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My contribution to this session in honour of Professor Stouffer is based on a very brief acquaintance with him, and leans on his published work and on the comprehensive papers of Professors Stephan and Hauser which precede this one. In the course of working out these remarks I also talked with a number of people, including Mr. William Stouffer, brother of the man we are honouring. He told me something of the life of the Stouffer family in Sac City, Iowa, about the turn of the century when Sam was born. The family owned a weekly newspaper, the Sac City Sun, on which Sam worked after taking a master's degree in English at Harvard, and it seems likely that the contact with men and affairs, both at home and later as a reporter, helped to kindle in the young man the deep curiosity about how society works that was to characterize him throughout his life. After three years of reporting, Stouffer decided that the way to more solid knowledge of the operation of society lay through social science, and he enrolled at the University of Chicago, whose department of Sociology had been given its shape during the 1920's by another ex-reporter, Robert E. Park.

Stouffer's mature work included powerful insights into the means of finding out about society, some of which he exploited himself, some of which were exploited by students and colleagues. As an example of his style of thinking I shall refer to experimental design. He points out that a proper experiment can be designed to find the effect of a film on the attitudes of viewers, of a course on students, of training on soldiers, or of other "treatment" on those who are subjected to it.<sup>1</sup> The proper procedure includes observing the group before and after treatment and observing also, for purposes of control, an untreated group. This gives four cells to be entered with observation of attitudes: before and after, for each of the experimental and the control groups. In addition it ought to be decided at random, say by the toss of a coin, which of the two groups is to be treated and which used for control, and all this ought to be repeated in a number of trials or replications.

Stouffer shows what happens to this means of drawing conclusions when it gets into the hands of people who are careless or ignorant. They leave out the random allocation and the replications, but this still provides the four cells on which some kind of judgment might be made. But then they say that since it is the effect of the experiment that is sought, the control group is unnecessary; this brings them down to two cells: before and after in the experimental group. But after all it is only in the situation after treatment that the result shows, so why bother with before, which, if needed, can easily be constructed by recollection. Armies have always judged the worth of their training by the fine

qualities of their men after training; Stouffer persuaded the United States Army to carry out a proper experiment. Suitable objective tests of physical stamina were devised, and their use in the experiment showed that "men who had been in the Army six months to a year and had been subjected to the old-fashioned conditioning system made little better scores on tests of strength or of stamina than did new recruits."<sup>2</sup> A new program of training was tried which proved to be clearly superior in a controlled experiment. On the strength of these results the Army scrapped its traditional procedures.

Such tests always meet resistance, for fear of the doubt they will throw on what has been the basis of day-to-day work; people who can bravely stand up to the thorough investigation of the illusions of others will fiercely resist any tampering with their own, and, because their cooperation is usually required, this has made progress slow. Professor Stephan has told us how agencies resist discussion of the accuracy of their data. Stouffer combined a realization of the need for doing the experiment with the ability to persuade those concerned to see its merits—I am told that his argument went up the army command in a chain rising through General Osborn to General George C. Marshall, then Chief of Staff. Senior officers who initially had supported a regulation unconditionally forbidding surveys of men in the forces later sat up nights reading Stouffer's reports. His persuasiveness worked horizontally as well as vertically and infected many colleagues, and the style of thought of which he was one of the first proponents has spread widely since the 1930's. Census and survey methods began to be tested; radiologists began to make duplicate readings of X-ray films; professors began to arrange duplicate gradings of essays. When someone asks today whether a long schedule will be less well filled out by respondents than a short one, the answer is not as obvious as it was before Stouffer and Hansen and others began to change the outlook of all of us. It may be that people get tired with the length of the questionnaire and their attention flags; it is also possible that as the successive questions are asked their interest increases. Only the type of experiment Stouffer was discussing can tell. As a result of many such experiments we now know that there may be a large difference in a census result arising out of seemingly small differences of procedure; that even with the identical procedure a random component is revealed in successive repetitions of the survey. The two preceding papers have cited many other examples of Stouffer's imaginative approach to problems.

To make the points which are to follow, it is convenient to compare Samuel Stouffer with John Graunt, who worked in London in the 17th century.¶

<sup>1</sup>Samuel A. Stouffer, "Some Observations on Study Design," AJS, 1950, 55, 355-61.

<sup>2</sup>Samuel A. Stouffer, "A Study of Attitudes," The Scientific American, CLXXX (1949), No. 5, 11-15.

He too was a social scientist, but, living in the days before foundation support and fellowships, he could start on his life's real work only after he had made good as a haberdasher and was able to retire. Graunt's Observations on the Bills of Mortality was published in 1662; we can now celebrate the 300th anniversary of this remarkable book. It should be celebrated for a number of reasons; for one, because like Mayo-Smith, who has just been cited by Professor Hauser, Graunt expressed a belief in the regularity of measurable events in the lives of men; he was able to trace some of these regularities even in his very crude data—the fact, for instance, that there are more births of boys than of girls but that the death rates of boys are higher, so that the sexes are about equal in the older population.

