Comments and Communications

Research Note on Randomization in a Social Experiment

When the sociologist attempts to apply an experimental design to measure the effects of some social program of treatment, such as a public housing program in the free community situation, two obstacles to generalization of results are encountered: (1) the selection of slum families for an experimental group to receive treatment and a control group denied this treatment (admission to the public housing project) cannot ordinarily be randomized, because administrative rules always require that families to be admitted to the project must be the *most needy*; and (2) during the experimental period of 1–5 years, there are losses of cases due to death, mobility, etc., which would destroy any randomization at the outset. In one study of this problem these losses of cases due to death, illness, mobility, refusals, etc., amounted to 12% of the experimental group of slum families admitted to the housing project, and to 42.7% of the families in a matched control group remaining in the slum for the 1-year run of the study. The following design of experimental study would obviate both these difficulties.

The operations would be: (1) take a housing project of limited accommodations, say, 500 dwelling units; (2) build up a pool of 1,000–1,500 eligible and processed families who could be admitted; (3) explain to applicants for admission to the housing project that the limited accommodations require that applicant families draw lots for admission (randomization); (4) then the families that drew lucky numbers will be admitted; and (5) the families that drew unlucky numbers will have to wait their turn as further construction opens up new projects. These rejected families become the control group remaining in slum conditions. In this manner favoritism and bias in admission would be avoided and yet randomization would be obtained. Both groups would be measured for adjustment at the beginning of the experiment, followed through an experimental period of 1–5 years, and then measured for adjustment at the terminal date.

The second dilemma is loss of cases from death, illness, mobility, refusals, etc., during the run of the experiment, thus destroying the initial randomization. The resolution of this dilemma is to randomize the experimental group of residents, and likewise the control group, into 50 small samples of 10 families each. Some of these samples will lose cases during the run of the experiment, but in all probability some of the small samples will not lose cases and hence will remain randomized groups throughout the period. These residual small groups of families may then be the subjects for analysis of variance and covariance to test the results of the experiment. Since experience shows that losses from death, illness, mobility, and refusals are more frequent in the control group than in the experimental group, the control group should be larger than the group of resident families, to allow for shrinkage. Harold Hotelling, in correspondence with the author, points out that it is essential, when randomization into subgroups is carried out, that a careful scheme of analysis of variance should be laid down in advance and in full detail.

The foregoing design should provide a basis for generalization so often lacking in control group studies in the free and uncontrolled community situation. It has the merits of avoiding matching to obtain homogeneity (which experience shows may occasion losses of 27% of the initial cases), and also of avoiding the usual penalty on randomization caused by losses of cases from natural reasons during the run of an experiment.

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Social Responsibility in Science

When Albert Einstein joined the Society for Social Responsibility in Science during the past summer, he made a public statement for the society to use as it pleased. The SSRS feels that Dr. Einstein's statement deserves the thoughtful attention of as wide as possible a group of his colleagues. His statement follows.

WILLIAM F. HEWITT, JR.

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Howard University
Washington, D. C.

DEAR FELLOW-SCIENTISTS:

The problem of how man should act, if his government prescribes actions or society expects an attitude which his own conscience considers wrong, is indeed an old one. It is easy to say that the individual cannot be held responsible for acts carried out under irresistible compulsion, because the individual is fully dependent upon the society in which he is living and therefore must accept its rules. But the very formulation of this idea makes it obvious to what extent such a concept contradicts our sense of justice.

External compulsion can, to a certain extent, reduce but never cancel the responsibility of the individual. In the Nuremberg trials this idea was considered to be self-evident. Whatever is morally important in our institutions, laws, and mores can be traced back to interpretation of the sense of justice of countless individuals. Institutions are in a moral sense impotent unless they are supported by the sense of responsibility of living individuals. An effort to arouse and strengthen this sense of responsibility of the individual is an important service to mankind.

In our times scientists and engineers carry particular

moral responsibility, because the development of military means of mass destruction is within their sphere of activity. I feel, therefore, that the formation of the Society for Social Responsibility in Science satisfies a true need. This society, through discussion of the inherent problems, will make it easier for the individual to clarify his mind and arrive at a clear position as to his own stand; moreover, mutual help is essential for those who face difficulties because they follow their conscience.

