violet source and the photomultiplier. Improvements in the quality of the glass rods and in the mechanism for positioning them may be expected to increase the precision of measurement.

The energy dependence of the silver-activated phosphate glass appears to be a limitation on it use for *in vivo* dosimetry. The seriousness of this limitation can be more clearly assessed after the completion of depth dose experiments now in progress. The possibility exists that proper shielding can be devised for the rods which will minimize their energy dependence. Such shielding has already successfully reduced the energy dependence of larger rectangular blocks of glass to ±20% over the range 0.08–1.2 mev (*3, 7*). For problems in dosimetry where the energy dependence of the glass does not interfere, considerable advantages may be offered by the small size of the rods and the other excellent features of the radiophotoluminescent system of dosimetry.

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The Tetrazolium Test for Dormancy and Germinability of Gladiolus Cormels

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The need for a rapid method of estimating dormancy in gladiolus cormels has led to the adaptation for this purpose of the tetrazolium method for testing germinability of seeds (*1–3*). A standard procedure was developed and has been tested on a wide range of material over a 2-year period. It has given reasonably consistent estimates of the dormancy or germinability of nearly all lots of gladiolus cormels tested. In some instances, where germination tests gave a low proportion of emergence and the tetrazolium tests suggested a higher degree of germinability, the corms were found to have impermeable coats. When the husks were removed or cracked, germination rose to a level concordant with the results of the tetrazolium test.

The standard procedure is as follows. (1) A 1% aqueous solution of 2-3-5 triphenyltetrazolium chloride is prepared and kept in a stoppered bottle in the dark at room temperature. (2) A single sheet of filter paper is placed in each of 2 Petri dishes and soaked with solution. The minimum amount required is about 2½ ml per dish. The prepared dishes are kept in the dark if not used immediately. (3) Duplicate lots of 20 cormels, representative of the stock under test, are peeled (i.e., the dry husk is removed) and cut longitudinally with a razor blade to expose the central vascular region on one or both halves. Recent tests suggest that peeling may be unnecessary if a little extra tetrazolium solution is put in the Petri dish to allow for absorption by the husks. (4) Each pair of half cormels is placed radially on the outside border of the filter paper, cut surface down. Twenty pairs about fill the perimeter of the paper. Two dishes are thus prepared, each from one of the duplicate lots of 20 cormels. (5) The dishes are placed in the dark at approximately 70° F to incubate for 4 hr. (6) The cormels are rated according to the extent and intensity of the red color developing in the vascular region through the center of the cormel, and any additional coloration throughout the storage tissues. The rating given for the whole cormel is that of the half cormel with the more pronounced coloration. The rating standard may be described as follows. A value of zero is given to a cormel when there is no observable pink or red color from the dye; a faint coloration along the central vascular strand is rated 1; medium to strong color of the vascular strand, 2; strong color of the vascular strand plus some coloration throughout part of the parenchymatous storage tissues, 3; intense coloration of the central strand and medium coloration throughout most of the parenchymatous tissues, 4; and intense coloration over the whole surface, 5. The sums of the ratings, which range between 0 and 100 for a single dish, give an estimate of the mean germinability of the lot of corms from which the duplicate samples are taken.

The accuracy obtainable by taking readings with duplicate samples of 20 cormels is all that is required except in very critical work. Apart from samples of abnormally variable cormels significant differences are generally between 6 and 10 units on the 100-unit scale.

When a considerable proportion of the cormels have readings of 3, 4, or 5, satisfactory germination is usually obtained; when most of the cormels are rated 0, 1, or 2, germination is unsatisfactory. The relationship between ratings and germinability varies significantly with variety; some varieties germinate well when the rating is relatively low, others only when the rating is unusually high (Table 1). This difference appears to exist apart from the permeability of the outer coat. However, the degree of variability has not yet been sufficient to cause serious difficulty in predicting germinability. It is possible to discover by trial which varieties are likely to give abnormal readings.

