

rate organization similar in scope to the actors and teachers unions.

Professor Stars in Astronomy Over Four-City Video Circuit

Playing to full-capacity classrooms in Bloomington, Indianapolis, Lafayette and Fort Wayne, Frank Edmondson, head of the astronomy department at Indiana University, is achieving two of his goals: Course enrollment is rapidly increasing and astronomy is made available to students on campuses where no regular department exists. Twice a week, he and his studio crew of three beam a two-semester introductory course on the solar system and stellar astronomy to 800 Indiana and Purdue undergraduates, including 60 students who view tapes of the lectures during special evening classes in Indianapolis and Fort Wayne.

With an enrollment that size, there is no opportunity for class participation, which comes through the medium of discussion sections conducted by 12 teaching assistants. Bloomington has 23 such sections with 8 TA's, and three TA's are responsible for three such sections at Purdue on Saturday morning. At Indiana's Fort Wayne and Indianapolis campuses, discussion sections are conducted over TV by a Bloomington graduate student. The classes in these sections hear and see their teacher while he only hears them.

The course originates live in a studio on the Bloomington campus where Edmondson lectures to 50 students; meanwhile 500 additional students view the lecture in two classrooms on campus. Microwave relay transmits the lecture to other campuses having no astronomy courses. Groups of 80 each view the video at Indiana's Fort Wayne and Indianapolis campuses and at Purdue's Lafayette campus. Edmondson communicates with the teaching assistants at Purdue on Thursday morning after his lecture. "As a result, I claim to have a better rapport with them than with my own TA's in Bloomington where we get together whenever the spirit moves us," he said in a recent visit to PHYSICS TODAY. Student performance on examinations differs very little between

Indiana and Purdue, and the difference is never greater than between two sections taught by the same TA.

An added virtue of the video lectures is preservation of course continuity whenever the teacher is away from class. Recently Edmondson took part in the dedication of the Cerro Tololo Observatory in Chile. During his three-week absence, his prerecorded tapes were played on schedule. The tapes for the special evening courses are shown in succession to Thursday-night classes at Indianapolis and Fort Wayne. A discussion section taught by a TA precedes these lectures.

"I make no concessions in teaching style to the TV," said Edmondson. "There is no script, only an outline and a time table of topics on a single sheet of paper. My main purpose is to distribute the course more widely." To put the course on TV, his crew of three includes an operator for the camera (fixed position but with zoom lens), producer and studio engineer who runs the tape recorder. As an "added fringe benefit" musical selections now replace the ugly noise that formerly tested the audio part of the circuit before the lecture. Thus Haydn's "Clock Symphony" introduces a lecture on time, and relativity is preceded by Berlioz's "Symphony Fantastique."

In 1963, the first year he went on TV, course enrollment dropped. But every year since then, the Bloomington class has grown by 100 compared with

the 30-35 annual increase in the years before video. At the other campuses, seating capacity imposes an unofficial ceiling on enrollment.

Nominations Solicited for Sixth Fritz London Award

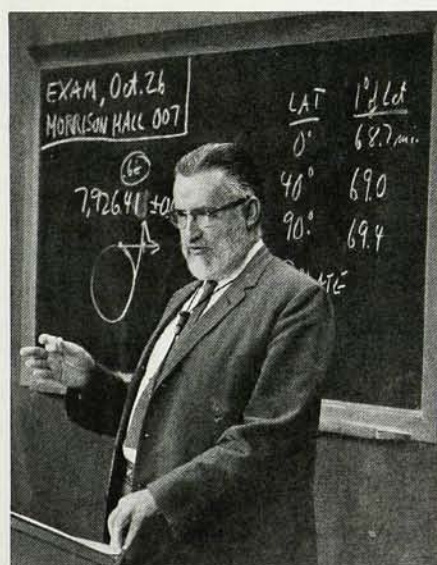
The Committee for the Fritz London Award, a prize honoring important contributions to basic low-temperature physics, is seeking recommendations for 1968. The sixth award will be presented at the 11th international conference on low-temperature physics this summer in Scotland. Suggestions (deadline 15 March) can be sent to the award committee secretary, Paul M. Marcus, IBM Research Center, Yorktown Heights, New York 10598.

