made. But it is equally natural that Congress should be at least a little uneasy at what may sometimes seem to be undesirable political initiatives or unwanted political pressures from outside. This is why it is to be hoped that Mr Mills and his men will not be silly and try to put the foundations back in the simpering places in which they used to be.

The difficulty, of course, is that the foundations can only avoid running foul of potential critics by spending their money on comparatively bland enterprises, among which in the past has been included the whole of pure scientific research. The objection to such a course is that funds are then spent less effectively than they might be. In the introduction to the latest report from Ford, Mr Bundy makes no secret of his wish to see that every ounce of influence is squeezed out of the money which his foundation spends, and the report itself is full of stories of the foundation's battles with various agencies of the government or, as in broadcasting, with AT&T. It is also clear that he is conscious of—or at least has been reminded of—the difficulty of endowing an organization without constituents of its own with a proper sense of responsibility. But neither Mr Bundy nor Congress can hope for perfection. If foundations are to function efficiently, they are bound to make mistakes. Although the motives behind the tentative decentralization of some of the New York schools, for example, were worthy, it is possible that a good idea was marred in its application by inadequate sounding out in advance. The lesson for Congress is that it should not attempt the impossible task of keeping the foundations on a tight rein. The wise course, indeed, is to encourage the foundations on the course on which Ford has now embarked. The foundations could be a splendid stalking horse for the politicians.

The question remains of what relationship there will be between the foundations and the scientific community which has traditionally been a voracious consumer of foundations' money. If all the foundations were to follow Ford, the cosy relationships of the past few decades could be much transformed. There is a taste of what might come in some of the ways in which Ford itself has recently been providing grants for the development of postgraduate education at a number of private universities. Many members of university faculties do not like the way in which the foundation has coupled the grant of money for these enterprises with restrictions of the pattern of graduate training—the stipulation that PhD courses should last for some determined interval of time, for example. The immediate lesson to be learned from this is that the foundations have probably by now outlived the period of history when they were an essential means of increasing the volume of scientific research at American universities. However reluctantly, the Federal Government has now shouldered that responsibility. In the months ahead—Dr DuBridge is still silent on this issue—it is to be hoped that there will be a much more forthright undertaking to this effect. In the circumstances, it is only to be expected that the foundations and the academic community are less likely to be bosom friends in the years ahead than they have been in the past. To be sure, the Ford budget itself still shows a quite staggering diversity of support for universities, chiefly underprivileged institutions, in the United States and elsewhere, but it is also increasingly choosey about the projects for which it will provide grants. This, too, is entirely understandable, even if it is a circumstance that will seem unpalatable to many people.

EUROPEAN INDUSTRY

Lagging Behind in Electronics

EVER since the concept of the technology gap between Europe and the United States was first invented (some say by Signor Fanfani of Italy) the OECD has been carrying out studies of this phenomenon, part technological and part commercial. The organization has now published one tangible product—a comparison among the OECD countries (which include Japan and Canada as well as the United States) of the condition of the industries for manufacturing electronic components. Few Europeans will be cheerful about the report. Even when it is possible to see what went wrong, it is hard to see how it will be possible to avoid the same mistakes in future.

The report (*Gaps in Technology—Electronic Components*, OECD, $3, 21*s*) has been prepared by a committee drawn from the member countries. Its transatlantic comparisons are telling. The report says that the important innovations in the components industry have usually been developed by a small number of United States companies, that "American companies are almost alone in a position to grant licences and sell their know-how on the international market", that outside companies have no substantial share of the market in the United States for components but that American firms dominate several markets overseas, and that American companies have a large and growing share of the export trade in components, particularly in the newer fields.

The scale of the disparity between mainland Europe and the other members of OECD is easy to appreciate. In 1955, Japan and the United States between them were responsible for two-thirds of the output of electronics components in the OECD. In the same year, 0·8 per cent of the GNP of Japan was accounted for by electronic components, compared with 0·40 per cent in the United States, 0·46 per cent in Britain and 0·43 per cent in France. These comparisons imply that the disparities of scale between the United States and the smaller nations are not so much a consequence of the intensity of effort deployed as of the size of the economy, although the report is also quick to point out that the production of components in the smaller nations includes a high proportion of older types of equipment.

Why is the United States so dominant? The OECD committee readily admits the importance of American marketing techniques in winning overseas markets, but it also asks, perhaps a little wistfully, that there should be a much more ready access to Government markets in the several OECD countries, and says that "the role of the Buy America Act is evidently of some

importance". The method just as much as the scale of government support for innovation is also singled out as an explanation of the success of the components industry in the United States. What has impressed the OECD committee is the direct connexion between government agencies and industrial companies in the United States. It acknowledges that the same methods are not applicable elsewhere, but suggests that other OECD nations should be on the look-out for ways of stimulating their electronics industries.

