volume, changes and the total protein changes correspondingly. The 2 days of protein deficiency apparently represent these slow and more or less natural changes in an accelerated form and are insufficient to cause alteration in the relationships of the blood protein fractions, which longer starvation would probably expose. It would seem that the loss of body weight is probably due in part to the tissue destruction which reduces total serum protein, but principally to dehydration, since a high fluid intake minimizes it.

Conclusions. 1. Due principally to low fluid intake, the blood is concentrated and the serum protein concentration slightly less than proportionately increased by a low calorie diet containing no protein.

2. Two days of protein deprivation is an insufficient time to make any change in the character of the blood proteins, but lowers the total blood protein definitely.

7965 C

Stimulation of Adrenal Medulla by Irradiated Insulin.*

J. MURRAY LUCK AND GORDON M. RICHMOND. (With the assistance of J. von Saltza.)

From the Biochemical Laboratory, Stanford University.

Davis, Luck, and Miller[1] showed that insulin on long exposure to soft X-rays of high intensity loses its characteristic ability to lower the blood-sugar content and, in massive doses, may even produce a slight degree of hyperglycemia. A substantial portion of its phosphate-lowering activity is retained, as well as part of its amino-acid-lowering activity. It was suggested, by way of explanation, that the irradiated insulin, though otherwise inactivated, retains its power to stimulate the adrenal medulla, thus causing the slight hyperglycemia, hypophosphatemia, and hypoaminoacidemia actually observed.

To test this hypothesis we have administered insulin, 7 to 10 units per kilo, irradiated with soft X-rays for 3 hours at an intensity of 3,400 Roentgen units per second, to adreno-demedullated rabbits. Six animals were employed, and in no case was a lowering in blood

* We are greatly indebted to Professor H. Jensen for the crystalline insulin and to Mr. Morden G. Brown for operating the X-ray equipment. The adreno-demedullated rabbits were generously provided by Professor J. E. Markee.

[1] Davis, B. L., Jr., Luck, J. M., and Miller, A. G., *Biochem. J.*, 1933, **27**, 1643.

amino acids observed. In 5 normal animals the irradiated insulin caused quite a pronounced decrease (Table I). Quantitatively the

TABLE I.
Effects of irradiated insulin on demedullated rabbits.

NORMAL					ADRENO-DEMEDULLATED				
Post-injection values after 1.5 and 3 hr. % initial					Post-injection values after 1.5 and 3 hr. % initial				
Amino N		Blood Sugar		Insulin	Amino N		Blood Sugar		Insulin
1.5	3	1.5	3	used	1.5	3	1.5	3	used
97	89	79	110	Cryst.	99	99	100	101	U- 80
86	75	61	92	"	97	101	96	100	U-100
92	83	69	81	"	101	100	101	101	U-100
87	89	88	98	"	99	100	89	96	Cryst.
78	86	81	98	"	99	99	92	98	"
					98	99	87	93	"

results differ from those obtained by Davis, Luck, and Miller in that no tendency towards hyperglycemia was observed. Indeed, for reasons that are still obscure, we were unable to *totally* destroy the hypoglycemic activity of the insulin, despite substantial increases in irradiation time and intensity. In the adreno-demedullated rabbits the irradiation product was completely inactive, such hypoglycemia as was observed being confined to the normal animals.

The results clearly indicate that the irradiated insulin, though inactive to a large extent wth respect to blood sugar, retains a substantial portion of its activity with respect to blood amino acids. The facts accord with the hypothesis that the irradiation of insulin by soft X-rays does not destroy its ability to stimulate the adrenal medulla.

7966 C

A Comparison of the Resistance of Bacteria and Embryonic Tissue to Germicidal Substances. III. Mercurochrome.

A. J. SALLE AND A. S. LAZARUS.

From the Department of Bacteriology, University of California, Berkeley.

Lambert and Meyer[1] bathed fragments of rabbit spleen in a suspension of *Staphylococcus aureus* for one minute followed by immersion in graded solutions of mercurochrome for 20 minutes.

[1] Lambert, R. A., and Meyer, J. R., PROC. SOC. EXP. BIOL. AND MED., 1926, **23**, 429.