
A point of view

gradient was 47 T/m with a maximum induction of 6 T in the windings and a stored energy of 700 kJ. The magnet has to be fitted with 6-pole and 12-pole windings, presently under fabrication, and will then be inserted into a horizontal cryostat for final testing and magnetic measurements.

Soviet neutrino telescope

A vast detector is being installed under a mountain in the Caucasians to detect solar neutrinos. The hunt for solar neutrinos has been led by R. Davis of Brookhaven and the low rate that has been observed, compared to that calculated from the assumed burning cycle of the sun, has been one of the physics mysteries of recent years. The Soviet neutrino telescope has a first module covering 2000 m² composed of cubic tanks each holding 150 litres of liquid scintillator (white spirit). Eight modules are planned (four vertical and four horizontal) for the complete detector. A huge cave has been cut out to hold the tanks and it has been lined with special rock, which has low radioactivity, and steel. The neutrino telescope is part of an astrophysics research station of the Soviet Academy of Sciences. The world's largest optical telescope with a 6 m mirror and a radio-telescope are in the same region.

500 GeV at Fermilab

On 14 May protons were accelerated to 500 GeV in the Fermilab synchrotron for the first time. Beam was ejected to the neutrino area and bubble chamber pictures were taken at the new high energy. More next month.

From time to time we hope to carry individual comment on aspects of the high energy physics scene under the title of 'A Point of view'. This month we reprint (with kind permission) an editorial which appeared in the November 1975 issue of the fine American science journal 'Physics Today'. It is written by R.R. Wilson, Director of the Fermi National Accelerator Laboratory and relates to our opening article in this issue concerning a 'very big accelerator'. We could hardly choose anyone more appropriate to begin a series of 'individual comment' since we could hardly choose anyone more 'individual'. Bob Wilson has repeatedly distinguished himself by feats of imagination which take his thoughts beyond what is preoccupying most of his colleagues. The Fermilab itself is a monument to this vision. It is a pleasure to open our pages to his comment.

It has been a long-time ambition of scientists to build an international laboratory, one with participation from every nation in the world. In CERN, Centre Européen pour la Recherche Nucléaire (how it rolls off the tongue), we already have the prototype, the paradigm, the Platonian ideal for such a laboratory. When suggested some twenty-five years ago, CERN was regarded as the impossible dream of visionaries. How could those divisive nations ever come together and agree upon anything? But now it is taken for granted as the successful vehicle of European collaboration. France may pull out of NATO, but is it thinkable that she pull out of CERN? Nor can there be any question of the scientific value of CERN. Had Western Europe proceeded on narrow nationalistic lines, then each of the nations would have been swamped by the order-of-magnitude larger effort of the USSR



or the US. Instead, through CERN they have managed to achieve a degree of scientific excellence that must be reflected by their political leaders in a pride of culture, a sense of self that may be an important background for playing a significant role in world affairs.

CERN grew out of a long tradition of the universality of scientific knowledge. Every country takes pride in its own contributions, but, as every scientist knows, a separate and distinct German electricity did not develop in isolation nor did a Russian chemistry. This tradition of internationalism has infused and informed science, has contributed importantly to its growth. In the very communality of this development a direct communication has developed between scientists of different countries, and this has led to personal friendships which in turn provide a mutual basis for understanding important problems that transcend those of science.

During the 'cold war' the cultural interchange between the USSR and US almost came to a halt. Immediately following the 'thaw', among the first to establish exchanges were physicists. Resumption of physics talk — ah, that was easy. But very soon the conversations were cautiously extended to social and political questions much more difficult to discuss with any understanding. However, here scientists have an advantage over statesmen, because they can start from the friendly, neutral and well calibrated statements of science and then go on to the charged and tenuous terms of politics.

