

There is a line in a popular song that says, "It's not the bullet (that kills), it's the hole." Thanks to research, we now know that the majority of deaths during earthquakes and violent windstorms are caused by the collapse of buildings and other constructions. We also know that communities which are prepared for an imminent battering by nature can escape with minimal loss of life and damage to property. For over thirty years, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has played a significant part in gathering knowledge about natural hazards. Now the challenge is to apply this knowledge to save the lives and cultural heritage of those at risk.

People cause disasters

In geological terms our planet is still active. The jagged pieces (plates) making up the Earth's crust are continually moving over and against each other, causing earthquakes and volcanic eruptions. Nothing can be done to stop these natural events or the awesome tsunami, (seismic sea waves — from the Japanese tsunami, harbour and nami, wave) they sometimes create. Similarly, typhoons and tornadoes, which wreak annual havoc in some parts of the world, are the natural effects of specific, unavoidable climatic conditions.

What can be avoided, or at least greatly reduced, is the heavy toll of human life, property and resources that turns natural hazards into disasters. While rich countries are just as exposed as the poor to natural hazards, 95% of the three million people killed and one billion affected by disasters in the last two decades were those least prepared and least able to cope, living in heavily populated parts of the developing world.

When Going To School Could Save Your Life

UNESCO's contribution to disaster reduction

"Our slogan," says Badaoui Rouhban, a programme specialist in UNESCO's Earth Sciences division, "is that although hazards are inevitable, the risks which may arise from them are not and can be reduced by continuous understanding of the hazards, their distribution in time and

with considerable accuracy, where these hazards will occur in the future. We also know which communities are most vulnerable. But we are still unable to say exactly when nature will strike. That is why the UNESCO programme also emphasises prevention.

• develop means to reduce



Earthquake of 6th of May 1976, Gemona del Friuli, Italy. — Photo: UNESCO

space and by adopting mitigating measures."

This translates into a series of initiatives to:

• identify, assess and evaluate the risks associated with natural hazards

This is an ongoing process. It involves the collection of massive quantities of data to produce hazard maps, divided into zones of risk. These data can come from continuous monitoring of seismic activity as well as analysing records of when and where earthquakes, volcanic eruptions, and other hazards have occurred in the past. As a result, we now know,

Similarly, UNESCO, with the UN Environmental Programme (UNEP), has identified 100 high-risk volcanoes and is helping set up an international system of rapid response. There are other networks to monitor earthquakes and floods.

• application of a code to make buildings resistant

Most people killed or injured in earthquakes and windstorms are crushed by falling buildings. We have known for many years how to strengthen new buildings so that they do not collapse under the stresses and strains these hazards cause. In vulnerable developed countries like the United States and Japan, these principles are rigidly applied as part of a building code. In the urban sprawl of developing countries the code is often not enforced. And in traditional villages or shanty towns the

code has to be translated for very different construction materials and methods to those used in cities.

Following studies by consultant architects, UNESCO has developed a package of educational services to member countries on how to make buildings resistant to earthquakes and windstorms. Where resources are scarce, the best strategy may be to make the school safe. It is usually the biggest building in a village and can be used as a shelter.

Another problem is to strengthen existing buildings to resist hazards or to restore them after a disaster. For UNESCO this sometimes overlaps with its commitment to conserve World Heritage sites. The best known example is its campaign to save Venice and its lagoon from flooding.

• education of all levels of societies at risk

School is also a good way to



Earthquake of 16th of June 1964, Niigata, Japan. — Photo: NOAA/EDIS

educate children and their parents in how to maintain buildings, what to do when disaster strikes and how to avoid becoming vulnerable in the first place. UNESCO also regularly publishes educational materials and helps train engineers and technicians.

