

Burt Richter – new chair at Stanford.



On people

Burt Richter of SLAC, joint Nobel Laureate for 1976 following the discovery of the J/ψ particle, has become first holder of a newly established chair at Stanford University — the Paul Rigott Professorship in the physical sciences.

The J. Robert Oppenheimer Memorial Prize, awarded annually by the Center for Theoretical Studies at the University of Miami, went this year to Richard H. Dalitz. The award was presented by Paul Dirac.

CERN Research Director General Leon Van Hove has been elected Foreign Associate of the US National Academy of Sciences, and has also become a Foreign Member of the American Philosophical Society.

and TASSO collaborations at PETRA; the study of pion-pair production in the low energy region at DCI (Orsay); and the observation of a dozen jet-pair events obviously due to the photon-photon mechanism, again by the PLUTO collaboration.

After a general introduction on the history and the problems by P. Kessler (Collège de France), the experimental work was introduced by G. Barbiellini (CERN and INFN). The results and projects of the various groups at PETRA were presented by C. Berger (Aachen) for PLUTO, E. Hilger (Bonn) for TASSO, J. D. Burger (M.I.T.) for MARK-J, H. Wriedt (Lancaster) for JADE, and M. Goldberg (Paris) for CELLO. Recent data obtained at DCI by the Orsay/Clermont-Ferrand collaboration were shown by J.-C. Montret (Clermont-Ferrand). P. Jenni (SLAC and CERN) gave a review of the study of photon-photon processes at SPEAR. D. Burke (SLAC) presented the experimental programme at PEP, and J. Field (DESY) described the possibilities at LEP. F. Vannucci (LAPP) discussed the contribution of the photon-photon mechanism to lepton pair production in proton-proton collisions and showed some data obtained at the CERN ISR.

Problems of analysis, at the border of experiment and theory, play an important role. A. Courau (Orsay) spoke about 'Tagging and identification'; J. Vermaseren (CERN) discussed mutual contamination between one-photon and two-photon processes; C. Carimalo and J. Parisi (Collège de France) treated problems of 'back-factorization' and G. Cochard presented some recent calculations on radiative corrections.

The theoretical part of the Workshop was introduced by J. Smith (Stony Brook) who showed the

results of computations of pair production (including heavy lepton and charm particle pairs). M. Greco (Frascati) discussed hadron production at low energy — mainly resonance production and applications of Regge-pole theory. J. Gunion (Davis and SLAC) treated QCD applications in general, T. Walsh (DESY) concentrated on deep inelastic effects and the determination of structure functions of the photon. Finally, C. Llewellyn Smith (Oxford) discussed 'Present trends in elementary-particle theory'.

A large part of the Workshop was devoted to parallel sessions. In the theoretical sessions (discussion leader K. Kajantie of Helsinki) subjects discussed were: the equivalent photon approximation; radiative corrections; lepton-pair production in proton-proton collisions; and some QCD applications (glueball production). In the experimental sessions (discussion leader G. Barbiellini) discussions were mainly devoted to machines and detectors for the study of photon-photon processes; suggestions were also presented on the use of the mechanism for luminosity measurements in colliding beam machines. The summary talk was given by G. Altarelli (Rome).

(A preliminary report of some of the results announced at this Workshop was included in our June issue, page 152.)

and things

David Shirley, new Director of the Lawrence Berkeley Laboratory.



Andrzej Wroblewski, Director of the Institute of Experimental Physics of Warsaw University, has been awarded the degree of Doctor Honoris Causa by Siegen University. Professor Wroblewski has been involved in bubble chamber physics for many years at CERN, Serpukhov and Fermilab and is particularly well known for his work on empirical laws of multiparticle production in high energy hadron collisions.

At a ceremony at the University of Geneva on 5 June, Jean-Pierre Blaser, director of the Swiss Institute for Nuclear Research (SIN) at Villigen, received the honorary degree of doctor of science.

Gerald T. Garvey, Argonne's Associate Laboratory Director for Physical Research, has taken over responsibility for the Laboratory's High

Energy Physics and Accelerator Research Facilities Divisions.

HEPAP plea for more USA accelerator research

In 1979, the USA Department of Energy set up a subpanel of HEPAP, under the Chairmanship of M. Tigner from Cornell, to review the overall quality and scope of the high energy accelerator research and development effort in the USA high energy physics programme (see November 1979 issue, page 367). The subpanel reported in May with what Maury Tigner described as a 'call-to-arms' to the USA high energy physics field in general to devote more attention to long range accelerator research.

Research in this field absorbs at present only about 1.5 per cent of the USA high energy physics operating budget and the subpanel believes that this figure should at least be doubled. Particular topics for accelerator research which are identified now are high field superconducting magnets (i.e. beyond the field levels attainable with niobium-titanium superconductors), superconducting radiofrequency cavities (essential for energy conservation at very high energy electron storage rings), new accelerator concepts (such as laser-driven devices and high current linacs) and the study of machine characteristics which limit performance.

Rutherford Laboratory Open Days

'Open Days' at the Rutherford and Appleton Laboratories are scheduled for 8-12 July. Under the theme 'Quarks to Quasars' the work of the Laboratories in support of UK Universities, Polytechnics, Government Departments and Industry

will be presented; exhibits cover a wide range of scientific and engineering disciplines. In the field of accelerators and high energy physics, displays show preparatory work for the Spallation Neutron Source, including the completed 70 MeV proton linac, and of apparatus and electronics involved in several of the large experiments for the CERN and DESY accelerators. Any inquiries about the Open Days can be addressed to the 'Open Days Secretariat', Rutherford and Appleton Laboratories, Chilton, Didcot, Oxon OX11 0QX, U.K.

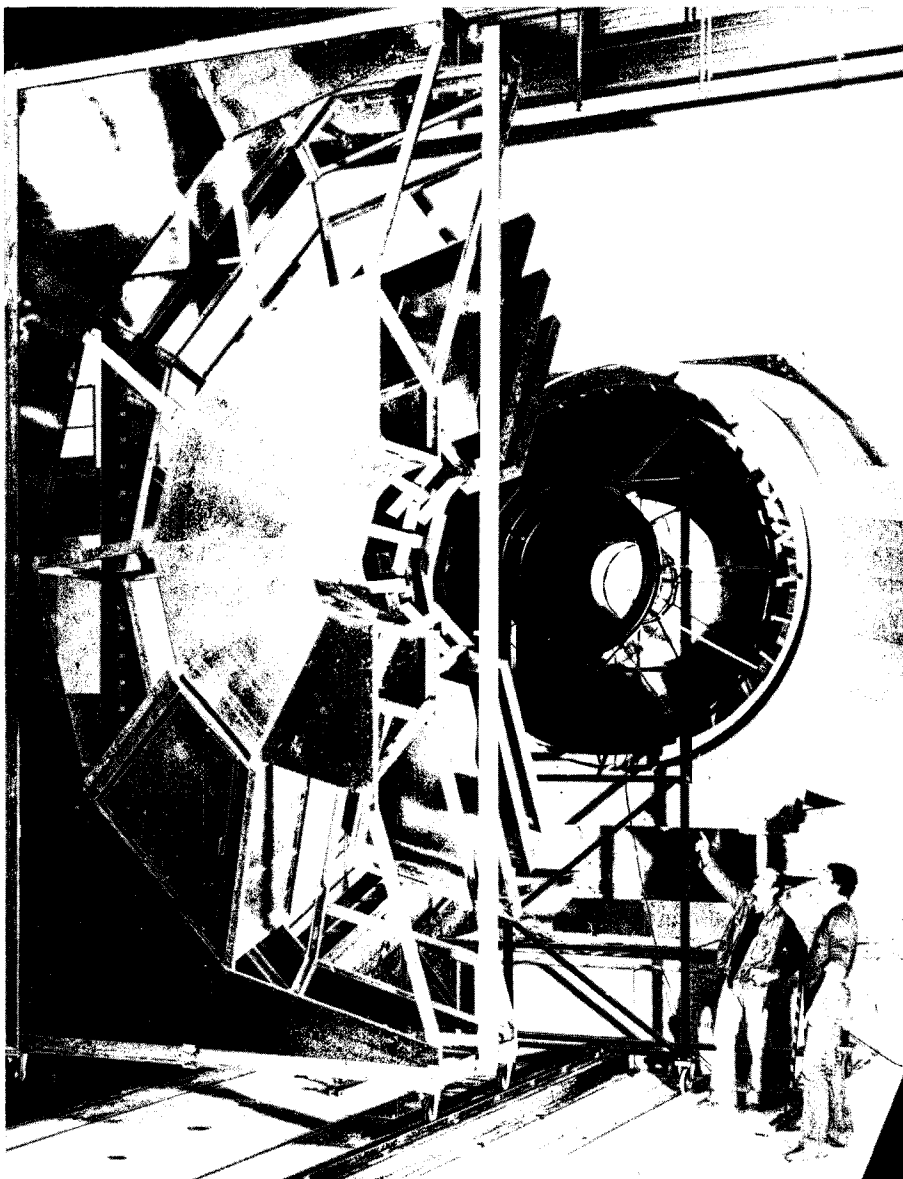
The Eighth International Vacuum Congress is being held from 22-26 September at Cannes, France. It will cover all aspects of vacuum science and technology, with the focus on fundamental and applied research. Further details from Société Française du Vide, 19 rue du Renard, F-75004 Paris.

