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INTRODUCTION

Governments and the public alike are becoming increasingly aware of the importance of having at their disposal quantitative information on a wide variety of subjects in order to permit intelligent planning, and as a basis for decisions regarding the diverse and complex economic and social problems of today. This ever-increasing need for statistics is reflected in the efforts by many governments to develop and improve their national statistical services. For many countries, this task involves establishing a statistical service where none had previously existed. For others, it involves expanding the scope and improving the quality of the work of existing services. Even governments with well-established services are experiencing new and heavier demands for statistics which, in previous years, were not considered as essential.

Many governments, especially those with less-developed statistical services, have not been able adequately to meet these demands in view of their limited resources and experience, and have accordingly looked to the United Nations and the specialized agencies for guidance and assistance in the development of their statistics. The function of the international agencies in assisting in the improvement of national statistics was clearly recognized by including among the assigned tasks of the Statistical Commission and the Statistical Office of the United Nations a responsibility for promoting such improvement. The work of the United Nations and the specialized agencies in this respect has included: (1) standardization of definitions and methods, (2) preparation of technical studies and handbooks on various statistical subjects and problems,[1] (3) provision of statistical experts, (4) organization and conduct of training centres, (5) organization and conduct of statistical seminars and conferences, and (6) training facilities for fellowships and scholarships.

The problems of organization and operation of a national statistical service are many and interrelated, and are concerned essentially with: (1) the type of structure and organization which would reflect the nature of the country's economy, its stage of development, and its institutional structure; (2) the means of maintaining effective co-ordination and control over all government statistical activities in order to avoid unnecessary duplication and waste of resources, to ensure the development of a well-balanced, integrated set of statistics, and to maintain adequate statistical standards; (3) the techniques for the most efficient utilization of staff and equipment; and (4) provision for the training of statisticians in order to ensure a continuous flow of trained personnel into the statistical service.

[1] General Assembly resolution 407 (V) recommended that the Secretary-General and the specialized agencies prepare such materials to serve as guides for governments wishing to make use of them; specifically, the resolution mentioned "suggestions relating to the organization of adequate government machinery" for obtaining statistics.

An *International Seminar on Statistical Organization* was arranged by the Technical Assistance Administration and the Statistical Office of the United Nations, with the co-operation of the Government of Canada, and the participation of the Food and Agriculture Organization, the International Labour Organisation, the International Monetary Fund and the World Health Organization.

The Seminar was held from 13–31 October 1952 in the Dominion Bureau of Statistics, Ottawa, Canada, and from 2–6 November 1952 in the Statistical Office of the United Nations, New York. Thirty-one senior officials from 26 countries participated in the sessions, 17 from Latin America, 10 from Asia and 4 from the Middle East. The staff of the Dominion Bureau of Statistics and of the Statistical Office of the United Nations, together with representatives of the specialized agencies, and senior officials from France, the Netherlands, the United Kingdom, and the United States, as well as several specialists from private organizations, assisted in the deliberations at the Seminar.[2]

The Seminar provided an opportunity for the senior officials of the national statistical services to meet and discuss the various problems which confront them in the day-to-day operations of national statistical services. The exchange of experiences and the study of the opinions of the experts on various subjects relating to statistical organization proved of invaluable assistance to the participants.

This Handbook on statistical organization, based largely on selected papers presented at the Seminar and the discussions resulting therefrom, is designed to meet the need for information and guidance in matters relating to the organization and operation of national statistical services. It is recognized that effectively functioning and properly integrated statistical services are essential to the development of accurate quantitative information in particular subject fields. Moreover, such services have become increasingly recognized as prerequisites to governmental planning and national development.

While the Seminar considered a broad range of questions relating to statistical organization, co-ordination, publication, cost control, compilation and processing methods, special problems in different subject-matter fields, personnel, statistical legislation, sample surveys, and procedures for undertaking statistical reorganization, this Handbook is confined in its scope to the problems of statistical organization. It does not deal with the specific problems which lie within the subject-matter fields such as population, agriculture, labour, industrial production, health, balance of payments, national income, migration,

[2] *Report and Proceedings of the United Nations International Seminar on Statistical Organization*, Statistical Papers, Series M, No. 16; United Nations, New York.

transportation, and vital statistics. Neither does it consider in detail the application of such specific techniques as sampling, mechanical tabulation, enumeration, quality control, punch card, and other means of data processing.

Chapter 1 deals briefly with *General considerations* relating to the role of statistics in the world to-day — their growing importance as a result of an increasing awareness on the part of government, private institutions and the public alike of the value of quantitative information in the formulation of intelligent decisions. It points out the necessity for a clear understanding of concepts or definitions in considering the various aspects of statistical organization.

Chapter 2 discusses the *Functions of a national statistical system*, which may vary in scope and detail among countries to meet their particular needs and to take account of a country's economy, its stage of development, and its institutional structure.

Types of statistical systems are described in chapter 3. The different patterns of statistical organization are examined from various points of view. The classification used here is based broadly on the degree of centralization or decentralization. It is pointed out, however, that, as descriptive of statistical systems, these can be only relative terms and further that the aspects of every statistical system must be considered against a background of the country's national interest and resources, its culture, and its people.

Chapter 4 deals with *National statistical co-ordination*. This refers to the process of co-ordinating the statistical services of a country, as well as the statistics produced by them. It considers the application of appropriate measures to achieve an integrated system which will produce efficiently the statistics needed.

