a decided change in the frequency distribution in going from the unloaded condition (curves *B*, *D*, *F*, and *H*) to the loaded condition (curves *C*, *E*, *G*, and *I*, respectively). Markedly different results were obtained for different tube structures and halogen-rare gas mixtures for the experimental conditions. Relatively long-lived metastable states are indicated by the shapes of the curves *B* through *I* (Figs. 1 and 2) for the halogen-quenched tubes. A statistical analysis of the curves *A*, *H*, and *I* by the method of variances shows that these distributions obey a Pearson, type 1, distribution.[5]

The results yield the following conclusions: (1) circuit loading not only affects spurious peak production,[3] but it also greatly affects the distribution of spurious peaks following an initial ionizing event in halogen-quenched tubes; and (2) the spurious peak distribution given by a halogen-quenched G-M tube differs from that given by an organic-vapor quenched tube.

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Mounting of Stained Stripping Film Autoradiographs*

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THE applicability of autoradiographic stripping film for the detection of labeled compounds in tissue sections has been limited in recent years because some difficulty was encountered by many workers in the staining and mounting of the tissue after processing of the film and prior to miscroscopic inspection. Staining of the specimen before application of the stripping film has the disadvantage that a protective layer is needed between specimen and film in order to prevent, among other things, chemical interaction of the stain with the photographic emulsion (fog, chemography). Such a protective layer, however, increases the distance between the specimen and film and thereby reduces resolution.

One way out of this dilemma is to renounce staining and to view the specimen and the autoradiograph in the phase contrast microscope which, in many cases, will reveal histological detail sufficient for the interpretation of the autoradiograph.

There are cases, however, in which differential staining of high resolution autoradiographs is imperative, and an effort has therefore been made to overcome the difficulties.

The routine procedure recommended by Pelc[1] and accepted by most investigators with only minor modifications is as follows: After processing of the stripping film covering a (biological) specimen, the tissue-film preparation is washed thoroughly in tap water, stained, and dehydrated in alcohol and xylol. Finally, the area above the specimen is covered with balsam or any other nonaqueous mounting medium and a cover slip. The difficulty arises during dehydration. Shrinkage of the film and/or the specimen occurs, and since the gelatin is impermeable to absolute alcohol and xylol, traces of air or moisture are sometimes trapped under the film. As a consequence, the preparation remains optically inhomogeneous and appears opaque when viewed under the microscope. Varying degrees of opaqueness are encountered and the results are not reproducible.

This difficulty can be overcome by making use of a water soluble plastic which will penetrate the gelatin film and produce an optically homogeneous filling of the interspaces of the dehydrated specimen under the film. The plastic used is a 2% aqueous solution of polyvinyl alcohol, commerically available under the trade name "Elvanol" (Dupont 51-05).

The improved method of staining and mounting is as follows: After processing and washing, the slide carrying the specimen covered by the autoradiographic stripping film is stained and then rinsed in 50% alcohol. To cover a surface of about 2×2 cm^2 with the plastic, *ca* 0.1 ml of 2% Elvanol in water is used and the slide is kept in a horizontal position at room temperature under cover. It is essential that the plastic penetrate the gelatin film rather than drying on top of it; best results are therefore obtained when drying is extended over a period of a few hours. For microscopic inspection at high power, the plastic coated area is covered with balsam and a cover slip in the conventional manner.

With this procedure, the specimen can be stained through the stripping film without distortion in optical properties. Experiments carried out with I^{131}-labeled thyroid tissue have shown that this process does not cause displacement of the photographic emulsion from the tissue. The technique outlined above has proved applicable to autoradiographic preparations using either the American Eastman Permeable Base Stripping Film or the British Kodak Autoradiographic Stripping Plates.

