in relation to the copper sulfate and ferric citrate may provide the destructive agent. De Ritter and Rubin(6) showed that ferrous iron would destroy thiamine under conditions of acid extraction, but that this destruction could be avoided by the addition of cystine to the extraction solution. It is of some interest to note that when L-cystine replaced the DL-methionine as the sulfur amino acid supplement, no convulsions were observed and growth was considerably improved. However, cystine added to the extraction solution or to the ration does not improve the recovery of the vitamin.

The data presented in this paper are based on a limited number of animals but similar results have been obtained with many other groups of animals. In all cases when a reduced growth response has been obtained a definite loss of thiamine in the ration as revealed by chemical analyses has been demonstrated. While more work is needed to establish the exact mechanism of the destruction and the protective action of the sulfa drug, it seemed advisable to bring these effects to the attention of other workers. Since the lability of thiamine has been encountered in rations containing only 9% casein and no added niacin or tryptophan, one might conclude that protein and tryptophan or niacin may have some protective effect. However, it is more likely that a deficiency of tryptophan or niacin may reduce the food intake sufficiently to precipitate a thiamine deficiency when a significant portion of that added to the ration is destroyed. These relationships may be studied further when the level of the thiamine in the ration can be accurately controlled.

Summary. The "nervous syndrome" condition produced in rats after 10 weeks or longer on a low protein, niacin-free regimen has been shown to respond to thiamine supplementation. Complete protection from the convulsions was affected when sulfasuxidine was added to the ration. Analyses of the rations for thiamine showed that as much as 70% of the vitamin was destroyed in the non-sulfasuxidine ration, while very little destruction occurred in the ration containing the drug. The addition of 0.2% DL-phenylalanine did not increase the thiamine requirement.

6. De Ritter, E., and Rubin, S. H., *Ind. Eng. Chem.*, Anal. Ed., 1947, v19, 243.

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Use of Cortisone in Treatment of Experimental Frostbite. (18934)

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It has been reported that cortisone and ACTH therapy has been beneficial in the treatment of severe burns(1,2). Since frostbite resembles burn injuries in some respects, cortisone has been used in the treatment of frostbite casualties in the Korean conflict. It has been demonstrated that the adrenal glands become enlarged in rabbits following local cold injury, and in severe frostbite pathologic changes have been observed in the cortices(3). However, as far as we know, no clinical or experimental evidence has been presented to support the use of cortisone in local cold injuries. These experiments were performed to determine the effect of this drug on the extent of frostbite necrosis.

Materials and methods. The experiments were performed on 65 male albino rabbits of more than 2,500 g body weight. Two degrees of local cold injury were induced, one by exposure of a hind leg to an alcohol bath at −12°C for 30 minutes for the determination of muscle necrosis, and the other at −15°C for 30 minutes for the determination of skin as well as muscle necrosis. We have shown in

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2. Whitelaw, M. J., and Woodman, T. W., Letter to the Editor, *J. Clin. Endocrinol.*, 1950, v10, 1171.
3. Hoelscher, B., to be published.

TABLE I. Muscle and Skin Necrosis After Local Cold Injury.

Exposure (°C)	Test animals	Results	
		Muscle necrosis, %	Skin necrosis, cm²
−12° for 30 min	18 treated with cortisone	24.5 ± 4.6	
	17 controls	26.7 ± 4.1	
−15° for 30 min	15 treated with cortisone	61.4 ± 7.2	11 ± 2.5
	15 controls	57.1 ± 7.1	11 ± 3.7

previous experiments that these exposures result in injuries which are critical for muscle and skin, respectively(4).

Thirty-five animals had one hind leg exposed to −12°C for 30 minutes, of which 18 were treated with cortisone* intramuscularly. Two and one-half mg were given intramuscularly in the thigh of the unexposed leg twice daily for 2 days beginning with the day of exposure followed by 1.5 mg twice daily for 5 days. Seventeen rabbits did not receive cortisone and served as controls. All animals were sacrificed 7 days after exposure, and the extent of muscle necrosis was determined in percent of the total weight of the leg muscles as described previously(5).

A second group of 30 animals was exposed to −15°C for 30 minutes to determine the extent of skin necrosis and also the extent of muscle necrosis. Fifteen of these received 2.5 mg cortisone intramuscularly twice daily for 2 days beginning with the day of exposure followed by 1.5 mg twice daily for 4 days. Fifteen did not receive cortisone and served as controls. All animals were sacrificed after 6 days. The area of necrotic skin was measured in square centimeters.

The exact procedures of freezing and measuring skin and muscle necrosis have been described in other papers(4-6). Except for cortisone administration, all animals received the same care after exposure. The frozen legs were coated with 3% sulfamylon ointment, dressed, and left to spontaneous rewarming in air at room temperature. The animals were placed in individual cages in the air-conditioned animal room and dressed daily. The average results are given with the standard deviation of the mean.

Results. None of the 35 rabbits exposed to −12°C for 30 minutes for the determination of muscle necrosis died before the end of the experiment, and all developed muscle necrosis. Three cortisone-treated and 5 control animals developed small areas of skin necrosis. The percentage of muscle necrosis in the two groups is given in the table. The results in the cortisone-treated and control animals are not significantly different.

Of the 30 animals exposed to −15°C for 30 minutes for the determination of skin and muscle necrosis none died before the end of the experiment. Four cortisone-treated rabbits and 5 control animals did not develop skin necrosis but were included in the calculations. All developed extensive necrosis of muscle.

As shown in Table I, neither the extent of skin necrosis nor the percentage of muscle necrosis differs in the control and cortisone-treated groups.

Conclusions. Cortisone in the doses used in these experiments was not effective in reducing the extent of muscle or skin necrosis in rabbits after 2 standard local cold injuries.

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* Cortone Acetate, Saline Suspension. Merck and Co., Inc.

5. Pichotka, J., Lewis, R. B., and Luft, U. C., *Texas Rep. Biol. and Med.*, in press.

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