Future challenges

Says Badaoui Rouhban, "today there is a body of scientific knowledge. If this is consolidated and applied, it will reduce disasters. The challenge for the future is to reach out further to those communities at the bottom of society who are most vulnerable." This not only involves translating educational materials into hundreds of dialects and training engineers, but getting communities to abandon homes in hopelessly exposed sites. It also means shifting away from agricultural practices (like forest clearing) that lead to desertification or flooding and landslides. These slow onset hazards are often man-made, and their management requires the political will to move from disaster response to disaster prevention.

1960 The United Nations Economic and Social Council asks UNESCO to begin a comprehensive study of the ways and means to reduce earthquake damage.

1968 The mandate includes other natural hazards — tsunamis, volcanic eruptions, landslides and river floods.

1980 The study of natural hazards becomes an integral part of UNESCO's science sector programmes.

Courtesy — UNESCO

UK-Continental Europe Gas Link Moves Closer

MORE detailed technical and commercial studies are to be carried out on a plan to link Britain's gas transmission system to the European gas grid, following strong interest by potential users.

The UK-Continental Gas Interconnector sponsor group, made up of British Petroleum (BP), British Gas, Conoco, Elf, Norsk Hydro, Statoil and Distrigas, says it has received a "favourable outcome" to its market testing of the idea over the last three months.

The proposed interconnector is a 215 km long, 0.9 metre diameter gas pipeline running from Bacton on the east coast of England to Zeebrugge in Belgium. The project, backed by the British and Bel-

gian governments, is intended to meet the need for new supplies in continental Europe in the late 1990s with likely surplus in UK gas supplies at that time.

Gas could ultimately flow in the opposite direction, enabling the UK to import gas from the former Soviet Union or Algeria in the next century. Interconnector business advisor, Mr David Glendinning, says the response from UK and Norwegian producers, European buyers, transit shippers and power generators has been "well in excess" of the proposed capacity.

It is hoped to start building the pipeline in 1997 with technical studies due to be finished by mid-1994. (LPS)

Affordable Automation

ROBERTA deftly picks up a blood-filled syringe, uncaps the container and inserts the specimen in an analyzer that transmits information to a central laboratory, reports AP.

Roberta does not worry whether the blood contains the AIDS virus or hepatitis B. She also works around the clock for no pay, doesn't break for meals and never takes a vacation.

She is a vision in steel — a robot used by the University of Virginia hospital to perform blood analyses for intensive care units.

The dhrs 70,000 robotic analyzers are computers with mechanical arms. They save four full-time medical technologists positions at a cost of about \$160,000 annually, said John Savory, a pathologist who heads the clinical chemistry and toxicology laboratory at the hospital.

Savory said the system, in use since September 1992, already has paid for itself. Today, he estimates it now costs about \$10 to perform a test that previously cost \$16. The time it takes to run the test also is greatly reduced. The blood analyzers can do in 2 to 3 minutes what used to take 20 minutes.

"It's that rapid turnaround that's extremely important in the care of these patients, patients who are in the recovery area from open-heart surgery or patients in the regular surgical intensive care unit and other transplant patients," Savory said.

Savory is one of several University of Virginia pathologists and engineers who developed the technology and built the system, which has been submitted for patent approval. Using the robots, the hospital can test about 140 blood samples a day, Savory estimates.

"It has cut down on the workload some," said medical technologist Tammy Booth, who monitors the blood tests at the clinical lab, dubbed "Satellite Central."

nated by the specimen," she said.

Not only are robots cost-effective, but it makes more sense to handle blood fluids as little as possible because they could be contaminated and pose health risks for workers. Savory said it is also cheaper to send information down a wire to a technologist than to send tubes of blood through a complex transportation system.

"You worry about putting infected blood samples in the tube system," he said. "What happens if it gets lost and contaminates the whole thing? We recognized in the 1990s that it's a lot easier to send information down a wire than send a blood sample scurrying around the hospital."

The U Va team has sold its software to the Veterans Administration Medical Center in Salem for \$20,000. The VA paid for a system, but without the robot, for two intensive-care units that just opened, Savory said.

"We're very excited with this new concept," said Dr. Amanda Esquerre.