Chapter 5 deals with *Legal provisions for a national statistical system*. Since not all individuals and private enterprises feel obliged to furnish information for statistical purposes unless required to do so by law, legal authority is almost universally essential for the collection, compilation, and publication of national statistics. On the other hand, such legal authority must recognize and guarantee the protection of individual interests against the misuse of the material collected.

General problems of data collection are dealt with in chapter 6. A survey or inquiry should be undertaken only after it has been decided that it is needed, is feasible, and is desirable. Development of the survey plan, including extent of coverage, methods of collection and follow-up, preparation of the questionnaire or schedule, the selection, training, and supervision of enumerators and the importance of good public relations should be given careful consideration.

The discussion of *General problems of data processing*, in chapter 7, indicates that tabulating systems are an essential part of any statistical organization in that they are the medium by which the data are assembled, arranged or rearranged into the form required. Such processing techniques may be simple or complex and should be based upon an analysis of the job, the time element, cost factors, labour availability and the facilities at hand. This chapter also reviews the management of a mechanical statistical activity and emphasizes the need to maintain steady work loads.

In chapter 8 some of the *General problems of publication* met with in statistical organizations are reviewed and remedies suggested. Statistical offices should enjoy the fullest possible responsibility in meeting the needs of government and the public for statistical information. However, the pressures from without and from within for new publications in competition with each other and with already established publications present problems of no small magnitude. The solution of many publication problems has been facilitated by the establishment of a committee or board of senior officers charged with maintaining a continuous review of the publication programme.

Elements of budget planning, in chapter 9, shows that the main functions of a budget are (1) to clarify the objectives of the system in terms of money, (2) to provide a plan of work and the funds needed to carry out that work, (3) to balance the statistical programme, and (4) to provide the basis for controlling the costs of the statistical system.

Cost control of statistical operations is dealt with in chapter 10. Cost control is essential to the efficient and economical operation of a statistical organization. The effective measures will vary according to the size of the organization, degree of centralization, nature of surveys and degree of staff specialization. It is important to keep in mind a balance between the cost involved in the implementation of cost control measures and the resulting value.

The criteria by which the *Professional status of statistical personnel* in a particular country may be judged are discussed in chapter 11. There are five cardinal principles: (1) appointment on the merit basis, (2) promotion on the merit basis, (3) security in position, (4) objectivity of statistical activities, and (5) objectivity of the individual. Governments which adopt these principles ensure the attainment of high professional status for the statistician.

Chapter 12, *Training of statistical personnel*, suggests that statisticians and statistical personnel require in-service training. Statistical offices should provide adequate training programmes within the country. In addition, key personnel should be selected for training in other countries. Full use should be made of the training and consultation facilities of international technical co-operation programmes.

Appendix A presents a general descriptive outline of seven typical national statistical systems. These have been selected to portray differences in structure, degrees of co-ordination, and, broadly, the various methods of planning the statistical work programmes.

The *Descriptions of typical national statistical systems* found in *Appendix A* are based on papers prepared as follows: (1) *Brazil*, by an officer of the Brazilian Society of Statistics, Rio de Janeiro, (2) *Canada*, by the Dominion Bureau of Statistics, Ottawa, Canada, (3) *France*, by the National Institute of Statistics and Economic Studies, Paris, France, (4) *India*, by the Central Statistical Organization, Cabinet Secretariat, New Delhi, India, (5) *Japan*, by the Administrative Management Agency, Tokyo, Japan, (6) the *United Kingdom*, by the Central

Statistical Office, London, England, and (7) the *United States*, by the Office of Statistical Standards, Bureau of the Budget, Executive Office of the President, Washington, D.C., U.S.A.

Appendix B contains graphic illustrations of the organization of statistical services in a number of selected countries.

Appendix C presents a *Bibliography on statistical organization*. It lists publications which contain information found useful to those charged with administering and improving statistical services. The selection does not include references on specific fields such as sampling, national income and post-enumeration techniques. It is limited mainly to general organizational matters and problems.

The collection of charts in Appendix B, and the Bibliography on Statistical Organization in Appendix C, were compiled by the staff of the Statistical Office of the United Nations, New York.

The material for the handbook has been drawn from a number of papers which were prepared for the International Seminar on Statistical Organization by officers of the Statistical Office of the United Nations, New York, and the following: John D. Affleck; Leah J. Beehler; Harry Campion; F. Louis Closon; Calvert L. Dedrick; Ray Hurley; Ph. J. Idenburg; Nathan Keyfitz; João de Mesquita Lara; Herbert Marshall; John T. Marshall; Angus B. McMorran; Thomas J. Mills; Ryokichi Minobe; Louis R. Mobley; Cecil V. Parker; B. Ramamurti; Stuart A. Rice; Donald F. Ritchie; John E. Robbins; Virginia Venneman; and Rudolf Ziola. The material in chapter 4 has been adapted from a working paper prepared by the secretariat of the Inter American Statistical Institute for the second session of the Committee on the Improvement of National Statistics, held in Ottawa, Canada, 29 September to 10 October 1952.

The selection of material from the above sources, its general arrangement and the editorial work for this Handbook was done for the Statistical Office of the United Nations by Mr. John T. Marshall, Assistant Dominion Statistician, and Miss Leah J. Beehler, of the Dominion Bureau of Statistics, