

ty, who is now in prison and threatened by Israeli military authorities with deportation. He has been adopted by Amnesty International as a "prisoner of conscience." I report here only facts of which I have first-hand knowledge.

I visited Birzeit University twice, in 1977 and 1982. It happened that Ramzi Rihan, who was head of the Birzeit physics department in 1977 and later became dean of the faculty of science, had been a student in a quantum mechanics course I taught at Columbia. From conversations with Rihan and his students, and from visits to classrooms and laboratories, I could see that Birzeit is a bona fide university, with a faculty working hard and successfully to provide modern higher education to the West Bank population. I was amazed by their dedication to this task under the harsh conditions of the Israeli military occupation. When I visited in 1977, Aruri had been sitting in jail without charges for three years. When I visited in 1982, the whole university was closed for two months as a collective punishment for a student demonstration. Since students were refused access to the classrooms, I was obliged to give my physics seminar to a small audience in a private home.

The Israeli authorities say that Birzeit is a hotbed of student radicals. This is of course correct. But the students did not learn radicalism from Birzeit. They learned radicalism from their daily encounters with Israeli soldiers and from their experience of the injustice of collective punishments, long before they became students. Birzeit is one of the few institutions on the West Bank that offers young people hope. It stands, like the Hebrew University in Jerusalem 30 miles away, as a symbol of peaceful achievement in the midst of turmoil. The faculty at Birzeit, as I observed, was trying constantly to steer the students away from violence, to give the students an alternative to violence. The faculty was accused by the Israelis of encouraging terrorism and was accused by the students of encouraging subservience to the occupation. Neither accusation was true.

On 21 November 1988 the Military Advisory Committee announced its decision to uphold the order of deportation against Aruri. The announcement begins as follows: "Tayseer Ragheb Ali Aruri, born in 1945, resident of Al Bireh, Professor at Birzeit University, is the oldest of the appellants, and, we have the impression,

the ranking member of the group, having sensed the high esteem his prison colleagues show towards him."

These words show that Aruri has won the respect of his enemies as well as of his friends. The sentence of deportation is nonetheless a monstrous injustice, cutting off a dedicated teacher from his students, a father from his children, a native son from his homeland. For a native of the West Bank, prison is an everyday occurrence but deportation is a tragedy. I call upon all supporters of academic freedom, and especially upon American and Israeli physicists, to protest this injustice. The freedom of Birzeit should be as precious to us as the freedom of the Hebrew University.

FREEMAN J. DYSON
Institute for Advanced Study
Princeton, New Jersey

3/89

Physicists may be interested in the situation of one of our number, Tayseer Aruri, a professor at Birzeit University. Aruri was put under "administrative detention" by the Israeli military authorities in the 1970s. No precise charges were made, but he was accused of organizing violent activity, a charge he has denied. The Israeli authorities also claimed he was a member of the Palestinian Communist Party—a charge he has *not* denied. Although the Palestinian Communist Party is affiliated with the PLO, it has no military arm, and I know of no evidence that it has, even unofficially, advocated violence.

On 14 June 1988 Aruri, together with 24 other Israeli and Palestinian writers and academics, signed a document referred to as a "peace treaty," advocating a two-state solution to the problems of the region.

On 8 August Aruri was arrested.

On 18 August Aruri was served with a deportation order, which he is appealing to the Israeli supreme court.

Aruri is still, I understand, being held in Junaid prison near Nablus.

Several organizations, including Amnesty International and the Committee of Concerned Scientists, and numerous individuals have endeavored to find out the precise nature of the charges against Aruri. So far the Israeli authorities, including Defense Minister Itzhak Rabin, have not been helpful, merely quoting part of the above past history, without dates or place names, and stating, without any specific claim, that Aruri "continued his political activity in prison" and continues to advocate, and organize, violence.

I understand that in most, if not all, Israeli deportation orders there is no precise statement of charges, there is no presentation of evidence, and the accused does not have the opportunity of confronting, or even questioning, his accusers.

Many countries have used exile, deportation or banishment as punishment throughout the ages. But many countries agreed on 12 August 1949 to the fourth Geneva Convention, which in article 49 outlaws "individual or forcible transfers, as well as deportation, of protected persons from occupied territory." Neither the government nor the supreme court of Israel accepts the applicability of this convention to the situation in the West Bank.

Many persons in the world are concerned. The UN Security Council, in its resolutions 605 of 22 December 1987, 607 of 5 January 1988 and 608 of 14 January 1988, called upon Israel to cease such deportations.