The obvious advantage is that it will cut down on the number of individuals handling the specimens to some degree," he said. "Sometimes accidents happen. A tube of blood is dropped. These are rare occurrences, but it does happen."

Savory said the system has other applications. "If we can develop our systems to do cholesterol testing and some of the microbiology testing and do the monitoring off site, you could set up a little clinic down in Goochland and have it monitored" from the Medical College of Virginia in Richmond, he said. "That's where we really see the technology going."

Ernest MacIain, a Paramus, N.J.-based consulting engineer for laboratories, said the robotics technology is good "if labs can afford it."

"Big labs will suck this technology up," MacIain said in a telephone interview. "Mid-size and smaller laboratories may not find this economically feasible. It's the issue of affordable automation."

'QUEER FISH' AND FEMINISED CROCODILES SET OFF FERTILITY ALARM

by Susan Aldridge

There is mounting evidence that tiny amounts of chemical pollutants found in lakes, rivers and tapwater might be contributing to the growing fertility problems of many species — including humans.

They may account for reports of a drastic fall in sperm count in men in Western industrialised countries. And American cancer scientists say they could be linked to the development of breast cancer, which is on the increase in the United States.

"Because these findings may have extraordinary global implications for the prevention of breast cancer, they should serve as a wake-up call for further urgent research," says Dr David Hunter of the Harvard School of Public Health. Unlike most other cancers, breast and prostate cancer are sensitive to the effects of sex hormones.

But the evidence is still conjectural as the only research concerning the issue has been on fish and reptiles.

The chemicals are called alkylphenols and DDE, and there may be more unknown substances which cause similar problems. They act like the female hormone oestrogen on some of the creatures they contact, feminising males and adversely affecting their reproductive potential.

The evidence concerning fertility first showed up in animal populations in Britain and the US.

For years, anglers fishing downstream of sewage works in England and Wales have been catching fish with both male and female sex organs.

Professor John Sumpter of Brunel University has been investigating the anglers' reports. He found that male trout grown in sewage effluent have a chemical called vitellogenin in their blood. Vitellogenin is normally found only in females.

Vitellogenin is produced by the female sex hormone oestrogen. Sumpter believes sewage effluent contains many oestrogen-like substances. One source that has shown up in research is alkylphenols caused by the breakdown of detergents in sewage works.

When Professor Sumpter and his team grew male trout in tanks containing alkylphenols, the fish had the tell-tale vitellogenin in their tissue, and their testes were abnormally small.

There is little chance of

getting rid of alkylphenols. Hundreds of thousands of tonnes are produced every year. They have over 800 different sources — from detergents to cosmetics.

DDE is produced when chlorine-containing organic compounds such as PCBs (used in electrical insulation) and the pesticide DDT break down in the environment. PCBs and DDT were widely used until their pollution potential was realised. Today they are banned in many countries, though still in use in parts of the Third World.

But they break down slowly, and wherever they were used or spilled, DDE residues will persist in soil and water for many years.

In the US, an old chemical spill — and the DDE it produced — is to blame for a drastic decline in the local alligator population, says Professor

Louis Guillette of the University of Florida.

Although the spill has been cleaned to the satisfaction of the US Environmental Protection Agency, most alligator eggs in the area fail to hatch. Professor Guillette has found abnormally high levels of oestrogen-like hormones in the remaining male population.

"In effect, these male alligators have been feminised. They're also showing abnormal development of their sex organs," says Guillette.

The situation is complicated by the growth in the number of environmental contaminants found to have oestrogen and other hormone-like effects, and the chemicals are very diverse, ranging from alkylphenols and DDE to natural chemicals found in fungi and plants.

Chemists at the Imperial Cancer Research Fund in Lon-

don are using computers to track down what these "oestrogen-mimics" have in common. If a shared quality could be identified, scientists could compare new chemicals with a hormone dossier to screen out the possibility of oestrogen-like reactions in the environment. Existing chemicals could be dealt with before they become a problem. But it will be several years before the computer models yield results.

