AN INTERNATIONAL PROGRAMME FOR EDUCATION AND TRAINING IN STATISTICS

(Report of the Secretary-General for consideration under item 6 (a) of the Provisional Agenda)

A. Introduction

1. During the Third Session of the Statistical Commission the member from the United States submitted a proposal (E/CN.3/43/Add.1) suggesting that the Economic and Social Council recommend that UNESCO sponsor and support an international programme for education in statistics with the collaboration of the International Statistical Institute in general conformity with the plan outlined in An International Programme for Education in Statistics (E/CN.3/43). The proposal suggested that the private and public international agencies involved take necessary steps to reach an early agreement so that the programme might be implemented as soon as possible. It was discussed by the Statistical Commission at its Twenty-eighth meeting (E/CN.3/SR.28), Thirty-first meeting (E/CN.3/SR.3), and Thirty-second meeting (E/CN.3/SR.32), after which the Statistical Commission recommended in its Third Report to the Economic and Social Council (E/795) as follows: that the Secretary-General arrange for a survey of the needs for education and training in statistics and for the formulation of an international programme to meet these needs; and that the Secretary-General arrange for a report on the means by which such a programme may be put into effect. The Statistical Commission further recommended that the Secretary-General take into account the views expressed in the Commission and in the communication titled An International Programme for Education in Statistics, and that he submit the recommended survey and report to the Fourth Session of the Statistical Commission prior to further recommendations by the Commission to the Council on this matter.

2. In its consideration of this part of the Commission's report the Economic Committee of the Economic and Social Council amended the recommendation to provide that the survey and report of the Secretary-General take into account the "relevant sections of the Survey now being undertaken by the United Nations System of National Accounts (SNA) for the United Nations Secretariat as basis for a set of recommended survey forms and methods for the statistical collection and reporting of data for education and training in statistics, and that the Secretariat (in close consultation with relevant United Nations agencies) prepare and submit to the Commission a comprehensive statement on the extent to which the project is compatible with the programme for education in statistics."
under Resolution No. 132 (VI) on international facilities for training in public administration". (E/960) The Economic and Social Council adopted the revised resolution (ECOSOC Resolution 149D VII).

3. In accordance with these recommendations the Secretariat has reviewed available documents on the subject of statistical education and training, interviewed available members of the Statistical Commission, and consulted with representatives of the following Specialized Agencies: International Monetary Fund, International Bank for Reconstruction and Development, Food and Agriculture Organization, International Labour Office and International Civil Aviation Organization. Special inquiries were made about the experience in statistical training of the United States Bureau of the Census, Inter-American Statistical Institute, United States National Office of Vital Statistics, and the Dominion Bureau of Statistics in Canada. In addition, the experience of numerous administrators of statistical affairs, national and international was consulted.

4. Concepts and Definitions. At the outset, it is felt that a distinction must be made between education and training in statistics. Education may be regarded as the preparation of qualified candidates for university and college degrees in the fundamentals of statistical science. Training may be regarded as instruction in statistical skills and techniques for specific and more or less immediate applications, imparted to those already possessing some knowledge of the fundamentals of statistical science. The distinction is not a dichotomy, and education and training in statistics shade into each other. For example, it was found necessary in the Baghdad training institute conducted by the Food and Agriculture Organization during the spring of 1948 to devote much of the early time to statistical subjects normally found in a basic course in statistics. This was also the experience of the Food and Agriculture Organization in the statistical training institute conducted in Mexico City in the autumn of 1948. In both cases, it was necessary to provide a review of principles before beginning work on the application of statistics. Contrariwise, the best informed views about statistical education and training seem to agree that university and college courses in statistics acquire something of especial value when the student is brought reasonably soon into close contact with the range of applications of statistical method to subject-matters. This conjunction of theory and specific applications is one of the characteristics of statistical training. In short, public agencies sometimes find it necessary to review fundamentals in training exercises and universities find it useful to associate general theory with the practical particulars encountered outside the classroom.
5. It may be recognized in practice, therefore, that statistical education and training merge. Indeed, it may be true that in the promotion of improved statistics in statistically underdeveloped countries, education and training will be virtually indistinguishable. Even though education and training may fuse into a single problem, and even though it be recognized that these two activities merge with each other in the middle ranges, there is use in maintaining the distinction for the purpose of defining the nature and immediacy of the interest of the United Nations in each.

6. In the main education in statistics is the function of the institutions of learning - the universities, colleges, and the professional associations. The training of statistical personnel is a matter of immediate concern to the agencies and organizations of the public service, national and international. Education, in brief, is a principal academic preoccupation. Training may be said to be an official responsibility. The institutions best equipped to provide and guide education are the universities, colleges and private professional associations of the world. The institutions best equipped to provide and guide training are those for whom the training is required, namely, the official governmental organizations of the world. Private business organizations and semi-public agencies like actuarial societies also need and maintain training facilities, but these services are for private purposes and are therefore outside the scope of this report.

7. In the United Nations, statistical training already assumes the character of an operating responsibility since its application is immediate and close to the daily work of the United Nations agencies and organizations. There are circumstances in which it could be supposed that statistical education would also possess the character of an operating responsibility. Such a circumstance might exist in the promotion of improved statistics in statistically undeveloped countries, as indicated above. Or if universities, colleges and private national and international professional organizations proved incapable of advancing statistical education by their own efforts, it might become desirable for the United Nations to consider direct and active measures to give effect to its continuing interest in the subject. As will be further described below, however, it is felt that the present facilities of private organizations and

---

the UNESCO provide an available means for promoting statistical education, and that the experience of these agencies in this effort should be watched and weighed before the United Nations pursues more direct courses towards this goal.

