

La Scuola wall lizard, the Israel painted frog, the smooth snake, the meadow viper and the spectacled salamander.

But it is not just a question of protecting pretty animals, according to Dr Pierre Hunkeler, the Swiss ecologist who organized the scientific side of the Athens meeting. Colonies of coastal plants and animals of great scientific interest need protection. Turkey and Greece have the richest coastal flora, followed closely by Morocco and Spain. Greece has 670 species of plants unique to the area (compared with Britain's 15) claim IUCN, and many of them are threatened.

Many of the ecosystems under attack are not yet well specified scientifically: in the wetlands, for example, like the protected Camargue (the Rhone delta), bird life is well understood but much less is known of the plants and water-dwelling animals. Ecologists and zoologists must have a chance to study these regions, argues Hunkeler, if only to give a baseline against which to measure the effects of pollution and development.

Representatives from ten Mediterranean nations had gathered in Athens by Monday: Greece and Turkey, France and Italy, Algeria, Libya, Tunisia, Israel, Yugoslavia and Malta were there. Representatives from Monaco and Cyprus were "on their way" from another meeting. The EEC was represented, but no sign had yet been seen of Spain, Morocco, Lebanon, Syria or Egypt.

The Athens meeting will avoid defining precise geographical regions to be protected. At that point, local political and development interests come into play, and costs and benefits must be worked out. If protected areas also mean protected fisheries, and increased amenities for the local populations and for tourists, then perhaps a deal can be reached which will satisfy both the ecologists and governments. But the Athens experts are leaving that to the politicians. **Robert Walgate.**

Electric cars

Win some, lose some

Washington

Plans for the development of a battery-driven electric car have taken one step forward and one step back. Scientists from the University of California's Lawrence Livermore Laboratory have announced the successful testing of a new aluminium-and-water battery which, they claim, can power cars for much greater distances than other batteries under development.

The announcement came only a few days after reports of tests by the Department of Energy (DoE) suggesting that Gulf and Western (G+W) may have been premature in some of the claims made for its new zinc-chloride battery, launched last June.

The Livermore results, presented at a meeting of the Electrochemical Society in Miami, are the products of research jointly

Plates in contact

Africa's slow movement towards Eurasia probably caused last Friday's 7.3-magnitude earthquake in El Asnam, Algeria, which destroyed 80 per cent of the city 20,000 killing perhaps people.

El Asnam, sits on a tectonic boundary between two plates — or so it appears, for the region is not seismically well characterized. The 1954, 6.7-magnitude earthquake in the same area, which killed 1,200, occurred before the world seismic monitoring network had been established. But measurements of magnetic anomalies between Africa and the United States, and between the United States and Eurasia, across the midatlantic ridge, indicate that the Africa-Eurasia boundary is closing.

The grisly event has one positive outcome: it will increase geological knowledge of the zone dramatically. Seismic stations can now pinpoint the epicentre to within 5 km, and by following the expected series of diminishing aftershocks (one of magnitude 6.2 occurred three hours after the main quake) determine the nature of the movement. This is expected to be a thrust, rather than strike-slip with Africa riding up over the Eurasian plate — the Atlas mountains themselves being part of the result.

Algerian authorities may not have a spot-on repeat of 1954; but they were criticized this week for not taking sufficient care to protect their buildings. The building codes for the El Asnam region call for stiffening to resist an extra 10 per cent weight static load, said Dr F.K. Farma of Imperial College, London, a civil engineer who made a study of the area. "But for that quake they needed 50 per cent".

Robert Walgate

sponsored by DoE and two large industrial corporations, Continental Group Inc. (working with the Lockheed Corporation) and the Diamond Shamrock Corporation.

The battery works by submersing an aluminium plate in a solution of sodium hydroxide. The reaction of the two with air produces an electric current and hydrazillite, an aluminium compound which subsequently crystallizes out so that the aluminium can be recovered.

Unlike more conventional storage batteries which require overnight charging, the new battery is claimed to need only to be refuelled with tap water every 250-300 miles. The aluminium plates would be replaced every 1,000-3,000 miles, but the operation should take only 15-30 minutes.

One drawback is the cost. Operating the new battery — including in particular the need to replace the aluminium plates at regular intervals — would cost the equivalent of between \$2 and \$3 a gallon, about twice the present US price.