SPS Programme Review

The SPS Experimental Committee (SPSC) is to hold a meeting at Cogne, Val d'Aosta, from 8 to 12 September preceded by an open meeting at CERN on 5 September. The Cogne meeting will review the experimental programme at the CERN accelerator and establish guidelines for the programme after the long shutdown during which the SPS will be prepared for proton-antiproton physics. The meeting will be examining the implications of reduced support for the SPS programme during the period of LEP construction, the balance between fixed target and colliding beam physics and the implications of higher energies at Fermilab when the Tevatron comes into operation. Reports on present experiments

A full-scale model for the UA2 experiment for the proton-antiproton collider at the CERN SPS. For a progress report on this experiment, see the June issue, page 147.

(Photo CERN 128.5.80)



and future plans for experiments after the shutdown have been requested to be sent to the Committee before 1 September.

Omega minus antiparticles

The first measurement of the production rate of omega minus antiparticles comes from a Bristol/Geneva/Heidelberg/Orsay/Rutherford/Strasbourg collaboration using

the charged hyperon beam at the CERN SPS (see July/August 1978 issue, page 257). The latest results from this experiment compare the production rates of different baryons and antibaryons under the same kinematical conditions, and provide important input for theories of hadron dynamics. The experiment measures the more abundant particles using a DISC Cherenkov, however rarer particles, such as the

anti-omega, have to be picked up through their decay products. Fifteen examples have been found of an anti-omega decaying into an antilambda and a positive kaon. It is found that the antibaryon to baryon ratio increases quickly with strangeness. Under the actual experimental conditions, antiprotons are seen a thousand times less frequently than protons, while anti-omegas are only three times as scarce as the omega minus.

Successful production of superconducting magnets

To produce a large increase in the luminosity at one point in the Intersecting Storage Rings, CERN decided to introduce superconducting quadrupoles at a beam intersection region. In addition to the physics interest of the higher event rate that will thus be made possible, there are two other interests to which the project can contribute — to check the ability in European industry to produce superconducting magnets to the required tight specifications and to check the performance of the magnets in the demanding environment of storage rings.

The first of these questions has now been answered in the affirmative. Eight superconducting quadrupoles have been produced by industrial firms according to CERN design and manufacturing specifications and have been successfully assembled and tested at CERN. The horizontal cylindrical cryostats, which contain windings and steel yoke in a boiling helium bath, have a 173 mm warm bore. For 31 GeV beam energy, the maximum operating gradient on the quadrupole axis is 43 T per metre and the maximum field in the windings is 5.5 T.

Four of the quadrupoles have

The injection end of the radio-frequency focusing quadrupole which has been successfully tested at Los Alamos. Tank diameter is 11 cm. The new RFQ technology (see May issue, page 108) may have fruitful applications in several accelerator schemes.

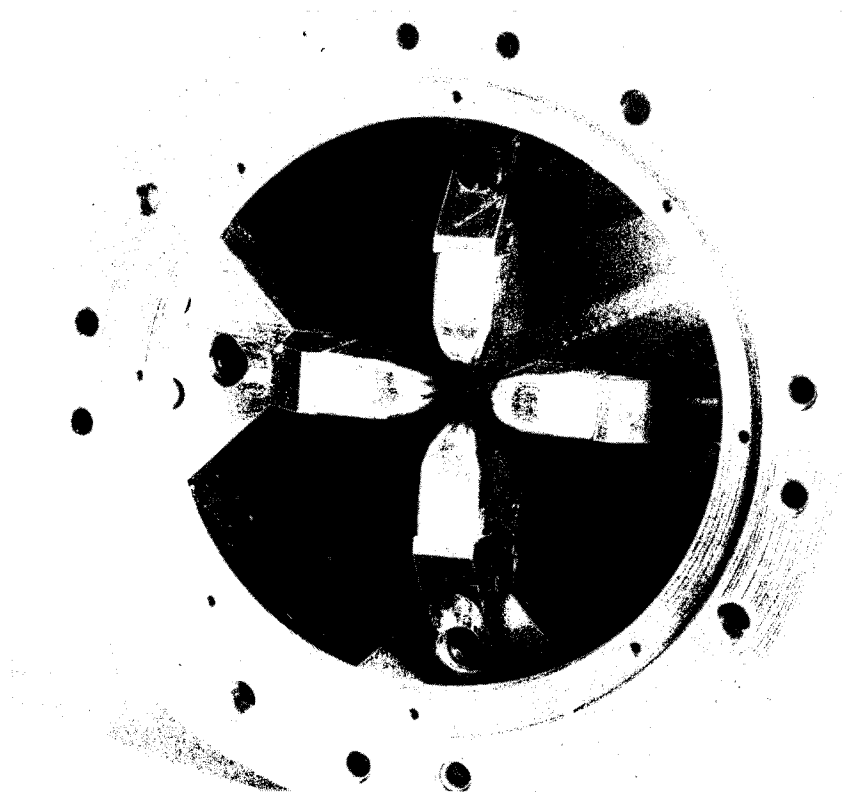
(Photo Los Alamos)

1.15 m and four 0.65 m magnetic lengths. They have been manufactured by the Alsthom-Atlantique factory in Belfort, using superconducting wire supplied by Vacuumschmelze, Hanau. The cryostats have been supplied by Leybold-Heraeus, Cologne.

Magnetic measurements, which finished in May, have shown that performance and field quality meet the specified requirements for the high luminosity insertion. Installation in the ISR will take place during the long shutdown starting in mid-August.

Proton radiography at Argonne

Recent results from the Argonne research into the possibilities of improved radiography using proton beams was reported in the May issue of 'Radiology'. Using a 205 MeV proton beam and test objects made of lucite or excised soft human tissue, accuracies in thickness measurement are now approaching 0.1 mm (equivalent to detecting a difference in mass smaller than one per cent across the specimen). The technique (described for example in the September 1974 issue, page 303) monitors the proton energy absorption, related to the density of the object transversed. Tumour detection and organ abnormalities should be detectable with radiation doses over an order of magnitude down on conventional X-ray methods, in addition to revealing far more detail. The Argonne work was promoted in the early days by Ron Martin and the recent results were reported by Steven Kramer. One of our favourite remarks is Ron's 'Anyone who closes down accelerators like the ZGS needs his head examined and here at Argonne we are developing just the tool to do it with'.



