Twelve years at DESY

David Cline - reviewing thirty years of neutral current research.

D. Cline. The discussion centred on why Fermilab failed to get the early collider programme started, thus failing to compete for the big discoveries, and the brilliant CERN accelerator team that made the proton-antiproton collider a reality.

An interlude was speculation on the role of neutral currents in a possible connection between the chirality (left-right handedness) of life. Dilip Kondepudi (Wake Forest) presented an interesting study of the mechanism by which a small symmetry breaking WNC interaction in the prebiotic period on earth could be amplified into the full chiral symmetry breaking observed in all life forms. Hangyo Wang (UCLA) showed new simulations on the same theme.

Carl Wieman (Colorado) surveyed the past and future of atomic physics parity violation measurements. These beautiful table-top experiments will soon provide new precision in this field.

Sandip Pakvasa (Hawaii) recalled the confusion and developments during the period 1974-1978 until the Standard Model was finally established. Robert Burman (Los Alamos) described neutral current studies with low energy neutrino beams and the observation of W/Z interference effects.

Turning to the future, Vernon Barger (Wisconsin) peered beyond the Standard Model, emphasizing the phenomenology of supersymmetry, and Mark Ito (Princeton) described past and future searches for new decay modes in K decays. Ahmed Ali (DESY) looked at the b quark sector and the observation of neutral B meson mixing by UA1 and ARGUS.

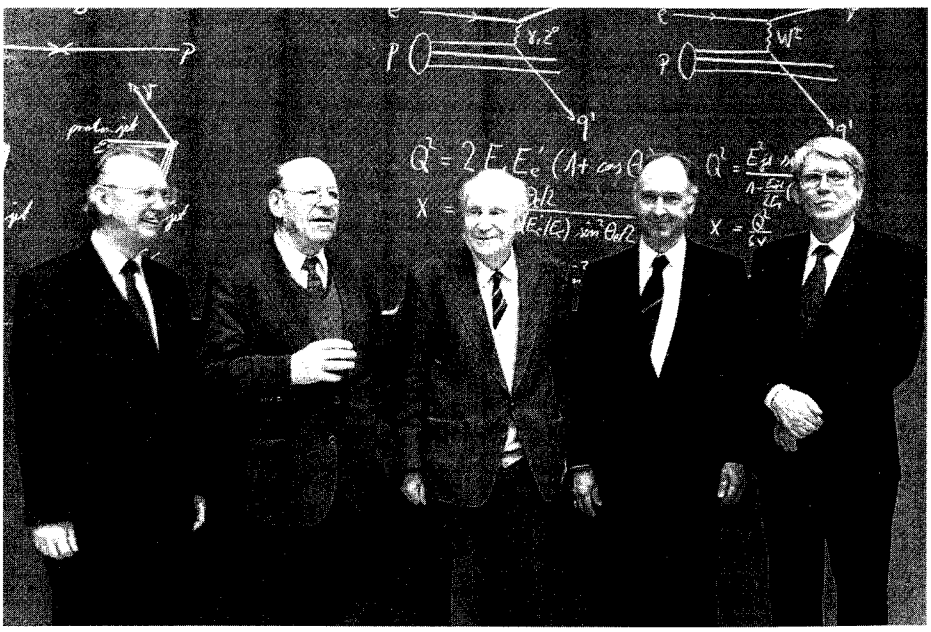
Participants enjoyed the informal discussion and informed recollections of an exciting period in particle physics, a period when small groups of scientists made major breakthroughs, a contrast when imminent experiments at the SSC and LHC will involve groups of 500 to 1000 people.

The proceedings of the meeting, published by American Institute of Physics, will be edited by D. Cline and A.K. Mann.