Those tentative discussions led to the Pugwash Conferences, designed largely to discuss disarmament. The success of the Pugwash conversations led directly to the official discussions about the Nuclear Weapons Test Ban Agreement and, less directly, to the SALT talks. This is not to say that

scientists can bring about disarmament or peace between nations — political leaders do that.

However, scientists can be among the first to sense areas of possible agreement — they may even be among the first to recognize the urgency for it, they may be useful in giving technical advice — none of this having much to do with science itself — except that for science to survive, we must all survive.

Perhaps the international experience of scientists in living in accord and cooperation is relevant in this present crisis of survival and can be of some help. Maybe CERN will stand as a hopeful beacon, the impossible become real. And perhaps a world laboratory, aside from the obvious scientific benefits, could carry this experience an important step further. Just as CERN had to solve problems of currencies, of languages, of national prerogatives, of industrial cooperation between the European nations, the solution to all of which may have contributed seminally to the establishment of the Common Market, so might a world laboratory break similar ground on a truly global scale.

Space physics, astronomy and high energy physics as well as other disciplines, can offer projects appropriate to this scale. In particular, high energy physicists have met together, perhaps for about 15 years each year in a different country, to discuss collaboration in general, the world laboratory in particular. Although a healthy collaboration now takes place between many of the countries, attempts to form a world laboratory have been confounded by national plans for immediate projects. An 80 GeV synchrotron at Serpukhov, intersecting storage rings at CERN, a 400 GeV synchrotron at Batavia, an even larger machine at CERN, all stand in mute testimony of what might have been done more economically, perhaps

more intensely, at one world laboratory. However, it can be said of all those facilities that their exploitation has indeed been on a truly international basis — and to everyone's benefit.

But a new opportunity for a world laboratory is in the air. We can now see that the multi-hundred GeV level will not be enough, that an accelerator ten miles in diameter rather than one mile will be required to give a more complete picture of elementary particles. Particle physicists need ten-thousand-billion electronvolts — ten TeV — one billion dollars. If they and the statesmen of *all* the nations of the world can get together to build and operate such a laboratory — on a really world scale — then the individual nations will get more knowledge, more technology and more opportunities in science for their money and effort. Even more important to the nations, such an undertaking might well provide some of the experience in international living so necessary for human survival — a candle in the darkness.