8. The Need for Statisticians. The Statistical Commission recognized that there is a shortage of adequately educated and trained statisticians in many countries, and the Secretariat has had this opinion confirmed by expert testimony. In appraising the need for statisticians, the Secretariat sought expert advice in preference to quantitative measurements of doubtful reliability. In the first place consideration was given to the making of a survey of statistical positions vacant in international organizations and in the departments of national governments but it was decided that such data would tend to reflect budgetary stringencies rather than demand and deficiency. It was felt too, that an extended opinion survey of expert testimony would have produced only a more numerous confirmation of views already expressed by some experts and accepted by others. Further, in those expert opinions appraised, it was found impossible by the men in daily touch with statistical problems to make a quantitative evaluation of the need for statistical personnel. There was unanimous concurrence in the view, however, that the burden of statistical work in public and private institutions is large, will increase, and will have to be met by the education and training of more and better statisticians.

9. Although it was not possible to obtain a quantitative estimate of need, useful statements were collected about the nature and distribution of the need. It was the universal view that the statistically less well developed countries are in need of undefined numbers of statistically trained personnel of all kinds, from the mathematical specialist at one extreme to the lowest grade statistical clerk at the other. The shortage was reported to be most acute in Africa, Latin America, the Middle East, Southeast Asia, and Southeastern Europe. It was said to be least urgent in Northern Europe, Western Europe and North America, excluding the Latin-American countries. Some shortages were reported, however, in even the more statistically advanced countries. In these countries mathematical statisticians were said to be in short supply as well as such subject-matter specialists as air transport statisticians.

10. Almost, although not all, of the professional writings on the subject of need has been supplied by mathematical statisticians who have been concerned to stimulate interest in their subject. International and other statistical officials interviewed, however, tended to think that the most pressing difficulty is to find enough personnel possessing both statistical and subject-matter knowledge. For example, in Specialized Agencies like the
specialists (economists, for example) who have had some statistical training. Members of the statistical staffs of the United Nations and of the Specialized Agencies said that a pressing need in the statistical systems of the Member countries with which they habitually deal is for personnel competent to gather statistical materials needed by the agencies and organs of the United Nations, such as data on population, income, manufactures, agriculture, foreign trade, and the like. It was also said that in the collection of data, the census taker may be more immediately important than the population analyst or the specialist in mathematical statistics.

11. A useful paper on the kinds of statisticians in short supply, is the report of the Committee on Applied Mathematical Statistics of the National Research Council in 1947. Among the fields mentioned in this report were industrial statistical control, research in the biological sciences, the collection and analyses of government statistics, market research and commercial sample surveys, psychological testing, finance and taxes, labour and employment, prices and production, business cycles, and the estimation of national income and other economic quantities. These categories are rather gross, but they tend to bear out the observation made above, namely, that the need for more and better statisticians is widespread and pressing because of the increase in the uses and applications of statistical technique that has taken place in both government and industry.

12. A somewhat different view of the problem of need is supplied when statisticians are classified by type of function, rather than by subject-matter fields. In a paper in the Journal of the American Statistical Association, Milton da Silva Rodrigues classified statistical experts as follows: mathematical statisticians, statistical analysts, and statistical supervisors. These three groups are called "staff" statisticians to distinguish them collectively from such functionaries


as enumerators and interviewers, coders, punchers, verifiers, tabulating machine operators, drafting clerks, and computers. For the three staff types, the practical need is said to be greatest for the statistical supervisor. The statistical analyst is the most difficult to educate and train to a high degree of competence because he has to know at least two fields of specialization—statistics and the subject-matter speciality to which statistical technique is to be applied. The important difference between statistical supervisors and statistical analysts is the involvement of the former with the administrative aspects of technical statistical work. Although the definite separation of the two classes (supervisor and analyst) is not yet made in a majority of countries, the specialization it requires is desirable because the supervisor often finds himself doing the work of the analysts. The further development of the class of statistical supervisor is not only a matter of concern to professional organizations, as Rodrigues urges, but is also a matter for the attention of those concerned with the development of international facilities to promote the science of public administration. (Resolution 132 (VI), E/694).

13. One empirical measure of need may be mentioned. The Statistical Office of the United Nations and the Specialized Agencies report the receipt of requests from Member countries for the assignment and detail of statistical personnel in the field to advise and assist with the development of national statistical systems both in general and in particular matters. The number of such requests is larger than the recipients of them can satisfy and, at the same time, maintain the level of output and quality of the day to day work with which they are regularly involved. These requests in the main come from the areas of the world where statistical activity of high professional competence is less well developed.

14. It may be said in conclusion to this section that the professional organizations in the field of statistics seem not to have done very much in compiling useful vocational information either with respect to the content of statistical subject-matters and the varieties of employment available to statisticians, or with respect to the numbers of statisticians needed. This lack was also felt by the Secretary of the American Statistical Association, which he wrote in 1945 that,

"The profession itself has done literally nothing to clarify the content of its field or to establish any kind of standards for its work. So far as this reader knows, vocational information on statistics is limited (to three papers) one of which was prepared

/with assistance,
with assistance of persons high in the offices of the professional statistical societies.\(^4\)

Mr. Kellogg seems to have confined himself to the situation that exists in the United States, but his observations have a wider application.