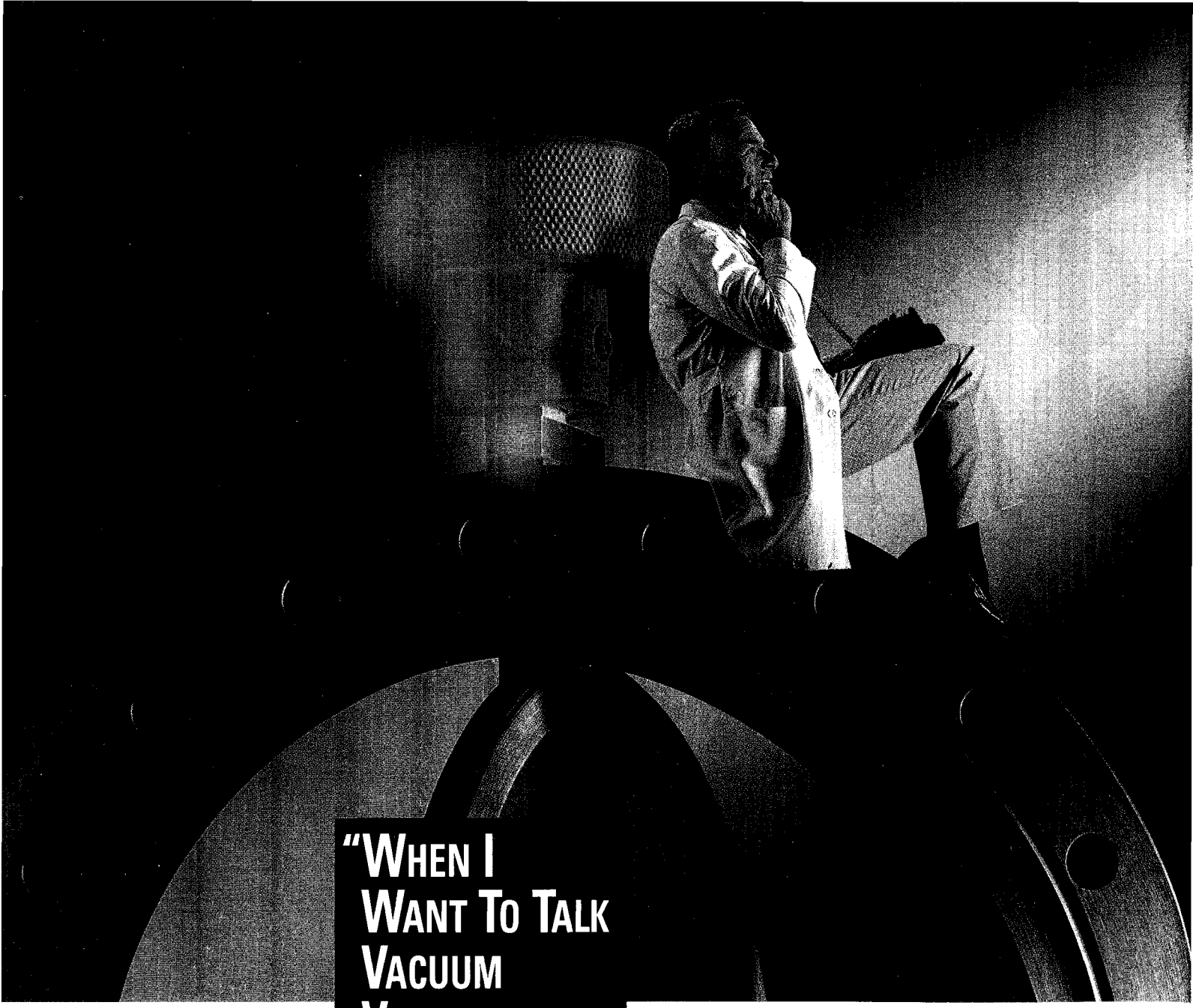
From David Cline (UCLA)

As reported in our previous issue (page 27), on 28 February Volker Soergel stepped down after serving as Chairman of the Board of the DESY Laboratory in Hamburg since January 1981, when the previous chairman, Herwig Schopper, moved to become Director General of CERN. DESY is now headed by Bjorn Wiik.

During the twelve years of Soergel's mandate, DESY substantially evolved and progressed. Dominating the landscape was the big HERA electron-proton collider - the world's first - proposed, approved, constructed and commissioned under Soergel's leadership. As well as pioneering electron-proton collisions, HERA also broke new ground in international collaboration. At the approval of the project by the German government, it had already been made clear that both the machine and its experiments had to be built with full international cooperation, using material contributions from foreign institutes. With the difficult task of transforming these require-



Historic picture by Pedro Waloschek of all the Chairmen of DESY's Board of Directors since the foundation of the Hamburg Laboratory in 1959. Left to right - Herwig Schopper (3rd), Wolfgang Paul (2nd), Willibald Jentschke (founding), Volker Soergel (retiring), Bjorn Wiik (current).



