to elevate the R.Q. The disparity between minima and maxima under similar experimental conditions is often great enough to indicate a difference in the quality of metabolism. This fact can be ascribed to a difference in antecedent nutrition of the individuals constituting the groups in separate experimental vessels. The magnitudes of the R.Q. in each case imply the conventional aerobic utilization of food substances.

Prefeeding of the animals with glucose in conjunction with the presence of glucose in the experimental vessels tends to increase Q_{O_2}. Analysis of the R.Q. values reveals, also, that this increase in the utilization of oxygen consequent to the accessibility of glucose is associated with a change in the nature of the R.Q.

The magnitude of oxygen uptake determined indirectly by the method of Dickens and Simer was satisfactorily comparable with that determined directly by the method of Warburg under analogous conditions.

11034 P

Conversion of Sulfanilamide into *p*-Hydroxylamino-benzenesulfonamide by Ultraviolet Irradiation.

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In a previous publication[1] the authors demonstrated that solutions of sulfanilamide and certain related compounds were endowed with anticatalase activity following irradiation with ultraviolet light. It was suggested in a subsequent paper[2] that this activity might result from the formation of either the *p*-hydroxylamino derivative or free hydroxylamine in the irradiated solutions. Taking hydroxylamine as a standard, it was calculated that the activity found could be explained by the conversion of about 2% of the sulfanilamide in an irradiated 8 mg % solution into the active compound. At that time no evidence was available to show that the assumed derivatives were actually formed under the conditions described. With a method recently developed by Rosenthal and Bauer,[3] it has been possible to

1 Main, E. R., Shinn, L. E., and Mellon, R. R., PROC. SOC. EXP. BIOL. AND MED., 1938, **39**, 272.

2 Shinn, L. E., Main, E. R., and Mellon, R. R., PROC. SOC. EXP. BIOL. AND MED., 1938, **39**, 591.

3 Rosenthal, S. M., and Bauer, H., *Pub. Health Reports*, 1939, **54**, 1880.

demonstrate that solutions of sulfanilamide upon ultraviolet irradiation yield appreciable amounts of a substance which reacts as the *p*-hydroxylamino derivative.

Rosenthal and Bauer's method for the estimation of the *p*-hydroxylamino derivative in the presence of the free amine is based on the fact that in a mixture of the two substances, the amine can be acetylated by acetic anhydride and thus prevented from participating in the diazotization and coupling. The hydroxylamino form is not so affected and can thus be determined colorimetrically. As standards Rosenthal has recommended either *p*-hydroxylamino-benzene-sulfonamide or *p*-hydroxylaminobenzoic acid. We have chosen to use the benzoic acid.* Analyses were carried out precisely as in the specifications of Rosenthal and Bauer. The compounds were examined in simple, neutral aqueous solutions and in this respect were parallel to the standards. Complications arising from other organic materials which might be present in urine were, of course, not encountered.

Sulfanilamide was irradiated by exposing a thin layer of an aqueous solution for 1 min at a distance of 3 in. from an ultraviolet lamp. Irradiated and non-irradiated solutions were analyzed by the Rosenthal and Bauer method. Non-irradiated solutions gave a trace of color, but these colors were consistently too low for estimation. From the analyses the amount of material reacting as the *p*-hydroxylamino form was determined. The results are given in Table I.

It will be seen that under conditions comparable to those for which 2% conversion was postulated,[2] a compound reacting as the *p*-hydroxylamino form was found in a concentration of 0.19 mg %,

TABLE I.
Conversion of Sulfanilamide to the *p*-Hydroxylamino Derivative by Ultraviolet Irradiation.

A		B		
			Conc. of *p*-hydroxyl comp.	
Time sec	% converted	Conc. mg %	mg %	% converted
0	0	2	0.13	6.4
5	+	4	0.16	4.2
15	0.9	8	0.19	2.2
45	2.2	16	0.29	1.8
120	6.1	50	0.40	1.2
		100	+	+

A. Effect of duration of irradiation on an 8 mg % solution of sulfanilamide.
B. Effect of concentration of sulfanilamide solution at time of irradiation.

* Color matches were never perfect with the *p*-hydroxylamino benzoic acid as a standard but were not too difficult for adequately accurate colorimetric readings.

representing conversion of 2.2% of the original sulfanilamide. This supports the suggestion previously made that irradiated sulfanilamide solutions may owe their anticatalase activity to the presence of a hydroxylamino derivative. The presence of free hydroxylamine remains to be proven and the relative anticatalase activities of hydroxylamine and *p*-hydroxylamino-benzenesulfonamide is not at present known.

The method was applied to certain related compounds which had been examined for anticatalase activity. Non-irradiated solutions of 4,4′-diaminobenzene-sulfonanilide gave no measurable color when acetylated and diazotized. Irradiated solutions gave definite, measurable color. Sulfapyridine gave no color before or after irradiation. Three sulfones (methyl *p*-aminophenyl, *n*-amyl-*p*-aminophenyl and *β*-hydroxyethyl-*p*-aminophenyl sulfones) showed the failure of complete acetylation mentioned by Rosenthal and Bauer for other sulfones. The suggested double acetylation was not carried out. However, these sulfones did give stronger colors after irradiation, indicating a change similar to that in sulfanilamide.

11035 P

Experiments on the Antidermatitis Component of the Filtrate Factor in Rats.

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In rats fed a basal diet deficient in vitamin B and supplemented with vitamin B_1 and riboflavin, skin manifestations may persist or develop anew after the specific acrodynia has been moderated or cured by treatment with pure vitamin B_6 (natural or synthetic).[1, 2] Three more or less distinct types of lesions have been observed. In the most common type the lesions begin as sores around the mouth and as scaly dermatitis visible at first around the axillae, the groin and over the back between the scapulae. Later, alopecia follows and extends to the neck and over the back. In several animals, generalized scaliness (exfoliative dermatitis) has been observed.

1 György, P., *J. Am. Chem. Soc.*, 1938, **60**, 983.

2 György, P., and Eckardt, R. E., *Nature* (London), 1939, **144**, 512.