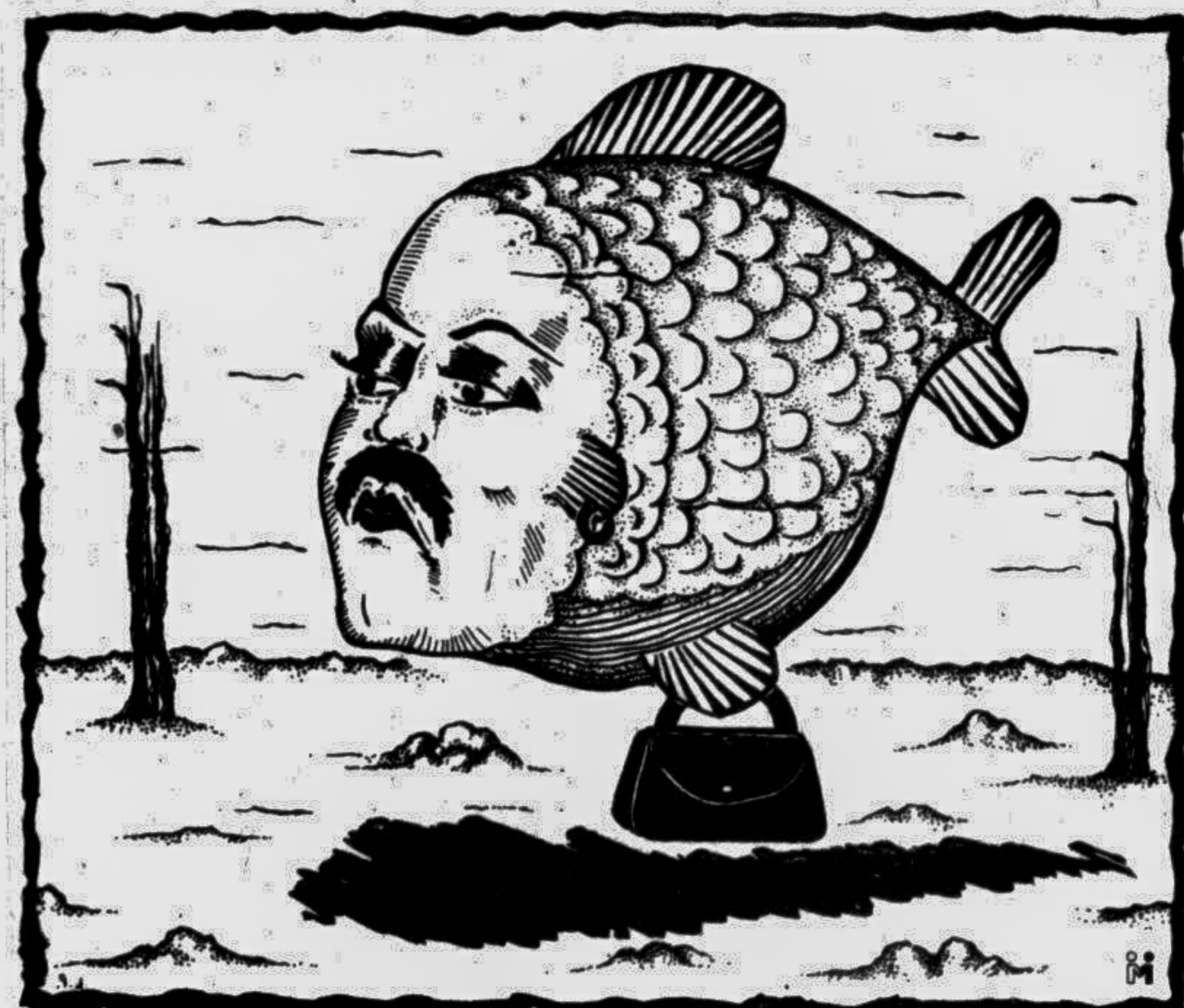
There is concern, however, that the hormone-like effects of some chemicals are being ignored by scientists and legislators more worried about cancer.

