TABLE 1. Survival rates of thermally injured rats receiving single injections of Piromen or placebo immediately postburn.

Expt.	No. of rats	Wt range in g	Percent burn	Therapy	Piromen dose (μg)	Percent survival hours					Days 10
						3	5	8	12	24	
Part I. *Varied dosages of Piromen*											
A	12	202–210	50 ± 2	P	1	100	0	0	0	0	0
B	10	200–210	50 ± 2	P	0.1	20	0	0	0	0	0
C	5	220–240	37 ± 2	P	1	100	40	0	0	0	0
D	5	190–210	36 ± 2	P	0.1	100	20	0	0	0	0
	5	200–210	36 ± 2	None	—	100	60	0	0	0	0
E	10	190–210	32 ± 2	P	0.1	100	90	70	10	10	10
	5	197–210	32 ± 2	None	—	100	100	80	20	0	0
	5	190–210	32 ± 2	Pl	〃	100	100	40	0	0	0
Part II. *Piromen dosage calculated individually on basis of 0.65 μg/kg body weight*											
F	10	190–210	32 ± 2	P	0.65 μg/kg	100	90	50	20	10	10
	10	190–210	32 ± 2	Pl	〃	100	90	50	30	0	0
G	10	215–235	32 ± 2	P	0.65 μg/kg	100	100	50	0	0	0
	10	215–235	32 ± 2	Pl	〃	100	100	50	10	10	10
H	10	250–270	32 ± 2	P	0.65 μg/kg	100	100	70	20	0	0
	10	250–270	32 ± 2	Pl	〃	100	100	40	30	10	10

Results and Discussion. The results of these experiments are summarized in Table 1. The survival times of the animals in the several groups increased as the percentage of the area burned was reduced from 50 ± 2 percent to 32 ± 2 percent. No significant difference in survival percentage of the Piromen-treated rats was observed among the several experimental groups within the dosage ranges given. Since the majority of the animals listed in Table 1, Part I, received burns greater in surface area than those reported by Greene *et al.* (*5*), it is possible that the dosages of Piromen administered were not sufficient to permit recovery from the injury. However, we are at a loss to explain why those animals in Part II of Table 1, which received burns similar to those reported by the above authors and which received optimum therapy calculated individually for each animal, did not respond to the Piromen therapy as they have reported. We have had no experience regarding the ability of the drug to protect when given prior to burning, although Mefferd, Henkel, and Loefer (*8*) have reported that Piromen affords protection from x-irradiation when given prior to the radiation. Millican (*9*) has used Piromen in the treatment of mice following thermal injury and has found it to be ineffective in promoting survival. We have given normal rats the drug within the dosage range given to the thermally injured rats and have found no ill effects. We have also administered the drug intravenously to burned animals and have found it to be of no benefit.

Summary. Single intraperitoneal injections of Piromen given to rats immediately following severe thermal injury were found to be ineffective in promoting survival under the conditions of the experiments reported above.

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Received January 18, 1954.

Prevention of Alloxan Diabetes by 2-Tetrahydroxy Butyl 5-Methyl 4-Carbethoxy Furan and Its Sodium Salt

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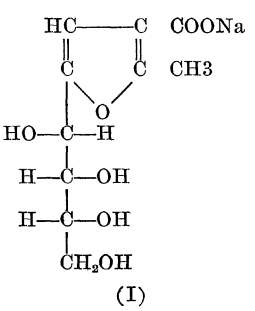
Large doses of cysteine and glutathione injected prior to alloxan, but not after alloxan, have been found by Lazarow (*1*) to protect animals from diabetes. Patterson, Lazarow, and Levey (*2*) explained this mechanism by showing that alloxan reacts with cysteine to form dialuric acid and with glutathione to give rise to dialuric acid and an additional compound showing a maximum at 305 mμ, which, it is stated, is formed by a reaction involving alloxan and the