Graunt's life-long struggle to derive useful information from incomplete materials made him a backer of more deliberate methods of securing and publishing data. He spoke long and persistently of the need for a complete census. His voice had to be joined by many others before it was heard; a complete and regular census did come in England, but not until 139 years after the Observations were published. Starting about the end of the 18th century censuses were institutionalized in all advanced countries. This meant that considerable numbers of people came to depend on the census for making decisions on many matters. One indicator of whether or not an activity is an institution is secured by trying to think how we would go about our business without it. If doing without it is inconceivable, then it passes this test; it is institutionalized. It is hard for us to realize that prior to 1700 the population of Europe was not known with even approximate accuracy, and today we are not sure whether there were more people in 1700 than in 1300. Where once differences from century to century were of little concern, it is now essential to know how population is changing from year to year. Periodic censuses are part of our lives. Insofar as we can more easily imagine ourselves being ignorant of family budget patterns than of census information, we can say that censuses are more institutionalized. Censuses and vital statistics were the answer to John Graunt's problems; there is no equally simple answer to Stouffer's.

The way in which censuses become institutions has immediate application to underdeveloped countries. Towards the end of his life Stouffer became interested in world population, and the data available for its study engaged his attention. He had visited Puerto Rico, and he and his wife were planning a trip to India. The Population Council had secured his help in its work of extending knowledge in this field. He would have had to cope not only with the absence or inadequacy of censuses in many countries but also with the fragility of those which are set up in underdeveloped areas. Having few ties in the needs of the business community, government, labour, and the other elements of the community whose relation to the U.S. Census Professor Hauser has mentioned, such censuses are not easily brought into existence nor, once brought in, sustained. An excellent census was carried out in the Argentine in 1914,

as its dusty reports testify. But it stands like a monument in a desert; it had no ties with the lives of men, was subject to no claims and pressures from other institutions, nor could it exert any, and when the man who had envisioned it left the scene he and his work were virtually forgotten; the next census was not taken until 33 years later. It is not such isolated efforts that are needed, but a continuing institution of census-taking, as independent of personalities as it can be made, as intertwined with other institutions as can be arranged.

When the Dominion Bureau of Statistics in recent years proposed to improve its statistics of crime, it began not by publishing volumes of data but by getting in touch with the police, finding out their needs, even making them aware of needs which they had not been conscious of before. Police chiefs and statisticians entered into fruitful collaboration on the design of the survey; former police personnel were taken on to the staff of DBS. We can look for a permanent institutional structure out of this process.

Professor Stephan has referred to the centralized and decentralized, Professor Hauser to the governmental and private, organizations in which statistical data are collected. Both have declared, as I have above, the dependence of these on other organizations outside the field of statistics. I would add only the effect on them of a different kind of institution—the association of statisticians with one another. If the individual statistician working for a soap company was oriented solely to his superiors, then he would be a maker or seller of soap and not really a statistician. It is the fact that he internalizes the norms of fellow statisticians in other organizations—including competing soap producers—and insists on applying these in his work that makes him a professional. His boss may be able to tell him to what problems he must direct himself, but cannot instruct him on how to tackle them. The role of the American Statistical Association, with which Stouffer was associated in a number of capacities, in developing norms and orienting statisticians to them is evident enough that it needs no underlining here.

New institutions often come into existence where there is conflict and struggle. Not only the work of Graunt, but even more that of the statisticians who followed him in the various states of Europe during the 17th and 18th centuries, constituted strong pressure for statistics of population. The mercantilists and their rulers had to know the number of their people, as well as their wealth, in order to promote measures that would advance their states in the military and economic competition of the day. To the demands of scholars like Graunt were added the requirements of those who thought that the more population the better for the state, and for whom censuses would record progress in making their state stronger than the neighbouring ones. Professor Stouffer's work with the War Department began in earnest within days of Pearl Harbour. The Canadian statistical system arose in part out of the dissatisfaction with the data available for guiding the economy during World War I. The strongly pressed claims of the Canadian provinces and of the American states for representation in

the national legislature were resolved by using census figures and constituted the initial *raison d'être* of the census in both countries. The relation of the modern competitive economy to the demand for marketing and other statistics is familiar.

Sometimes the conflict out of which statistical work has been institutionalized is not military, political or economic, but intellectual. An example is the controversy between Malthus on the one side and the perfectionists and mercantilists on the other—the latter agreeing on little save the desirability of greater population. Discussion led to an avid searching for relevant data, and hence pressure for better censuses and vital statistics. Science thrives on the desire of people to prove themselves right, on condition that there is a scientific public able to compel the contestants to conduct their argument according to the rules of evidence.

In tracing the life of a scholar and man of action it is natural to seek to find what presently existing institutional forms can be attributed to his work. Of Dr. R.H. Coats, President of this Association in 1938, who died a few months before Professor Stouffer, one can say with some confidence that the centralized Canadian system is in a certain quite definite sense his achievement. The Ottawa situation was reasonably fluid when he arrived on the scene about the time Stouffer was born; Coats directed its flow along lines that he thought were good; he faced opposition, but was able to overcome it. If he had not lived and worked in Ottawa, or had taken some field other than statistics for his endeavours, Canada would probably not have her present arrangement for collecting and publishing data.