At the time cormels are harvested, the tetrazolium test reveals considerable physiological activity in the

TABLE 1

NUMBER OF CORMELS WITH LOW (0–2) AND HIGH (3–5) TETRAZOLIUM RATINGS COMPARED WITH PERCENTAGE GERMINATION 40 DAYS AFTER PLANTING

Variety	Treatment	Tetrazolium ratings		Percentage germination
		0–2	3–5	
Elizabeth the Queen	Room temperature	39	1	8
	Cold storage	2	38	68
Margaret Beaton	Room temperature	36	4	26
	Cold storage	5	35	77
Leading Lady	Room temperature	40	0	3
	Cold storage	25	15	41
Valeria	Room temperature	40	0	1
	Cold storage	4	36	28

tissues that is not associated with germinability. The color pattern is centered mainly on the parenchymatous tissue and the perimeter of the cormel. As the sheathing husk dries and hardens, the color reaction decreases until the depth of dormancy is reached and hardly any reddening occurs. From that time on, intensity of the reaction to tetrazolium and capacity for germination rise in parallel. The rise may be rapid or slow, depending on the variety and the conditions of storage or treatment.

A description of experiments which led to the application of this method to gladiolus cormels will be published elsewhere by the senior author.

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Mechanism of Suppression of Nontransmissible Pneumonia in Mice Induced by Newcastle Disease Virus[1]

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In 1942 Burnet (*1*) reported that two successive intranasal inoculations of Newcastle disease virus (NDV) produced extensive influenza-like pneumonia in the mouse and that neither the infection nor the lesion could be transferred by serial passage in mice. This unusual host-virus relationship was later studied extensively by Ginsberg (*2*) and by Davenport (*3*), independently. The data obtained by these investigators were in substantial agreement and indicated that the production of pulmonary lesions by a large amount of NDV paralleled many known host-virus interactions that occur in a true viral infection except that demonstrable viral multiplication[2] did not occur (*2, 3*).

In this laboratory (*4*) the microbial product APM was found to exert a definite but transient suppressive effect on the development of pneumonia in mice following infection with influenza A virus. The fact that APM failed to exert any appreciable antiviral effect *in vitro* or *in vivo* prompted studies which led to the demonstration of its capacity to suppress the nontransmissible pneumonia in mice induced by NDV. Extensive studies with pneumonia virus of mice (*5*) and influenza A virus (*6*) as well as with NDV (*2, 3*) have indicated that factors other than viral multiplication per se are involved in the production of lesions. It would appear that in the case of NDV and of influenza A virus, APM might selectively affect such a factor.

The California strain of NDV was used throughout these studies and was propagated in the allantoic sac of embryonated eggs in the usual manner. Infectivity titrations on pooled allantoic fluid were carried out in embryonated eggs as previously described (*7*). The infective titer of mouse lung tissue was determined in a similar manner except that the diluent for homogenized lung tissue contained 500 units each of penicillin and streptomycin/ml to insure bacterial sterility and that all eggs were chilled overnight after 48 hr of incubation before collection of allantoic fluid. Hemagglutination tests were carried out at 4° C (*8, 9*).

Inoculation and injection of mice. Large numbers of albino mice weighing 18–20 g each were inoculated intranasally under light ether anesthesia with 0.1 ml of undiluted allantoic fluid containing 10^9 ID_{50} of NDV. After inoculation of NDV the mice were distributed at random into identical cages, 6–8 mice per cage. The cages were previously marked as control mice or as mice to be injected with APM and with the scheduled date of sacrifice and examination. Injections of APM were made subcutaneously under the loose skin on the backs of the mice. Groups of 10–15 mice each were sacrificed at appropriate daily intervals and the lesion score (*10*) and average weight of the lungs (weight of Petri dish plus 10 lungs less weight of dish after removal of lungs, divided by 10) were recorded (Table 1). The microbial product APM was prepared as originally described (*4*) from culture filtrates of *Achromobacter* sp. 134.

Suppression of pneumonia was readily effected by daily injections of APM. Large numbers of mice were inoculated intranasally with NDV. One half of these received daily subcutaneous injections of 1.0 mg APM

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[2] The term viral multiplication as used in this communication is restricted to the formation of new infectious particles. Ginsberg (*2*) has noted that although multiplication of incomplete virus was not detected, the possibility of its presence could not be definitely eliminated.