factor IX for heterozygous females may reach the mean level for affected males at the one extreme and that for normal males and homozygous females at the other (*2, 3*). These extreme values correspond to the case where the X chromosome carrying the mutant gene happens to be active, or inactive, in all cells of the individual. In our data (Table 1) the range for heterozygous females is in agreement with this expectation, since in a sample of only 17 women the range was 10 to 100 percent (in four affected males studied, results from 3 to 10 percent were obtained). Also, the coefficient of variation (Table 1) was greater for the heterozygous females than for the other two classes (*9*).

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Variations in Survival Time after Whole-Body Radiation at Two Times of Day

Abstract. *Rats, anesthetized with sodium pentobarbital, given 900 roentgens of x-radiation over the entire body, survived more than 130 days when the radiation was given in the morning. The same dosage killed all the animals within 13 days when the radiation was given at night.*

In the course of experiments designed to study protection against the effects of whole-body radiation, it became necessary to irradiate animals both in the morning and at night. It was noted that untreated, control animals responded quite differently to the same dose of x-radiation administered at two different times of day. The phenomenon was so striking that a more detailed investigation was made. The experimental animals used were female rats (*1*) weighing 172 ± 3 g. All the animals were kept in quarantine in our animal quarters for 2 weeks prior to the tests and routinely checked by culture for parasitic or bacterial infection. Before and after irradiation the animals were maintained one to a cage and fed a standard rat diet. They were allowed to eat and drink all they wanted. The room in which all the animals were kept was artificially illuminated for 9 hours and kept dark for 15 hours each day. There were no windows. The period of illumination began at 7 A.M.; the period of darkness, at 4 P.M.

Table 1. Results for four experiments.

Irradiation		Animals (*N*)	Average survival time (days)	Days after irradiation for 1st death	Days after irradiation for last death
Date (1962)	Time				
11 June	9 A.M.	5	*		
	9 P.M.	5	8.2	5	10
21 June	9 A.M.	5	*		
	9 P.M.	5	9.2	7.5	13
14 August	9 A.M.	5	*		
	9 P.M.	5	11.0	10	12
28 August	9 A.M.	5	*		
	9 P.M.	5	8.0	6	12

* All animals still surviving on 20 October.

The radiation was administered with a Picker Vanguard high-frequency, deep-therapy unit of 280 kilovolt peak, operating at 20 ma, with added filtration of tin (¼ mm), copper (½ mm), and aluminum (1 mm).

The beam had a half-value layer of 2.03 mm of copper. A 50-cm target-to-midline distance and an air dose of 900 roentgens (given at 93 r/min) were used in all cases. The dosage rates were checked at each irradiation with a Victoreen roentgen chamber and meter calibrated by the National Bureau of Standards. The unit was equipped with a dose-rate meter in the useful beam, which measured the constancy of the output.

The animals were anesthetized with sodium pentobarbital given intraperitoneally (30 mg/kg) and examined before and after radiation for signs for cyanosis. They were placed on a rotating table (12 rev/min) in the beam to insure homogeneity of dose to each animal. Table 1 shows the results for four experiments and the dates of irradiation. Of the 20 animals irradiated in the morning, all survive at this writing and continue to appear in good health, whereas none of the animals irradiated at night survived longer than 13 days. No signs of cyanosis as a result of the anesthetic were noted either before or after irradiation, and the animals all revived from anesthesia at about the same time.

Work in this laboratory is being continued to determine the basis of the differences in radiosensitivity that were observed (*2*). We believe that these may be light-dark related and that radiosensitivity may vary as a function of irradiation in the light phase or the dark phase of a 24-hour day. We are also investigating the possibility that sex or species differences are reflected in the results.

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Notes

1. The rats used in this study were obtained from Carworth Farms, New City, New York.
2. This work is supported in part by the U.S. Public Health Service (contract USPHS-CRT 5069).

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Incidence of Gastric Ulcers in Swine

Gastric ulcers have been recognized in man for many years. Sporadic observations made in the past (*1*) have also indicated the occurrence of gastric ulcerations in swine. The ulcers in swine are similar to those found in man, and investigations with pigs may furnish some valuable information applicable to humans. A recent study of 164 hogs slaughtered in Indiana (*2*) showed a 25-percent incidence of esophagogastric ulcers. The condition is