A CHEER for Fermilab

The annual Woods Hole meeting of the US HEPAP subpanel in early June, which surveys the US high energy physics scene, received a submission from Canadian physicists for the construction of an electron machine at Fermilab to make electron-proton colliding beam physics possible. The machine goes by the name of CHEER — Canadian High Energy Electron Ring.

For many years, the Canadian high energy physics community has benefitted greatly from contacts with its near neighbours in the US and from access to advanced accelerator facilities, like Fermilab. In April 1979, the Canadian Institute of Particle Physics (IPP) decided to review the contributions Canada could make in the next five to ten years. A Workshop discussed a

wide variety of projects and emerged with a proposal to study the feasibility of electron-proton physics.

An Electron-Proton Steering Committee has been set up with Richard Hemingway (IPP) as Chairman, Nathan Isgur (Toronto) as Physics Coordinator, Doug Stairs (McGill) as Machine Coordinator, Cliff Hargrove (National Research Council, Ottawa) as Detector Coordinator and Jim Prentice (Toronto) as Strategy Coordinator.

Workshops were held at Fermilab in February and Toronto in April, and a third is scheduled at Carleton University, Ottawa, at the end of June. Physicists from twelve Canadian Universities are involved, together with participants from Chalk River, TRIUMF, the National Research Council and IPP, together with US colleagues.

Leon Van Hove (left) fires the starting pistol for the traditional annual relay race around the CERN site.

(Photo CERN 67.6.80)



The unique physics interests of experiments using colliding electron-proton beams were outlined in the article on the HERA project at DESY (see May issue, page 99). The plan which is emerging for CHEER foresees a 300 MeV electron linac feeding a 2 GeV booster. The 2 GeV electrons would pass into a 10 GeV storage ring, giving 10 GeV electrons colliding with 1000 GeV protons from the Tevatron. Design luminosity is 10^{32} per cm^2 per s. Attention is being given to ensuring the availability of polarized electron beams. Detector design, given the rather restricted space in a Tevatron ring long straight section, is under way.

Canadian physicists are optimistic about the prospect of securing funds for the project, the tentative cost estimate for which is about 60 million Canadian dollars. CHEER is emerging in a climate of assur-

ances of much higher budgets in Canada for research and development. It is hoped that the feasibility study can be completed this summer and the proposal submitted to the Natural Sciences and Engineering Council on 1 September with the hope that it can be included in the budget presentation of 31 October. Funding could then be released from 1 April next year for detailed design work, and a year later for construction. If this optimistic schedule is met, CHEER could be in action in 1985.

Proceedings available

The Proceedings of the X International Symposium on Multiparticle Dynamics held last year in Goa, India, are now available on order from Prof. P. K. Malhotra, Bubble Chamber Group, Homi Bhabha Road, Bombay 400 005, India. Price