**B. Education in Statistics**

15. **Some Elements of Statistical Education.** The promotion of education in statistics can be viewed from two sides: first, what measure of agreement exists as to the elements of an adequate statistical education; and second, what role can private or public international organizations play in aiding and carrying forward domestic efforts to improve statistical education? This section deals with the elements of an adequate statistical education.

16. There exists a small body of writing on the elements of an adequate statistical education. In a paper read before the Royal Statistical Society in 1939, John Wishart was moved to confess that statistics was a subject "which does not yet figure very prominently in the curriculum of the ordinary University".\(^5\) By 1948, the teaching of statistics had become a matter of serious enough concern on both sides of the Atlantic to have produced an investigation and report by the Council of the Royal Statistical Society, two investigations and reports by professional societies in the United States, and an investigation and report by the Committee on Education of the Inter-American Statistical Institute. The professional literature seems to be more or less in general agreement on several points. First, it has been suggested that a place may be claimed for statistics in general education.\(^6\) This view was expressed as long ago as 1926 when Professor Robert E. Chaddock urged instruction in statistics for majors in the social sciences and other undergraduates because it tended to develop the critical judgment of the student, emphasized the essentials of the

---


scientific method, and aided in the description of relationships of cause and effect.\textsuperscript{2/} The Royal Statistical Society Report of 1947 stated that the need for a more wide-spread knowledge of the statistical approach might be met by introducing statistical courses into the schools.\textsuperscript{8/} Second, there is some measure of agreement that a basic introductory course in statistics should be available in colleges and universities,\textsuperscript{2/} although the merits of such a course are not entirely established in the view of all who have given thought to the question.\textsuperscript{10/} Third, some sentiment is expressed for the organization of the teaching of statistics in a separate department, with or without a laboratory connection.\textsuperscript{11/} There are other areas of agreement between the British and American conclusions about statistical education, its organization and administration.\textsuperscript{12/}

17. The three British and American reports made in 1947 and 1948 were the results of inquiries by mathematical statisticians. The work on Statistical Teaching in the Western Hemisphere tends to express more fully the views of those in the social and natural sciences who use statistical techniques, and comes to somewhat different conclusions.

18. As a result of its investigations, the Secretariat is of the opinion that the particular content of university and college courses should be worked out and developed by the Member countries within the general understanding of competent professionals as to what might reasonably be expected of statisticians possessing varying degrees of knowledge. The difference in the organization, structure and content of institutions of higher learning from country to country, as well as the national and cultural differences of the countries themselves, should make it prudent to be slow about attempting to standardize educational requirements unduly. The improvement of national and local educational systems must be developed in the countries where they exist, by force of local desire, under local controls, and for such international objectives as are shared locally.

\textsuperscript{8/} 110 Journal of the Royal Statistical Society, 51 (1947).
\textsuperscript{2/} National Research Council, Committee on Applied Mathematical Statistics, op. cit., page 12.
\textsuperscript{10/} Milton da Silva Rodrigues, Statistical Teaching in the Hemisphere, op. cit. at pages 36-40.
19. Except for the purely mathematical aspects of statistical science, it is a common view that statistical technique takes form and colour from the multitude of subject-matter applications. The promotion of adequate statistical education would seem to require the utmost co-operation within the universities, colleges and professional associations between the statistical specialists and the subject-matter specialists. Statisticians will find it necessary, therefore, not only to convince academic administrative officials of the desirability of revising the courses in statistics and of introducing them where they have not been before, but they have also the task of convincing their academic colleagues in the social sciences of the relevance of statistical technique to their work. Many are already so convinced. Others must be persuaded. The form in which the association is made between statistics and the subject-matters of social science will probably vary from one institution of learning to another, a fact that further demonstrates the need to keep the actual development of statistical education decentralized.

20. It is also the opinion of the Secretariat that devices must be found to bridge the separation between the academic and the official areas of statistical concern. John Wishart has suggested that the education of statisticians who intend to go into government service might profitably include some acquaintance with the principles of administration "which would have the effect of turning out graduates better equipped for government and business posts of an administrative or quasi-administrative character". This is in line with the thought of Rodrigue who suggested that the duties of the statistical supervisor and those of the statistical analyst should be specialized and distinguished from each other. The suggestion of Wishart would appear to have merit, and is a matter for the attention of those involved in the development of any United Nations programme to promote education in the science of administration under the resolution of the Economic and Social Council dealing with this matter.

21. In the main, however, the task of bridging the separation between the academic and the official worlds in the production of more and better statisticians, would seem to rest in the hands of the national organizations of Member countries. In this connection attention might be called to the experience of the Royal Statistical Society, the Institut Statistique de France, and the Netherlands Foundation of Statistics. Each of these countries has had experience in methods by which programmes of professional

13/ Ibid.
14/ See page 5, Note (3).
education are brought into close connection with governmental offices and vice versa.\textsuperscript{15/} Attention might be also drawn to the proposal made in Peru for the organization of a Central Statistical Council in which academic and official statisticians might meet.\textsuperscript{16/} In Member countries the fullest exploitation of university education in statistics will not be realized in the government service unless the civil service requirements for statisticians are brought into realistic relationship to the academic preliminaries. Considerable attention has been given to the organization of courses and materials for the education and training of statistical personnel in the government service by Carlos E. Dieulefait and Robert Guye, and their findings will be of interest to statisticians in Member countries who concern themselves with the problems of statistical education and training.\textsuperscript{17/}

