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DISCUSSION OF PRECEDING PAPER

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There are two aspects to Mr. Levinson's paper: (1) his theory of mortality classes, and (2) his application of data processing equipment to his numerical analysis.

Mr. Levinson's theory of mortality classes has to do with the very basis of actuarial science. Anything so basic in regard to one field naturally has parallels in other fields. His concepts of "the inherent nature of the organism," "deterioration," "claims," "homogeneity" and "changing environment" apply not only to the mortality table but to other actuarial functions—*e.g.*, withdrawal rates, and hospital and surgical insurance (repair work at the start of a surgical program changes the individual from one class to another). The theory of classes also applies to other sciences—criminology, sociology, and economics—and to such classes as credit risks: to changing individuals and things in an irregular and uncontrollable environment.

Mr. Levinson's arithmetical procedures can also be used to refine premium calculations—*e.g.*, assume 10% chance that mortality will be 70% to 80% of X_{18}; 30% that it will be 80% to 90%; 50% that it will be 90% to 100%; 8% that it will be 100% to 110%; 2% that it will be 110% to 120%. These assumptions, when combined with similar judgments of interest, expenses, and withdrawals, can be used to produce premium rates with any desired judgmental probability of loss, or above a given level of profit or loss at a given "confidence level" on a judgmental probability basis. A paper by J. De Jager is interesting in this connection.[1]

A mortality table is really just an average of a lot of probable tables. Mr. Levinson's paper and mathematical procedures open the door to replacing the average by various figures which enter into the average. This is nearly always a worth-while clarification of thinking and of procedures.

[1] "Stochastical Investigations on Mortality Tables," *Het Verzekerings-Archief*, DEEL XXX (4), October 1953.