R.R. Wilson

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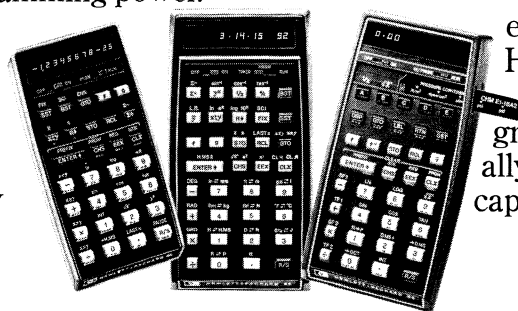
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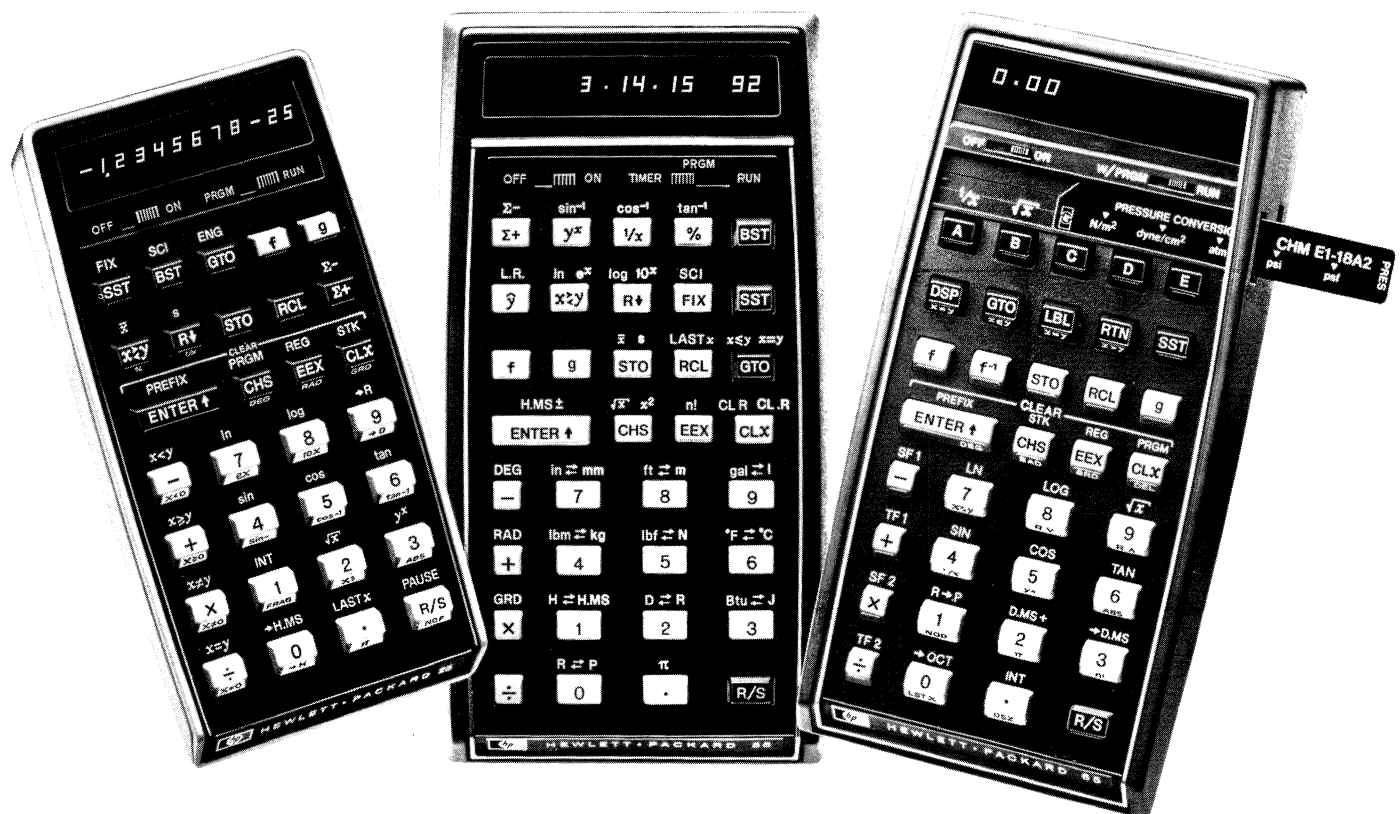
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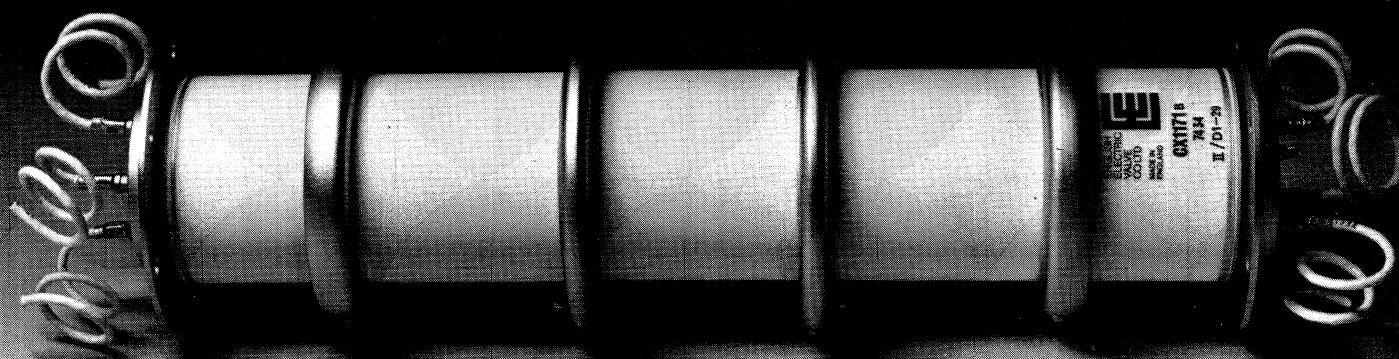
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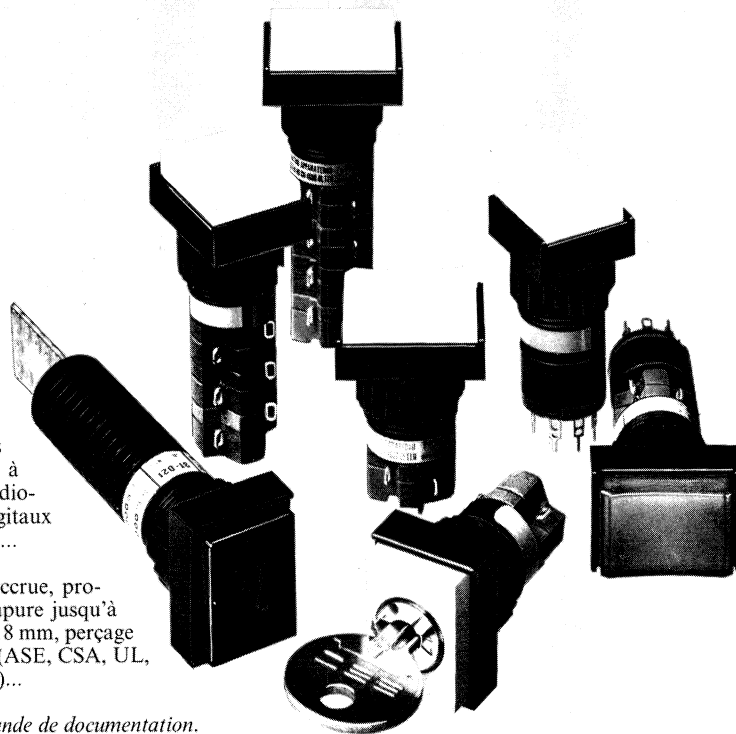