22. In conclusion on this point, it may be repeated that national and other variant complications make complete standardization of courses and other educational requirements difficult (if not impossible) and probably undesirable. It is believed by many that excessive formalization of requirements will be obnoxious to Member countries, if fashioned by non-nationals, and distasteful within Member countries to those who are sceptical of a too pedantic professionalism. The view has been expressed by some that education should be differentiated not parallel, and that there is no sound reason that Burmese courses should be like those of Guatemala or the United Kingdom. Or, to cite an observation of a decade ago, "the advantage of excluding by severe mathematical requirements many quacks was bought too dear if it shut out a single John Graunt".\textsuperscript{18/} Some have expressed the view that teaching is the crux of good statistical education - not the mere formulation of standards, or the invention of rigid requirements too assiduously enforced. The improvement of statistical education cannot overlook the improvement of statistical educators. Some of the aids that seem to lend themselves to this improvement will be discussed in the next section.


\textsuperscript{17/} Carlos E. Dieulefait and Robert Guye, Minimum Plan of Study for the Training of Statistical Technicians: Preliminary Report, programme document for the Meeting on Statistical Training Methods and Materials of the First Session of the Inter-American Statistical Institute, 6-18 September 1947, Washington, D.C.

\textsuperscript{18/} Professor Major Greenwood in the course of the discussion of the paper by John Wishart, "Some Aspects of the Teaching of Statistics", 12
23. **International Promotion of Statistical Education.** Although statistical education is thus a domestic and academic affair, there is an important role that can be played by international organizations of a public and private character. This role is chiefly one of stimulation and guidance. The will to improve statistical education and the ability to do so must be encouraged and taught inside the Member countries. These attributes cannot be laid on from the outside. The fundamental force for improvement must be developed within the countries where it is to be directed and employed, and new techniques will come to prevail only if they are built into the national mores. The function of international professional and public organizations can only succeed to the extent that Member countries are encouraged to help themselves. It is of great importance therefore that a principal role be accorded to the nationals of Member countries in the formulation of programmes for the improvement of statistical education within their borders.

24. Among the activities that international organizations could perform to serve, stimulate, and guide the development of better statistical education are the development of teaching tools; training of teachers; assistance and encouragement in establishing journals; maintenance of clearing house and advisory services; and provision of research facilities.

25. **Teaching tools.** A serious lack has been reported of some of the basic tools for the instruction of students in statistical science. Among these needed instrumentalities are common glossaries of statistical terms, textbook translations, monograph series in many languages, and library materials. The statistical concept of the "gainfully employed person", for example, is one for which it is difficult to find equivalents in many languages. "Household" is another. It is very difficult to make data comparable if the basic concepts in use are not agreed upon and understood. Language barriers are troublesome obstacles in achieving this desired comparability. 12/ There is a real need for glossaries of common terms, and the preparation of such glossaries, or encouragement to develop such glossaries, is a function that international organizations can perform. The desirability of translating basic texts into several languages is clear, as is the desirability of adding to or supplementing the libraries available to students in Member countries where statistical education is lacking or inadequate. An international organization working

---

12/ Attention is drawn to Statistical Vocabulary (preliminary), Project Series No. 12, December 1948 published by the Inter-American Statistical Institute. This useful publication contains about 2,000 statistical words and phrases in English, French, Spanish and Portuguese.
to improve statistical education would perform a useful and needed service if it could supply or arrange for the supply of monograph series on such statistical topics as the taking of censuses, the making of index numbers, and the like.

26. Teachers: The development of good teachers can be stimulated by an international organization through the exchange of professors and the exchange of mature students who intend to enter teaching activities. A mere exchange of students who do not intend to become teachers is probably not enough, since they do not represent what may be regarded as "educational capital", capable of yielding indefinite returns in more and better students in the years to follow. The exchange of students who plan to be teachers, however, is an augmentation of the capital education resource in statistics, and is capable of returning a large yield in the future.

27. Journals: It may be both useful and important to encourage and stimulate the establishment of professional journals in areas where they do not exist. Students who have been exchanged and return to their country of origin need professional organizations and professional journals through which they can express and maintain their new interests. The advancement of statistical science is more readily achieved where numerous outlets exist for the exchange of opinion, and for the reporting of new developments in technique.

28. Advisory services: An international organization is also uniquely situated to supply a clearing house and advisory service for the statisticians of the world. The maintenance of a central directory of statistical experts in various fields, consultations upon matters of statistical theory and practice, the loan of expert staff or the arrangement for the loan of expert staff by one Member country to another, the exchange of information on courses and examinations in statistics together with the problem put before the candidates for solution, the development of a bibliography service, the maintenance of a library of statistical materials - all of these are clearing house and advisory services which an international organization might be expected to perform, and which it would be desirable to have performed.

29. Research: These activities would be aided by, and in turn would aid, the prosecution of research programmes, of a substantive nature. There is a useful place for the establishment of an international statistical research centre whose body of substantive problems would come from two sources: resident research professors and contract assignments to do specific jobs. Such an international research centre could be employed by professors of statistics during sabbaticals or in the intervals between terms in the academic calendar to advance their investigations. During
these seasons at the international research centre, some professors could be expected to hold seminars for mature graduate students in their fields of special interest. In addition to these research activities, it is not unreasonable to suppose that contract assignments to perform substantive work of statistical research might be made by private organizations, national governments or international agencies, although it is doubtful whether any considerable amount of this business could be expected.

