pool of engorged *Aedes canadensis* collected in southeastern Massachusetts during 1959. and from 3 pools of unengorged *C. melanura* collected in 1960. The virus also was isolated from the brain of an infected 3-year-old Impeyan pheasant and from the blood of a 3-week-old chicken in 1959. WE and EE (eastern encephalitis) antibodies were detected in domestic fowl hatched and reared in widely separated areas in eastern Massachusetts during 1959. Although no human or equine outbreaks of WE have occurred in the eastern United States, the potential for such an outbreak apparently exists.

Addendum. Since this paper was submitted for publication, there have been three isolations of western virus from 1961 collections—two from pools of *C. melanura* and one from the blood of a catbird during the nesting season.

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Effect of Local X-Irradiation on Growth Capacity of Mouse Kidney.* (27075)

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It is well known that cells may continue to enlarge after dosages of X-rays sufficient to block cell division. Renal compensation after unilateral nephrectomy is generally attributed to hypertrophy(1). This system, therefore, lends itself to the study of radiation effects on a growth process characterized mainly by enlargement of existing cells(2).

In the present investigation the following experiments were performed: 1) effect of uninephrectomy on size and DNA content of the remaining kidney in mice of various ages, 2) effect of immediate or delayed local X-irradiation on renal compensatory response. We have confirmed the fact that mitosis plays a relatively minor role in the kidney enlargement following uninephrectomy in the young adult mouse. We have also found this compensatory phenomenon to be radioresistant.

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Materials and Methods. CF no. 1 female mice of various age groups received sodium pentothal intravenously and the right kidney was exposed by a dorsal surgical incision, ligated and removed. Care was taken to maintain the integrity of the adrenal gland. Unilaterally nephrectomized mice were sacrificed 5 to 6 days post-operatively and the kidneys taken for DNA analysis by the spectrophotometric method of Schneider(3) as modified by Barton(4). These were compared with the normal kidneys removed from the same animals at time of operation. The values reported for the 2-month-old animals are based on individual microdeterminations; those of mice in other age groups represent pooled samples of several kidneys. In the radiation studies, the left kidney was freed from the adrenal and ovary and exteriorized after removal of the right kidney. Local irradiation of the organ was accomplished through a one centi-

meter cone, using a GE Maximar 100 source. The radiation factors were: 100 kv, 5 ma, target distance 15 cm, 2014 r/min using 0.1 mm of Al shielding. By adjusting the X-ray cone and the mouse it was possible to irradiate the exteriorized kidney alone without shielding the rest of the animal. Precautions were taken to prevent pressure upon the kidney or its blood supply during irradiation; the color of the exteriorized organ remained normal throughout the exposure. After irradiation the kidney was replaced in the body cavity and the muscle and skin closed separately with interrupted silk sutures.

Results and Discussion. Removal of the right kidney in the normal mouse results in a 50% increase in the wet weight of the left kidney 26 to 38 days post-operatively. The weight of the remaining kidney at this time corresponds to 75-80% of the initial combined weight of both kidneys. The greater part of this increase (40% increase above initial weight, 70% of initial combined weight) is attained within 14 days after nephrectomy and this period was selected for analysis in the radiation experiments. The dry renal tissue represents about 25% of total kidney weight and, in general, this percentage was unchanged during the course of kidney enlargement.

In the 2-month-old CF no. 1 mouse total DNA content of the normal kidney was 1.12 mg with a standard error of 0.05, whereas that of the kidney that had undergone enlargement for 5 or 6 days was 1.26 ± 0.06 mg (Table I). These differences are not significant. In both rat(5) and mouse(6) it has been reported that mitotic activity, if it occurs at all during the compensatory response, takes place within 48 to 72 hours after nephrectomy.

TABLE I. Kidney DNA Content 5 to 6 Days After Unilateral Nephrectomy.

Age at operation	Group	No. kidneys	DNA/kidney (mg)
4-6 wk	Normal	13	.97
	Nephrectomized	13	1.50
2 mo	Normal	7	1.12
	Nephrectomized	7	1.23
2 " *	Normal	9	1.12 ± .05†
	Nephrectomized	9	1.26 ± .06
4 "	Normal	6	1.05
	Nephrectomized	6	1.08
6 "	Normal	3	1.16
	Nephrectomized	3	1.00
10.5 mo	Normal	11	1.03
	Nephrectomized	11	1.11

* Individual determinations; others are pooled values.