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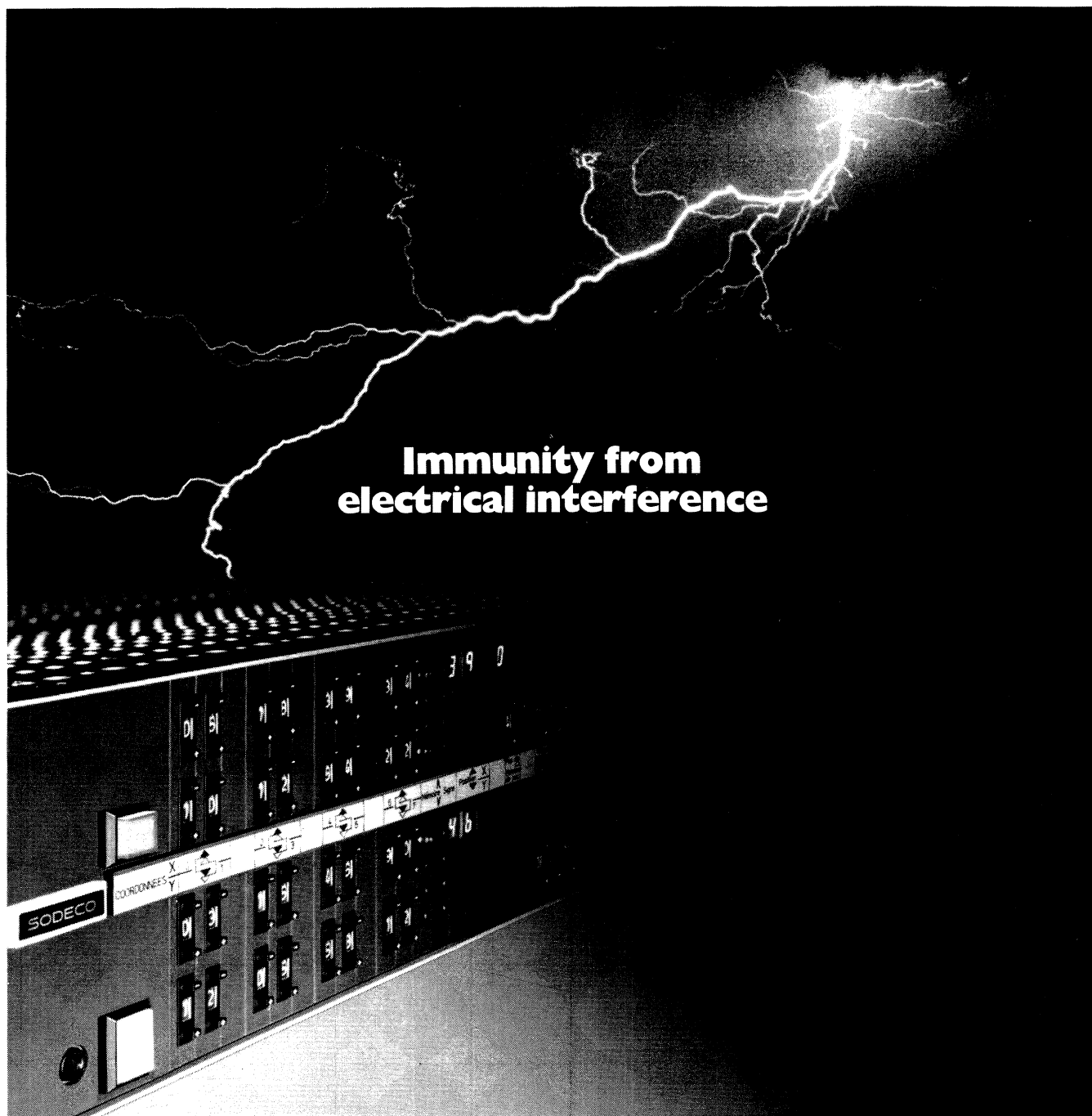
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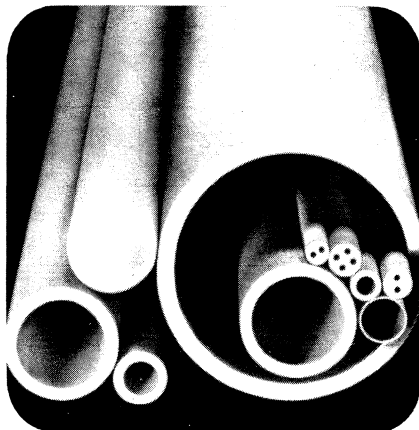
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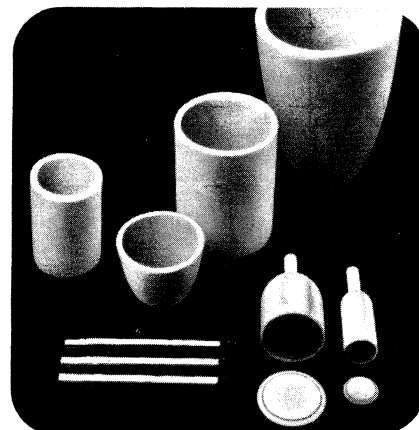
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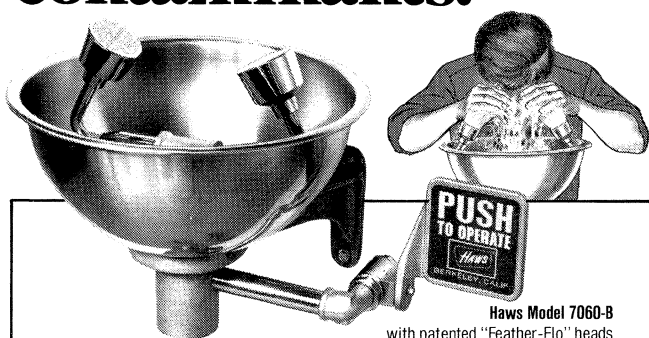
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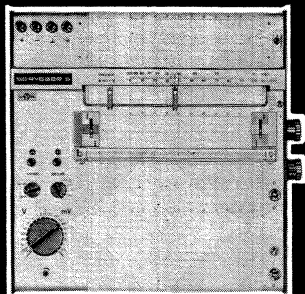