I have directed questions to those who knew and worked with Stouffer at different points in his career, but no correspondingly clear-cut assertion concerning his influence emerges from what I was told. He was advisor to the Bureau of the Census prior to 1940 and exerted much influence towards professionalization of the staff, giving strong moral support to the work that Morris Hanson, W. Edwards Deming, and others were beginning to do. He became Director of the Laboratory of Social Relations at Harvard and initiated many projects there. Prior to that he inspired people at the University of Chicago. One of his first students at the University of Wisconsin, before he had yet secured his Ph.D., was Harold Dorn, who followed him to London to study under Pearson. In what sense is the present work of the Bureau of the Census, of the statistics and sociology departments at Harvard and Chicago, of the Institutes of Health, the result of Stouffer's effort? At this point in tracing the history of our profession I was brought to a halt. All I learned was that much that now goes on has some relation to the personality of Stouffer; according to universal testimony he inspired colleagues, students, and administrators; he left them with questions and ideas which were combined with many others before they became embodied in continuing survey and research institutions.

I suggest that this arose partly from his own

personality and partly from the situation in which he worked, which is that in which we all work. With the exception of a few items such as a five year census, what seems to be needed today is not so much the immediate establishment of more series that are definitely namable and specifiable. Issues have become infinitely more subtle since John Graunt called for the institution of censuses. To argue this point, which will be my last, I shall make use of the initial work of a continuing committee on social statistics of which Dr. Taeuber is chairman. It was founded by Professor Stephan when he was chairman of the Social Statistics Section of ASA, and will I think help overcome the handicap each year's program committee faces as it starts afresh in its one-year term; by pursuing subjects from year to year and making long-range plans it will give continuity to this part of the ASA program, as well as furthering the cause of the Section in other useful ways.

Its initial deliberations help to outline the present frontier of social statistics. On that frontier is knowledge of how to conduct surveys of the ability of people to predict their own behaviour. Dr. Taeuber points out in effect the formal resemblance despite complete difference of content among surveys of intentions to purchase automobiles and houses; the number of children that couples intend to have; the party a person intends to vote for. This resemblance ought to make it possible to transfer experience from one field to another. It happens to tie in also with a part of Stouffer's work that has just been mentioned. He was chairman of an important SSRC Committee on the Prediction of Personal Adjustment, which concerned itself with prediction by neutral observers of success of couples in marriage, of students at school, of criminals on parole. Under Stouffer the committee reached some points at which its insights have not since been surpassed.

Again Professor Stouffer was vitally concerned at every point in his career with sharpening the tools of measurement. He measured the values of college students and the attitudes of soldiers. His work in the army came to a stop at one point before the apparently impenetrable problem of measuring fear. During this meeting of the ASA I have heard of the need for measuring the quality of medical care, the effectiveness of treatment for alcoholism and drug addiction; the degree of mental illness and quality of treatment; the factors which bear on the sentencing behaviour of judges.

One of the main features of American and European society at the moment is rapid upward mobility. The entire occupational spectrum is moving upward; in North America it has passed the point at which over half the labour force is in white collar occupations. Through what sequence of occupational changes do people cross the manual-whitecollar line? From what social groups do schoolteaching, engineering, medicine, and other professions recruit? What is the degree in which the educational system is being upgraded, especially at its upper end? To what extent is upward mobility reflected in changes of place of residence, from the countryside to the cities, and from the centre of cities to the

periphery? Is the movement of people to the suburbs accompanied to any important extent by the movement of the industrial establishments in which they work, a process which would reduce the amount of commuting? What is the strength of the move back to the centres of cities, and who are the participants?

Attention is also being directed to statistical measurement of features of particular groups. The incomes, health, welfare services received by older people come to the fore with the increasing proportion of them in the population. At younger ages the decline virtually to zero in death rates deprives vital statistics of some of their interest and has begun to bring into existence on a periodic basis statistics of health and sickness, but these are not yet by any means in finally satisfactory form. Professors Stephan and Hauser have offered important indications of where the present statistical frontiers lie.

The preceding argument has distinguished between imaginative thinking in statistics and the establishment of institutions turning out data. The former is the basis of the latter, but

often the links are indirect. It is institutions that get the work of the world done in a reliable way; being in some degree independent of individual talent they enable the majority of mankind to pursue useful careers. Imaginative thinking, on the other hand, as often dissolves old institutions as it founds new ones. It seems that what is needed at the present stage in the history of statistics is not so much a greater quantity of institutionally provided data as the better defining of statistical variables, better knowledge of survey methods, in some instances the replacing of existing series by quite different new ones. Unlike John Graunt, Stouffer could not simply call for the establishing of censuses, or any other equally clear-cut answer to our problems. The inspiration he gave was both more subtle and more fundamental. This brings me to the same somewhat depressing conclusion as the other papers on this program: that what our age needs most is the element hardest to come by—men with the training, curiosity, honesty, persistence, imagination and brilliance of Samuel A. Stouffer.