

2 Mv Flash Radiography



High speed, high penetration with wide photographic latitude maximizes recorded data

Radiographs can now be exposed directly on Eastman KK film (without phosphor screens) for medium sized objects such as 1" of steel or 3" of aluminum. The high speed photographer thus gains resolution and latitude and the quality control engineer gains the advantage of a "stop-motion" exposure (30 nanoseconds).

Much thicker objects—up to 4" of steel or 16" of aluminum—can be examined with "stop-motion" radiography using fast films and screens.

Shadowgraphs can be taken throughout a large volume of space up to 65' from the source. Thus it is possible to obtain high speed radiographs of large events—for example, the entire fragmentation pattern of a bomb.

Illustrated above, a .45 caliber bullet (A) penetrating a series of 1/4" plywood (B) and lead plates (C). Note detail through thick metal gun, unlocking of barrel (D) and operator's hand (E).

2 Mv flash radiography is but one example of the advanced research capabilities offered by Field Emission pulsed radiation source systems—available in a complete line of compatible equipment ranging from small, portable x-ray units to 2 million volt systems. For detailed information on this specific application, request Catalog C-10, "Fexitron 703 Two Million Volt Flash X-ray System."

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C-10**



Field Emission Corporation
McMinnville, Oregon 97128

the mid-1970's," says the 1966-67 *Occupational Outlook Handbook* published by the Labor Department. While the number of physicists seeking employment will rise rapidly during the late 1960's and early 1970's, the "demand for physicists is expected to be greater than the number of new graduates available for employment. Thus, graduates with advanced degrees and well qualified graduates with the bachelor's degree should have very good employment opportunities in physics to the mid-1970's."

A complete report on physics manpower, education and support is now being prepared by Susanne Ellis at AIP and will be issued in the fall.

NSF legislative hearings

Congressional cooks are preparing a new National Science Foundation broth from old reliable science-community recipes spiced with national-interest innovations. And generally scientists inside and outside government favor the NSF revision proposed by Congressman Emilio Q. Daddario in his HR 13696 (see *PHYSICS TODAY*, March, page 56). Their main apprehension concerns the bill's emphasis on applied research; their principal difference of opinion is among themselves and concerns the role of the National Science Board.

Extensions of NSF activities in the social and applied sciences, engineering, international affairs and information functions have the support, with minor reservations, of scientists who testified at recent hearings on the bill. Whenever strong issue was taken with certain features of the bill (applied research, annual science report) Daddario (D.-Conn.) was often solicitous to alter the bill's wording or interpretation to accommodate the objections of scientists. For example, when various witnesses have expressed doubts about the feasibility of having the board render an annual report on US science, Daddario has said that he would not expect a complete evaluation and report each year on every science discipline. He would expect the board to be selective, to report areas that appear most significant or where the greatest gaps and needs exist.