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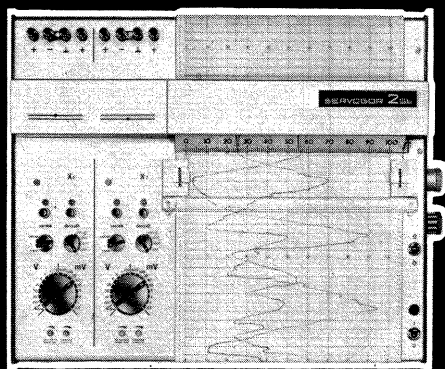
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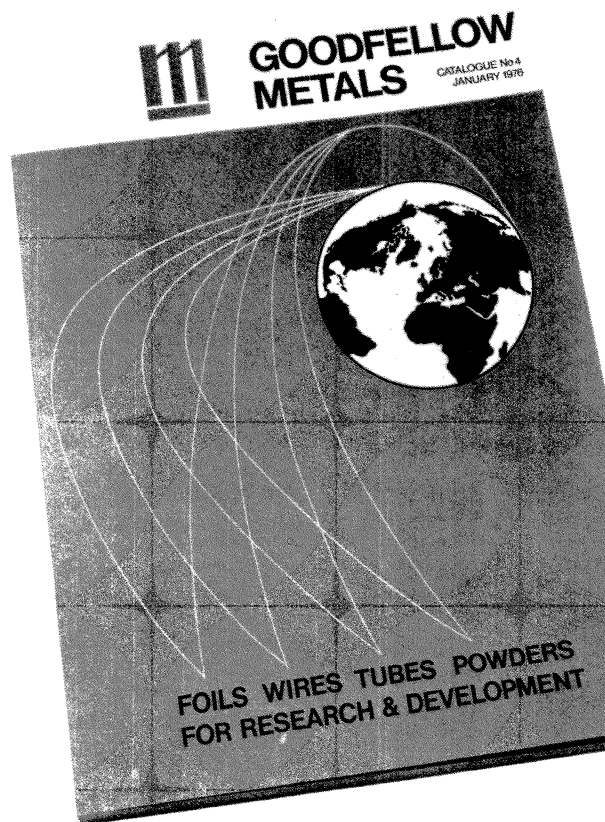
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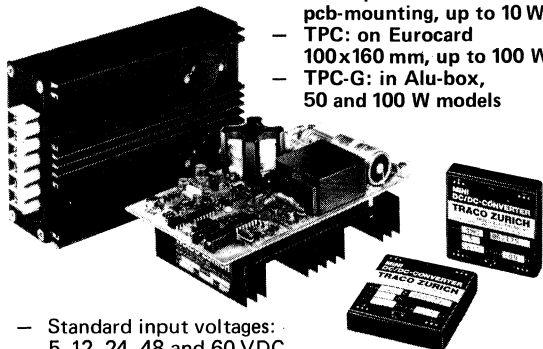
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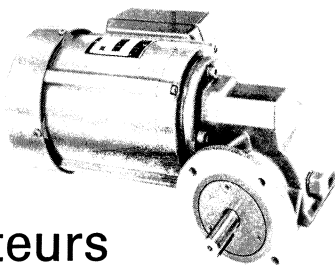