New Immigration Laws May Check European Brain Drain

New US immigration laws that come into effect this July are expected to retard the entry of scientific and technical talent into the US from other nations, especially from industrialized western Europe.

The new and more liberal laws replace the old national quota system with a system of preferences, one of which is for professional-class immigrants. The total number of immigrants from the eastern hemisphere permitted into the US annually under the new law is fixed at 170 000, and the professional class will be allotted 10% of this figure or 17 000. Since each professional immigrant is accompanied by an average of one dependent, a total of about 8500 scientific and technical personnel may be permitted to emigrate from Europe, Asia, Africa and Australia, to the US each year. Furthermore the backlog of applications by professional people seeking to emigrate to the US from these areas is expected to reach about 48 000 by the time the new law comes into effect, and applications will be processed on a first-come, first-serve basis. This backlog comprises professionals from countries that have oversubscribed their quotas.

Consequently, future scientist immigrants who come from countries that have usually undersubscribed their quotas, such as the nations of western



EDMONSON

This vibrating reed electrometer has greater sensitivity than any device for measuring currents from high-impedance sources.



Buy less, pay later.

As a compact, solid state unit, the CARY 401 has all the capability you'll ever need. Don't settle for less.

Suppose today you're investigating dielectric polarization and absorption phenomena. Or studying other physical properties — photoelectric, thermoelectric, piezoelectric. Or, possibly, checking resistances of dielectrics, insulators, and substrates. Fine, the 401 will serve your needs.

What about tomorrow? If, for example, you have to measure diode reverse currents, transistor leakage currents, MOS FET gate resistances. Maybe even take Hall effect measurements of organic or inorganic semiconductors. The 401 works perfectly for any of these, too.

Several built-in features enhance the 401's versatility: Critical damping gives fast response; remote switching between three input resistors and remote input

shorting provide operator convenience. And the instrument has the ability to measure potentials from grounded or above-ground sources. Additionally, two power modes afford operational freedom — battery cuts-in automatically when line power fails, cuts-out when power resumes.

Then there's the extraordinary sensitivity. More than you'll need in some applications, necessary for others. It detects current less than 10^{-17} ampere, charges as small as 5×10^{-16} coulomb, potentials down to 2×10^{-5} volt, and resistances as high as 10^{16} ohms.

We have an interesting brochure on this electrometer for today and a lot of tomorrows. Write Cary Instruments, A Varian Subsidiary, 2724 S. Peck Road, Monrovia, California 91016. Ask for Data File P705-127.

CARY® 401

Europe, and who do not apply for an immigration visa before 1 July, may have to wait several years for an opportunity to emigrate to the US.

In Brief

Metallography: An International Journal will be issued quarterly by American Elsevier Publishing Co., 52 Vanderbilt Ave, New York, N.Y. 10017.

Archives of Mass Spectral Data will be published bimonthly by John Wiley and Sons, 605 Third Ave, New York, N.Y. 10016.

