after irradiation. This phenomenon is being studied at the 35-r dosage level.

From the data presented above it is evident that the mitotic activity of mouse skin is extraordinarily sensitive to the effects of X-rays. Between the two dosages reported here it appears that the best index of damage is the time for the mitotic index to return to normal. Both the extent of the drop from normal and possibly the time in reaching the minimum point appear to be quite similar at these two extremes of dosage. However, the first point obtained at 325 r was at 2 hrs, and therefore the minimum point could have been reached earlier. By the use of this biological criterion of radiation effect our present program is to compare the relative destructiveness of different types and different energy-ionizing radiations.

It seems possible to postulate from the data at the dosage level of 35 r that the degree of depression of mitotic activity from normal may serve as an index of tissue damage at very low dosages. Experiments now in progress indicate that 5 r of 250-KV X-rays decreases mitotic activity to less than 25% of normal in 60–90 min.

The above work on the mitotic index in skin is being paralleled by similar studies in the jejunum, adrenals, and lymph nodes, but at the present time it appears that the skin is by far the most sensitive of the organs studied.

Experiments are in progress to determine the effect of rate of irradiation and of single or divided doses for various types of ionizing radiation on the mitotic index of mouse skin and other tissues. It is hoped that comparisons of the change in mitotic index and the shape of the recovery curve will be of value in evaluating these radiation effects.

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A Report on the Ridgway Color Standards

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Research workers have known for some time that the Ridgway Color Standards (*8*) are less useful in color description than it was originally hoped. Changes in hue, value, and chroma of the chips have resulted from aging, fading through exposure to strong light, offsetting, abrasion, and darkening through use. Moreover, there is no satisfactory way to describe those colors which occupy positions in the color space between named chips, since the spacing between the steps is quite variable. Since color records are still being made and reported in Ridgway terms, the authors believe that those biologists who are in the habit of using Ridgway, especially entomologists, mycologists, and ornithologists, would be interested in the visual differences noted among several Ridgway chips bearing the same color name.

The discrepancies were noted recently when checking the Munsell (*4*) notations for 96 colors from a set of Ridgway color chips used in Ottawa. As a result, this set was brought to Toronto and compared with two copies of Ridgway here. Notations of 12 colors were made in Baltimore from another copy. These notations are shown in Table 1. The Munsell Standards (*4*) were employed since they are convenient to use, and the work of Newhall (*5*), Nickerson (*6, 7*), and many others has demonstrated their stability, utility, and accuracy of notation. Further, the Munsell description system, like that of a recent edition of Ostwald (*1*), has the advantage of being permanently described in terms of the I. C. I. system (*2, 7*), which is internationally known and understood.

In considering the notations, some latitude must be given to inherent errors, errors of human judgment, errors produced by imperfections in viewing conditions and illumination, and errors which may possibly have arisen through the use of two sets of Munsell Standards, one in Toronto and the other in Baltimore. It is believed that the maximum error of figures shown in the table is within the limits of ± 0.5 hue, ± 0.25 value, and ± 0.5 chroma. Though the application of these limits to the recorded notations reduces the apparent differences in some cases, it should be kept in mind that the chips for which unlike notations are given were visually different when compared directly with one another.

The copies of Ridgway checked were: two copies from the Department of Botany, University of Toronto, one (Ta) purchased in 1929 and used steadily since then, one (Tb) purchased in 1940 and used rarely and only with great care; one copy (MB) from the Munsell Color Company, Baltimore; one copy (O) from the Department of Botany, Central Experimental Farm, Ottawa, purchased in 1919 and used since then. All copies have received careful treatment and have normally been stored in the dark. All were compared with a 40-hue set of Munsell Standards with occasional reference to the constant value and chroma sheets. Part of the Munsell Standards was purchased in 1940, the remainder in 1947.

During our notation both standard and unknown chips were masked with neutral gray, value 5, illuminated at 45° by either a Spencer Daylight lamp or north skylight, and viewed normally. Both types of lighting gave comparable results except in the cases of Vinaceous Cinnamon and Vinaceous Fawn. The skylight reading is used in both. In Baltimore a 6,500° K daylight lamp was used.

The data obtained are shown in Table 1. The first column gives only the colors for which the Munsell Color Company, Baltimore, provided a notation from its copy of Ridgway; the second column, the ISCC-NBS (Inter-Society Color Council—National Bureau of Standards) (*3*) class name as derived from the Munsell notation; the third, the copy index; the fourth, the Munsell notation; the fifth, the maximum differences in terms of hue, value, and chroma steps from the Tb copy of Ridgway. The ISCC-NBS class name was added, as it describes in simple terms the colors of the Ridgway chips.