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† Visiting under the auspices of the Educational Exchange Program of the Department of State. A grant from the U. S. Atomic Energy Commission is gratefully acknowledged. Permanent address: Department of Biological Isotope Research, University of Copenhagen, Copenhagen, Denmark.
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Cold Trap Anti-Icing Shield*

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THE formation of ice from atmospheric moisture is one of the annoying problems connected with maintaining liquid N_2 cooled cold traps on vacuum equipment. Skvarla and Evans[1] have described a successful metal anti-icing shield and the author has used shields employing a similar principle for several years. We have recently constructed anti-icing shields from foamed polystyrene (Styrafoam, Dow Chemical Company, Midland, Michigan). These shields employ the same principle utilized by the metal shields to prevent icing but eliminate the condensation of water and the necessity of using any kind of adhesive tape to hold them in place. Unlike solid polystyrene the foamed material does not disintegrate even after being immersed in liquid N_2 for several minutes and then struck with a hammer.

The general design of the shields is shown in Fig. 1. The hole for the glass cold finger was bored one-eighth inch less in diameter than that of the particular finger involved. The shield was then forced over the cold finger with a slight rotatory motion, taking

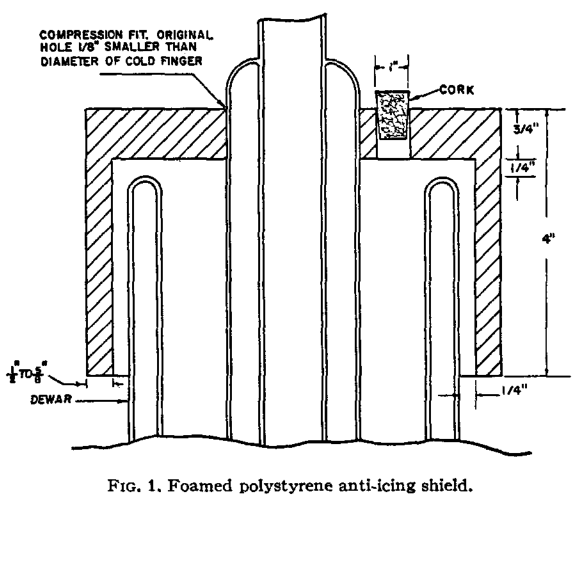

FIG. 1. Foamed polystyrene anti-icing shield.

advantage of the compressibility of polystyrene foam. The compressed foam is sufficiently resilient to keep the shield in place. These shields have reasonable mechanical strength and do not deteriorate with time. A cork or a plug made of the foamed plastic should be used to close the filling port when not in use.

Because of the excellent insulating properties of this cellular material, consumption of liquid nitrogen is lower than it is when metal shields are used. The table below shows the results of trials with both types of shields, the same Dewar flask being used for the two tests. Room temperature was 25±1°C.

	Days	Liters liq. N_2 used
Metal shield	4	9.75
Foamed polystyrene shield	4	8.75

Compared to the metal shields, these polystyrene foam shields are inexpensive to fabricate. Approximately ½ man-hour was required to make one shield, and the material cost was about $0.70 per shield.

* Contribution No. 456. Work was performed in the Ames Laboratory of the U. S. Atomic Energy Commission.
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Three Directional Motion Vacuum Sealed Joint*

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A VACUUM sealed joint with motion in the three directions of a cylindrical coordinate system has been developed to make possible remote positioning of the arc source for the Columbia University 36-in. cyclotron. This seal permits motion with no detectable leaks in our test system, which was evacuated to a pressure of 2×10^{-6} mm. A description of the assembly is best given in terms of the exploded assembly drawing in Fig. 1.