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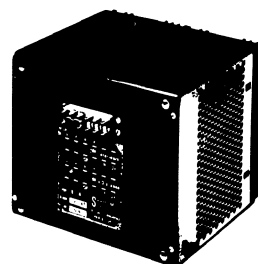
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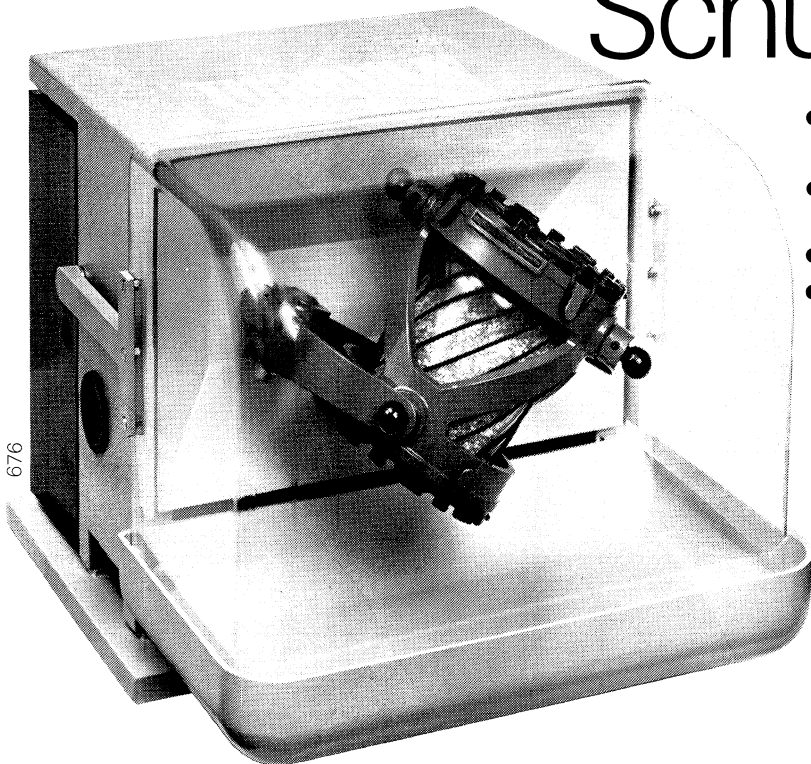
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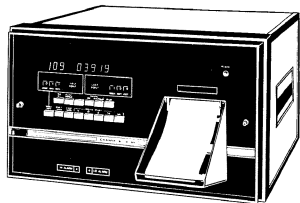
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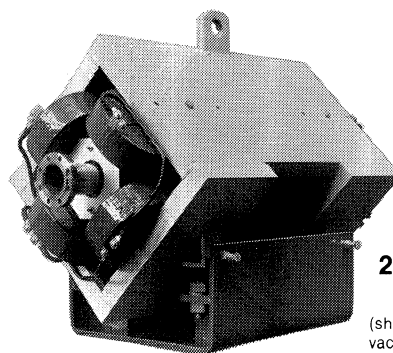
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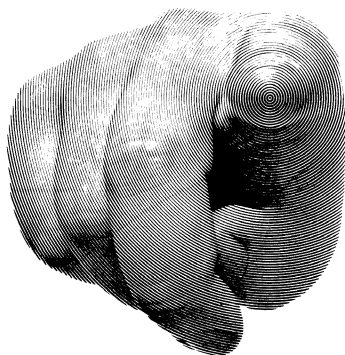