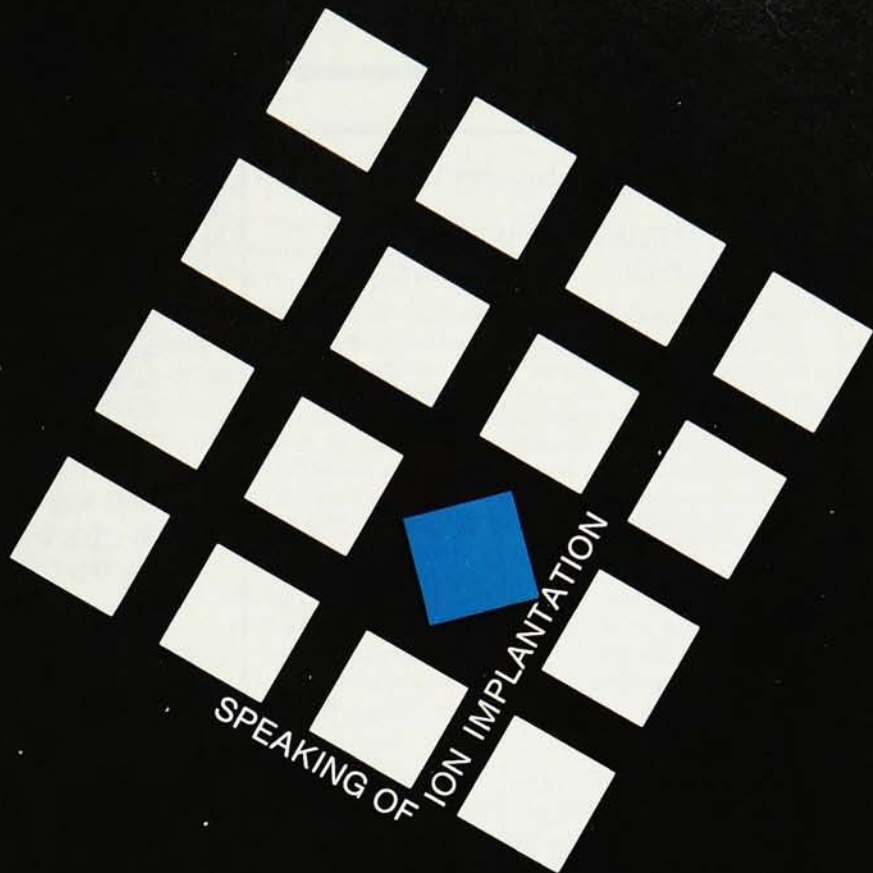
The National Science Foundation has awarded a \$2.2 million contract to Cornell University for operation of its 10-GeV electron synchrotron.

The National Academy of Sciences has received \$500 000 from the Commonwealth Fund to further the academy's "ability to exercise independent initiative and judgment concerning vital problems and issues in science."

The General Atomic Division of General Dynamics Corp. has been acquired by Gulf Oil Corp. Frederic de Hoffmann, president of GA since 1955, has been named head of the new company, to be called Gulf General Atomic. De Hoffmann has also been elected a vice president of Gulf Oil.

The University of Toronto has opened its new \$12 million McLennan Physical Laboratories to house the departments of physics, astronomy and computer science. The 285 000-square-foot complex comprises a lecture-room wing, a three-story undergraduate laboratory and a 16-story Burton tower. On the tower are two telescopes, one for visual work, the other for photographic and spectroscopic work.

President Johnson has urged that the new National Accelerator Laboratory be named after Enrico Fermi. Johnson, speaking at the 25th anniversary of the first atomic chain reaction, said "I suggest that we dedicate this great new laboratory to the memory of the modern-day Italian navigator." □



**... They laughed
when we set out
to make something useful.**

That was seven years ago. We accelerated a beam of heavy ions toward a silicon crystal to see if a semiconducting junction would be implanted. It wasn't. But if you have a team of solid state physicists, atomic physicists, semiconductor specialists, electrical and mechanical engineers boring in on a problem, something's got to give — and it did.

A few people are still laughing about ion implantation as a manufacturing process. Especially us. Because at this point in time we are manufacturing semiconductor devices with our Implan[®] process at the rate of 20,000 a month, and the yield is exhilarating.

Of course our present production

rate isn't going to choke the market, and our device, a high performance solar cell, isn't necessarily what the world is waiting for. But space people like its reliability, uniformly high output, and long life — qualities we are now engineering into more sophisticated devices like transistors. And the controlled-beam Implan process has fascinating possibilities for writing integrated circuits composed of active devices, resistors, capacitors, and connectors — all computer-programmed.

Ion implantation. When you say that, smile. So far there's a lot to be happy about. Write for more information.



ION PHYSICS CORPORATION

A subsidiary of High Voltage Engineering Corporation, Burlington, Mass. 01803