During the comparison it was noted that in most cases the differences between the Tb copy, which was in very good condition, and the others were very easily seen, even when the differences between the Munsell notations were very slight. Two examples where there is presumably high color stability are Yellow Ocher and Vinaceous Drab. However, considerable differences were noted in Dresden Brown and Seafoam Yellow. The greatest differences found were 3.0 hue steps, 0.9 value steps, and 3.0 chroma steps.

TABLE 1

Color names		Copies of Ridgway	Munsell notation	Maximum difference		
Ridgway	Judd-Kelly			Hue	Value	Chroma
Chamois	Weak Yellowish Orange	Ta	2.0Y 7.6/6.0			
		Tb*	3.0Y 7.8/6.5		−0.8	−1.5
		MB	2.5Y 7.0/5.0		−0.8	−1.5
		O	2.0Y 7.5/5.8	−1.0		
Dresden Brown	Moderate Olive	Ta	1.0Y 3.9/3.5			−1.0
		Tb*	10.5YR 4.5/4.5			
		MB	1.0Y 4.2/3.5			−1.0
		O	9.0YR 3.6/4.0	−1.5	−0.9	
Light Ochraceous Salmon	Weak Orange	Ta	6.0YR 7.2/4.5			
		Tb*	7.0YR 7.5/4.5			
		MB	6.5YR 7.2/4.5	+1.0	−0.3	
		O	6.5YR 7.2/3.5			−1.0
Light Vinaceous Cinnamon	Weak Orange	Ta	5.5YR 7.3/4.5			
		Tb*	6.0YR 7.6/5.0			
		MB	7.0YR 7.0/4.0	+1.0	−0.6	−1.0
		O	6.0YR 6.8/4.3			
Old Gold	Dark Yellow	Ta	3.0Y 5.9/5.5			
		Tb*	3.5Y 5.7/5.5			
		MB	2.5Y 5.7/5.2	−1.0	0.0	−0.3
		O	3.0Y 5.8/5.5			
Olive Ocher	Moderate Yellow	Ta	3.0Y 6.6/7.0	−1.0		
		Tb*	4.0Y 7.2/6.5			
		MB	4.0Y 6.2/5.2		+1.0	−1.3
		O	3.0Y 6.8/6.8	−1.0		
Seafoam Yellow	Pale Orange	Ta	9.0Y 9.0/3.0		+0.2	−1.5
		Tb*	7.0Y 8.8/4.5			
		MB	10.0Y 9.0/3.0	+3.0	+0.2	−1.5
		O	9.0Y 9.0/3.0		+0.2	−1.5
Vinaceous Buff	Weak Orange	Ta	8.0YR 7.8/3.5	+1.5		
		Tb*	6.5YR 7.5/4.5			
		MB	8.0YR 7.0/3.0	+1.5	−0.3	−1.5
		O	8.0YR 7.8/3.5	+1.5		
Vinaceous Cinnamon	Weak Orange	Ta	6.0YR 6.4/5.5†			
		Tb*	6.5YR 6.8/5.5†			
		MB	3.0YR 6.2/5.0	−3.0	−0.6	−0.5
		O	6.0YR 6.5/5.5†			
Vinaceous Fawn	Weak Reddish Orange	Ta	4.0YR 6.4/3.5†			
		Tb*	5.5YR 6.8/3.5†			
		MB	2.5YR 5.9/3.0	−3.0	−0.9	−0.5
		O	4.5YR 6.7/3.5†			
Yellow Ocher	Moderate Yellowish Orange	Ta	10.5YR 6.8/8.5	+0.5		
		Tb*	10.0YR 6.6/8.0			
		MB	10.0YR 6.0/11.0		−0.6	+3.0
		O	10.0YR 6.8/9.0			
Vinaceous Drab	Weak Red Purple	Ta	10.0RP 4.7/2.0	0.0	+0.2	
		Tb*	10.0RP 4.5/1.8			
		MB	10.0RP 4.7/0.5		+0.2	−1.3
		O	10.0RP 4.7/2.0		+0.2	

* Good copy.
† Made with north light.