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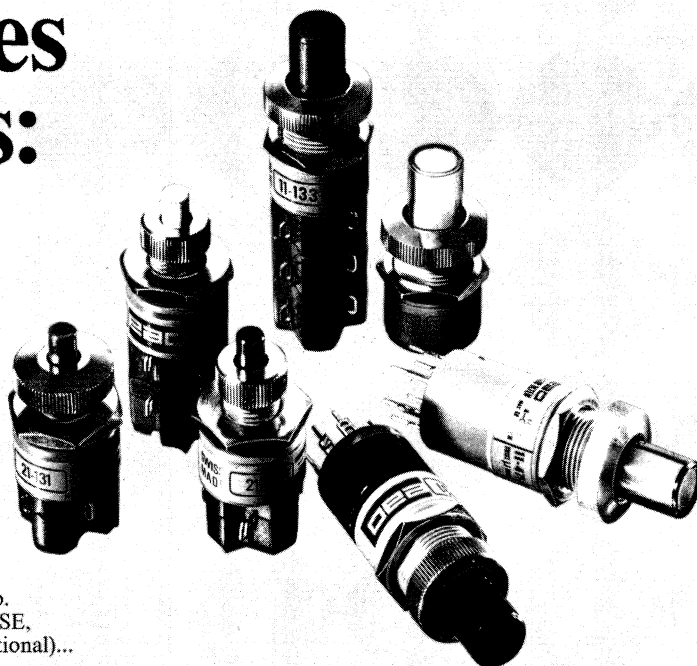
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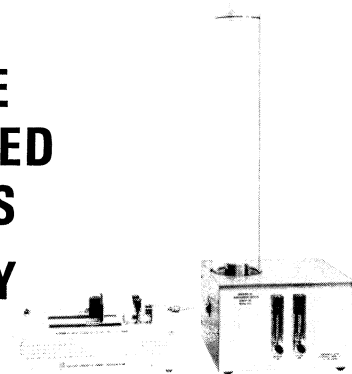
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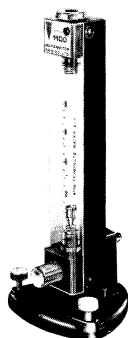
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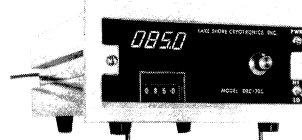