However, this may still be competitive with gasoline made from coal — and it

would be as efficient to use coal for making the aluminium plates as for producing gasoline.

Meanwhile, a report in the *Wall Street Journal* that G+W is encountering technical problems in developing its zinc-chloride battery has raised questions about the extent to which the announcement was designed primarily as a publicity exercise. The newspaper quoted DoE reports that although G+W had claimed that the battery could power a standard car for 150 miles driving at 55 m.p.h., technical difficulties with charging the battery suggested that these figures were over-optimistic.

A spokesman for DoE, which has invested more than \$15 million in the G+W project, accepted last week that the development of the battery had encountered several technical difficulties, and that as a result some of the claims made by the company last June were probably premature. But he denied that the department had lost enthusiasm for the programme. **David Dickson**

Nuclear wastes

Small disposals

Washington

Much to the relief of many east coast hospitals, universities and medical schools, the Nuclear Regulatory Commission (NRC) is proposing that liquid scintillation media used for detecting low levels of radioactivity in biological samples need no longer be buried in nuclear waste disposal sites.

At present, almost all scintillation media used in this way for biomedical research, as well as the carcasses of animals in which chemicals containing radioactive tracers have been studied, have to be transported in special drums 3,000 miles across the continent for disposal.

This expensive exercise — Harvard Medical School and its associated hospitals spent almost half a million dollars last year disposing of 3,000 drums in this way — has been necessary since the state of South Carolina announced a year ago that it was no longer prepared to accept low-level wastes from hospitals and research laboratories at its Barnwell storage site. Shortly afterwards, the nation's other two radioactive waste dumps at Richland in the state of Washington and at Beatty in Nevada announced that they too were closing their doors in protest at the poor way in which low level waste was being packaged and shipped.

Alarm spread quickly through the medical research community. Scientists said that many cancer research programmes would have to stop if liquid scintillation media and animal carcasses containing trace amounts of radioactive elements could no longer be disposed of in this way. Some medical schools claimed that storage space was so tight that research

could continue only for a few weeks if no action was taken.

Following this outcry, the contractor responsible for the Nevada and Washington sites announced that they would be reopened to receive laboratory wastes. However, the South Carolina site remains closed, and the two west-coast sites are being used by all major research laboratories which have not been able to obtain a licence for disposing of radioactive materials by other means.

Now NRC is proposing that liquid scintillation media and animal carcasses containing less than $\mu 0.05\text{Ci}$ of tritium or carbon-14 per gramme can be disposed of merely as toxic chemicals "without regard to their radioactivity".

The commission says that, since the potential dose to any individual exposed to these wastes would be less than 1 mrem a year, such a move would have a negligible effect on health aspects.

Using the same reasoning, it is also proposing that research laboratories and hospitals should be allowed to release up to 5 Ci of tritium and 1 Ci of carbon-14 a year into the sanitary sewage system, in addition to the present limit of 1 Ci per year for all radionuclides.

If these changes are approved, the commission estimates that research institutions and hospitals will save up to \$13 million a year. Disposal of the wastes by more conventional means would cost only \$3 million a year, compared with the \$16 million it now costs to package and ship the materials to the west coast sites.

The proposed change in the rules is intended to conserve waste burial capacity that is already in short supply at nuclear dumps. At present, between 200,000 and 400,000 gallons a year of liquid scintillation media — mainly toluene containing heavily diluted radioactive tracers — has to be stored at these sites, taking up 400,000 cubic feet of space, with animal carcasses taking up another 70,000 cubic feet.

Many university safety officers have welcomed the proposed changes in the rules. Others, however, are being more cautious, pointing out that the material will still have to be disposed of under strict federal, state and local regulations. Liquid scintillation media such as toluene are highly flammable and potentially carcinogenic — one of the reasons that South Carolina decided it no longer wanted to handle the wastes — and pose chemical and biological hazards which NRC says are a greater health problem than their radioactivity.

The result is that disposal will have to be carried out under strict new laws to deal with toxic wastes in general, such as the Resource Conservation and Recovery Act. The Environmental Protection Agency, however, has still to agree on how it intends to carry out the requirements of the act, and research laboratories are consequently uncertain of the new demands that they may have to meet.

