to be active when tested by the capillary permeability method reported by Ambrose and DeEds (*J. Pharm. exp. Therap.*, 1947, 90, 359). The variable introduced was the time interval between the rutin injection and the shocking dose of antigen. Table 1B shows that again no significant protection was shown in the 13 animals tested.

The third series of animals was pretreated with 10 mg of rutin (methyl-glucamine salt) before shocking with histamine. In these, the histamine dose was 0.4 mg/kg (as base), which in our experience agrees with reports of other investigators as the LD_{100} dose. The interval between rutin and histamine was varied between 5 and 45 min. In no instance was protection demonstrable, as shown in Table 1C.

TABLE 1

INFLUENCE OF RUTIN PRETREATMENT IN ANAPHYLACTIC AND HISTAMINE SHOCK

	Rutin (mg, IP)	Interval before shocking (min)	Total animals shocked	Shock, absent	Shock, non-fatal	Shock, fatal
	None	Control	8	0	4	4
	1	30–35	4	1	1	2
	2	45	7	0	5	2
	4	45	7	2	2	3
A	10	45	3	0	1	2
	20	45	1	0	0	1
	5	30	1	0	0	1
	10	30	1	0	0	1
	None	Control	20	0	0	20
	10	10	2	0	0	2
	10	15	4	0	2	2
B	10	25	3	0	0	3
	10	30	1	0	0	1
	10	35	2	0	1	1
	10	40	1	0	0	1
	None	Control	10	0	0	10
	10	5	2	0	0	2
C	10	10	3	0	0	3
	10	15	2	0	0	2
	10	45	2	0	0	2

A. Horse-serum sensitized guinea pigs, intravenous horse-serum shocking dose.

B. Egg white-Freund adjuvant sensitized guinea pigs, intravenous dilute egg white LD_{100} shocking dose.

C. Nonsensitized guinea pigs, intravenous histamine LD_{100} shocking dose.

It might be suggested that some variability in the degree of sensitivity of the guinea pigs might account for the apparent slight protection following rutin pretreatment. This conclusion could have been drawn from our own first series, had not chance introduced the low mortality incidence in the controls as well. When the experiments were repeated with highly sensitized animals, results were more definitive. The relatively small number of animals makes statistical evaluation difficult. However, application of the Chi-square method gives a P value between 0.02 and 0.05, which is considered only on the borderline of significance. With respect to the disparity of results with histamine shock, it should be pointed out that we used the LD_{100} dose of histamine, while Wilson, *et al.* used the LD_{50} amount. We have frequently observed that minimal doses of an antihistaminic, incapable of preventing ultimate death, may nevertheless delay for some time the fatal outcome following a lethal dose of histamine, whereas in our rutin series, no prolongation of life was noted, all animals dying within 5 min. Our agreement with Raiman, *et al.* would indicate that rutin protection is insignificant when the higher amount of histamine is used.

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Red Skin Color of Bliss Triumph Potatoes Increased by the Use of Synthetic Plant Hormones[1]

During the course of experiments with synthetic plant hormones on potatoes an increase in the red skin color of the variety Bliss Triumph was noted. Sodium and ammonium salts of 2,4-D and the butyl ester were applied to the soil as a side dressing when tubers were approximately one-third grown. Rates of 20 lbs, 200 lbs, and 400 lbs/acre of the acid equivalents were used. No apparent injury to the plants or reduction in yield was noted with the 20 lbs/acre, but serious plant injury and yield reduction occurred where 200 and 400 lbs/acre were applied. All rates showed an increase in the red skin color of Bliss Triumph tubers grown in sandy soil. No change in flesh color or flavor of the treated tubers was noted. Since a deep red color in Bliss Triumph potatoes is a highly desired market character, this finding may prove of considerable economic importance.

Further tests are in progress to determine minimum amounts required for increasing red color of potatoes.

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On Olfaction and Infrared Radiation Theories

The work of Beck and Miles on odor experiments with bees (see Abstract of paper presented before National Academy of Sciences, *Science*, November 28, 1947, p. 512), recently brought to some popular attention, has revived interest in theories concerning the possibility of an olfactory sense mechanism in which radiation of wave lengths characteristic of molecular vibration frequencies (infrared or Raman spectra) plays a part. There is a considerable body of discussion in the literature about such theories (cf. R. W. Moncrieff. *The chemical senses.* New York: John Wiley, 1946).

We should like to emphasize several points having a bearing on these theories which we believe require more

[1] Contribution from the Department of Botany and Plant Pathology, Colorado Agricultural Experiment Station, Fort Collins, in cooperation with the Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA. Published with the approval of the director of the Colorado Agricultural Experiment Station as Scientific Journal Series Article No. 284.

scrutiny before any noteworthy importance can be attributed to them. One such point is concerned with the properties of isotopic molecules. For example, we have had occasion to prepare the deuteroxyl counterpart of *n*-butyl alcohol. The deuterated compound has indistinguishably the same odor as the original alcohol, although, of course, the infrared spectra differ to some extent as a result of the substitution. The spectra of odorless ordinary water and odorless heavy water, it is well known, are quite dissimilar. We suspect that no evidence has been found, or is likely to be found, that the odor of any isotopically substituted molecule differs from that of its ordinary counterpart.