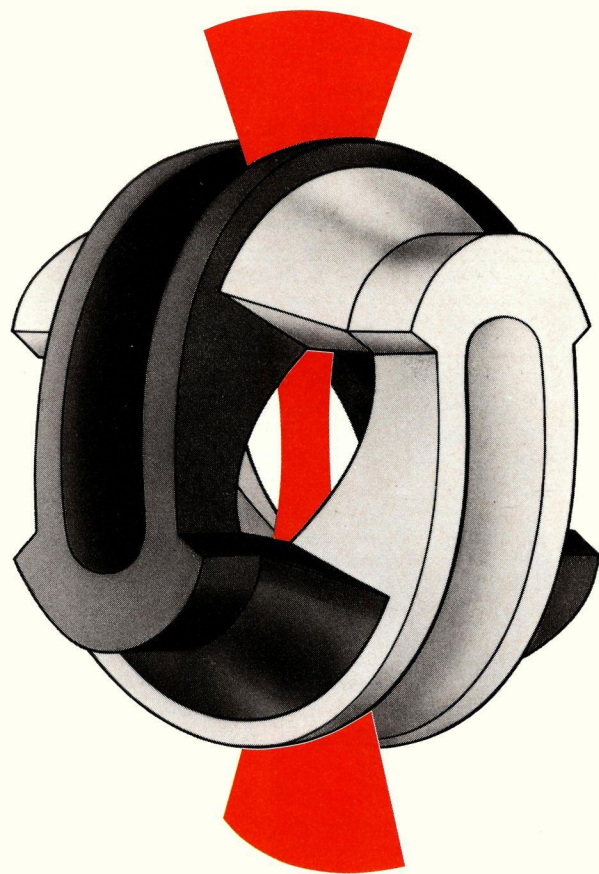
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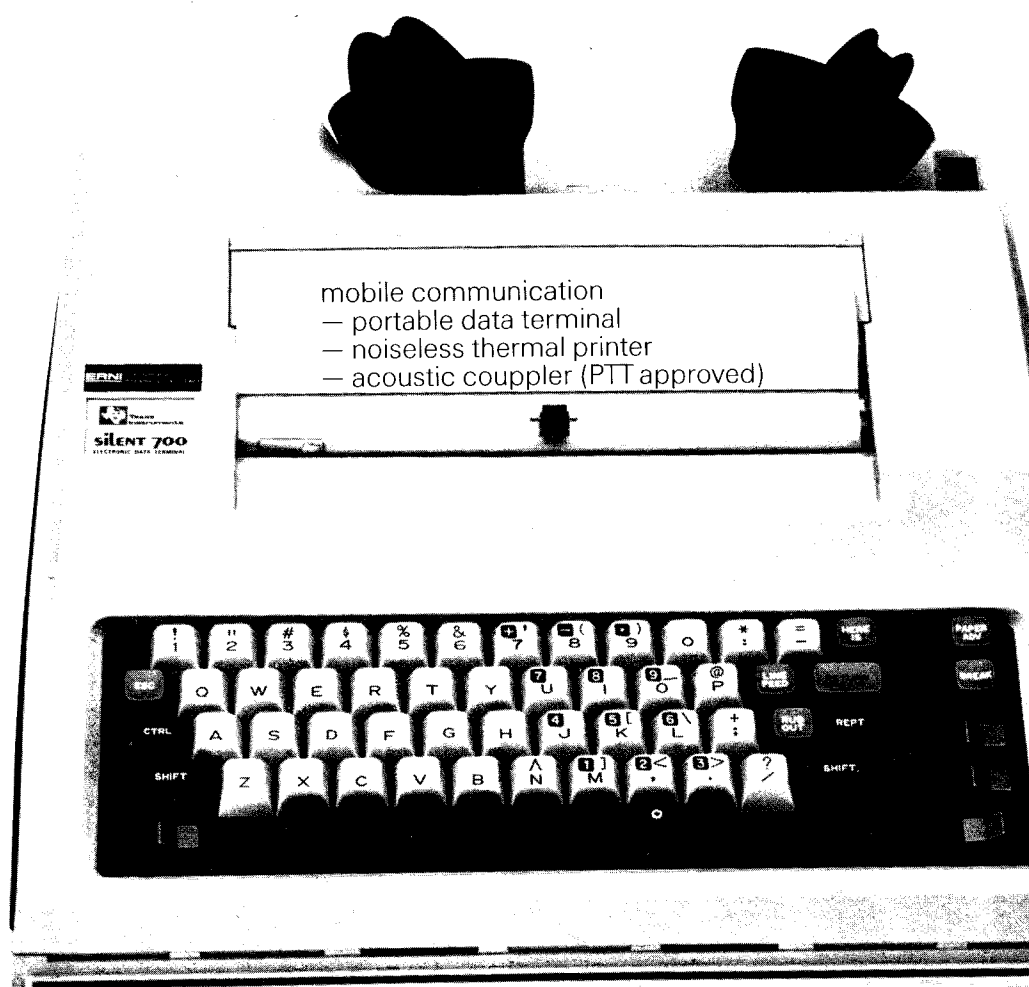
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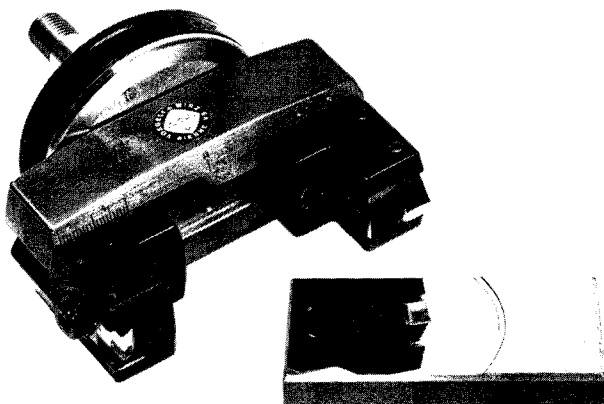
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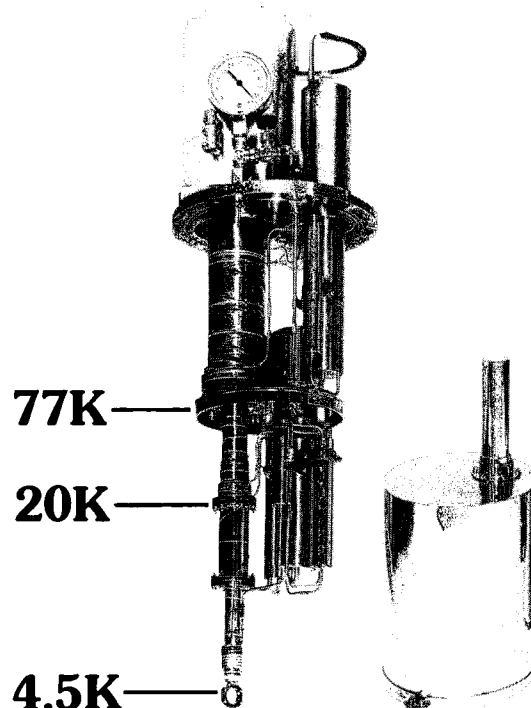
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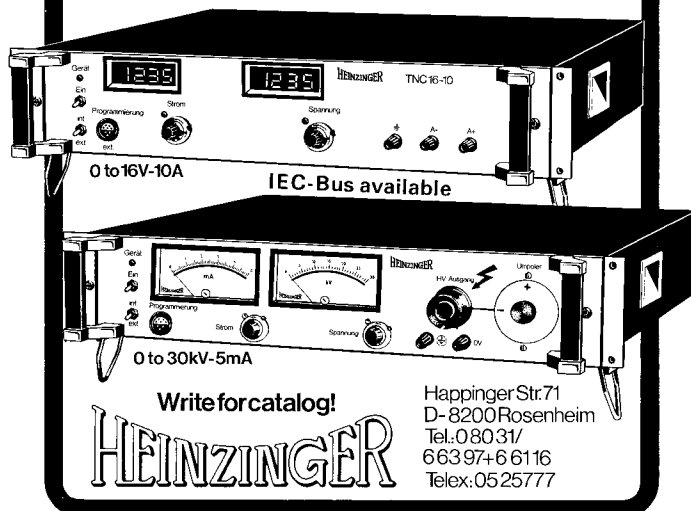
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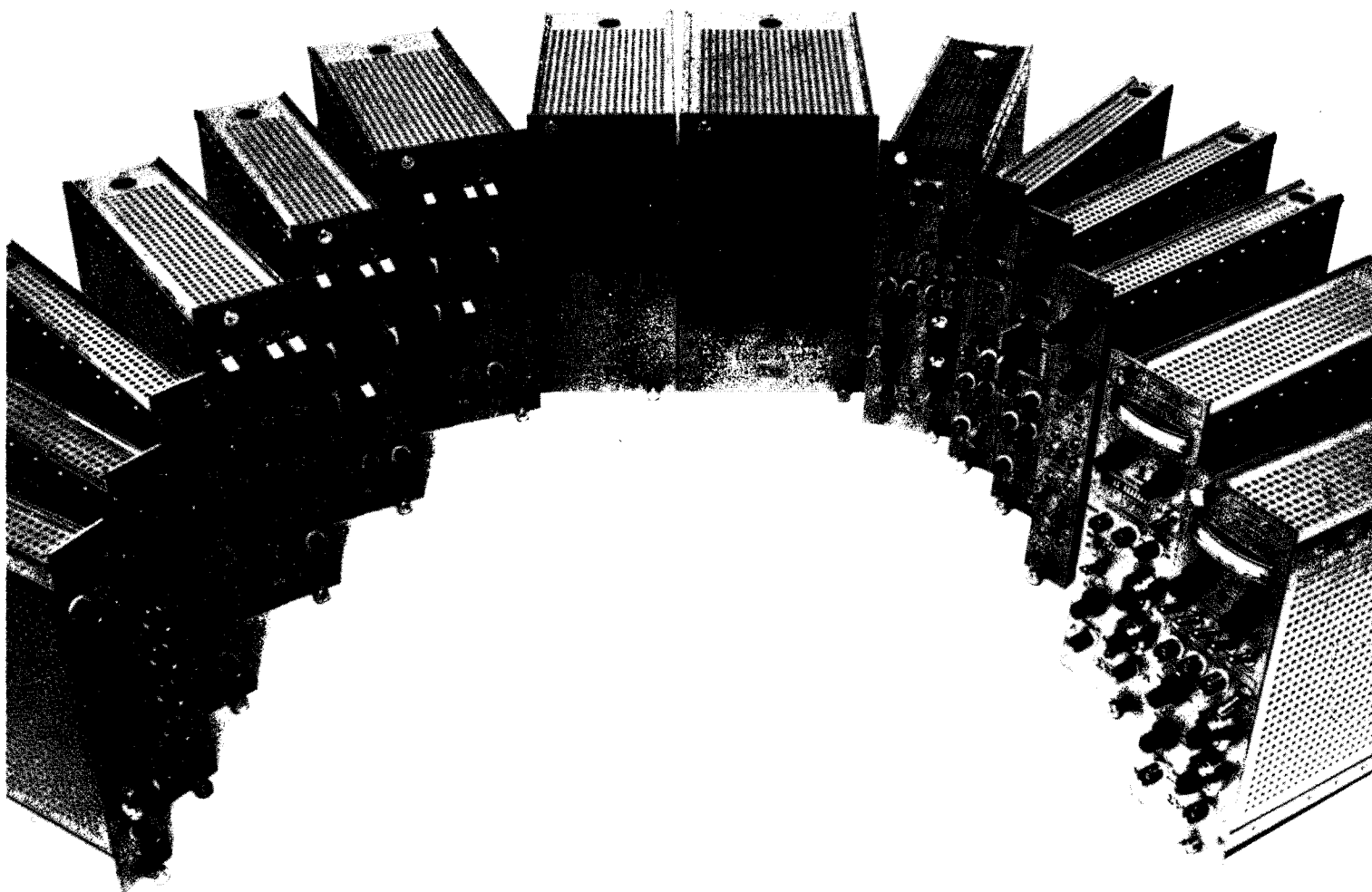
