The last mentioned investigators showed that ultraviolet light when administered under the proper conditions stimulated growth and caused increased budding.

For studying the residual bactericidal action of radiated water for yeasts, 3 species were used: *Willia anomala, Saccharomyces ellipsiodeus* and *Pichia polymorpha.* They were handled in the same manner as described above for the bacteria. No residual germicidal property could be established for these 3 species. They died just as rapidly in the control water as in that which had been radiated.

Conclusions. If water and other materials exposed to ultraviolet light retain a bactericidal property, it varies greatly for different organisms. There is some doubt in the authors' minds as to whether the mortality of certain bacteria in radiated water is really due to a toxic factor contributed by the ultraviolet light.

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Is Ferratin Precipitinogenic?

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In 1893 Schmiedeberg[1] announced that it was possible to extract a protein from the liver by means of boiling water. The extract was filtered and the filtrate treated with tartaric acid for precipitation of the protein. Schmiedeberg concluded that this was a high iron containing protein but not a nucleoprotein. He named it ferratin. Subsequent investigators,[2] however, came to the conclusion that the protein extracted in this fashion was really a nucleoprotein, or derived from nucleoprotein.

Since by repeated extraction and precipitation it seemed probable that ferratin could be completely separated from the accompanying blood and lymph proteins, it seemed advisable to test its antigenic properties.

Our first experiment was unsuccessful and new ferratin was prepared with particular care to avoid its exposure to any undue hy-

[1] Schmiedeberg, *Arch. f. exp. Path. u. Pharm.*, 1893, **33**, 101.

[2] Beccari, cited from *Malys Jafresber*, 1902, **32**, 494. Wohlgemuth, *Z. f. Physiol. Chem.*, 1902, **37**, 474, and 1904, **42**, 519. Scaffidi, *Z. f. Physiol. Chem.*, 1907, **54**, 448. Salkowski, *Z. f. Physiol. Chem.*, 1908, **58**, 282.

droxyl ion concentration. In dissolving the ferratin it was suspended in water and 0.5% sodium carbonate solution was added slowly with constant stirring in such quantities that the solution showed only the faintest reaction to litmus. No attempt was made to dissolve completely all the suspended material and the undissolved portion was removed by filtration.

Numerous experiments were made to determine whether ferratin is precipitinogenic. As the rule 2, 4, 6, 8, 10 or 12 cc. of the 1% solution of ferratin were introduced intravenously in rabbits at intervals of 3 or 4 days and on the fourth day after the last injection the serum was tested for precipitin by the contact or layer method. In all such tests progressive dilutions of the ferratin solution were tested in order to make sure that the presence of precipitin did not escape observation through the occurrence of a negative prozone. In most of the experiments no evidence of precipitin for ferratin was obtained. The serum of 2 rabbits which had received hog ferratin gave apparently specific reactions with that ferratin in dilutions of 1 to 800-1600. The serum of a rabbit treated with sheep ferratin gave precipitin reactions with beef, hog and sheep ferratins in dilutions of 1 to 3200-6400, but not with any of the corresponding serums. In another experiment the antiferratin serum reacted with sheep ferratin only at a dilution of 1 to 3200. All the dilutions of ferratin were made with physiological salt solution. Of rabbits treated with beef ferratin, the serum of one reacted with beef ferratin 1 to 1600 but not with beef serum, albumin, euglobulin or pseudoglobulin; in a second rabbit the serum reacted also with beef serum albumin; in the case of a third rabbit, the serum reacted with beef and sheep ferratins at 1 to 1600-3200 and not with beef serum, beef blood proteins or sheep serum.

From these results it may be concluded that the preparations of ferratin used in the experiments were practically free from blood proteins and possessed at most only comparatively slight precipitinogenic power, the resulting precipitins in some cases reacting also with other ferratins than the one used as antigen. The question whether ferratin is a species-specific antigen has not been settled definitely.