real contraction of about ten per cent.

The cuts would be shared across the board. The high-energy physics budget, for example, would have a proposed growth of 11 per cent cut to three per cent, with a \$20 million cut in operating funds for the major accelerator laboratories and in particular a \$5 million cut in funds for the construction of Fermilab's energy saver/doubler.

Administration officials have been working hard behind the scenes, hoping the Senate can be persuaded to mitigate some of the worst effects. Unless the funding prospect improves, there will "really be some sort of chaos and disaster", warns Dr Edward Frieman, director of DoE's Office of Energy Research, predicting in particular that up to 1,500 scientific and technical jobs could be lost at the national laboratories.

So far, nuclear physicists seem to be accepting what is in store for them phlegmatically. Almost two-thirds of the 76 university-based accelerators operating in 1970 have since had to close, many for lack of operating funds.

There is also widespread concern that these developments are putting off potential research students, while the supply of postgraduate research workers is also beginning to dry up. One estimate is that there are currently several hundred vacant teaching and research assistantships.

DoE officials still hope that a reasonable programme can be salvaged. Internal figures being used in planning next year's budget include an increase in nuclear physics funding from \$115 million to \$130 million between 1982 and 1986 (in 1980 dollars) — in contrast to level-pegging for high-energy physics.

But nobody pretends that this year's tide can easily be turned. Mr Robert N Giaimo, chairman of the House Budget Committee, told a meeting of the American Association for the Advancement of Science last week that in the near future "there has to be more discrimination between basic research which is likely to be useful and basic research which is not likely to be" — and that faced with the prospect of a non-expanding pie, the competition for funds will get increasingly fierce.

David Dickson

Heidelberg lab

Danes drag feet

A GROUP of Danish scientists who advise the government on the scale and division of Denmark's basic research budget has recommended that Denmark should no longer contribute to the costs of the European Molecular Biology Laboratory, based in Heidelberg. If the Danish government were to accept the advice, it would be a severe blow to the morale — if not the pocket — of the £10 million a year laboratory, which was launched by an

agreement of ten nations in July 1974 and opened in May 1978.

Denmark was obliged to make a decision on EMBL this year. So far, its Natural Science Research Council and its Agricultural and Veterinary Research Councils have been supporting EMBL (to the tune of some £120,000 a year) out of their own budgets; but it had been agreed in July 1974 that this arrangement should last for only seven years. The source in Denmark of the EMBL contribution for 1981 thus came into question.

Normally in Denmark, subscriptions to international bodies are paid out of government rather than research council funds — that is to say, the sums are allocated from the total research budget before it is divided among the various research councils. So when a committee of scientists from the Natural and Agricultural Research Councils considered who should pay for EMBL in 1981, it attempted to transfer the burden to what it considered to be the rightful place — at government level, but effectively shared among all the other research councils.

None of this need have caused a stir in Heidelberg. In making its administrative recommendation, however, the joint committee chose also to criticise Danish participation in EMBL. For example, the committee pointed out that there is no Dane at the laboratory, and that its programme of research seemed to be rather disjoint from Denmark's.

When this rather qualified recommendation went to the government's science advisory body, the body decided against further participation in EMBL, in the light of tight financial constraints imposed upon it by government.

Denmark thus finds itself in a difficult position. The agreement establishing EMBL was reached as a treaty by West Germany, Austria, Denmark, France, Israel, Italy, the Netherlands, the UK, Sweden and Switzerland, and abrogating it would be a diplomatic matter, as it would be for a nation leaving the high-energy physics laboratory, CERN (on which the EMBL constitution was modelled). However, Danish scientists believe the money will be found somehow, probably by a small group of research councils footing the bill independently, somewhat as before. The new arrangements will have to be complete by mid-October, in time for the Finance Committee of the Danish parliament to consider them in November.

Robert Walgate

Helsinki agreement

West looks East

Brussels

The whole system of West-East technology transfer needs re-examination, according to Charles Levinson, secretary-general of the International Federation of Workers in the Chemical Industry. This

was one of the few clear ideas to emerge this week from the review by the European Parliament's Political Affairs Committee's of the Helsinki agreements.