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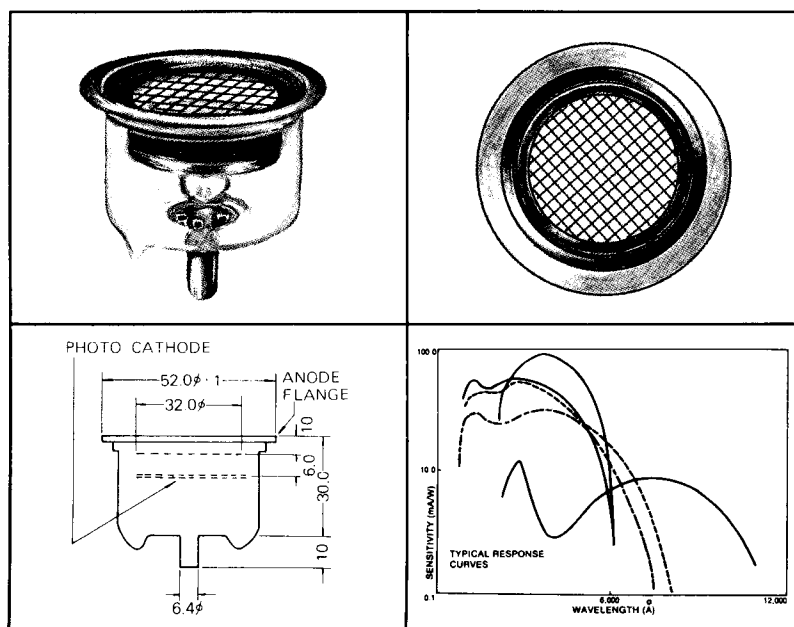
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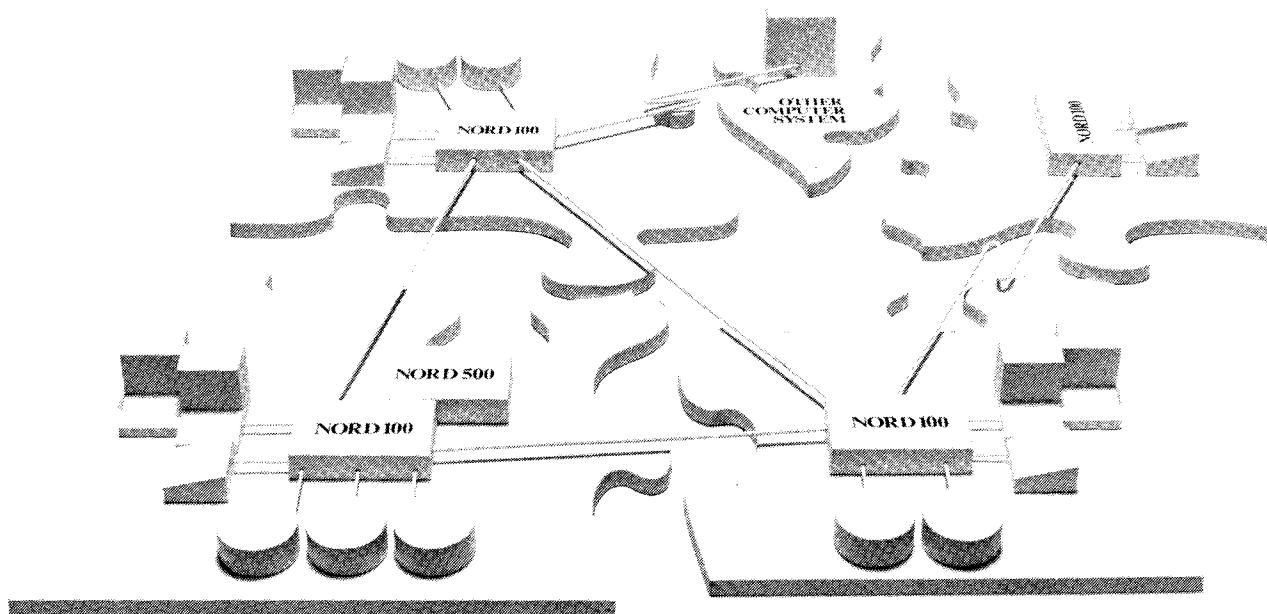
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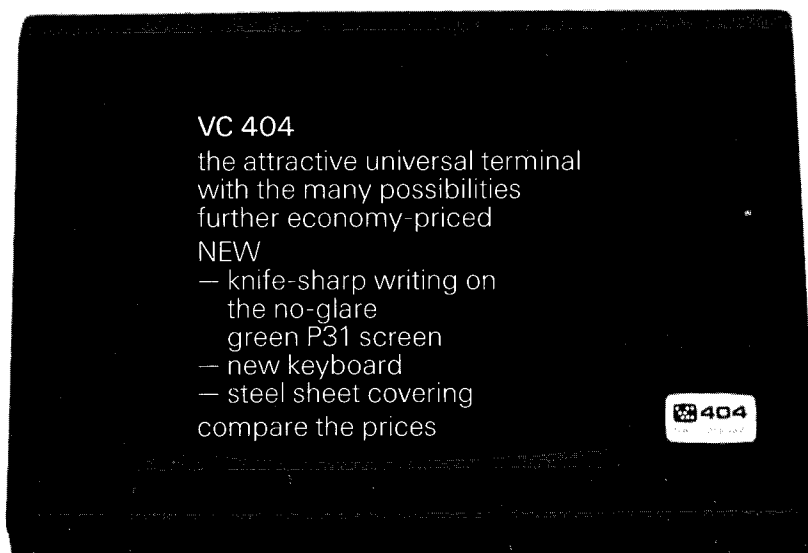
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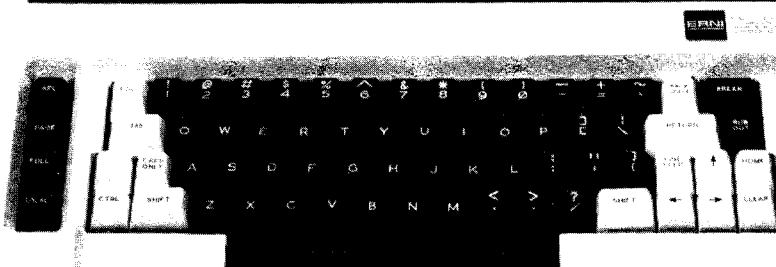
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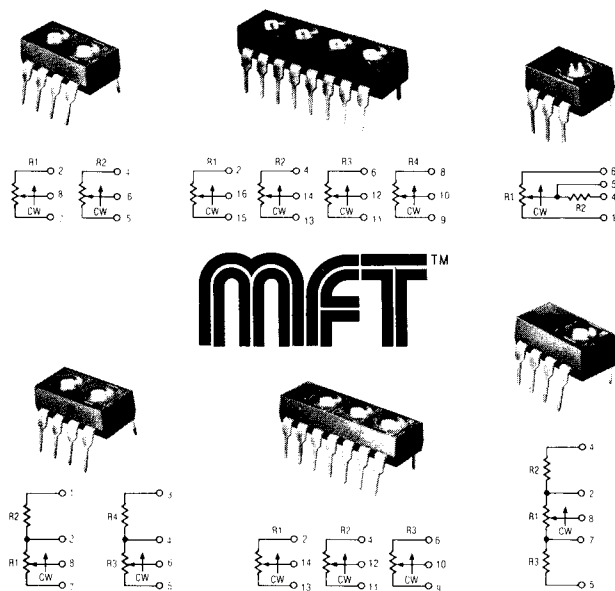


