to the Viking Fund for a generous sustaining grant to cover field expenditures of the survey during the years 1950–1952. The Pacific Science Board has approved the project and has agreed to arrange for naval air transport where feasible throughout the Trust Territory. Harold Coolidge, executive secretary of the Pacific Science Board, now on several months' tour of the Trust Territory, is generously arranging for field personnel to assist in the collection of blood and saliva samples. The present plan is to concentrate survey efforts in Micronesia and Polynesia, since naval air transport will not be available there later than July 1, 1951. During this period it is planned to obtain samples from the ports of call of the floating laboratory, *U.S.S. Whidbey.* These latter results may be of special importance, since detailed physiological and medical data will be routinely obtained by medical personnel from the same individuals.

This survey promises an efficient and inexpensive way in which our knowledge of population genetics can be rapidly expanded and by means of which evolutionary hypotheses can be tested. Individuals who may be able to assist in the establishment of proper field contacts in the Trust Territory at this time, or in Australasia or Southeastern Asia at a later date, are asked to communicate with the undersigned.

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The Concept of "Internal Compensation"

The purpose of this communication is to propose an experimental solution to the problem of the meaning of "internal compensation" as applied to meso compounds. A few years ago C. R. Noller (*Science,* 1945, **102,** 508) pointed out the lack of meaning of the phrase "inactive by internal compensation." His argument was based on the well-known thesis (founded on a mass of empirically correlated data [e.g., cf. H. Gilman, *Organic chemistry,* 2nd Ed. New York: John Wiley and Sons, 1943. P. 214 ff.] and on theoretical grounds [e.g., cf. W. J. Kauzman, J. E. Walter, and H. Eyring, *Chem. Rev.,* 1940, **26,** 339]) that the symmetry properties of a molecule as a whole determine the nature of its interaction with polarized light. The epitome of this argument is that symmetric molecules do not, and dissymmetric molecules do, have optical rotatory power. A symmetric molecule may be differentiated from a dissymmetric one by the criterion that the former is, whereas the latter is not, superimposable on its mirror image (enantiomorph). In the light of this concept, Noller showed that some staggered configurations of meso compounds are dissymmetric and hence should be optically active (cf. also G. W. Wheland, *Advanced Organic Chemistry,* 2nd Ed. New York: John Wiley and Sons, 1949. P. 191). In support of his argument, Noller proposed the synthesis of some substituted succinic acids which should be stabilized in the staggered configuration, due to the bulkiness of the substituents.

In a rebuttal to C. R. Noller's paper, George F. Wright (*Science,* 1946, **104,** 190) has taken the position that a meso compound may be regarded as made up of two nonsuperimposable enantiomorphous halves, each rotating plane-polarized light in opposite directions to the same extent. This argument is taken as a justification of the term "internal compensation," although the symmetry property of the molecule as a whole (i.e., the criterion for optical rotatory power as stated here) is apparently disregarded. Arguing on the basis of this misconception, Wright has predicted that the staggered form (Fig. 1) should be optically inactive, whereas the symmetry criterion (already mentioned) shows that this molecule must be optically active.

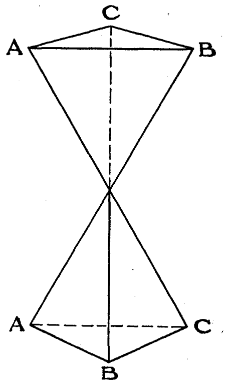

FIG. 1.

In view of this controversy, the isolation and resolution of such staggered meso forms would constitute an important experimental contribution. The use of Noller's compounds, however, meets with two serious objections: (1) The compounds have iodine (or iodine and bromine) atoms on adjacent carbon atoms; they would therefore be expected to be quite unstable and it is doubtful that they could be synthesized. (2) The assumption that rotation about the central carbon—carbon bond is restricted, based essentially on the study of molecular models, leaves the activation energy corresponding to the rotational energy barrier an unknown quantity; hence the rate of racemization might still be appreciable at room temperature, necessitating special techniques and complicating the task of separation and resolution.

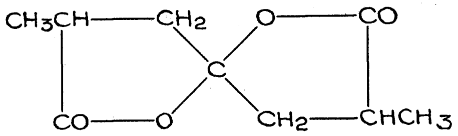

FIG. 2.

The experimental solution of the problem may be found in the resolution of compounds having the spiran ring system, as exemplified by 3,8-dimethyl-1,6-dioxaspiro-[4.4]nonane-2,7-dione (Fig. 2). Such compounds, in which the ring systems are at right angles to each other, and which in addition contain two dissymmetric groupings, can exist in six stereoisomeric forms (cf. Wheland, G. W., *loc. cit.* p. 201). Two of these steroisomers, which are enantiomorphous (Figs. 3 and 4), have the