[1] The authors record their grateful thanks to the Ministry of Education, Government of India, for the award of one of the Ministry's Senior Research Scholarships to one of them (V.K.S.).

sulfhydryl group of glutathione. Bruckman and Wertheimer (*3*), on the other hand, have observed that substitution of alloxan in both imino groups or in the C_5 position obviates its diabetogenic effect. Although glucose as well as acetoacetate have been found to cause immediate rise in blood sugar on injection, the condensation product of the two, namely 2-tetrahydroxy butyl, 5-methyl, 4-carbethoxy furan (*4, 5*) is without any such effect (*6*). Acetoacetate has been shown to reduce glucose tolerance in rabbits on gram diet (*Cicer arietinum*) (*7*) and to cause a marked increase in the susceptibility to alloxan diabetes (*8*). Studies on the effect of this condensation product on alloxan diabetes were undertaken to see if this substance could have any effect on alloxan diabetes.

This substance was prepared according to the method of West (*9*), slightly modified in our laboratory (*10*). The intraperitoneal injection of the condensation product was given in fine suspension with distilled water to male albino rats weighing between 110 and 160 g, about 45 min before the injection of the diabetogenic dose of alloxan (20 mg/100 g body weight, injected intraperitoneally in a 5-percent solution). In all the 24 rats studied, the condensation product in the molecular proportion of about 15:1 with alloxan was found to prevent completely the development of alloxan diabetes, and when such proportion was reduced to 10:1, complete prevention was observed in about 50 percent of the animals taken. No prevention could, however, be observed when this substance was injected after alloxan was administered in 6 rats.

In the subsequent experiments, where the ethyl ester of the condensation product was transformed into the more soluble Na salt (I) by treatment with alkali (2 *N* NaOH) it has been observed that a much lower amount of this product (i.e., the Na salt) in the proportion of 1.5:1 with alloxan could bring about complete prevention of alloxan diabetes. No glycosuria or hyperglycemia could be noticed in any of the 8 rats studied, even up to a period of 10 days, and the amount of blood GSH was also found to be retained to the normal level (i.e., in the neighborhood of 34 mg/100 ml blood), and all the animals seemed to be perfectly normal.



(I)

The condensation product has recently been shown in this laboratory (*11*) to undergo oxidation by alkaline H_2O_2 to form some bisulfite binding substance which gives a semicarbazone melting at 248° C, and it seems likely that the protective effect of the condensation product might be either through the formation of a complex between it or one of its breakdown products and alloxan, or through the substitution of alloxan in both imino groups as suggested by Bruckman and Wertheimer (*3*).

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Received January 18, 1954.

The Li^7 (n,t) Reaction

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The well-known Li^6(n,t)α reaction has been utilized for neutron detection, Li^6 detection, and tritium production. The extent of undetected Li^7(n,t) contributions in some of these applications has been questioned (*1*). With the development of equipment for tritium recovery and counting at sufficiently low activity levels (*2*), it became possible, in highly enriched Li^7, to detect the (n,t) reaction.

Pile Irradiation Procedure. The high thermal cross section (*ca.* 900 barns) and $1/v$ dependence of the Li^6(n,t)α reaction required extensive shielding and the purest possible Li^7. Boron and uranium were chosen as the primary shields because of their $1/v$ absorption and because of the additional fission neutrons produced in the uranium. A small cadmium shield was added as an extra precaution. A uranium sleeve location was available in the Oak Ridge National Laboratory graphite pile[1] where the proportions of fission and moderated neutrons were nearly equal. The purest Li^7 available contained 55 ppm Li^6. For a pure fission spectrum, the Li^6(n,t) reaction for this material was computed to yield tritium equivalent to about 0.4 mb Li^7(n,t) cross section, the latter computed for the flux above 2.8 Mev. To reduce the slow neutron Li^6(n,t) contribution to the same value in the location available required an average attenuation of 10^8. The boron powder shield (Fig. 1) was increased to about 10^{10}

[1] Courtesy of the ORNL Solid State Division.