Levinson described West-East technology transfer as an inevitably expanding process without any political control of interdependence between Western enterprises and Eastern state trading corporations. The Western entrepreneurs, he said, were providing credits for transfer of capital technology which could then only result in the flooding back of joint production onto Western markets. However, Levinson's grasp of the situation was not echoed by many of his colleagues.

At an international hearing of this kind, it might be supposed that apparent naivety was intended simply to stress a point on the record. However, Dr Guido Carli, former director of the Bank of Italy and now president of UNICE, seemed unaware of several contradictions. Speaking on what the Helsinki agreements call Basket II (economic, scientific, technological and environmental exchange) he accepted unquestioned the CIA estimates that the Soviet Union would become a net importer of energy in 1985 (a forecast which the Soviets emphatically deny).

On the other hand, he failed to rise to a question from the floor on the possible economic threat of increasing West German dependence on gas imports from the Soviet Union. Carli proposed a joint research project into energy saving between the major energy importers, including the Soviet Union, as a future counter to OPEC, yet showed no firm grasp of the statistics and parameters involved.

Professor Stefano Silvestri, of the Institute of International Affairs in Rome, suggested that the EEC's lack of a common "or even serious" energy policy and its consequent dependence on Middle Eastern oil was essentially another aspect of the political and military instability of the Mediterranean area. In general the Mediterranean featured largely in discussions, perhaps because of the presence of Willy Brandt, initiator of the North-South Report on sharing of world resources.

Linkage of the three Helsinki baskets — defence, trade and human rights — is a fundamental of Western policy. Max van der Stoep, former minister of foreign affairs of the Netherlands, stressed that dialogue does not have to be "music in the ears of the Eastern states".

The problem of Sakharov, other Soviet dissidents and Charter 77 signatories must, he said, be raised at Madrid. Linkage between Basket II, trade and technology, and Basket I, defence, normally comes to the fore in connection with the transfer of militarily sensitive and strategic technology.

However, Colonel Jonathan Alford of the International Institute for Strategic Studies in London illustrated another

aspect of that problem. The Western observers at Warsaw Pact manoeuvres, present under the terms of the Helsinki accords, had, he said, been virtually incapacitated by maps drawn to an inappropriate scale and binoculars which somehow failed to work.

Vera Rich

Biotechnology

Products work

Another hurdle has been cleared in the pursuit of profitable products from genetically manipulated bacteria. Evidence presented to the Food and Drug Administration in Washington at the beginning of June makes it clear that at least one bacterially produced human hormone has the biological activity of the natural product.

It was no coincidence that the evidence emerged when and where it did, for the aim was for the FDA to decide whether there is a need for special requirements before the licensing of bacterially derived hormones and other peptides or proteins, particularly for clinical use. Clearly the more evidence there is for the identity, not only in structure but also in activity, of bacterial and natural products, the less necessary will be additional requirements for bacterial products.

Not surprisingly, it was the San Francisco company Genetech Inc., one of the first and most voluble of the biotechnology companies, which produced the crucial evidence. Genetech's evidence centred on human growth hormone (hGH), which has been produced by Genetech bacteria for at least the past year.

When Genetech published its first account of expression of the gene for hGH in *Escherichia coli* (*Nature*, 281, 544; 1979) there was no evidence that the hormone had the biological activity of natural hGH. Now Genetech has at least a solid foundation for that evidence.

The mainstay of their new claim is a comparative study of the stimulation of the growth of rats without pituitary glands by hGH from bacteria and from human pituitaries. The overall weight gains and the tibia growth with either hormone or with a mixture of them were virtually indistinguishable. In a further test, the bacterial hGH appeared, if anything, more potent than the pituitary hGH — an observation which Genetech attempted to relate to analytical evidence that the bacterial hGH is the purer of the two.

Genetech has also explored the possibility that its hGH-producing bacteria would stimulate the growth of rats without pituitary glands when simply present in the gut. A positive result might have rekindled the debate about the hazards of recombinant DNA. In the event, the result was negative. The rats put on no weight even though some of the bacteria survived for several days within the intestinal tract.

