

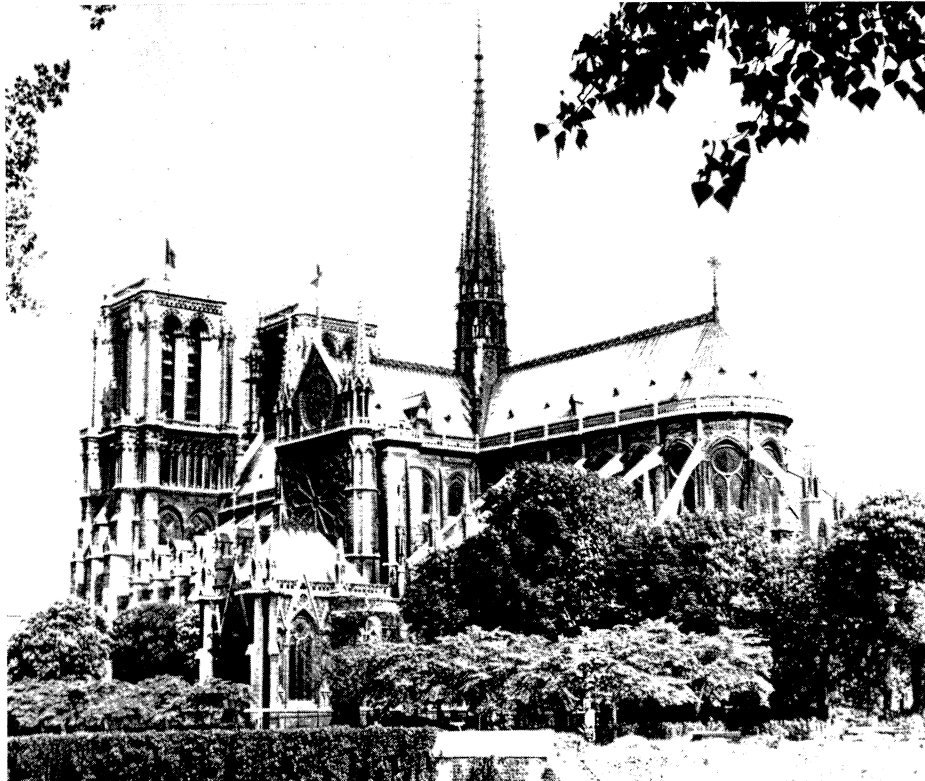
Paris Conference

While this issue was being prepared to go to press, the twenty-first International Conference on High Energy Physics took place in Paris from 26-31 July. Although no unexpected major new discovery was announced, a wealth of new results, data and ideas was presented.

This was the first major international physics meeting to hear detailed results from the newly available 540 GeV record collision energies at CERN's SPS proton-antiproton collider. These energies were previously attainable only in cosmic rays. A plenary session was given over to the physics results from four experiments. These appear to be largely consistent with the cosmic ray findings. A major exception is the unexplained very high charged multiplicity cosmic Centauro phenomenon, which has yet to be found under SPS collider conditions. Comparison of collider results with lower energy data makes for interesting insights. Of course the amount of data recorded by these experiments is still very limited and more advances could result from higher proton-antiproton collision rates.

There was a major resurgence of interest in jet physics, with impressive new evidence for production of confined clusters of secondary hadrons now seen at both the CERN Intersecting Storage Rings and at the SPS collider.

The implications of proton decay, predicted by lofty theoretical aspirations to extend the unification of Nature's different forces, were much discussed. The experimental searches for proton decay, big passive experiments mounted deep underground, now provide an interesting contrast to the conventional experimental scene at the major accelerator centres. More candidate proton decay events were reported, this time from the newly commissioned



detector in the Mont-Blanc tunnel as well as the Kolar Gold Fields experiment in India, which reported its first proton decay candidates last year.

While the possible magnetic monopole signal observed recently at Stanford was not reported directly, there was much talk of the continued search for these long predicted magnetic charges. No signals have been seen in other experiments. An idea for proton decay to be catalysed by magnetic monopoles was much discussed in theoretical circles.

Quantum chromodynamics, the candidate theory of quark and gluon interactions, is still labouring uphill. However the theory is not yet in conflict with experiment, even though its predictive power might sometimes be limited. The recent successes of gauge theory calculations on a lattice seem to point to one possible way out of the quagmire. At the Conference, the coverage of non-perturbative QCD was less than initially advertised because of the inability of A. Polyakov to attend.

In mainstream physics, results from electron-positron annihilation and from fixed target experiments with lepton and hadron beams are largely in agreement and generally well understood, although a few corners remain to be tidied up and some explanations found.

The spectroscopy of new particles is filling up nicely, thanks in particular

to the experiments at Cornell's CESR electron-positron ring. Lifetime measurements too are converging. There is still no direct evidence for the sixth quark flavour, despite the accumulation of confidence in favour of a theory based on six types of quark and three types of lepton. There is not yet any definitive evidence for glueballs — particles made up of gluons rather than quarks — although there is no shortage of candidate particles from a variety of experiments.

The Conference was impeccably organized. Even with 1200 participants and up to five parallel sessions, everything clicked smoothly into place. Despite the sheer size of this biennial event these days, which many people find daunting, at Paris there was nevertheless plenty of opportunity for people to meet and discuss matters of common interest. As well as the physics presentations, there were sessions on detectors and new machines, poster displays and much, much more. A fuller report of the Paris Conference will be published in our October issue.

(Photo G. Bertin)