Very truly yours,

ALBERT EINSTEIN

Concerning the Zoological Record

The Zoological Record was founded in 1864 by a group of British zoologists mainly connected with the British Museum (Natural History) and the Zoological Society of London, with the object of providing each year a comprehensive bibliography of zoological literature. The first volume, dealing with the literature published in 1864, appeared in 1865, and since then the annual series has continued unbroken, a unique example of scientific bibliography. Because of the war there is now, unfortunately, a delay of about two years, and Volume 84, dealing mainly with the literature of 1947, is the last complete volume published, although several separate sections of Volume 85 have already appeared. However, as soon as printing conditions are easier, it is hoped to get back to the normal practice of completing and issuing the *Record* in the year following the literature to which it refers.

It will be obvious that a publication of this nature is most costly to produce and could hardly hope to be self-supporting unless sold at a very high price, but it has always been the policy of the Committee to provide the *Record* at a price within reach of individual research workers. As a result, many difficulties have had to be overcome during its varied history, and it has been dependent to a large extent upon private donations.

The *Record* was first issued by Van Voorst, a London publisher interested in natural history, but after five volumes he abandoned the venture as unprofitable. Volumes 6–22 were issued by the Zoological Association, a private body helped by grants from the British Association for the Advancement of Science, the Royal Society, and the Zoological Society of London. The Association found itself unable to continue after 1886, when the Zoological Society first undertook full responsibility. In 1900 another change in the administration took place with the foundation of the *International Catalogue of Scientific Literature*, published under the auspices of the Royal Society, for one of the annual volumes in this catalogue professed to cover the same ground as the *Zoological Record*. It was agreed, however, after some difficult negotiations, that the Record Committee of the Zoological Society should remain responsible for the compilation and editing of the volume dealing with zoology, with the *International Catalogue* bearing the cost of printing and publishing. This system continued until the first world war, and, with the resulting breakdown of international arrangements, the Royal Society ceased to be responsible for any volumes of the *Catalogue* subsequent to those dealing with the literature of 1914.

The Zoological Society of London then continued to issue the *Record* from 1915 to 1920, reserving a set in sheets for the possible future use of the *International Catalogue*. However, it was not found possible to resume the production of this somewhat ambitious *Catalogue*, and since that date the Zoological Society has undertaken the sole responsibility for the *Record*. It was considered only reasonable, however, in view of its great value to zoologists, that other organizations and individuals should be invited to contribute at least a share of the cost. As a result, a certain number of donations have been received, but they are still inadequate to meet the expenses. In view of the international character of the *Zoological Record*, the committee responsible for its general direction has now been enlarged to include representatives of the British Commonwealth and certain foreign countries. The present American representative is Remington Kellogg, of the U. S. National Museum.

There is a mistaken impression that the *Zoological Record* is of interest only to the systematist, but, as mentioned previously, it is invaluable to workers in all branches of zoology. To provide easy reference the *Record* is divided into sections representative of the various zoological groups, and each reference is allotted to its appropriate section and then dealt with under three headings: (1) Titles, arranged in alphabetical order of the authors' names, with a full bibliographical reference; (2) Subject Index, giving a detailed analysis of the subjects dealt with in each article; and (3) Systematic Index, comprising a list of all the animals referred to in the section concerned, including those described as new forms, arranged in systematic order. This arrangement enables the reader to find the information regarding the current zoological literature of any group under the authors' names, under specific subjects, or under the scientific names of animals.

The nature of the service given by the *Zoological Record* is illustrated in the following excerpt:

I. TITLES.

66.—CHRISTENSEN, J. F. The oocysts of coccidia from domestic cattle in Alabama (U.S.A.), with descriptions of two new species. *J. Parasit.* Urbana, **27**, 1941, pp. 203–220. 2 pls. 1 text-fig.

II. SUBJECT INDEX.

STRUCTURE.

SPOROZOA

Eimeria spp. (including new) from American cattle, CHRISTENSEN, **66.**

ECOLOGY

PARASITISM: Hosts—

MAMMALIA: *Bos taurus*, intestine (U.S.A.): *Eimeria alabamensis* spp.n., *E. subspherica* spp.n. (Sporoz. Coccid.) CHRISTENSEN, **66.**

ECONOMICS

COCCIDIOSIS: Coccidiosis in U.S.A. cattle. CHRISTENSEN, **66.**

III. SYSTEMATIC INDEX.

4. SPOROZOA. (b) COCCIDIIDA

Eimeria alabamensis, *E. subspherica* spp.n. (with key to other spp.) from cattle, U.S.A. CHRISTENSEN, **66.**

As an illustration of the comprehensiveness of the