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due time. At the present economical level the efficiency of future research programs could be improved by reducing the number of intermediate-size experiments with devices of a more "conventional" Tokamak, Stellarator, pinch, and mirror type and by avoiding unnecessary duplication. Only a few large devices for studies of the not completely understood scaling laws should be further developed. Further, a certain fraction of the total budget should be reserved for investigations on modified toroidal devices and other schemes, as well as for basic research conducted on broad lines and by means of moderate-size experiments. Finally a systematic research for more alternatives to the present lines of approach should be continued. New ideas, as well as reconsiderations of earlier ideas from new angles, may even become necessary for a future success.

B. LEHNERT

Royal Institute of Technology
Stockholm, Sweden

Public understanding

Your editorial in the June issue (page 88) described some of the ways in which individual physicists were contributing to an improved public understanding of science. I would like to describe several other approaches used at the National Bureau of Standards. These include:

Open House. In October of 1973 some 30 000 persons traveled to Gaithersburg, Maryland for a tour of our facilities. Approximately 60% of them were students. Many of the students who visited with us on Friday returned with their parents on Saturday; some even had to cross state lines to do it. People really are eager to walk into the lab and find out what you're doing. The National Institutes of Health and other federal laboratories in the Washington area indicate a similar degree of public interest.

Tour Program. Aside from establishing good will, a vigorous tour program can establish a veritable army of contacts reaching out into all areas of the community. Public tours of NBS are available at specific hours each week. Special tours are arranged for any group that makes a request. These have included Congressional staff, diplomatic training classes, professional societies (APS included), school groups, etc. About 3500 come to the Gaithersburg site each year.

Speaker's Bureau. NBS professional staff members speak before a wide range of audiences. Demonstrations are often included (properties of air, cryogenics, chemistry, fire, etc.). It's quite a thrill to watch a pack of Cub

Scouts swarming over a beaker of liquid nitrogen, asking "What would happen if ...?" That's when you know you've sparked the creative process in at least one young mind.

Film Loan. We have a collection of about 35 16mm movies available for free loan to school systems. A catalog and order forms are available. There are about 2000-4000 bookings each year.

Exhibits. A considerable amount of space has been set aside in various buildings at both the Gaithersburg and Boulder sites for exhibits of current work. These areas are often used for small informal meetings where visitors can find a quick overview of the full spectrum of our activities. Current publications and handouts are also found here. (Westinghouse Research Lab in Pittsburgh provides some special chairs equipped with videotape playback units and a selection of eight short films describing recent work. Visitors can fruitfully use some free time while waiting for an appointment.)

Special exhibits, designed for use at professional meetings, are staffed by technical personnel. These exhibits provide an exceptional opportunity to establish an interaction with new groups. For example the NBS Micrometrology Section recently had a booth at the International Machine Tool Show. Other persons concerned with radiation measurements had a booth at the National Conference of Radiation Control Program Directors.

Several exhibits for the general public have also been assembled and travel a circuit of about 50 science museums in this country. These exhibits have potential exposure to 20 million people in a single year. Two are concerned with metrication, while another traces the history of time measurement. The American Chemical Society is currently sponsoring an exhibit on "Taking Things Apart and Putting Things Together," which is traveling the same circuit. It is interesting to note that one of these science museums was a winner in the recent store-front physics contest.

Science Fairs. Hundreds of school children and parents attend a science fair at the NBS sites each year.

Assistance to schools. We are currently meeting with the head of science education in one of the local secondary-school systems to explore ways in which we may help to supplement their curriculum. One of the possible approaches is to provide special tours, lectures and demonstrations for select groups of students, some of whom could be offered summer jobs in the various NBS laboratories.

Despite the limited resources available to NBS, we consider it essential to communicate with the general public so

that taxpayers may understand what they are getting in return for their support of our programs.

Many other groups are performing services similar to the ones listed above. Perhaps each institution or local organization would be able to add just one more item to its present list of public-information programs.

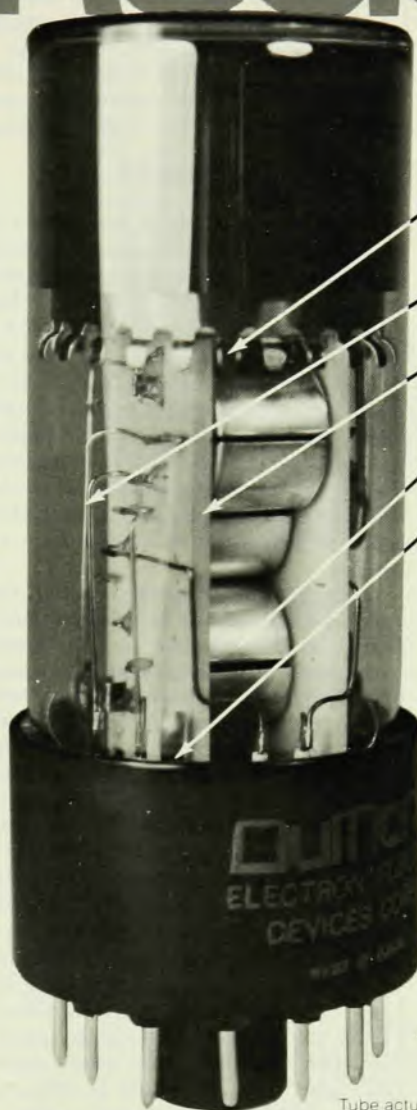
HOWARD E. CLARK
National Bureau of Standards
Washington, D.C.

Jobs for bachelors

Many discussions continue to take place concerning the decreasing number of positions available for young physicists who have recently finished their doctorates. In many of these discussions, mention is usually made of the decline in the number of academic positions available, and this decline is coupled to the decline in undergraduate physics enrollment. But this avenue is usually not pursued any further in such discussions. Rather, it is optimistically dismissed with the hope that undergraduate physics enrollment will return to "normal" accompanied by a "stabilization" in the number of academic positions available in college and university physics departments.

It is my strong opinion that this hope is unrealistic as long as we give low priority to the problems of employment of physics majors with the bachelor's or master's degrees and continue to imply that those not going on to the PhD are not as worthy of our concern. It seems to me that employment of physicists at the baccalaureate and master's levels is actually more important to our physics community than employment at the PhD level. Most of our undergraduate students are extremely job-oriented. They are not about to invest four years in an area of study that does not give a fair degree of assurance of a job at the bachelor's level should they (for economic or other reasons) decide against graduate school. Let us be frank and admit that undergraduate physics departments are competing for students with chemistry departments, engineering departments and mathematics departments. These professions are several orders of magnitude more concerned with preparing their students for jobs at the bachelor's level than is the physics profession. As long as this situation remains, the undergraduate physics enrollment will certainly continue to decline. Such decline will result in further large reductions of faculty positions in colleges and universities. Unless this is what we want to happen, we must make a very large national effort to increase the availability of jobs for baccalaureate physics majors. This may require some changes of emphasis in the traditional curriculum as well as

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