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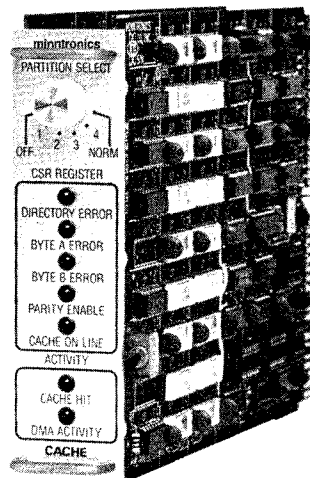


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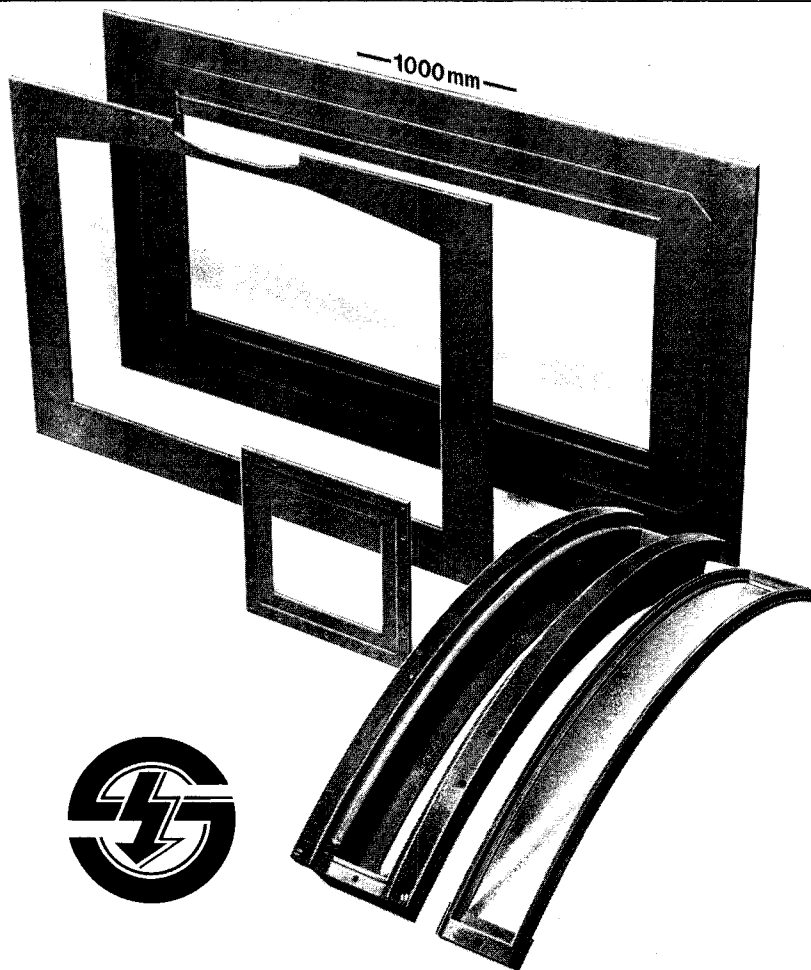
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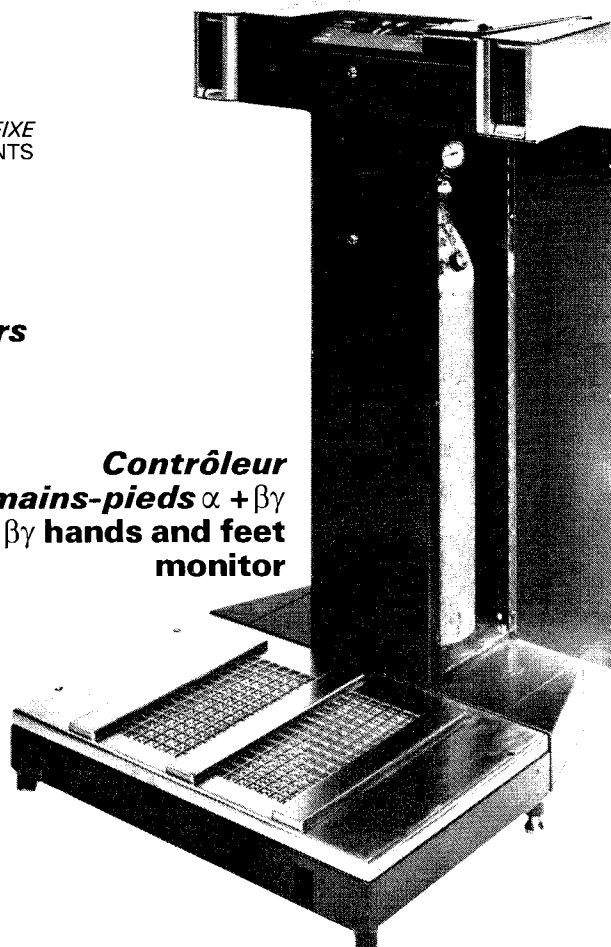
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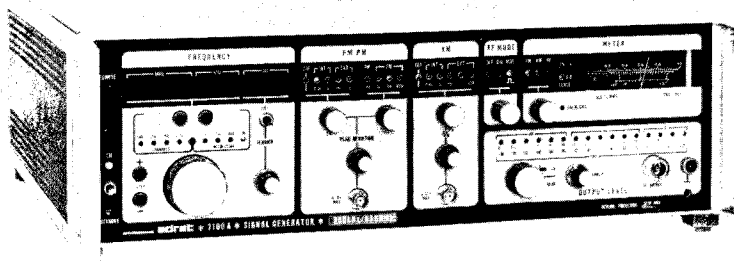
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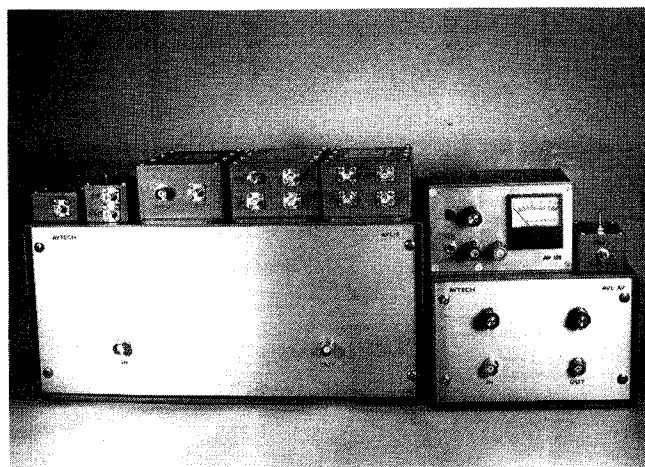
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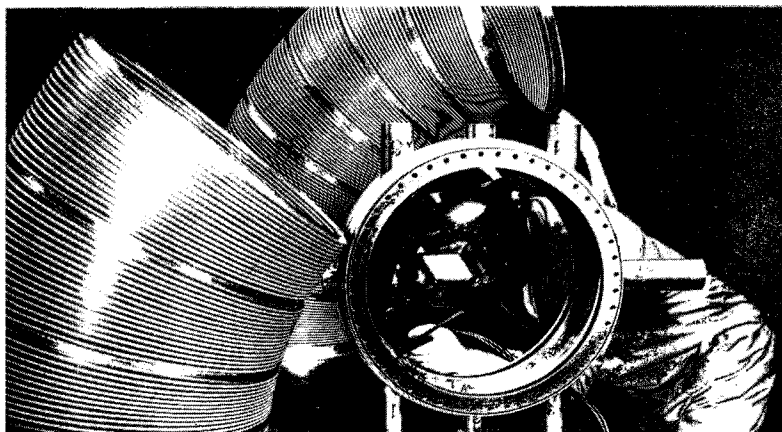