While these differences and similarities appear to be representative of all 96 colors examined, another confusing feature—similarity of color with dissimilarity of name—was also noted. The table gives four examples which have received the ISCC-NBS color class name of Weak Orange, which also show very small differences in the Munsell notation for the Tb copy of Ridgway. These are Light Ochraceous Salmon, Light Vinaceous Cinnamon, Vinaceous Buff, and Vinaceous Cinnamon.

These observations support the view that Ridgeway color chips are changing with age and use. Hence they are not desirable as permanent standards in biological work and should be replaced by a system of colors which has been permanently described according to the requirements of the I. C. I. system.

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Flowering of the Jersey Type Sweet Potato

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Within the past 11 years certain investigators (*1–5*) have induced flowering and fruiting of many varieties, strains, and introductions of the sweet potato (*Ipomoea batatas* Lam.). In these investigations, varieties and strains of the Jersey type were a noticeable exception in that they failed to produce flowers under the conditions described. This was most unfortunate, since they generally produce a high percentage of No. 1 roots and have an attractive skin and the desired shape. Thus, the induction of flower primordia with the subsequent development of fertile pollen and ovules would be highly desirable, since the excellent characteristics of the roots of the Jersey type could be combined with disease resistance, general adaptability, and vigor of other types.

During the fall of 1947 two plants of Maryland Golden produced a small number of functional flowers in the breeding nursery of the Horticulture Research Department of Louisiana State University. Since many sweet-potato breeders are interested in the development of flowers and seed of varieties and strains of the Jersey type, a description of the conditions under which the plants flowered is presented.

The breeding nursery in which the plants were grown is equipped with vertical trellises constructed of chicken wire 6′ high and arranged in rows 8′ apart. The soil type is well drained, moderately fertile, slightly acid Lintonia silt loam. Vine cuttings were taken from plants grown in the field during the last week of October 1947, planted singly in 12″ clay pots, and trained to 1″ × 1″ × 5′ stakes. The plants were grown in a greenhouse until April 22, when they were set in the nursery rows. The greenhouse was maintained at temperatures varying from 75° to 85° F during the day and from 60° to 65° F during the night, and the plants were watered as often as necessary to permit steady vegetative growth. At the time of transplanting, the stems were 8–9′ long, the internodes were short, the leaves were normal in size and color for the variety, and the roots had thoroughly ramified through the soil in the pots. However, there were no indications of flower bud development. This was in sharp contrast to the large number of flower buds which had developed on certain seedlings which flower readily.

Transplanting operations consisted of making holes directly under the trellises 30′ apart, 18″ deep, and 12″ wide, thoroughly mixing with the soil about ½ lb of a 4–12–4 commercial fertilizer in each hole, transferring the plants from the pots to the holes, and firming the soil around the roots. In general, the plants recovered rapidly from the check in growth incident to shifting to the nursery.

Growing operations consisted of training the vines on the trellis to provide for maximum exposure of the leaves to sunlight and air, and manipulating the nitrate and water supply to promote rapid development of vines during spring and early summer and a slow growth of vines during late summer and fall. About 40 days after transplanting, $NaNO_3$ was applied, as a side dressing, at the rate of ½ lb/plant, and water was run in small irrigation furrows at biweekly intervals in May and June, at weekly intervals in July and August, and at biweekly intervals in September. Irrigation water was not applied in October. No vine trimming or stem girdling was practiced. October weather was particularly favorable for the slowing down of vine growth and the accumulation of carbohydrates, a condition associated with flower bud formation. The days were bright and warm, the nights were comparatively cool, and the rainfall was only 0.93″.

On October 28 small clusters of comparatively slender flower buds on 3–4″ slender peduncles appeared in the axes of short secondary stems on 2 of the 6 plants. The expanded corolla was about 1″ in diameter and was pale pink with a light purple throat. The stamens were slightly prostrate, and the anthers extended slightly above the level of the stigma. Pollen production was low. The superior pistil was normal in appearance and, when receptive, retained pollen on the stigma. Six cross-pollinations were made. Of these, 5 were unsuccessful, and one, between Maryland Golden and seedling L-130, was apparently successful. The ovary of the Maryland Golden, the female parent, began to grow—characteristic of successful pollinations. However, low temperatures on November 8 and 9 prevented further ovary development.

Observations at the Louisiana Experiment Station on the behavior of Maryland Golden indicate that the Jersey type requires relatively long periods for the vegetative and reproductive stages. Apparently, the vegetative stage requires conditions favorable for the development of a large number of vines; the reproductive stage, conditions favorable for the accumulation of carbohydrates for a longer period than is necessary for flowering of varieties of other types.

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