30. An international organization that concerned itself with the improvement of statistical education would perform valuable service by consulting with and advising the nationals of Member countries on ways in which the latter could improve themselves. Indeed the best use, perhaps, of a small expenditure would be the guidance that could be supplied to Member countries in the discovery, development, and utilization of their own resources for the advancement of statistical education. Resourceful and imaginative advice frequently uncovers potentialities that would otherwise go unexplored. An example is the manner in which existing facilities in universities, colleges, government agencies and private associations can be utilized to organize a small programme for the training of teachers of statistics. Education is growth from small beginnings and an international organization is in a well disposed position to communicate to one country the fact and the promise of small beginnings made in others.

31. The Role of the International Statistical Institute. Economic and Social Council (ECOSOC Resolution 1490 VII) requests the Secretary-General to take into account the views expressed in the communication titled, An International Programme for Education in Statistics which proposes that the International Statistical Institute be given a leading role in the promotion of statistical education.

32. Article 1 of the 1947 statutes of the International Statistical Institute describe it as a society "devoted to the development and improvement of statistical methods and their application throughout the world". This general objective is to be fulfilled in a variety of ways. For example, the Institute exists to encourage "the international association of statisticians, the exchange among them of professional knowledge, and the growth among them of a collective interest in the advancement of such knowledge". The Institute seeks to serve its objects by "establishing and maintaining professorships, lectureships, and fellowships for advanced studies in statistics" and by "promoting the training of competent statisticians". Other provisions of the revised statutes deal with the advancement of statistical science and the improvement of statistical
33. It is part of the role of the International Statistical Institute to represent and embody the collectivity of international statistical interests. Within recent years several new or reorganized international statistical organizations have been established, each with a subject-matter speciality as its principal concern. Among these are organizations in biometrics, psychometrics, national income, population, and public opinion measurement. It is hoped by the Institute that all of the principal international statistical organizations will become affiliates to the International Statistical Institute, and that it will therefore function as a centre for the entire complex of private international statistical organizations. By 1 March 1949, more than a half-dozen organizations had applied for membership in the International Statistical Institute under the revised statutes.

34. As an international statistical centre, the Institute will be both equipped and placed in the most advantageous position possible to conduct the affairs of mutual interest of the constituent organizations. One of these is the promotion of statistical education throughout the world, an object to which the institute is now devoted. It would appear, therefore, that the International Statistical Institute is a private international body capable of giving expression to the common interest that the statistical profession has in the advancement of programmes of statistical education throughout the world. The particular needs of statistical education that each of the subject-matter specialities required should not be neglected. Assurance that they will not be neglected is provided by the voice that each of the affiliates has in the affairs of the Bureau of the Institute. Where community of interest bespeaks unity of action, the reorganized International Statistical Institute possesses the facilities for negotiating decisions of mutual resolve and common action.

35. It was said above that the promotion of statistical education in the many countries of the world is a matter of interest to the United Nations which may be served and fulfilled through the encouragement of the activities, in this field, of universities, colleges, and private international organizations. It was also indicated that more direct forms of promotion of statistical education by the United Nations might wait upon the experience of such national and private international organizations. On the assumption that this policy is the desirable one, it is a conclusion of this report that the International Statistical Institute is the preferred agency, at this time, for carrying forward the work of promoting statistical education throughout the world.

/36. Means for Promoting
36. **Means for Promoting Statistical Education.** Resolution 149 D (VII) of the Economic and Social Council requires the Secretary-General to report on the means by which a programme for education in statistics might be put into effect.

37. It appears likely that the International Statistical Institute would view favourably the kind of programme of activities in statistical education described above and would undertake a programme along these lines if financial support were forthcoming. On 30 September 1948 the Institute made application to the United Nations Educational, Scientific, and Cultural Organization for financial assistance in establishing a programme in this field. By resolution of 30 December 1948, UNESCO committed itself "to assist and promote education in statistics, including financial help to the International Statistical Institute if a satisfactory agreement is reached" (30/105, 30 December 1948). For the fiscal year 1949 a grant of $5,000 was made to the Institute to enable it to undertake work on the development of a programme for promotion of statistical education. It is understood that the Institute will make a new application for financial assistance for the fiscal year 1950.

38. It would be of help to the Statistical Commission and the United Nations to be kept informed of the progress made by the United Nations Educational, Scientific, and Cultural Organization and the International Statistical Institute in their joint undertaking to promote statistical education. The Statistical Commission and the United Nations have a strong interest in the rapid and sound development of statistical education; if necessary or desirable, the Statistical Commission should be prepared to make recommendations from time to time the purpose of which would be to maintain a suitable level of education in statistics.

C. **Training in Statistics**

39. **Statistical Training Activities of Specialized Agencies.** This section will describe some of the statistical training activities of the specialized agencies after first considering two distinctions, one already made and the other, new. The first is the distinction between education and training. Training is the instruction of individuals in the immediate use of statistical tools to perform actual jobs of work. Training is less concerned with the basic theory which underlies the use of the tools than with the development in the trainee of enough skill to enable him to perform some part of the job that requires to be done. Education deals with principles; training concerns itself with applications of principle. Education imparts instruction in a variety of matters and subjects for which there is no intended immediate use.
Training imparts instruction in the specific matters and subjects for which there is an intended immediate use. The form and scope of training programmes therefore are governed by the immediate needs of organizations for the specific skills in which they are in short supply. Training becomes a by-product of the programme of active organizations. The second distinction is that between institutional training and operational training. In the first, an organization trains its own personnel. In the second, an organization undertakes to supply training to those who are not its employees, but who are involved in joint or cooperative operations with its employees. Operational training is therefore a form of technical assistance. This distinction is important to keep in view, for it is the second or operational kind of training that lies close to the goals and obligations of the United Nations and the specialized agencies in economic and social matters.