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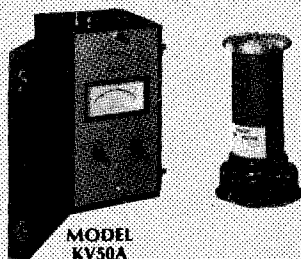


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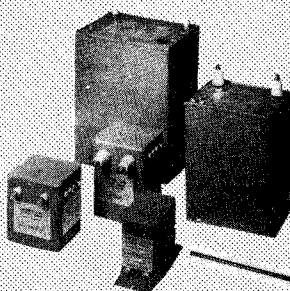
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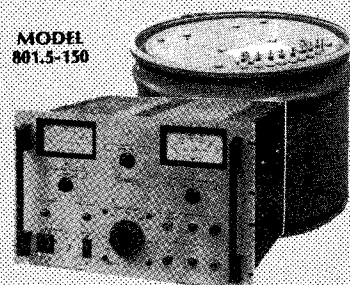
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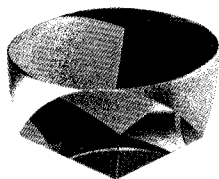
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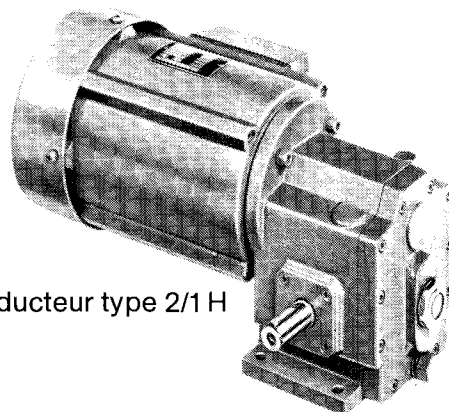
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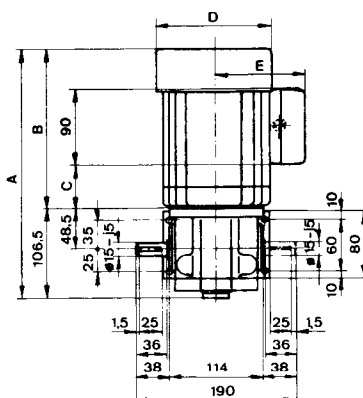
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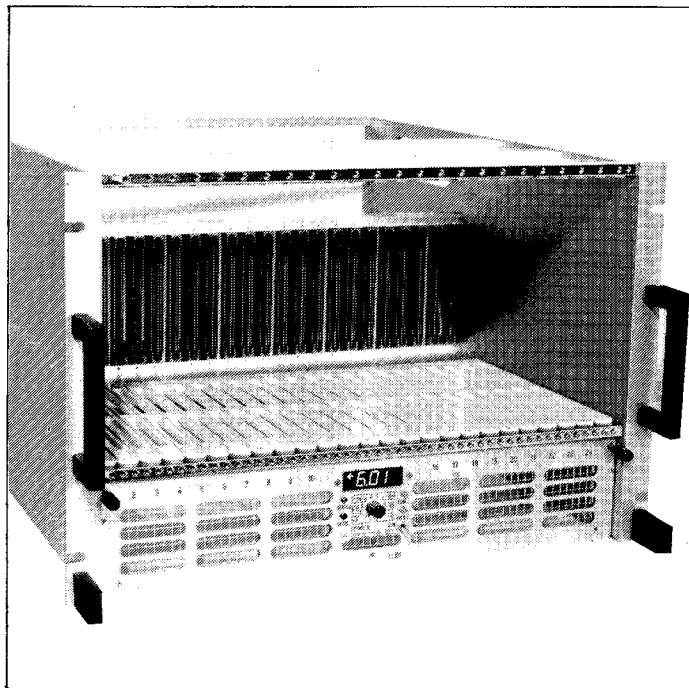
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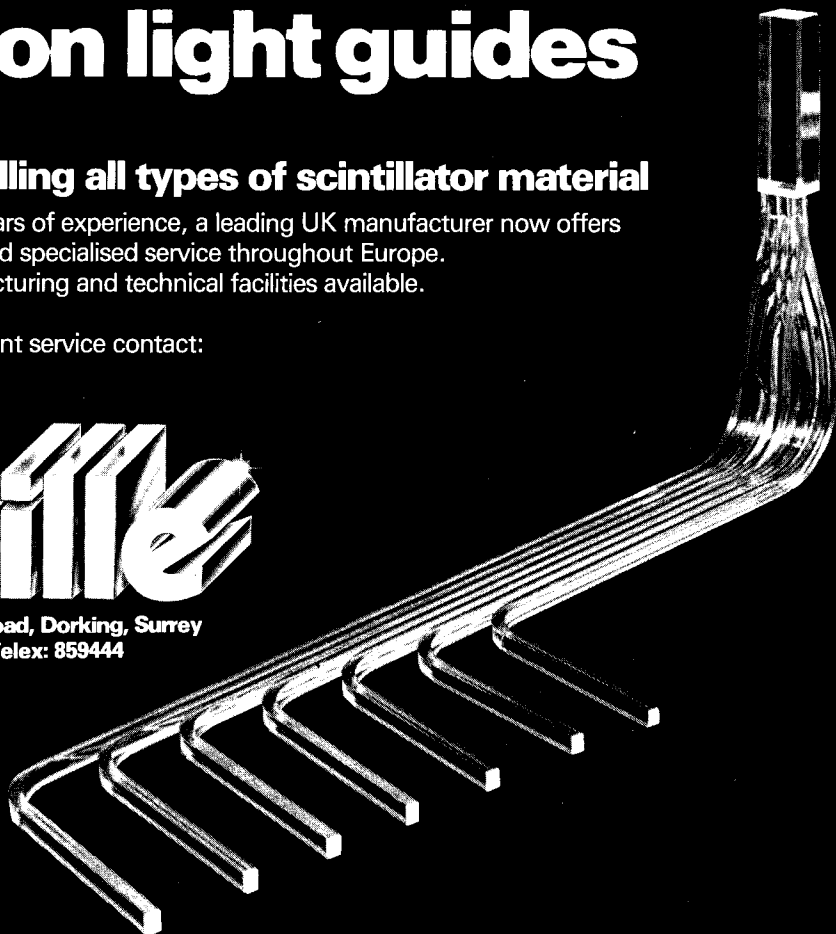
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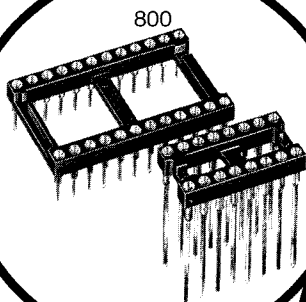
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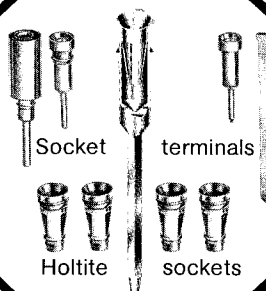
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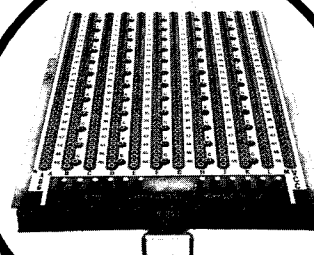


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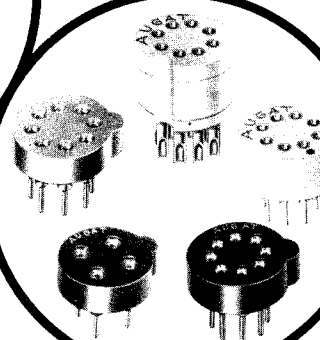