On the other hand, there is some evidence that *d*- and *l*- forms of a few optical isomers have different odors (J. von Braun and W. Kaiser. *Ber.*, 1923, 56B, 2268; J. von Braun and E. Anton. *Ber.*, 1927, 60B, 2438). Here the infrared spectra (or Raman) are identical (barring the effect of polarized radiation, presumably not to be considered in the question at issue). Clearly, a difference in odor between optical isomers must be explained by some effect other than infrared absorption.

These two points would seem to offer an insoluble contradiction to any sort of infrared radiation theories concerning (at least) the human olfactory sense.

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The Curare-like Action of Thiamine

Demole (*Kongressber. XVI, Int. physiol. Kongr.*, 1938, 19) and Pick and Unna (*J. Pharm. exp. Therap.*, 1945, 83, 59) mention the curare-like action of thiamine in frogs and rats. The present preliminary paper presents additional evidence for the curare-like action of thiamine.

Thiamine hydrochloride,[1] by rapid intravenous injection of 50 mg/kg or more into dogs, causes respiratory paralysis, hypotension, bradycardia, and vasodilation, all of which eventually disappear if artificial respiration is maintained (J. A. Smith, *et al. Fed. Proc.*, 1947, 6, 204; 1948, 7, 116; *J. Pharm. exp. Therap.*, 1948, 93, 294).

Fig. 1 shows that D-tubocurarine,[1] in doses of 1–2 units/kg, produces effects closely resembling those of thiamine (150 mg/kg). The vasomotor action of D-tubocurarine, however, has not yet been investigated fully. The figure also shows the results of experiments in which the sciatic nerve was isolated and stimulated and the resulting contraction of the toe recorded. It is seen that both D-tubocurarine and thiamine stop the contractions resulting from stimulation of the nerve. (The muscle was still responsive to direct stimulation.) These results are typical of substances having curare-like action.

Intocostrin[1] (2 units/cc) and thiamine hydrochloride (5% solution) were injected into the ventral lymph sac of frogs. The sciatic nerve and gastrocnemius muscle were exposed. It was found that intocostrin (80 units/kg) and thiamine (2,000 mg/kg) prevent the contraction of the muscle when the nerve is stimulated without decreasing the contraction on direct stimulation.

Thus, except for the dosage, the effects produced by curare preparations are like those produced by thiamine under the conditions of these experiments.

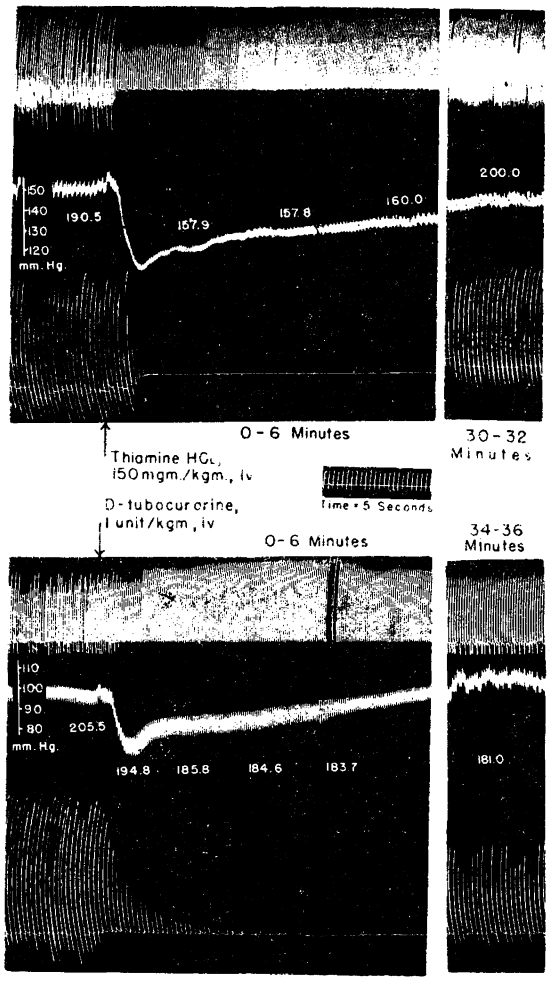

FIG. 1. Effects of intravenous injection of thiamine hydrochloride and D-tubocurarine into dog. Upper recording—respiration. Natural respiration is superimposed on artificial respiration. Middle recording—blood pressure. The heart rate is shown by the numbers along the blood-pressure curve. Lower recording—muscle response recorded from the toe when the sciatic nerve was stimulated at 5-sec intervals throughout the experiment.

The curare-like action of thiamine probably explains many of the results previously obtained by us with thiamine hydrochloride (*J. Pharm. exp. Therap.*, 1948, 93, 294) and by Haley with other thiamine salts (*Proc. Soc. exp. Biol. Med.*, 1948, 68, 153).

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[1] Thiamine hydrochloride was supplied to us by the Upjohn Company, Kalamazoo, Michigan; D-tubocurarine and intocostrin, by E. R. Squibb and Sons, New York.