US election

Business as usual for science

Washington

If the results of last week's US presidential election contained few surprises, they also imply that the administration of science will continue unchanged. This has been a good year for incumbents in the Congress. There will be fewer than 50 new faces in the 435-member House of Representatives and only six in the Senate, which means little change in the committee power structures of Congress.

The most noticeable shift will be the move of Representative Albert Gore (Democrat, Tennessee) to the Senate. Gore, who chaired the investigations subcommittee of the House Science and Technology Committee, took an unusual personal interest in scientific issues, initiating well-publicized investigations of biotechnology, human genetic engineering and university–industry relations (including the multi-million dollar deals between Washington University and Monsanto and between Massachusetts General Hospital and Hoechst), biomedical research fraud, organ transplants and hazardous waste.

His staff may be forgiven the minor exaggeration that Gore's move to the Senate marks the "end of an era" for the Science and Technology Committee; it is indeed hard to see who on the committee is equipped, by temperament or knowledge, to follow in his footsteps. Curiously, the two other members of the House who also ran successfully for the Senate — Tom Harkin (Democrat, Iowa) and Paul Simon (Democrat, Illinois) — were also on the Science and Technology Committee, although neither held a chairmanship.

Representative George Brown (Democrat, California), a leading voice for science in the House, was re-elected by a surprisingly wide margin, given his recent troubles in his increasingly Republican district. Brown has led the fight for competitive grants for agricultural research and has been a key opponent of the testing and deployment of antisatellite weapons in particular and Star Wars in general.

Brown has not yet decided whether to seek a subcommittee chairmanship on the Science and Technology Committee or retain his position as chairman of the research subcommittee on the Agriculture Committee. He has moved back and forth before; with the farm bill up for renewal this year and the prospect of a major push to expand the competitive grants programme, however, he may find a compelling reason to stay put.

In the Republican-controlled Senate, the major change in prospect is on the Foreign Relations Committee, which would have the first crack at any arms-control treaties submitted for Senate ratification.

The chairman had been moderate Republican Charles Percy of Illinois, the man who, incidentally, fought the valiant but unsuccessful fight to overrule an Energy Department scientific advisory panel and award the contract for a new electron accelerator to Argonne National Laboratory, which happens to be in Illinois. He was defeated in part through the good offices of the National Conservative Political Action Committee, which decided it would prefer an extra Democrat in the Senate than Percy in command of foreign policy.

Next in line for the committee chairmanship is staunch conservative Jesse Helms (Republican, North Carolina), who has expressed strong reservations about arms control and who holds the distinction of being the only senator to support the Argentinian military regime in the Falklands War. Helms promised during the campaign to stay put as chairman of the Agriculture Committee — an important point in his home state, always worried about losing its tobacco subsidies. But Helms is said to be under strong pressure from the right-wing of the Republican party to take the foreign relations post.

There have been no strong signals about the course the Reagan administration will take towards science and technology in its second term. It is safe to assume that the National Science Foundation and the National Institutes of Health will be protected as they have been; that defence research and development will continue to grow faster than civilian; and that, if Reagan hews to his promise to reduce the deficit without raising taxes, that hopes for big science in the form of accelerators or planetary missions will have to be tempered. **Stephen Budiansky**

Thermonuclear fusion

Japan's tokamak and after

Tokyo

THE assembly of Japan's giant tokamak, JT60, was completed this week and final sub-system tests are under way. If all goes well, the whole system will be in operation in the spring, plasma heating experiments will start the following year and break-even will be achieved in 1987.

The JT60 project, run by the Science and Technology Agency's Japan Atomic Energy Research Institute, is on much the same scale as the US Tokamak Fusion Test Reactor (TFTR) at Princeton University and the Joint European Torus (JET), but is running a little behind them: TFTR successfully produced its first test plasma almost two years ago and the assembly of JET was completed last year.

The project is not cheap: the budget for this year alone is around Y29,000 million (£96 million) and total expenditure is expected to be considerably higher than that at Princeton. Most of the equipment is built by the giant engineering company Hitachi, which has one of its manufacturing facilities conveniently close by, at Hitachi city.

Despite the overall similarities between JT60, TFTR and JET — all are of tokamak configuration with an external radius close to 3 metres — JT60 is not intended to follow exactly the same research path as the other two designs. No attempt is to be made to create a deuterium–tritium plasma, the fuel that a commercial reactor would have to use. The energetic neutrons produced in such reactions would make the tokamak structure radioactive, requiring all maintenance reactions to be carried out remotely. Instead, only hydrogen and deuterium fuels will be used, and the aim will be to study the confinement of plasmas that would produce break-even conditions if tritium were present. At both TFTR and JET, there will be a switch to tritium and deuterium fuels, and remote handling, towards the end of the decade.

Plasma heating in JT60 is to be achieved by a combination of 14 neutral beam injectors, firing high-energy particles into the plasma, with microwave heating in the 2 GHz range. The effect should allow much longer heating pulses to be produced than in TFTR, which relies more on ohmic heating. JT60 will also incorporate a poloidal divertor to skim impurities from the edge of the plasma, a sophisticated piece of technology that had not been developed when TFTR was being planned.

After JT60 will, in theory, come the experimental test reactor, which will aim in the 1990s for tritium–deuterium self-ignition, a burn of more than a hundred seconds and the self-sustaining breeding of tritium in the lithium blanket surrounding the reactor. But like the United States and the European Community, Japan is worrying about just how much longer it can maintain the enormous expense of an independent fusion reaction programme that inevitably duplicates some of the effort made elsewhere.

Japan already has a long-term cooperation agreement with the United States in fusion research and there is every likelihood that some joint technical workshops — and perhaps exchange of engineers — will take place as both Japan and the United States move to the design stage of the next generation of fusion machines. But whether closer cooperation between the United States, Japan and Europe is possible on a large scale is more doubtful: discussion of the merits of a joint fusion materials test facility has been dragging on for more than a year (see *Nature* **306**, 215; 1983) without the European Community being able to commit itself, even though both the United States and Japan have expressed enthusiasm. **Alun Anderson**