the drop but led to a significant rise above normal in all lipid constituents. In these animals the blood lipids could be made to fluctuate by the addition or removal of the glandular tissue in the diet. The constituent affected to the greatest degree by the ingestion of the pancreas was esterified cholesterol, whereas free cholesterol showed the least change. A typical result is shown in Table I. Following the second removal of raw pancreas from the diet, the esterified cholesterol decreased but did not completely disappear from the blood despite the fact that no pancreas was ingested for a period of 78 days.

7915 P

Growth Rate and Variance in the Razor Clam.

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In discussing the growth of the razor clam *(Siliqua patula,* Dixon) we have pointed out a correlation between the absolute growth rate and the variability as measured by "D", the interdecile range.[1] In this work we used samples of clams representing the normal population of the respective beds. For this reason the numbers in the older age groups were small, and it was not possible to determine the presence or extent of selective mortality which might greatly affect the relation between growth and variance.

Recently we have selected 2 samples of clams, one from Little River, Humboldt County, California, containing 300 specimens, all 7 years of age, and one from Hallo Bay on the Alaskan Peninsula, containing 76 specimens 13 years old. A complete growth record was obtained for each individual by measuring the consecutive annual rings. The mean length and the variance were calculated for each year for the 2 localities, and the tenth, the fiftieth (median), and the ninetieth percentiles were determined for the distribution of sizes at each age. We have, therefore, by this means obtained data which is obviously unaffected by selective mortality.

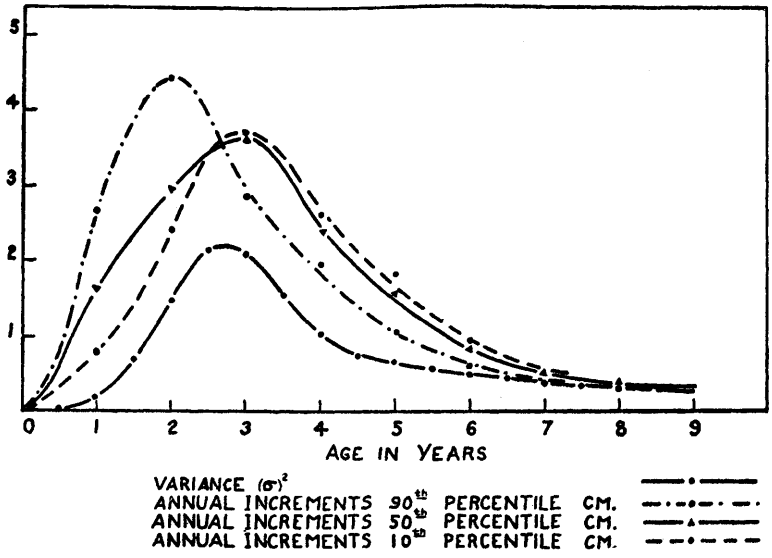
The absolute growth rate (annual increments) shows a high positive correlation with the variance. During the period preceding the inflection of the growth curve both the growth rate and the

[1] Weymouth, F. W., McMillin, H. C., and Rich, Willis H., *J. Exp. Biol.*, 1930, **8**, 228.

variance is increasing, and the point of maximum absolute growth occurs at the same time as that of the maximum variance. As the growth rate declines the variability also declines. As the animals approach final adult size they tend to reach a uniform length.

During the time the growth rate is increasing the successive annual increments are apparently mutually independent. The variability increases with time, in such a manner that we might consider it to be due to chance. If, in the period of declining growth rate, the increments continue to be mutually independent, the variance would rise continually, but at a decreasing rate. A reduction in the variance, such as we find in the present case, may be brought about by a mutual dependence of successive increments.*

If the above relations result from a mutual dependence of the successive annual increments, then those clams showing the greater growth during early life should show lesser growth during the period of declining variance. The accompanying figure shows the increments between successive medians and in the same fashion the



increments for the tenth and ninetieth percentiles. During the preinflectional period the largest clams are growing the fastest. In the postinflectional period the smallest clams are growing most rapidly. In later life the variance remains constant, and clams of all sizes are growing at practically the same rate. If we select groups consti-

*The writers wish to acknowledge the assistance and advice of Dr. Harold Hotelling, of Columbia University, by personal communication.

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.

7916 C

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.