David Dickson

Soviet cosmonautics

Cuban went up

All the most interesting aspects of Cuban science have been reflected in the Soviet-Cuban space mission, according to Wilfredo Torres Yribar, President of the Cuban Academy of Sciences. Half of the 20 experiments planned for the flight, he said, reflect the interests of the Cuban economy.

Although space research began in Cuba "just five years after the victory of the revolution", Yribar admitted that the initial contribution had been "rather modest". In the beginning, he said, space research had not even come under the Academy of Sciences, but had been supervised by the Ministry of Communications. However, for the past ten years, Cuba had been making extensive use of data from meteorological satellites. At first this was only for weather forecasting, but now, he said, the Meteorological Institute was working out programmes for monitoring industrial pollution and studying the influence of the earth's climate on the ripening of sugar cane.

Many of the experiments performed in orbit by Cuban cosmonaut Arnaldo Tamayo Mendez and his Soviet crew-mate Yuri Romanenko, appear to be simple extensions of the regular Salyut programme. As usual, there was an experiment to grow semiconductor materials using the Soviet-designed Splyv furnace, while Cuba, as the non-Soviet participant, provided the experimental capsule — in this case, the target substance was epitaxial aluminium-doped gallium arsenide — and an appropriate code-name "Caribba".

The MKF-6 camera and the Bulgarian-made Spektr-15 apparatus (so named because it can record 15 radiation channels) have been standard equipment on several Salyut missions, although on this occasion they were used in the "Tropika" experiment (photography and field observations of a defined area of Cuba) and in "Antilla" — an examination of the dynamics of the physical, chemical and biological characteristics of agricultural land and part of the surrounding seas.

Medical experiments, too, are a regular part of such missions. In this case, they included a Cuban-designed "coordinograph", which determined the accuracy and time characteristics of the cosmonauts' coordination of right and left arm movements. Another new medical experiment, "Cortex", was described by the Cuban back-up cosmonaut Jose Lopez Falcon on Moscow radio: the cosmonauts, he said, are fitted with bonnets which include sensors and electrodes; light and sound signals are transmitted, and the data recorded.

The most specifically "Cuban" experiments, however, were "Sakhar" and

Forgotten martyrs

Perhaps the most interesting aspect of the Mendez-Romanenko flight is the light it throws on the early days of Soviet space research. Speaking last week on the twentieth anniversary of the Committees for the Defence of the Revolution, Fidel Castro paid tribute to the "scores of Soviet cosmonauts" who had paved the way for the Cuban flight. In particular, he recalled the "many who had died in their attempt to go into space or during their descent from space".

Those who died during descent are well known: Komarov in 1967 and the three crew-members of Soyuz 11 — Dobrovolskii, Volkov and Patsaev — in 1971. It is less clear who he meant by those who died attempting to go into space. Yuri Gagarin died in a plane crash in 1968, while still officially on the space team, and a back-up cosmonaut, Seregin, was killed with him. Two other trainee cosmonauts are believed to have perished in high-altitude training missions. The Soviet space planners have always been highly reticent about such accidents, and the rumours of the early 1960s often complete with cosmonauts' names and family details, seem for the most part to have had little or no foundation. Even Gagarin's historic flight was rumoured to have been the back-up mission to a disaster the previous day — a story which seems to have been generated by a premature TASS announcement — although no signs of any launch were picked up by the US monitoring stations in orbit. (Just conceivably, of course, a spacecraft could have blown up on the launch pad.)

Castro referred to having visited a "gallery of martyrs" at, presumably, Baikonur, where he observed that the loss of life had been "relatively high" before space flights were "made safer". Since no westerner — except possibly Charles de Gaulle — has ever visited this gallery, Castro's remarks have renewed speculation as to just whom it commemorates.

"Zona". These are designed to study the growth of sugar monocrystals in conditions of weightlessness — the first time an attempt has been made to crystallize an organic substance in orbit. Also of Cuban provenance is the "Support" experiment, which uses special Cuban-designed shoes that place a given load on the support areas of the feet. Returning cosmonauts, it seems, have a tendency to platypodia, and "Support" was intended to determine whether this change in the arch of the foot was a significant factor in post-flight posture disturbance. Although only Mendez wore the shoes on this occasion, they are to be worn by Soviet cosmonauts on future flights.

Vera Rich