Aruri's situation appears to be opposite to that experienced by scientists who wanted to leave the Soviet Union in the last 15 years: The USSR insisted that they stay. But either situation represents a deprivation of freedom of choice. There are other differences. In some cases, the "refuseniks" in the USSR were accused of crimes such as "defamation of the Soviet Union"; but the charges were specific, even though ludicrous, and the legal procedure, while grossly inadequate, was at least formally carried through. Aruri's situation is more similar to that of the Argentine physicists whose fate concerned many of us some years ago; many of them could have left the country before they were arrested, but they elected to stay and were jailed.

Another physicist at Birzeit University, Nicola Dabit, was put under "administrative detention" in the summer of 1988. But he was released on 21 November. Alas, the absence of these teachers from their duties does not affect Birzeit University, because it has been closed by a series of military orders since 9 January 1988.

RICHARD WILSON
Harvard University

1/89

Cambridge, Massachusetts

Patching a Hole in the Antarctic Ozone Story

In her comprehensive report on our state of knowledge about the Antarctic ozone hole (July 1988, page 17), Barbara Goss Levi has given the impression that very few experimental field data were available until the

Spectroanalysis Under Control... Your Control

Under your control means: You do not have to compromise when specifying a spectroanalytical system; you can select the best suited optical components from the world's most complete line of spectrometers, gratings and accessories. You have complete control of the spectral acquisition, data treatment and presentation using the ENHANCED PRISM SOFTWARE and IBM compatible computer. Create any number of personalized routines to automate and simplify your analysis.

Contact Instruments SA/Jobin Yvon and see how quickly and easily you can be on line with a spectroanalytical system optimally matched to your specifications.



**JOBIN
YVON**



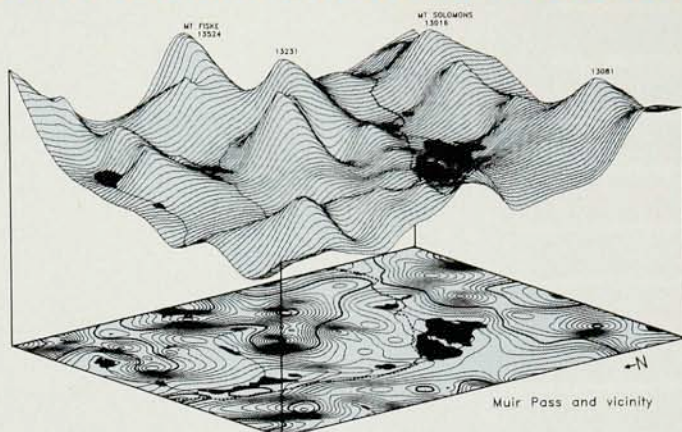
**J-Y Optical Systems
Instruments SA**

6 Olsen Avenue, Edison, NJ 08820-2419
(201) 494-8660 Telex 844516 FAX (201) 494-8796

In Europe: Jobin Yvon, 16-18 Rue du Canal 91163
Longjumeau, France. Tel. (33) 1.69.09.34.93

Circle number 74 on Reader Service Card

A NEW DIMENSION IN GRAPHICS



Plotworks revolutionizes its PLOT88 package to include three-dimensional contour maps at a fixed level. You can now project your two-dimensional contours into the third dimension for a unique visualization of your data.

PLOT88 is a library of more than 50 subroutines to construct grids, contour maps, and mesh drawings that outputs to printers, plotters and displays. A device-independent graphics package, it includes PLOT, SYMBOL, AXIS and LINE—just to name a few.

Now your mainframe graphics programs can run on your personal computer at your convenience and at a fraction of the cost.

**Call (619) 457-5090 today
for a free poster**

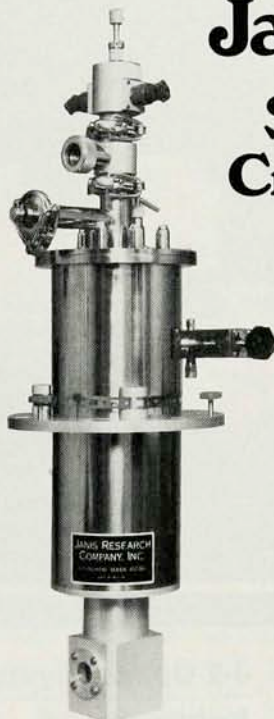
PLOTWORKS, Inc.

Department P-12
16440 Eagles Crest Road
Ramona, CA 92065

"Toolmakers for the Information Age"

Circle number 70 on Reader Service Card

Janis Quality! SuperVaritemp Cryostat Systems



- ☐ 1.5–300 K temperature range.
- ☐ 5 Watt cooling capacity.
- ☐ Optical access along any direction.
- ☐ 0.75" O.D. tails for magnetic measurements.
- ☐ Fast sample interchange.
- ☐ Automatic temperature control.
- ☐ Low helium consumption.
- ☐ Reliable proven performance.