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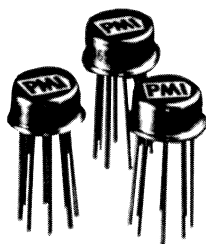
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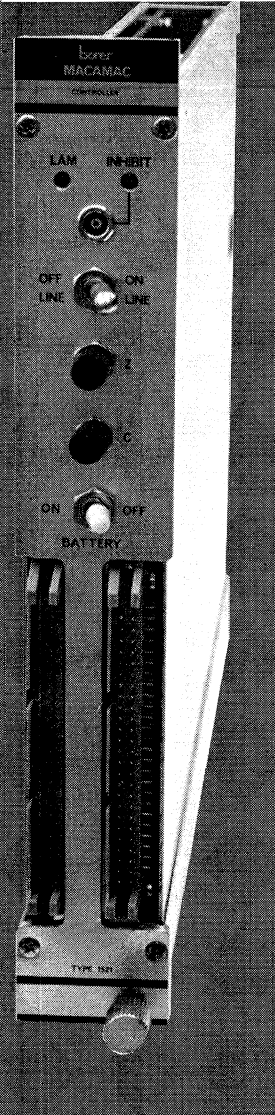
RÉFÉRENCES:

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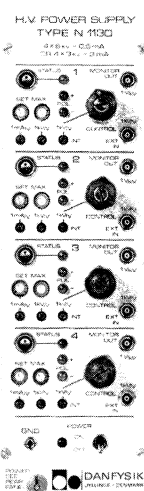
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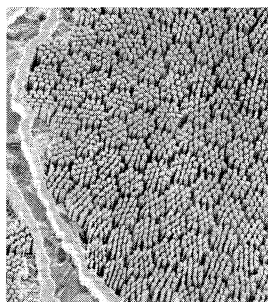
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