Cancer is often immediately life-threatening, unlike the fertility problems caused by these chemicals. But the hormone-like effects of alkylphenols and DDE may have far-reaching implications for entire species on this planet.

— GEMINI NEWS

About the Author: SUSAN ALDRIDGE is a British science writer.

When anglers started catching fish with male and female sex organs, the scientists moved in. Their preliminary research findings are disturbing, reports Gemini News Service, because they indicate that small amounts of chemicals may be affecting fertility.



Eurofighter makes official debut

by David Welsh

THE International Eurofighter Aircraft made its official world debut at British Aerospace's (BAE) Warton Airfield in North-West England Wednesday 4 May.

The UK-assembled Eurofighter DA2 is the second prototype to have become airborne, following the earlier first flight of the design in Germany. The delta-winged aircraft was demonstrated in a flying display before some 1500 guests including ministers from the four partner nations of Britain, Germany, Italy and Spain which are sharing in

the design, development and manufacture of the 30-billion pound project. Spectators are also reported to have included officials from Saudi Arabia, Japan and Malaysia.

The Eurofighter partners anticipate major overseas markets for the highly-maneuvrable computer-controlled single-seat fighter. While each 2200 km/h (1370 MPH) plane will cost more than 34 million Pounds Sterling, Eurofighter is said to be significantly less expensive than its closest rival

the American F-22.

Although designed to be inherently unstable in flight so as to be able to make exceptionally rapid changes of direction during aerial combat, and relying on its 'fly-by-wire' British Gec-Marconi flight computer system to keep it under control, test pilots have praised the aircraft's handling characteristics. "It was very solid. I felt very comfortable," said Chris Yeo, British Aerospace's Chief Eurofighter test pilot.

Britain's Defence Secretary Malcolm Rifkind described the Eurofighter as "an aircraft at

the pioneering edge of technology". He added: "It is always a remarkable event when a new aircraft takes to the sky and pushes forward yet further the boundaries of aviation technology."

The Eurofighter makes extensive use of carbon fibre composites in its construction to ensure light weight. Other advances include direct voice input and a helmet-mounted display system to reduce the pilot's workload, and the overall shape of the plane is designed to hinder detection by radar.

Some 10,000 BAE staff have been involved in the project so far, and full production would involve around 44,000 jobs.

Science Briefs

RR to Build Three Indian Power Stations

BRITAIN'S Rolls-Royce industrial group has just won three multi-million pound Indian power station contracts in the space of two days.

Under the first two contracts, Rolls-Royce Power Generation Systems will build a 200MW gas fired combined cycle power station at a cost of \$110 million at Kakinada in Andhra Pradesh, and also take a state in the Chandil Power company, which has been established to build and operate a 500MW coal-fired power station at Chandil in Bihar State. RR's share of the latter will be worth \$272 million.

The Kakinada station, known as the Godavari Project and due in service in 1995, is expected to be one of the first independent power projects carried out in the country following the Indian government's recent initiative to encourage private sector involvement in the electricity industry.

The new station is being built by the Spectrum Power Generation company of Hyderabad and will have three gas turbines, three heat recovery steam generators and one steam turbine generator. It will be able to use either gas or

naphtha as a fuel.

The Chandil power station will be built by 1996 for Chandil Power, a new company in which Rolls-Royce will be shareholder along with CESC, the project management arm of the CESC company of Calcutta. Rolls-Royce Power Generation Systems will have total turnkey project management responsibility for this contract and RR group member Parsons Turbine Generators (PTG) will supply two 250MW steam turbine generators.

The third contract involves a \$272 million coal-fired power station at Balaghar in West Bengal, which will also be a total turnkey project carried out by Rolls-Royce Power Generation Systems, part of Parsons Turbine Generators, on behalf of CESC. PTG will supply two 250MW steam turbine generators for the three-year project on an island in the Hoogly River in West Bengal.