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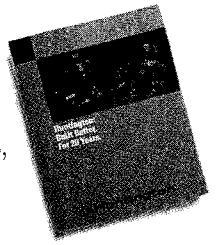

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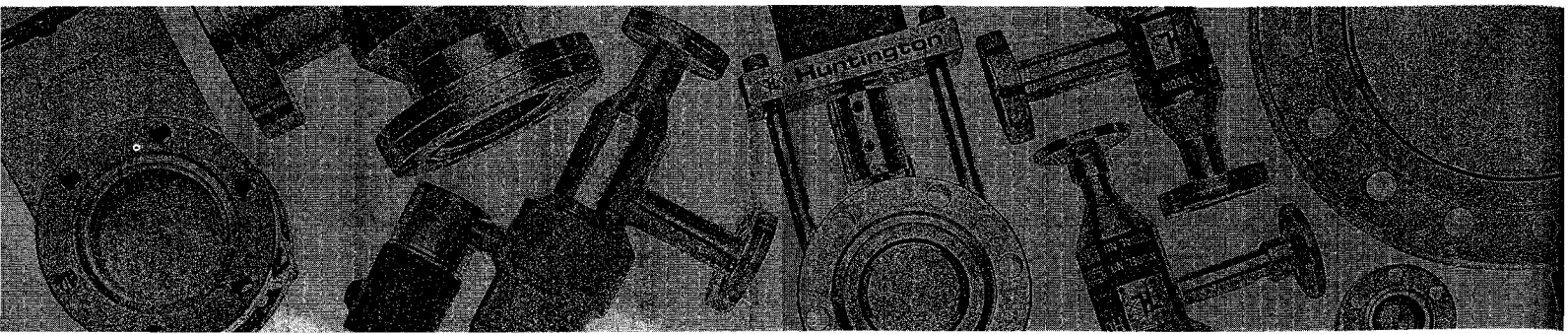

ments into hard reality, Volker Soergel succeeded brilliantly. The 'HERA model', with interested countries pledging contributions in equipment and/or manpower, established a new route to major project involvement.

For HERA, the substantial Italian contribution, organized by Antonino Zichichi, was vital to the success of the project.

Attesting to the success of the HERA preparations, physics results from the big H1 and Zeus detectors were presented last year and the machine is rapidly approaching its design performance.

Away from HERA, the PETRA electron-positron collider continued to operate for physics until 1986, when it embarked on a new career as HERA injector. The observation of gluon jets and deep studies of quark/gluon field effects were PETRA's main physics claim to fame.

Electron Laboratories are inextricably linked with synchrotron radiation (SR) schemes. At DESY, the SR potential of the DORIS ring, in use since 1974, was extended with a new hall, inaugurated in 1981, a building added for X-ray angiography and medical research, another for molecular biology, and finally a new curved section on one side of the ring providing additional space for extracted beams. DESY now provides an impressive array of SR facilities.

Meanwhile the Argus experiment continued as the flagship of DORIS particle physics, providing many valuable results in heavy quark physics.

Away from physics, the Laboratory also played its part in German reunification. The Institute of High Energy Physics in Zeuthen, south of Berlin, formerly in East Germany, is now part of DESY, under an agreement between the Federal Government, the City of Hamburg and the 'Land' of Brandenburg.

Even before the iron curtain was drawn back, DESY in general and Volker Soergel in particular fostered good relations with Laboratories in Eastern Europe. While political obstacles have been removed, economic ones remain, and the tradition of cooperation with Eastern Europe will be maintained in this important transition period.

The Soergel era also saw closer ties with universities, where he cultivated a university-like atmosphere in the big Laboratory.

In these and many other issues, Soergel's pragmatic and direct approach was continually fruitful, as concurred by the scientists, politicians and DESY staff who took part in the retrospective event in his honour held at DESY on 25 February.

While he has returned to the University of Heidelberg, Volker Soergel remains in close contact with DESY as a member of the Laboratory's Scientific Council.

Around the Laboratories

CERN/STANFORD
And now, what makes the neutron spin?

The annual Rencontres de Moriond in the French Alps traditionally provide a clothes line on which to hang interesting new physics results while they are still wet. This year's meeting, from March 20-27, saw exciting news on nucleon spin structure, with the Spin Muon Collaboration (SMC) from CERN and the E142 experiment from Stanford announcing results from data taken in 1992.

Both experiments were proposed shortly after the 1987 surprise from the European Muon Collaboration (EMC), when the combination of EMC and earlier Stanford (SLAC) data indicated that little of the proton spin is carried by valence quarks. Spin - the proton's main space-time quantum number - seemed to come mainly from the 'sea' of accompanying quarks and gluons.

The SMC and E142 experiments have investigated the spin structure of the neutron, and have tested for the first time the Bjorken sum rule. This is a fundamental prediction of quark-gluon field theory (quantum chromodynamics - QCD) which relates the difference between proton and neutron spin structure to well known coupling constants from neutron beta-decay.

At Moriond, SMC showed the spin structure of the deuteron from spin-oriented (polarized) muons probing deep inside polarized deuterons, over a wide kinematical range (x, the fraction of the nucleon momentum carried by quarks, running from 0.006