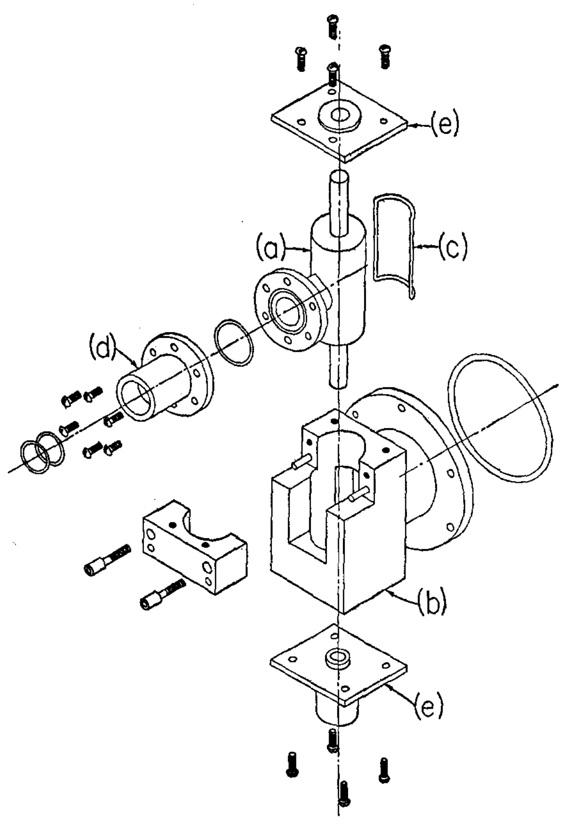

Fig. 1.

Rotational motion about a vertical axis and vertical motion are obtained by moving the cylinder (a) in the stationary housing (b) containing a vertically oriented cylindrical well. The housing, which in our application is mounted by a flange to the vacuum chamber of the cyclotron, provides a convenient reference axis, in addition to serving as a container for the moving cylinder. This cylinder, which is solid with the exception of a circular 1⅛ in. opening to allow for radial motion, is sealed into the housing by means of the O-ring (c) seated in a rectangular groove machined in the surface of the cylinder. Radial motion is permitted in a direction normal to the axis of the moving cylinder through the double O-ring seal (d).

The seal which we have constructed is driven hydraulically and permits one inch of vertical travel, 20° of rotation about the vertical and unlimited motion in the radial direction. Rotation of 3° is required to vary the lateral position of the arc source by about 2 in., so that this motion, too, is essentially linear. Thus the seal makes possible independent, linear, adjustment of the arc source position along three perpendicular directions.

In the design and construction of this seal a number of problems presented themselves. In the design it was necessary to minimize binding of the moving cylinder when the seal was connected to a vacuum. It was also necessary to assure proper compression of the sealing O-ring and protection of the sealing surface (the inner surface of the seal body). The two main problems in the actual machining were cutting the O-ring groove in the curved surface of the moving cylinder and minimization of warping when brazing was done on the seal.

To minimize binding, the moving cylinder was provided with an axle and supported with end bearings shown as parts (e). This served to maintain a clearance of approximately 0.003 in. between the cylindrical well of the housing and the moving cylinder, while still providing 0.015 in. compression of the O-ring. Furthermore, to insure a durable sealing surface, the well was chrome plated.

The O-ring groove was cut by mounting the cylinder in a milling machine so that the mill was always perpendicular to the axis of the cylinders. In this way we were able to control very accurately the depth of the groove (0.125 in.). The radii in the corners of the rectangular groove were marked on the surface of the cylinder and were followed manually by rotating the cylinder about its axis and advancing the cylinder axially with respect to the tool. Warping was reduced to a minimum by doing the final machining after brazing, whenever practicable.

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Simple Method to Control and Regulate the Output Current of a dc Generator

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IN many applications in the laboratory it is necessary to have a reasonably large, easily variable, direct current which is regulated to prevent long period changes. The direct current source, in the present instance, was a motor generator set and was used to supply a low power electromagnet where the large inductance of the magnet windings tends to smooth any ripple in the output current. Numerous methods have been described in the literature for regulating the current in low current, high voltage systems particularly in stabilizing magnet fields for nuclear studies.[1] Systems for stabilizing fairly large currents at low voltages have appeared in the literature but usually involve mechanically linked servo systems.[2-5] Although not new in principle, the method to be described has the advantage of