Rolls-Royce has also joined forces with RPG Industries of India in a new company that will provide a comprehensive plant life improvement service and operational support for power plant installed in India. (LPS)

Nissan Expands UK Manufacturing

THE Japanese Nissan car company is to invest another \$26 million at its UK manufacturing plant in Sunderland, north-east England.

A new \$16 million axle manufacturing facility will be built adjacent to Nissan's existing engine machining and assembly plants, bringing to Britain work currently performed in Japan. When it becomes operational in early 1996, it will manufacture rear axle sub-assemblies for cars produced at Sunderland.

The car maker also plans a \$10 million extension to its existing facilities for painting plastic parts such as bumpers, introducing the latest environmentally-friendly paint

technologies to this process.

UK managing director and chief executive, Mr Ian Gibson, comments: "It is important to recognise that despite the severity of the current recession in Continental Europe, Nissan is continuing to invest in the future of its north-east England-based operations. The proposed new developments will broaden our manufacturing base and strengthen our ability to respond to the forecast long-term market growth in Europe following the current recession."

As well as the Primera, the UK plant also builds a new version of the Nissan Micra small car while an adjoining plant produces engines for Nissan's new Spanish-built people carrier. (LPS)

"Choose Your Own Specification" Lagondas

CUSTOMERS of totally new range of Lagonda saloons and shooting brakes can have their car individually hand-built to a personal specification. The first five examples of the \$115,000 supercars are now under construction for buyers in both the UK and mainland Europe.

With coachwork by Aston Martin the new Lagondas offer particularly spacious accommodation and luxury. Both models are powered by fuel injected 5.3 litre 310 horsepower twin overhead camshaft V8 engines whose capacity can be increased to 6.3 litres with power output increased to 500 horsepower. The mechanical specification also includes the suspension and braking systems developed for the 281kph Aston Martin Virage and Volante 6.3 litre models.

Because the cars are produced by craftsmen and use hand-formed aluminium body

panels, customers can select any body colour and seating configuration, and choose a particular leather and carpet for the luxurious interior. The saloon can be equipped to accommodate either four or five people while the five-door shooting brake has room for up to six seats.

The choice of instrumentation and in-car entertainment system, including a CD player, TV and video, is unique to each vehicle.

There is a further choice of a five- or six-speed manual transmission or a three or four-speed automatic gearbox. All engines have electronic fuel injection and are designed to operate with unleaded fuels and a catalyst. Top speed of both models is over 273kph.

Prices of the new Lagondas will range from \$115,000 for the four-door saloon and \$121,000 for the five-door shooting brake. (LPS)

UK Wind-Tunnel Trials for New Airbus

WIND tunnel tests on Europe's new A319 Airbus will begin in Britain in January.

The A319 is a shorter fuselage version of the twin-jet single-aisle A320, seating 124 passengers instead of 150, but is otherwise identical. Wind-tunnel trials will thus concentrate on differences in handling, qualities and performance.

First flight of the A319 is planned for summer 1995, with deliveries to airlines beginning in the first half of 1996. To reduce costs, all the wind-tunnel models will be modified from existing A320 models.

The first, of 1/22nd scale, will be tested under British Aerospace guidance in the Bedford, eastern England, wind tunnel of the UK Defence Research Agency, and will seek to confirm the plane's high-speed performance. Low-speed trials will follow in March 1994, when a

1/12.8th scale model will be tested at British Aerospace's own facilities at Filton, near Bristol in south-west England. During the same month, a 1/7.5th scale A319 will be tested in the DNW wind-tunnel at Emmeloord in the Netherlands, under Deutsche Aerospace Airbus responsibility.

Finally, for handling qualities, Aerospatiale of France will complete low-speed tests on a 1/11th scale A319 model at Le Fauga, near Toulouse, in October 1994. This will be followed by high-speed trials a month later, at Modane in France.

Although the aircraft is not due in service for more than two years, six have already been ordered by the International Lease Finance Corporation (ILFC). Its sister aircraft, the A320, is the most successful member of the European Airbus family, with 638 ordered and 411 of them in service. (LPS)