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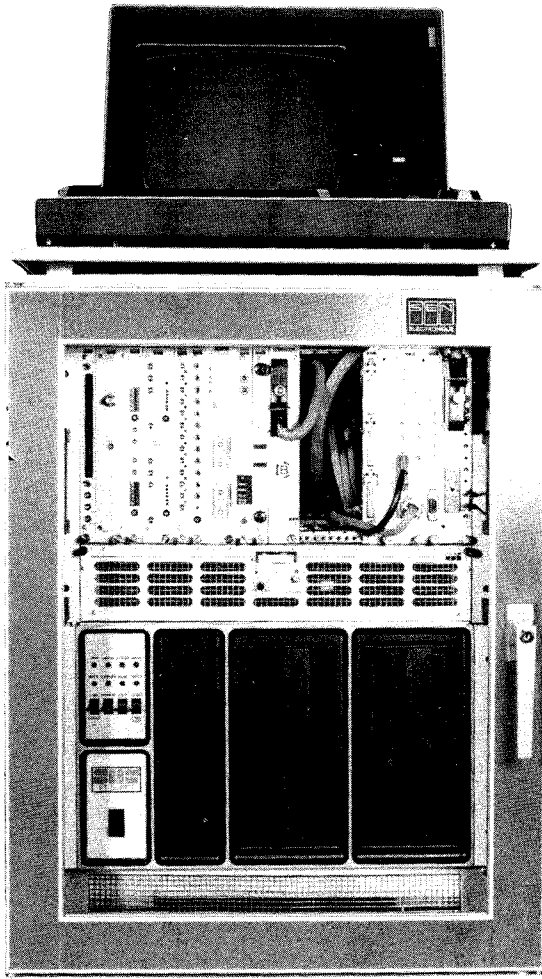
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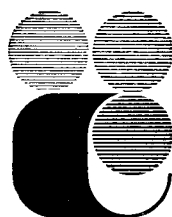
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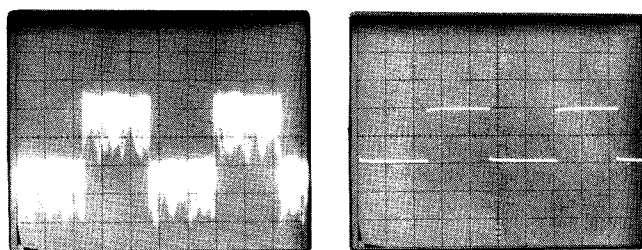


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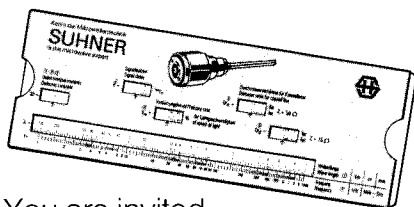
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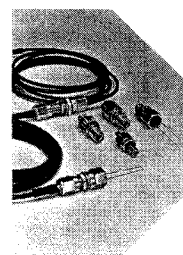


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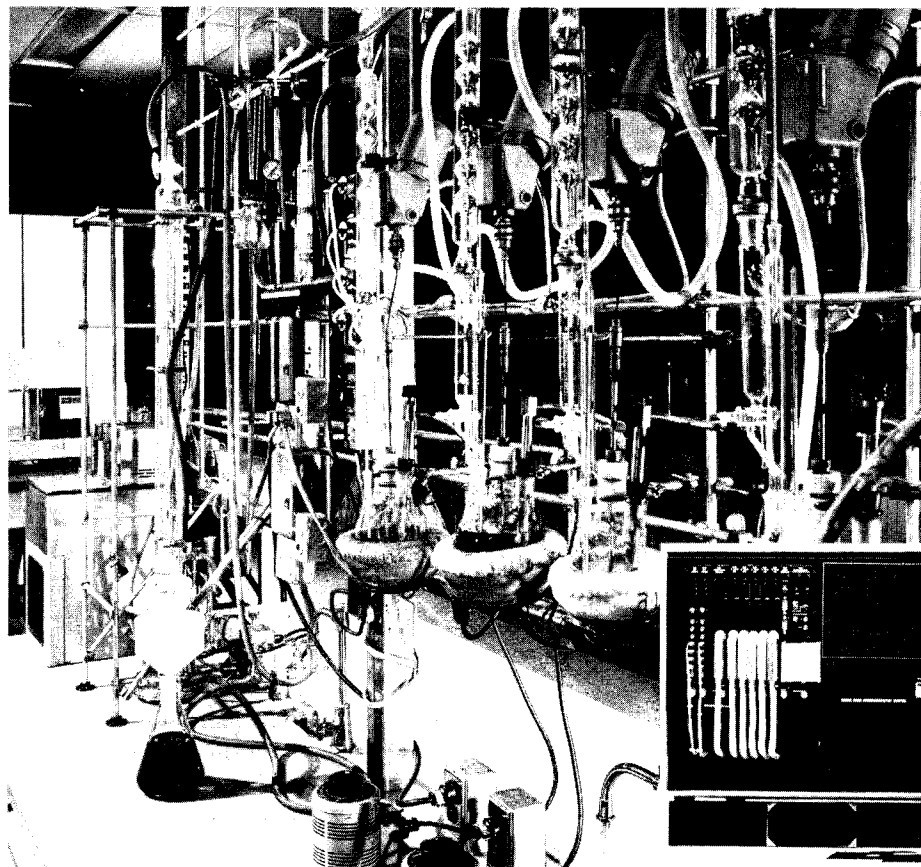
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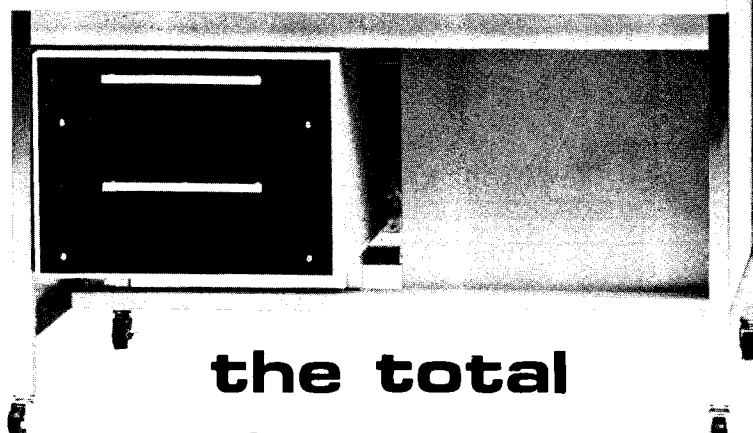
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CH ₄	C ₅ H ₁₂	Ne
(CN) ₂	C ₆ H ₁₄	O ₂
CO	C ₇ H ₁₆	PF ₅
COCl ₂	ClF ₃	PH ₃
COS	Cl ₂	SF ₆
CO ₂	D ₂	SO ₂
C ₂ H ₂	GeH ₄	SeH ₂
C ₂ H ₄	HBr	SiH ₂ Cl ₂
C ₂ H ₄ O	HCl	SiH ₄
C ₂ H ₆	H ₂	Xe
C ₃ H ₄	H ₂ S	Zn(C ₂ H ₅) ₂
	He	etc.

Equipements pour la mise en
 oeuvre de gaz
 Equipements cryotechniques

Equipments for manifold
 installations and low pressure
 gas handling
 Cryogenic equipments

Gasversorgungsanlagen und
 Armaturen
 Kryotechnische Apparate



Documentation ☐ { required
 Visit(e)/Besuch ☐ { désiré
 erwünscht

Name/Nom _____

Firma/Ets. _____

Tel. _____

Adresse _____

Carbagas

Division Scientifique
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