Management comes in for its customary drubbing, although the OECD committee has few specific complaints to make. Technological forecasting is one aid to success neglected by the Europeans, but the committee also complains of the lack of mobility of labour, particularly among scientists and engineers.

SPACE POLITICS

Will ELDO Last?

It was mid-November when the Third European Space Conference (ESC) in Bonn ended with (among others) a resolution that a "committee of high officials" should be set up to decide on the steps necessary to bring about the programme of jointly sponsored applications satellites that Mr Wedgwood Benn had proposed (at the conference) as the future main European space activity in lieu of the European rocket of ELDO. Despite a brisk timetable for various critical decisions on the path to a unified European space body pursuing a "useful" satellite programme, the first meeting of the "high officials" only took place this week, on March 27 in Paris. The chairman was Professor H. Bondi, director-general of ESRO, in his capacity as secretary-general of the European Space Conference in succession to Signor Carrobio.

All ESC progress has been held up by the continuing ELDO crisis, which has if anything worsened since November. It is, however, regarded as essential that decisions on the Europa rocket programme should be taken by ELDO or its rump in April. The ministerial meeting, without which recently ELDO has seemed incapable of making decisions, is being suggested for after Easter, no doubt after another meeting at the ministerial level of the "group of 4" (France, Germany, Belgium, Holland) which is determined to continue with the Europa rocket. Senior policy men from each of these countries last week visited Blue Streak facilities in Britain and, though nothing definite is likely to emerge immediately, they were apparently "suitably impressed".

Next October a draft constitution for a unified European space organization, which will bring together ELDO, ESRO and CETS, is to be ready, another responsibility for the high officials. It is already obvious this deadline will be missed, because little can be done until it is clear what form of ELDO—if any—there will be for amalgamation. The uncertainty over ELDO has also affected the speed of progress on the proposed European applications satellite programme. Answers on the CETS TV-relay satellite were called for by the end of February. Not all the countries (there are eighteen or so in the conference) have yet responded, however, and those which have are non-committal. Financing the programme is also hypothetical until it is known how much money will still be tied up in the expensive European launcher business.

Altogether the much quoted remark of Dr Stoltenberg, the German Science Research Minister, that activity in the European space field was "not very pleasurable" must be deemed an understatement. Nevertheless it is expected that the key decisions will have been taken and the new European space programme started, before the critical Intelsat conference setting the pattern for telecommunications for the foreseeable future is concluded. The first plenary session broke last week (March 20), and will not reconvene till November.

URANIUM SUPPLIES

Lean Years Ahead?

By 1973 or 1974, the world will need more uranium than it now seems likely to have available at a reasonable cost. A report, prepared for the Organization for Economic Cooperation and Development by the European Nuclear Energy Agency and the International Atomic Energy Agency (*Uranium: Production and Short Term Demand*, OECD, $1; 7*s*), estimates that in about four years the world production rate of U_3O_8 will have to increase from 23,500 short tons a year at present to around 38,000 short tons. The demand will rise with the increase in the use of nuclear power for generating electricity, which is rising steeply. By 1975, the installed nuclear generating capacity in the West will grow—according to the report—from the 26·0 gigawatts (1 GWe = 10^3 MWe) of 1970 to between 101 and 125 gigawatts. And the 38,000 short tons of fuel needed to sustain this growth corresponds to what OECD estimates is the world's limit of known uranium resources that can be mined within three to five years at a price below $10 a pound.

By 1973, of course, new amounts of low-cost uranium should have been discovered. The Americans are hard at work—24 million feet of exploration and drilling were carried on there in 1968—and the Canadians are willing and eager, but there are drawbacks. Uranium producers lost a lot of enthusiasm as their markets began to dry up when the military needs for uranium were satisfied around the beginning of the decade—uranium's peak year was 1959 when nearly 40,000 short tons of U_3O_8 were produced—and have not been happy about the uncertainties over the price of their product. There are not enough miners and in Canada in particular they have been sent to dig out other more commercially reliable metals. There are, however, two signs that the price in the future may be more stable. The OECD report says that production methods have improved, and arrangements between producers and buyers for supplies over long periods have been worked out. But, the report says, if substantial new sources of uranium are not discovered soon, the producers may hesitate to make long-term promises about deliveries.

If nuclear generating capacity is going to climb steadily in the next five years, it is going to soar after that. The real shortage could occur in the years from 1975 to 1980. After 1980, fast reactors, producing more fuel than they consume, should be in action (although they have been slow in development). That day is still too far distant for predictions about the effect of new reactors on the price of uranium. The report contents itself with saying that neither the advent of fast reactors nor the recycling of plutonium