JANIS RESEARCH COMPANY, INC.

2 Jewel Drive, Wilmington, MA 01887 • Tel: (508) 657-8750 • Telex: 200079 • Fax: (508) 658-0349

Circle number 76 on Reader Service Card

massive program of airborne experiments was carried out over Antarctica in the fall of 1987. Only an obscure cover-photo credit might have alerted attentive readers to the fact that something called the first National Ozone Expedition took place in 1986, and in the four-page news story only three sentences allude to the results of that campaign, with no mention of the additional NOZE II effort and its results in 1987.

In fact, NOZE I was perhaps the most successful polar scientific research effort ever conducted, if measured in terms of swiftness of organization and execution, volume and quality of relevant new scientific data, and timeliness of results on an issue of worldwide concern. A wealth of data was collected, analyzed and published from NOZE I before the airborne experiments of 1987 took place, and the findings from NOZE I had a strong influence on the selection and deployment strategies for equipment used in the airborne campaign.

All of the salient features needed to rule out alternative theories and confirm the chemical origins of the ozone hole were discovered during NOZE I. From August to November 1986 four experimental groups (from the University of Wyoming, the National Oceanographic and Atmospheric Administration's Aeronomy Laboratory, the Jet Propulsion Lab and the State University of New York at Stony Brook) carried out a coordinated series of experiments at NSF's McMurdo Station, about 800 miles from the Pole. The University of Wyoming team made frequent balloon-borne ozonesonde measurements at altitudes up to approximately 30 km, under difficult launching conditions, that established important details of the sequential development of the hole as a function of altitude. That team also carried out important temperature, aerosol and particle measurements. The NOAA Aeronomy Laboratory group confirmed and extended earlier measurements showing extremely low amounts of NO_2 in the lower stratosphere. (Suppression of NO_2 had already been hypothesized as a necessary prelude to any chemical mechanism for the hole's formation involving chlorine liberated from chlorofluorocarbons.) The NOAA group also detected for the first time OCIO in the stratosphere, a signal that unusual chlorine chemistry was present. The JPL group, using a high-resolution fast Fourier transform infrared spectrometer, measured column abundances of a variety of stratospheric species. The group again confirmed very low concentrations of

MeV Ion Beams for Instruction and Research



Pelletron® Ion Beam Systems are ideal for teaching physics, modern technology, and the latest applied physics techniques. Pelletron accelerators provide MeV ion beams for a variety of labs, class demonstrations, and advanced research. Pelletrons operate quietly with very low radiation. The ease of operation and high reliability gives students confidence and enthusiasm for the equipment and its applications. The modern technologies in Pelletron systems will attract and motivate top students.



National Electrostatics Corp.

Graber Road, Box 310
Middleton, Wisconsin 53562-0310
Tel. 608/831-7600 • Telex 26-5430 • Fax 608/256-4103

Circle number 77 on Reader Service Card



Your Source For IR Polarizers... 1 to 1000 μm

We are the exclusive distributors of a quality line of Infrared Polarizers, manufactured by Cambridge Physical Sciences of England.

If you're involved in IR Spectrophotometry, Interferometry, Plasma Diagnostics or Astronomy you'll be interested in Metal Mesh Polarizers.

Write or call today for your copies of our technical literature.

Molelectron
DETECTOR, INCORPORATED

1520B Dell Ave., Campbell, CA 95008
(408) 289-8211 or 800-366-4340
Telex 5106002976, Fax (408) 379-1071

Circle number 78 on Reader Service Card

Get Rid of LN₂ Cylinder Handling...



On MBE with
recirculated LN₂ in
SEMIFLEX/Triax
Vacuum Insulated Pipe,
from

**VACUUM
BARRIER VBC
CORPORATION**

P.O. Box 529
Woburn, Massachusetts 01801
(617) 933-3570

See us at the Semicon West Show,
San Mateo Fairgrounds, Booth #625.

Circle number 79 on Reader Service Card

SUPERCOOLING

Thermoelectric PMT Chambers

One-Inch Tubes!

As low as -50° with $\pm 0.05^{\circ}\text{C}$ stability. PFR's compact new Supercool housings for 1" dia. PMTs provide Air and Water heat exchanged models for side-on (TE-332, TE-329) and end-on (TE-331, TE-327) PMTs.

Ideal for S-1, trialkali and III-V photocathode materials that deliver improved performance at reduced temperatures.

