tuting the largest and smallest clams at the age of 1½ years (approximately those comprised in the ninetieth and tenth percentiles) and follow their subsequent history the results do not differ significantly from those obtained by following the percentiles as above. The smallest group shows the slowest absolute growth up to the point of inflection of the growth curve after which up to 8 or 9 years it grows the slowest.

We have thus clear evidence of compensatory growth in the case of the razor clam, although, of course, the mechanism of regulation is not revealed. It is not possible to attempt an analysis of this phenomenon in a preliminary paper of this character, but we do wish to call attention to the effectiveness of a regulatory process which causes a reduction in the variance to 32% of its maximum value in a space of 2 years.

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A Comparison of the Resistance of Bacteria and Embryonic Tissue to Germicidal Substances. II. Metaphen.

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In a previous communication[1] a comparison was made of the resistance of *Staphylococcus aureus, Eberthella typhi* and embryonic chick heart tissue to Merthiolate and phenol. Toxicity indices were determined by dividing the highest dilution of the germicide that killed the tissue by the highest dilution of the chemical showing no growth of the test organism. Using *Staphylococcus aureus* as the test organism the toxicity index for phenol was found to be 12 and for Merthiolate about 35. It was concluded that phenol possessed a lower toxicity index than Merthiolate when tested by the tissue culture method. Theoretically the smaller the toxicity index the more nearly perfect the chemotherapeutic agent.

In the present paper a comparison was made of the resistance of *Staphylococcus aureus* and embryonic chick heart tissue to Metaphen and phenol. The methods employed were the same as those given in the first paper.

A *Staphylococcus aureus* phenol coefficient was determined for

[1] Salle, A. J., and Lazarus, A. S., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 665.

aqueous Metaphen* by the method of Reddish.[2] Phenol killed *Staphylococcus aureus* in a dilution of 1-65 in 10 minutes but not in 5 minutes. The highest dilution of Metaphen killing *Staphylococcus aureus* under the same conditions was found to be 1-6,000. Therefore, the *Staphylococcus aureus* phenol coefficient was 92.

Birkhaug[3] reported a phenol coefficient of 1500. We are at a loss to explain such a great difference in the *Staphylococcus aureus* phenol coefficients of Metaphen when tested by the same method.

Buchsbaum and Bloom[4] reported that Metaphen killed *Staphylococcus aureus* in a concentration of 1-100,000 in cultures of chick periosteal cells. Since their methods differed widely from those employed here no comparisons can be made with their work.

Cultures were prepared from chick heart tissue obtained from 9-day-old embryos. The fragments of tissue were embedded in guinea pig plasma in Carrel flasks. The various dilutions of phenol and Metaphen were made in chick embryonic fluid. The plasma, after coagulation, was washed with Tyrode solution to remove the guinea pig serum, after which the various dilutions of germicide in embryonic fluid were added. Final observations were made at the end of 48 hours. The results are given in Table I.

TABLE I.
Toxicity of Phenol and Metaphen to Chick Heart Tissue and Bacteria.

Germicide	Highest Dilution Showing No Tissue Growth = A	Highest Dilution Showing No Growth of *Staphylococcus aureus* = B	Toxicity Index = A/B	*Staphylococcus aureus* Phenol Coefficient
Phenol	1-840	1-65	12.9	
Metaphen	1-76,000	1-6,000	12.7	92.

The results show that phenol and Metaphen are of the same order of toxicity (12.9 for phenol and 12.7 for Metaphen) when tested by the tissue culture method. Experiments on Merthiolate, as reported previously,[1] showed a toxicity index of 35 by the same procedure and a *Staphylococcus aureus* phenol coefficient of 71.

*The various dilutions of Metaphen used for the determination of the phenol coefficient were prepared by diluting the 1-500 commercial aqueous solution with distilled water.

The various dilutions of Metaphen used for the tissue culture experiments were prepared by diluting the 1-500 commercial aqueous solution with embryonic chick fluid.

2 Reddish, G. F., *The Newer Knowledge of Bacteriology and Immunology*, E. O. Jordan and I. S. Falk, University of Chicago Press, 1928.

3 Birkhaug, K. E., *J. Am. Med. Assn.*, 1930, **95**, 917.

4 Buchsbaum, R., and Bloom, W., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 1060.