ERIC A. WALKER

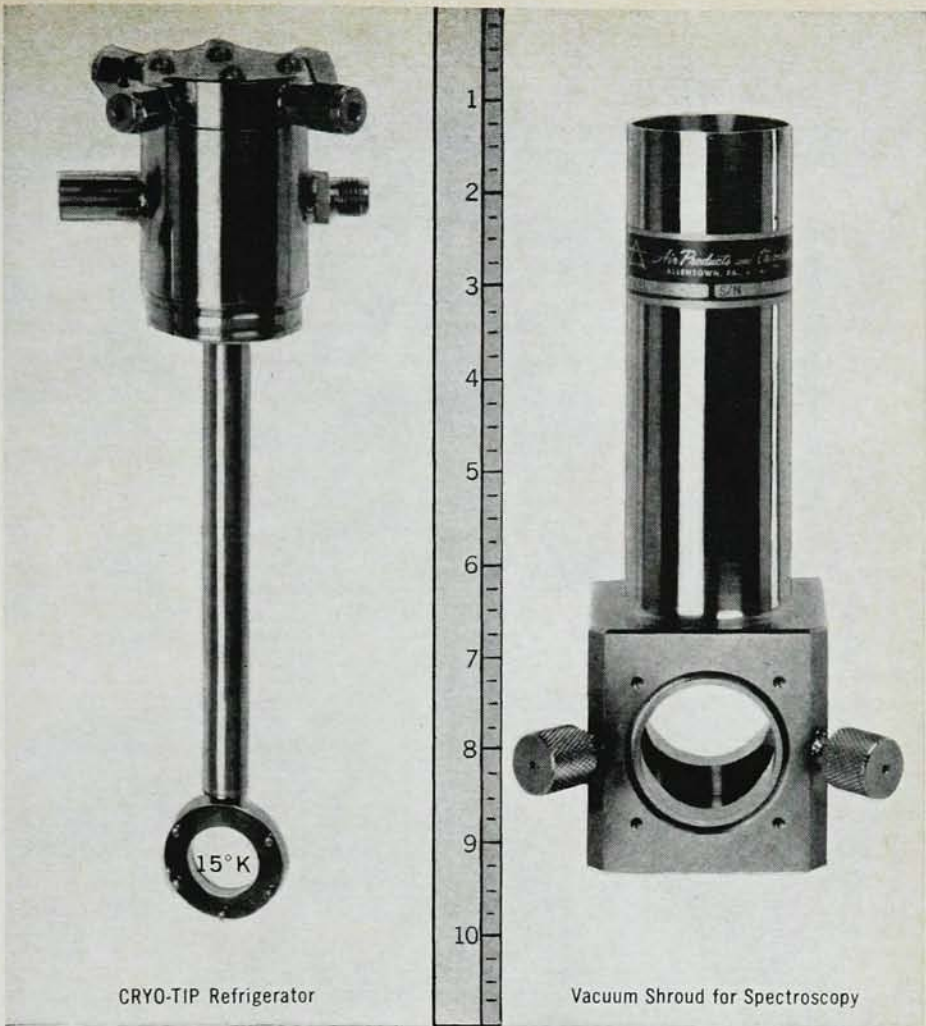
Fear applied research. Though the congressman has done much to assuage the fears of scientists concerning extended NSF support for applied research, misgivings linger that applied research will drive out support for basic research. On this score Daddario says, "I would like to put on the record that the committee supports the concept that applied activity would not come to the point where it would overcome and obscure the important work in basic research. So you ought not to be so fearful about the fact that this word 'applied' begins to creep into the legislation." These comments notwithstanding, National Academy of Sciences chief Frederick Seitz testified that "one of the greatest fears expressed by the scientific community is that NSF eventually will be transformed into an agency that is so involved in applied missions . . . that support of basic scientific research will be limited to a starvation level. Should this occur, and I believe the danger is far from remote, we could easily pay a heavy price by sacrificing positions of leadership in important fields of science. . . . I am concerned that support of applied research at academic institutions may be the thin wedge that could ultimately result in pressures to support mission-oriented work at the expense of basic research."

Board vs director. With regard to another important issue, the respective roles of the National Science Board and the NSF director, Daddario would perhaps be happy to oblige the scientists provided he could find consensus among them. But he encounters only a house divided. The

original wording of the Daddario bill said, "The function of the board shall be to establish the policies of the foundation." Director Haworth as well as most government scientists found this phrasing imprecise and wanted to change it so as to read, "The board shall be the policy-making body of the foundation and shall *review* its programs." Such wording, they said, would give the director necessary flexibility in taking executive action on policy matters and give the board an explicit role in reviewing NSF programs. But the board, reflecting the sentiments of much of the academic community, would have none of this. NSB wanted the section to read, "The board shall establish and be *responsible* for the policies and programs of the foundation."

Said NSB Chairman Eric A. Walker, "The key word here is 'responsible.' I'm not sure I know what 'review' means. It means to look at the programs, but then do you do anything about it? If you are responsible for programs, you look at them and if you don't think they are in accordance with the policies the board has established, you see that things get changed. . . . Now suppose the universities come to us and say, 'Look—as a result of some of the things you are doing, you are hurting the universities.' We shouldn't just say, 'Well, it is not our policy to do anything,' and walk away from it. We ought to be responsible for the end effect. . . . NSF is a unique sort of organization within government. It is one place where a lay board has the authority to set policies and govern programs, and it has worked very, very well. . . . The board and I are very jealous of this position. We do not want to be reduced to an advisory board. And we are going to hang on to this system."

And hang on to it the board will, for in the final wording of the bill Daddario has followed the board's wishes: "The board shall establish and be responsible for the policies of the foundation." He has, however, omitted board responsibility over NSF programs, which, for a group that meets only about nine times a year, perfectly accords with the reality of the situation. □



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