40. The training activities of the specialized agencies exhibit some common characteristics. First, none of the agencies has a programme of training for statisticians as such, either institutional or operational, with the exception of the Food and Agriculture Organization, of which more will be said below. Second, all of the agencies have small programmes or plans for small programmes of institutional training, the curriculum of which provides for some time and attention to the work of the statistical sections of the Agencies. Third, all of the agencies have small programmes or plans for small programmes of operational training. For example, the International Bank for Reconstruction and Development expects to take about eight trainees a year in a programme that is not formally designed for the nationals of Member countries but which is expected to result in the training of some individuals who will return to their countries after the instruction is finished. The International Labour Organisation has had a programme of on-the-job training, called the "stagiaire" system, for a number of years. In the case of the Statistical Section of the International Labour Organisation however, no "stagiaires" have been appointed since 1939. The Executive Board of the International Monetary Fund has approved a policy of bringing nationals of Member countries to the Fund for some instruction in Fund operations. The International Civil Aviation Organization has operated a six-month trainee plan for the nationals of Member countries since October 1947.

Fourth, because of the relative shortness of time that most of the agencies have been in existence and the modest compass of the trainee plans (4-8 people), the total number of people given either institutional or operational training is very small. An exception is the

---


/International
International Labour Organisation which estimates that it has had about 100 stagiaires during the life of its programme. Fifth, it is generally felt that training programmes in which the trainees are regarded as visitors are less desirable than those in which they perform actual jobs of work in the offices to which they are assigned. The objection to the visitor type of training programme is that the trainees occupy too much of the time of the working staff with no immediate and visible advantage to the organization which supplies the training. It is also felt that the value to the trainee of having been a visitor is less than if he had regarded himself as an employee on temporary and short-term appointment. One agency representative urged with feeling that every effort be made to rid trainees of the "visitor's mentality", in which they consider themselves to be guests of the organization, and entitled to special consideration and all of the courtesies. He suggested that trainees should be hired on the basis of ability and promise, and discharged whenever it should appear that these virtues had been exaggerated.

41. The most advanced operational training activities found were those conducted by the Food and Agriculture Organization. Two training institutes of note were held by the Food and Agriculture Organization in 1948, the first in Baghdad and the second in Mexico City. The Baghdad Institute conducted in the spring of 1948 provided training in agricultural statistics for 39 employees of government departments in Syria, Lebanon, Egypt, and Iraq. 21/ The training institute in Mexico City in the autumn of 1948 was established jointly by the Government of Mexico and the Food and Agriculture Organization of the United Nations. The Statistical Office of the United Nations and the Inter-American Statistical Institute co-operated in supplying instructors and materials. Census officials of a number of Latin American countries and the United States also took part in the training institute. The object of the institute was the operational training of officials and technicians who direct or who will be employed by Latin American countries in the statistical activities involved in the 1950 Census of the Americas. Besides these two undertakings, in 1948 the Food and Agriculture Organization co-operated with the Government of China in a training institute in agricultural statistics conducted by the Government of China. FAO is considering plans to conduct a Middle East statistical institute annually.

21/ Food and Agriculture Organization, Office Memorandum, T.C.M. Robinson to Conrad Taeuber, Report of Trip to Near East and Course in Agricultural Statistics, 1 June 1948.
and to establish statistical training institutes in other parts of the world.

42. **Technical Assistance by the Statistical Office of the United Nations.** The Statistical Office of the United Nations performs several functions of technical assistance which may be regarded as training. Although no formal programme of operational training has been established, operational training in fact has emerged as a natural by-product of the technical assistance supplied by the Statistical Office. These activities may be considered under four heads: publication; requests for assistance from Member governments; participation in formal training institutes; and participation in technical missions. First, in the course of publishing the *Monthly Bulletin of Statistics*, the *Statistical Yearbook*, *National Income Statistics of Various Countries* and the *Demographic Yearbook*, the Statistical Office is continuously concerned with the improvement of the data it collects, compiles, and tabulates. In the regular flow of correspondence with the statistical personnel of Member countries, advice and guidance are supplied in detail as to the content and application of statistical concepts, the need for new series, forms of reporting, methods of collection, improvements in comparability, and the like. The volume and character of this advisory correspondence are governed by the exigencies of the publications with which they are connected, and it represents a kind of training by mail. It may be said that it is a very efficient kind of training since there is little or no wastage. The modest expenditure of staff time in correspondence usually yields immediate and visible results in the improved data received and in the publications for which they were requested.

