Gram-positive bacterium has appeared. Whether this represents a true difference in the ability of either group of bacteria to allow the replication and maintenance of plasmids from the other group, or simply that conjugation cannot occur and transformation has just not been reported, remains to be elucidated.

Future research using P-group plasmids carrying Nif or other genes looks promising, both for studies of gene function in different environments and for the genetic analysis of Gram-negative bacteria. However, problems of instability and the reduction in the host range of such plasmids, as reported by Dixon, Cannon and Kondorosi, will need to be overcome. Also it has yet to be demonstrated that the type of recombination event involved in the formation of the RP4-Nif plasmid will provide a general method for making R′ factors in the future. □

PETRA : come and help

from David J. Miller

PLANNING the future of European high-energy physics is not a very cheerful exercise just now, but there is one major ground for optimism, despite the budget squeezes which seem to be happening all round. The Germans have announced that they will go ahead rapidly with the construction of their electron–positron colliding-beam accelerator—PETRA. This machine, which should begin operations before its American equivalent, called PEP, is very similar to the EPIC project which Britain recently decided to abandon. It gives European physicists a chance to play a leading part in understanding the "new physics" which has emerged with the discovery of weak neutral currents and of the J/psi family of particles.

In deciding to build PETRA, Germany has shouldered a very heavy financial burden and it has been made clear that she cannot, by herself, afford to provide the large detection systems which such a machine will need. International collaborations are therefore being encouraged to bring equipment, expertise and manpower to join in the experimental programme. As a first houseparty to introduce possible collaborators to one another, the European Committee on Future Accelerators (ECFA) sponsored a meeting during the first week of March at the Frascati laboratory near Rome. It was attended by physicists from universities and laboratories throughout Europe, the United States and Japan. Theoretical predictions were reviewed, confirming the enormous range of worthwhile physics available to the machine; experimental techniques were considered, and the basic parameters of PETRA were presented. The meeting became more political during the later part of the week when people put forward specific ideas for experimental equipment, and possible collaborators began discreetly to have lunch together. Professor Schopper, head of the laboratory where PETRA will be built, warned of the three essential steps in setting up a "marriage" between collaborating groups. First it is necessary to recognise the beauty of the prospective partner—how good are their ideas? This is usually clear on brief aquaintance, but the second question is more delicate—do they have money, or rather, do their parents (their governments) have money? Finally, one has to judge whether the collaborating groups are likely to be compatible throughout three or four years of hectic collaboration, with many crises to be survived.

A large proportion of the first sketches of apparatus for PETRA looked almost identical. The classic general purpose detector has a superconducting solenoid magnet with diameter and length between $1\frac{1}{2}$ and 6 metres. It is filled inside with drift chambers to reconstruct charged-particle tracks coming from $e^+ e^-$ collisions, and it is surrounded by electron, photon and muon detectors. Other schemes were also suggested which laid greater stress on detecting electrons and photons in particular, or on muons, or on recognising the exact identity of strongly interacting particles. The British contingent, representing half-a-dozen universities and the Science Research Council laboratories, presented a general purpose solenoid detector which had been costed more carefully than many of the other systems discussed. The estimated price is about £2 million, and it is unlikely that all of this could be found from Britain alone since it would consume too large a fraction of the total national funds available for experiments at CERN and during the last years of NIMROD. In fact, none of the nations represented at the meeting seemed keen to pay for the whole of such a device by itself.

Courtships begun at Frascati must progress quickly. In order to have equipment ready for the first 15 GeV PETRA experiments in 1979 it will be necessary to start building the apparatus in the autumn of this year at the latest. The machine will eventually be able to accommodate six separate detectors, each enclosing a collision point of the two beams, but only two collision points are to be available at first so there will be strenuous competition to win one of these places. The British group, backed by the expertise of the Rutherford Laboratory in superconducting magnets, seemed to be among the more popular debutantes at Frascati. If the SRC is able to provide a respectable dowry, commensurate with expenditure on individual CERN experiments, then there is a good chance that a match can be made with one or more of the strong European groups, and that Britain will take part in $e^+ e^-$ physics in 1979 despite the loss of EPIC.

The strong, weak and electromagnetic interactions are so fundamental to all modern science and technology that we often behave as if we understood them, merely because we can use them. But major changes in our understanding are now taking place, and no-one doubts that results from both CERN and PETRA will be important in consolidating these ideas. European collaborations have played a major part in the first wave of the "new physics". Even in a time of economic troubles it would seem foolish for any government to allow its physicists to lose touch with this frontier of knowledge. □

New view of the cell cycle

from Robert Shields

THE period between successive cell mitoses is conventionally divided into four phases—G_1, the period between mitosis and the onset of DNA synthesis, S the period of DNA synthesis, G_2 the time between completion of DNA synthesis and the beginning of mitosis itself. Measurements of these phases show that whereas G_2, M and S are of relatively constant duration G_1 can attain widely different values depending on the conditions. Even within cell populations G_1 is usually highly variable in duration and the distribution of intermitotic times (times between successive mitoses) is invariably skewed towards longer time intervals. The conventional explanation for this skewness has been that it is some kind of reflection of hetero-