(Fig. 20), saturated $CaCO_3$, pH 10 (Fig. 21), NaH_2PO_4, pH 5.0 (Fig. 22), acetic acid, pH 5 (Fig. 23), and HCl, pH 5 (Fig. 24).

Conclusion. Acidity accelerates and alkalinity retards the metamorphosing action of thyroxine on tadpoles.

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Action of Ultra-violet on Members of the *Pseudomonas fluorescens* Group.

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The early theory of the destructive action of ultra-violet rays on bacteria was that hydrogen peroxide was produced in the medium. Oker-Blom[1] proved that the death of the bacteria was not caused by hydrogen peroxide, but by the direct action of the rays on the protoplasm of the organism. Burge and Neill[2] found fluorescent organisms to be more resistant to ultra-violet than colon organisms. They attributed the superior resistance of the members of the fluorescent group to their power of converting the short waves into long ones, and thereby escaping the coagulative action of the short waves on the protoplasm.

The investigation reported in this paper was undertaken to determine whether the pigment produced by organisms of the genus *Pseudomonas* protects these organisms from radiant energy furnished by a quartz mercury-vapor lamp.

A suitable medium for irradiation was first considered. Both plain broth and lactose broth were found unsuitable because they protected the organism from the effects of the ultra-violet. The synthetic asparagine medium proposed by Georgia and Poe[3] was found to be satisfactory.

In the asparagine medium, 12-, 24-, 36-, and 48-hour cultures of several members of the *Pseudomonas* group were prepared; 10 cc. of each culture were diluted to 100 cc. with sterile water, and 4 cc. of the diluted culture were exposed to the vertical rays of a Gallois mercury-vapor lamp from one to 40 minutes. Undiluted cultures were also tested. Appropriate dilutions of the irradiated cultures

1 Oker-Blom, Max, *Z. f. Hyg.*, 1913, **74**, 242.

2 Burge, W. E., and Neill, A. J., *Am. J. Physiol.*, 1915, **38**, 399.

3 Georgia, F. R., and Poe, C. F., *J. Bact.*, 1931, **22**, 249.

were made and plated in nutrient agar. The colonies were counted and calculations were made showing the number of survivors per hundred million of the original cultures. Cultures of *A. aërogenes* and *E. coli* were treated in a similar manner. Before these cultures were irradiated, they were diluted with asparagine medium until the bacterial content was approximately the same as that of the *Pseudomonas* cultures. The bacterial population in all cultures was about 50,000,000 per cc. Some of the average results are reported in Table I.

TABLE I.
Survival Data when Cultures Were Exposed to Ultra-violet. (Survivors per 100,000,000.)

Minutes	*A. aërogenes*	*E. coli*	Pseud. organisms Aver. of 4
		12-hr. culture	
1	990,000	435,000	8,210,000*
3	285,000	6,900	1,400,000
5	47,000	3,700	111,700
7	5,550	1,600	17,400
10	3,950	80	2,100
20	420	30	410
40	145	10	60
*Not fluorescent.			
		36-hr. culture	
1	860,000	283,000	35,230,000†
3	333,000	18,500	6,600,000
5	15,500	1,430	980,000
7	2,260	400	222,500
10	1,550	60	39,000
20	225	40	11,250
40	7	2	235
†Fluorescent.			

The conclusions drawn from this study are as follows:

In actively growing cultures, the variation in resistance with the age up to 72 hours in the absence of pigment is negligible. The cultures of the *Pseudomonas* organisms are more resistant to ultra-violet than those of *A. aërogenes* and *E. coli.* Because the pigment is diminished by dilution, the *Pseudomonas* organisms lose resistance to ultra-violet. In the undiluted cultures of *Pseudomonas,* the resistance increases with the amount of pigment present. The resistance of cultures of *Pseudomonas* which have lost the power to produce pigment is less than that of cultures which retain the power to produce pigment.