclear Engineering. Not only has the Department trained new engineers, but it has also retrained engineers already on the staff of the Electric Corporation to handle the problems of nuclear plants.

Ben-Gurion University of the Negev, located not far from the famous Dimona reactor, recently opened its own Department of Nuclear Engineering,

Letter from Israel

from Nechemia Meyers

much to the distress of the Technion, which said it could train all the engineers required at a lower cost. The Haifa school is generally unhappy about the opening of engineering faculties at other institutions of higher learning and about the decision to allow technical colleges to grant academic degrees. Technion Professor Ya'acov Bar has warned that the award of academic degrees to "second-class engineers" would drastically lower the level of engineering in Israel.

● A former Technion lecturer who now holds a demanding industrial position is Dr Dahlia Greidinger, research and development Director at the Chemicals and Phosphates Company, Haifa. Her staff, about half of it female, is concerned with research in two main fields: mineral feed additives to supplement the food of animals and sophisticated fertilisers. In the first category a new product, urea phosphate, is now in semicommercial production, one ton per day being turned out. Also under development is an "instant fertiliser". "In the past few years," Dr Greidinger explains, "work has been done in various countries on liquid fertilisers so

that it would not be necessary to wait for rain or irrigation to bring fertiliser to the plants. But liquid fertilisers are hard to ship or store. So we are developing a solid fertiliser to which the farmer can add his own water when he wants to use it."

● An Israeli chemist recently teamed up with an Israeli historian to throw new light on the construction of Crusader fortifications in the Holy Land. In a report soon to appear in the *Israel Exploration Journal*, Hebrew University historian B. Z. Kedar and Weizmann Institute chemist A. Kaufman give evidence that the mortar used by the Crusaders in their large-scale construction projects contained organic materials, possibly olive oil and flax.

They recall that Rufinus, a little known herbalist of the late 13th century, presented the following recipe for the preparation of mortar: "Grind tiles rigorously and sift them through linsay. Then take smiths' iron-rust and grind and sift similarly, and take tow in the same quantity as of the afore-said two, and cut it up vigorously with a lopping-knife until it will be triturated on the bench. Having done this, take equal portions of the stone and the iron-rust and put these two and the tow in a mortar, and take olive oil and mix the said cement with the said oil until it is like clay. Apply it at the juncture of the stones and bind the stones together, and let it rest for many days."

They go on to quote an 18th century German missionary Stephan Schultz who, having visited Acre, reported that the extraordinary sturdiness of the Crusader palaces there stemmed from the fact that the builders used oil instead of water in preparing their mortar.

Kedar, the historian, turned to Kaufman, the chemist, to investigate the validity of this story by using carbon-14 measurements to determine whether Crusader-era mortar indeed contained organic materials. Kaufman, a member of a Weizmann Institute team which provides Israel's only carbon-14 dating facility, found that 2% of the material in the mortar from Crusader buildings in seaside Caesarea was indeed of organic origin and dated from AD 1013±160. Whether or not the masons at Caesarea used the Rufinus formula, or even used flax and olive oil is far from clear.

There is no reason to believe that this type of mortar was used only in the Holy Land. French mediaeval literature, for example, contains references to mortar prepared with the blood of serpents or dragons. Unfortunately, present carbon-14 dating methods do not allow researchers to differentiate between olive oil and dragon blood.