43. Also, the Statistical Office and the Population Division have collaborated in the preparation of a series of monographs titled *Studies of Census Methods* which are training materials of the first order and should prove to be of great value in the instruction of staff dealing with the 1950 censuses of population and agriculture. These papers describe and discuss problems of concept and definition, methodology, and practice in the enumeration, collation and analysis of census data. FAO and ILO shared separately in the preparation of two of these monographs. Specialized training papers are also provided by three papers dealing with some aspects and applications of statistical sampling. Additional papers of this type will be prepared from time to time. Another series of papers of the Statistical Office of the United Nations which may develop as a useful vehicle for the exchange of experience is a recent publication titled *Statistical Notes* which contains short articles and brief accounts of matters of statistical interest throughout the world.
44. It may be noted in passing that the Statistical Office conducts various co-ordinating activities, some direct, and some oblique and interstitial, which also represent a form of training. For example, in connection with the review of forms, schedules, and questionnaires, and in the collection and tabulation of statistics provided by the specialized agencies, the Statistical Office works to standardize definitions and concepts, so that all suppliers of data eventually supply comparable data.

45. Second, the Statistical Office supplies advice and assistance to Member governments on request. In providing technical assistance in statistical matters, the statistical expert who serves a Member government under such arrangements acts in the capacity of a training officer or adviser. It is not his role to collect the statistics of the Member government to which he is detailed, nor actually to perform functions of analysis. Rather it is his function to provide technical assistance and to train nationals of the Member government in the methods and practices on which advice and assistance have been sought.

46. Third, the most obvious example of participation by the Statistical Office of the United Nations in formal training exercises is that of the institute in Mexico City during the autumn of 1948. A staff member of the Statistical Office was detailed to give part of the lectures dealing with census methods. The Statistical Office considers such projects of statistical training to be of great importance in fulfilling the special responsibilities laid upon it for improving the statistical systems of Member countries. It is also evidence that joint activities in co-operative training enterprises are feasible, a matter to be discussed more fully in paragraph 57.

47. The activities of technical assistance described above do not represent a formal programme of statistical training. They do, however, represent an interdependent group of related activities which accomplish some of the results sought in formal training programmes. In addition, mention may be made of a special activity of the Statistical Office which has supplied training to a few graduate students of high promise recruited from the universities. During the summer of 1948, temporary employment was given to four such students, one each from Colombia, India, United Kingdom and United States. They performed needed work in connection with the Statistical Yearbook and, in so doing, acquired a new appreciation of the work of the Statistical Office and of the statistical problems of international agencies and Member governments.

48. Statistical
48. Statistical Training and the Mission of the Statistical Office of the United Nations. The proposal is made in paragraphs 52-56 that an increase of staff and funds be obtained so that the Statistical Office may augment and develop its activities of technical assistance, advice to Member governments and the promotion of improved statistical methods. This proposal is made on the assumption that these are some of the forms in which training may be most profitably undertaken in the Statistical Office. This section discusses the relationship between such augmented training activities and the responsibilities of the Statistical Office as they have been defined in four United Nations recommendations.

49. First, augmented training activities would help fulfill the recommendation previously made by the Statistical Commission on two occasions that a statistical field service be established. (E/39 and E/795). An augmented staff of the Statistical Office, available to advise and consult on matters of statistical science and practice by travel on temporary detail to Member countries would provide a superior kind of training, namely, that which is connected with the solution of substantive problems at the place where the problems occur and create difficulty. Second, an augmented training programme would enable the Statistical Office of the United Nations to fulfill its responsibility for promoting the development and improvement of the statistical systems of Member countries. Third, it would enable the Statistical Office more fully to discharge its function of providing advice and assistance to Member governments in technical matters of statistical importance, as required by its terms of reference. Fourth, as the Report of the First Session of the Statistical Commission recognized, the Commission and the Statistical Office should promote "continuously the adoption and use of the most valid and reliable statistics and statistical methods, including sampling and other modern techniques of collection and analysis". As it was said in that Report, in order to further this end, there is a "need to provide opportunities for statistical personnel of countries supplying information to the United Nations to obtain education and training in statistics" (E/39). Progress toward this goal can be aided by an augmented training programme under the direction of the Statistical Office.

50. The Resolution of the Economic and Social Council based on the Report of the Third Session of the Statistical Commission invited the Statistical Commission at its Fourth Session to consider "as a matter of urgency, how statistically underdeveloped countries requiring assistance in remedying deficiencies of statistical data can be helped to improve their basic statistical services". (Resolution 149 C (VII)). While there are undoubtedly
many respects in which this urgent matter may be dealt with, one of them is
the augmentation of the training facilities of the Statistical Office to
provide statistical experts qualified to render advice and assistance to
Member governments in the field and to develop and promote training
institutes where the urgency is most acute.
51. Because training plays an operating role in the regular activities
of the Statistical Office, therefore, and because an expansion of its
informal training activities would aid it to achieve both general and
specific obligations of the organization, it is desirable that these
training activities be increased and that means be provided for carrying
them out. Certain proposals for realizing this goal are set forth in the
following paragraphs.
52. Proposed Statistical Office Training Programme. In making the following
suggestions, two principles have been kept in mind. First, it is felt
that the Statistical Office of the United Nations should extend its training
activity in ways that will produce the most result for the least expenditure.
Second, it is felt that better administrative organizations are produced if
the activities they perform are not forced, either in speed or size, beyond
their capacity for effective performance.
53. It is proposed that the Statistical Office be encouraged to act as a
centre for receiving the nationals of Member nations who have had some
statistical experience, occupy posts of some responsibility in their own
country, and who may be expected to take back with them a new knowledge
of statistical method and operations which they can apply upon their return.
During their term of training they might be designated as "resident
statisticians". A course of instruction should be prepared for them which
will provide maximum opportunity to participate in the work of the
Statistical Office through specific tasks of more than clerical magnitude,
discussions of statistical subject-matters with staff of the Statistical
Office of the United Nations and temporary assignments to such Specialized
Agencies with the work of which they may be especially concerned.
Negotiations should be worked out between the Statistical Office and such
Specialized Agencies as may wish to undertake similar training programmes
in their subject-matters. Such resident statisticians should be required
to develop a thesis or report while in residence in which they examine the
possibilities for improvement of their national systems in the light of what
they have learned. A record should be kept by the Statistical Office showing
the accomplishment of each participant in such training.
54. Since the first priority in training is for numbers of competent
statistical personnel in statistically underdeveloped Member countries
approaches should be made through proper channels to appropriate more
highly developed countries to make their statistical systems available for in-service training. Through the intermediation of the Statistical Office, and in accordance with such procedures as protocol might require, placements of resident statisticians might be made in the appropriate offices of the host Governments. It would also be useful and desirable for the United Nations through the Statistical Office to encourage the temporary exchange of statistical personnel among Member countries, to facilitate the negotiations for such exchanges where feasible, and to aid in the placement and enrollment of statistical personnel in academic institutions and private organizations for such courses, laboratory work, and practical experience as may seem desirable.