Standard PFR front mounting adapter included. Also available — custom and other interface adapters. Series accepts options for standard. PFR chambers for 1" tubes.



TE-332 with Controller

Call (508) 774-3250 or write:



Products for Research, Inc.

88 Holten Street, Danvers, MA 01923
FAX (617) 245-1628 TLX 94-0287

Circle number 80 on Reader Service Card

CARBON FOILS

Carbon foils

2 — 100 microgram/cm²

Superstrong carbon foils

2 — 10 microgram/cm²

Self-supporting carbon foils

200 microgram/cm²

*very pure, very durable
prompt delivery*



YISSUM
Research Development
Company of The
Hebrew University
of Jerusalem
P.O. Box 4279
Jerusalem 91042
Israel
Tel: 972-2-661540
Telex: 25391 HUIL
Fax: 972-2-660331

Circle number 81 on Reader Service Card

NO_2 , and made valuable studies of the evolution of column abundances of HNO_3 , ClONO_2 and HCl .

The Stony Brook group, using a millimeter-wave spectrometer, measured an extraordinarily high concentration of ClO in the vicinity of 20-km altitude, observing both the diurnal variation and the secular change of this concentration through September and into October. ClO is the direct product of chlorine attacking ozone, and this observation proved beyond doubt that the hole has its origin in chlorine chemistry (coupled with other unusual conditions) rather than in dynamics, sunspot or solar wind activity, or other proffered explanations. The Stony Brook group also established that there was little or no long-term change in ozone above 25-km altitude, thus further disproving an upper-atmospheric origin for ozone depletion, and made the quite unexpected discovery of very low concentrations of the long-lived tracer N_2O in the spring stratosphere over Antarctica. This provided evidence for a substantial subsidence of stratospheric air during the winter months, a fact that was not being accounted for in either dynamical or chemical models of the Antarctic. Observations of persistently low amounts of N_2O while the hole was developing gave further proof that upwelling of ozone-deficient air (another theory suggested) could not account for the hole, since the N_2O concentration in the stratosphere would have been increased by such upwelling.

The second NOZE program, in 1987, resulted in ground-based LIDAR characterization of polar stratospheric cloud layers at McMurdo, carried out by researchers from SRI International; in prototype LIDAR measurements of ozone by NASA's Goddard Space Flight Center; in further detailed balloon-borne ozone-sonde measurements and new aerosol and water vapor measurements by the University of Wyoming group; in HCl , HNO_3 , O_3 , ClONO_2 and NO_2 measurements by groups from the University of Denver and New Zealand; in new measurements of OCIO and BrO by the NOAA group; and in new observations of ClO by the Stony Brook group. These last observations produced a vertical profile of ClO concentration over the critical altitude range of approximately 17–25 km where major ozone depletion occurs. Summaries of findings from NOZE I and II were reported in some detail at the Snowmass meeting discussed in Levi's news story or had been available in the literature for a number of months. It is unfortunate

that this impressive series of results, made possible by swift and generous support from several sponsoring organizations, was omitted almost in entirety from your otherwise excellent and comprehensive report on Antarctic ozone depletion.

ROBERT DE ZAFRA

State University of New York,

Stony Brook

8/88

Soviet Science Funds: Greener Grass?

I found it ironic to note in reading the January PHYSICS TODAY that while our NSF is diverting money from funding individual investigators to Science and Technology Centers (page 57), the Academy of Sciences of the USSR is moving money away from institutes and toward projects (page 61).

It appears the grass is always greener on the other side of the (procedural) fence. Perhaps a joint conference on funding methodology would be a good idea, prior to exchanging sets of problems.

ADRIAN L. MELOTT

University of Kansas

Lawrence, Kansas

1/89

The Laser Days of Youth

Joan Lisa Bromberg's article "The Birth of the Laser" (October 1988, page 26) has some "missing persons." For example, I find it curious that the "Columbia group" of 1958–60 is mentioned several times in the article, but its members are never identified, whereas all the other groups are richly detailed. The June 1960 result of Theodore Maiman "affected strategies" in other groups, but Columbia is not mentioned in this context. This letter is intended to fill in some of the gaps.

Bromberg gives a good account of how the 1958 paper by Charles H. Townes and Arthur L. Schawlow¹ came about. Mimeographed preprints were of course available to the two PhD students Townes had taken on at Columbia to work on the optical maser problem, as it was then called. The students were Herman Z. Cummins and myself.

Townes accepted Cummins sometime in 1958, and I joined the group in the winter of 1959, after the qualifying exams of 1958. Cummins had had extensive experience with infrared spectroscopy at the Sorbonne and Ohio State, while I had gotten my BA from the University of Toronto, where I had studied optics under