The findings with respect to coding appear similarly conclusive: intersensory coding yields significantly shorter RT's than intrasensory coding ($P < .01$). The objection may be raised that since confusions occurred in the intrasensory situation, the differences obtained may be attributable to discrimination difficulty. To resolve this question, an extension of the study was carried out in which two-choice, rather than three-choice, RT's were measured under both coding schemes. Intersensory coding was restricted to the middle intensity on all sense modalities. Intrasensory coding involved only the highest and lowest intensities, thereby reducing the difficulty of the intensity discrimination to a minimum. The results indicated overall shorter RT values under the two-choice than under the three-choice conditions, thus supporting the relationship of RT to number of alternatives suggested by Hick (*4*). However, the differences attributable to coding were still present at a high level of statistical significance ($P < .01$).

The conclusions to be drawn from this study are as follows: (i) the classical relationships between RT and stimulus strength, number, and sense modality are supported for stimuli equated in loudness across the senses and presented under conditions of inter- as well as intrasensory coding; (ii) all stimuli yield shorter RT's when involved in choices among sense modalities than when involved in choices among levels of the same modality.

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Evaluating Reflux and Drainage in Foam Fractionations

Abstract. Extreme care must be exercised in assigning an observed increase in enrichment to the beneficial effects of reflux or drainage, particularly in a single-solute system. The use of a system containing two or more solutes is recommended.

A recent publication (*1*) has emphasized quite correctly the beneficial effect to be expected from reflux in enhancing enrichment ratios obtained in foam fractionations. Unfortunately, the contribution of drainage is difficult to isolate from that of reflux (*1, 2*). For example, an early study yielded an enrichment of about 9-fold for methyl orange under conditions in which 3 ml of condensed foam were collected in 10 minutes (*3*). On the other hand, collection of 1 ml during a 30- to 40-minute interval gave an enrichment just under 90 (*4*). [The slow collection rate was made possible by substituting for the 24-cm Vigreaux column (*3*) an inverted 250-ml conical separatory funnel. The small amount of foam that survived to pass slowly into the collection vessel was not colored, and it had a gossamer appearance.] Under the circumstances, one might be inclined to attribute much of that increase to improved drainage. However, the contribution of reflux could not safely be assumed to have remained constant.

An examination of the results of a fractionation of two substances provides a means for better evaluating the contributions of reflux and drainage. Thus, if reflux were the overriding factor, one might expect not only the individual enrichment ratios to increase but also the quotient of the enrichment ratios. The chief factor operating to oppose such an increase in the quotient would be the usual tendency of a solute to be enriched to a greater extent when the foam is in contact with a more dilute solution.

In the earlier study (*3*), enrichment ratios of 5.4 and 4.1 were obtained for the 2- and 1-naphthoates, respectively, when each was present alone, giving a quotient of 1.3; for an initially equimolar mixture, the quotient was about 2. When this work was repeated with the separatory funnel to improve drainage, enrichment ratios of 70 and 40 were obtained for the pure compounds; for a mixture having the same initial concentrations of each substance, the enrichment ratios were 43 and 21, and the quotient was 2.0. These results emphasize that one must be extremely cautious in drawing conclusions about the contribution of a single factor, whether it be reflux or drainage, from the change in enrichment of a one-solute system. In addition, it illustrates how competition for the surface by two solutes in a mixture can lower the enrichment ratios of each. At the same time, it shows that competition for the surface, aided by limited reflux, did not increase the enrichment quotient for the mixture over that calculated from the single-solute systems. In this case, better drainage must have been the reason for the changes in enrichment observed for the single-solute systems.

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Irradiation of Bacterial Luciferase in vivo

Abstract. The fading of in vivo luminescence which is characteristically displayed by resting cell suspensions of the luminous bacteria *Photobacterium fischeri* is partly accounted for by a gradual loss of active luciferase. This luminescence is further diminished by exposure of such suspensions to gamma radiation, but the irradiated cells yield more, rather than less, active luciferase than do cells of the non-irradiated suspension. These and similar results with menadione-treated cells indicate that, while luciferase is gradually inactivated by its catalysis of light production, it can resist inactivation by radiation better than can some component of its supporting metabolism.

In 1954 one of us (*1*) demonstrated that the luminescence of resting cell suspensions of the luminous bacteria *Photobacterium fischeri* could be significantly depressed by doses of radiation as low as 500 rad. At about the same time, the enzymatic nature of bacterial luminescence was being proved by Strehler and co-workers (*2*) and