55. Resident statisticians should be appointed by the Statistical Office on the nomination of the Member governments, and they should be required to devote themselves exclusively and entirely to the programme of training for a period such as one year. It should be understood that they will return to their own countries at the expiration of the training period to take up their former employment in the service of the Member government, or new employment for which they may have been equipped by their period of training. Financial arrangements for living costs, travel remuneration, etc., should conform to the general policies laid down by the Secretary-General in connection with activities under the newly approved programme of technical assistance. (General Assembly resolution 200 (III)).

56. The Statistical Office should also have sufficient additional staff to enable it more readily to supply advice and assistance to Member governments upon request and to perform the functions of a field service. In the recruitment of such additional staff, care should be taken to select persons possessing familiarity with the administrative phases of statistical work, as well as technical competence. In addition provision should be made by the Statistical Office of the United Nations for the appointment to short terms (not to exceed six months) of a limited number of temporary employees. These persons should be recruited from among the more promising of the graduate students of high qualification in the universities of Member countries and should be required to perform actual tasks under the direction of senior staff of the Statistical Office. Individuals so appointed might be placed on the payroll but in a non-competitive salary scale, with travel reimbursable by the United Nations. The subvention for these persons would therefore be more in the nature of a


22/ In this connection, possible arrangements with the United States under Public Law 402, 80th Congress Ch. 36 - 2nd Session, approved 27 January 1948 should be explored.
fellowship than a salary. Their employment in the Statistical Office should be designed to supply them with the maximum opportunity to familiarize themselves with the problems of the central international statistical agency consistent with the accomplishment of assignments of work which the Statistical Office requires to be done.

57. Relation of Statistical Office to Specialized Agencies. Co-operation between the Statistical Office of the United Nations and the Statistical services of the Specialized Agencies would be expected to follow the patterns of co-operative action which have already been developed in the collection and publication of statistics. Emphasis would be placed on the desirability of joint action in certain projects and, in general, upon a high degree of co-ordination.

58. Relation of Statistical Office Training to Economic and Social Council Resolution 132 (VI). Account has been taken in the foregoing survey and report of Resolution 132 (VI) of the Economic and Social Council concerning the establishment of facilities from training in public administration. From discussions with staff concerned with the development of facilities for training in public administration, it does not appear that there will be any duplication of work between the training described in this report and that supplied by any facility for training in public administration that may be developed in accordance with Resolution 132 (VI).

D. Summary and Recommendations

59. There is a shortage of adequately educated and trained statisticians in many countries which adversely affects the administration of those countries and their ability to supply information to the United Nations and the Specialized Agencies needed to further the economic and social objectives of the Charter of the United Nations. In order to alleviate this shortage, it is desirable to consider and to put into effect arrangements for the development of further facilities for the education and training of statisticians. The International Statistical Institute would appear to be both favourably situated and well disposed to carry forward plans for a programme to promote statistical education, and to serve as a centre for the administration of such a programme. The United Nations is especially concerned with the further development of operational training which has emerged as a natural consequence of the regular activities of the Statistical Office and of the Specialized Agencies. The Specialized Agencies should be encouraged to develop such training services as their operational needs require. The Statistical Office should be encouraged to augment and extend its work in promoting the technical development of statistically under-
developed countries by providing instruction for resident statisticians
and by supplying advice and assistance to Member governments in the field.
Such arrangements will not conflict with, but will complement the
training activities of the Specialized Agencies, and will not duplicate
or overlap the activity of a facility for training in public administration.

60. The following draft resolution embodies the conclusions of this report:

The Economic and Social Council

1. Notes with approval the steps already taken by the United Nations
   Educational, Scientific and Cultural Organization and the International
   Statistical Institute to initiate a programme of education in statistics;
2. Urges the United Nations Educational, Scientific and Cultural
   Organization and the International Statistical Institute to establish
   adequate facilities for the improvement of education in statistics;
3. Recommends that the Secretary-General in collaboration with the
   Specialized Agencies undertake active programmes of training in
   statistics as integral parts of their work programmes.
BIBLIOGRAPHY


Hotelling, Harold, "The Training of Statisticians", 1 American Statistician 8 (December 1947).


Statistical Teaching in the Western Hemisphere, background paper submitted for the Meetings on Statistical Training Methods and Materials of the First Session of the Inter-American Statistical Institute, September 6-18, 1947, Washington, D. C.