† Standard error of mean.

Age appears to be an important factor since in the present experiments, DNA content was increased somewhat in 4- to 6-week-old mice but not in 2-, 4-, 6- or 10.5-month-old mice. A similar age-dependent relationship has been found in the rat(7).

When the remaining kidney of a 2-month-old mouse is irradiated immediately after uninephrectomy, the hypertrophic response as revealed by the increase in either wet or dry weight at 14 days is not altered significantly until X-ray doses in excess of 20,000 r are employed (Table II). The weight of kidney exposed to 30 kr is significantly smaller than that of a nonirradiated compensating kidney although it is still greater than normal. The diminished response in this instance may be due, in part, to necrosis and scarring; however, even with 30 kr sufficient renal tissue persists to allow the animals to survive for several weeks. With 50 kr there is apparently considerable renal destruction and only 1 of 7 animals survived for 14 days. The increased

TABLE II. Effect of Local X-irradiation on Renal Enlargement After Unilateral Nephrectomy.

Group	Irradiation immediately after uninephrectomy			Irradiation 5 days after uninephrectomy		
	No. mice	Kidney wt (mg) *	P value	No. mice	Kidney wt (mg) *	P value
Compensating kidney						
0 r	18	188.2 ± 4.6	—	8	192.4 ± 6.1	—
10 kr	10	182.4 ± 4.0	>.05	9	169.7 ± 5.6	>.05
20 "	18	163.6 ± 9.3	<.05>.02	8	161.0 ± 10.4	.02
30 "	6	149.6 ± 8.9	<.001	6	136.9 ± 8.0	>.001
†Normal kidney	10	132.4 ± 4.0	—	—	—	—

* Mean ± S.E. 14 days after irradiation.

† Nonirradiated.

renal damage is probably reflected in the weight loss shown by the animals exposed to the higher dose levels. While the hypertrophic response of the kidney following uninephrectomy may not be affected by rather large amounts of radiation, there is evidence of latent injury in that mean survival time of such locally irradiated mice is reduced. This effect, however, is seen also in control mice in which both kidneys have undergone local irradiation: with 40 kr both groups showed a mean survival time of about 10 days; with 30 kr about a month; with 20 kr almost 3 months; with 10 kr about 3½ months.

The possibility exists that a kidney irradiated immediately after removal of the contralateral organ might be more or less sensitive than one undergoing hypertrophy at the time of exposure. To test this, mice were uninephrectomized, subjected to local kidney irradiation 5 days later, and sacrificed at 14 days. The picture is similar to that seen when irradiation occurs immediately after nephrectomy; the hypertrophic response shows a significant decrease at about the 20 kr level (Table II). It has been reported(6) that sublethal whole body X-irradiation 3 hours after unilateral nephrectomy suppresses mitosis and inhibits kidney enlargement in LAF_1 mice. However, if irradiation is delayed 48 hours, until mitosis has occurred, enlargement is essentially similar to that seen in nonirradiated controls. There are obvious differences of local vs whole body radiation effects as well as possible strain differences, but the discrepancy between these results and ours may also be attributable to the age-dependency noted previously.

Summary. In adult female CF no. 1 mice, kidney enlargement after unilateral nephrectomy is a consequence mainly of hypertrophy. New cell formation as evidenced by an increase in total DNA content of the kidney may be a contributing factor in young animals but this becomes negligible with increasing age. The compensatory response occurring after uninephrectomy in the adult mouse is quite radioresistant, whether irradiation occurs immediately or 5 days post-operatively. This contrasts with the well-known radiosensitivity of cell renewal systems.

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Metabolic Fate of Injected C^{14}-Phytosterols.*‡ (27076)

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It has been demonstrated(1-4) that plant sterols are absorbed by animals and man to a slight extent. The mechanism of phytosterol absorption has been investigated and shown to be similar to that of cholesterol(4). Several reports(1,2,5) have shown that following administration of H^3-β-sitosterol or C^{14}-ergosterol by feeding or intravenous injection labeled sterols could be detected in a number of tissues, the highest levels of activity being in the serum and liver. There is also evidence that fed H^3-β-sitosterol disappears more rapidly from the tissues and blood than cholesterol (1). Regarding the metabolic degradation products of the absorbed plant sterols, it has

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