Genetech also revealed to the FDA that, in collaboration with Hoffman-La Roche Inc., it had successfully carried out a preliminary test of the biological activity of bacterially produced interferon. Because of the limited quantities of bacterial interferon available, the test was confined to showing that three animals survived infection by a potentially fatal virus when given the drug.

The importance of this test, if confirmed, is that it would establish the activity of bacterially produced interferon even though the carbohydrate groups of the natural product are missing.

Workers from the European company Biogen, in their own paper on the construction of interferon-producing bacteria earlier this year (*Nature*, 284, 316; 1980) expressed concern about the possible inactivity of the bacterial interferon. "If a lack of appropriate glycosylation diminishes the activity of the molecule, we shall have a problem on our hands". Their rivals at Genetech seem now to have provided a measure of reassurance on that score.

Peter Newmark

Soft money jobs

Policy rebels

The UK Science Research Council Astronomy II committee decided last week to ignore the SRC's six-year limit on short-term contracts in its future consideration of grant applications. The 25 members of the committee, which deals with infra-red, optical and ultra-violet astronomy, decided that they would advise senior researchers to "appoint the best person for the job" even if the potential researcher has been supported for more than six years on soft money.

The committee intends to consider applications for projects employing researchers whose time would run out before completion as well as applications involving the employment of a researcher who has already exceeded the SRC's upper limit of two three-year contracts.

The committee is taking its action "as a temporary measure" until a formal policy is evolved. Applications will be dealt with case by case, and the committee will fight for its recommendations, expected to be positive in all but borderline cases, on the Astronomy, Space and Radio Board, the next step up in the SRC hierarchy. The committee also empowered the Royal Astronomical Society to act on its behalf in a "big" meeting with the council to take place some time in November.

The committee's action comes at a time when the lack of university openings and requirements of modern astronomical research for specialized technology are placing a premium on retaining experienced researchers in temporary jobs. The SRC's policy, enacted in 1975, had been loosely applied until last November when

the SRC circulated a memorandum instructing its research directors to apply "rigidly" all rules on postdoctoral employment (*Nature*, 7 February). Since then, senior researchers have had their research programmes disrupted and a number of physicists have been forced out of work or have left the country. "It is a major cock-up all along the line. We are sure it is going to be reversed eventually" said committee member Professor Mike Disney of University College, Cardiff.

The case of Paul Gough, a physicist at the University of Sussex, is cited as one example of how the restriction is preventing good experiments from being carried out. Gough, whose final contract will expire in 1982, responded to an emergency call for experiments issued by the SRC on 16 April to fill vacant space created by US withdrawal from the Swedish Viking satellite. Gough proposed a novel experimental technique to study magnetospheric particle bunching by on-board data analysis of information collected from other magnetosphere experiments. Data on particle correlations, normally lost because of telemetric limitations, can be sent in analysed form through existing telemetering systems. The experiment is intended to provide information on links in the magnetosphere. Gough has been told by the SRC that the project was acceptable and would be proposed to the Swedish experimenters but that he would not be permitted to work on it because the work would carry him past his 1982 limit. The SRC has no alternative candidate to do the work. Other proposals that have received similar treatment recently include a cometary probe, a study of moon rocks and a proposal to study incoherent radio scattering from the aurora.

The SRC admits that the policy is presenting difficulties. Brian Oakley, Secretary of the SRC, says "it is a choice of evils, but we believe the restriction is best for science as a whole. The young man is important because of his freshness in comparison to the experience of the older man." Oakley also points out that SRC has created a small number of advanced fellowships (60) to assist the estimated 3,000 researchers affected by its decision and has begun to investigate the situation in an attempt to "free the log jam" caused by the lack of university openings.

Underlying the SRC's policy is the widespread assumption that the major contributions are made by younger physicists. The glamorous figures of quantum physics — Pauli, Heisenberg, Dirac — add fuel to the belief that the newcomer just around the corner is somehow going to change the course of an investigation overnight. As Brian Oakley says, "it stands to reason doesn't it? Once mental images get fixed they are extremely difficult to break."

The problems of people on short-term contracts are increasingly recognized to be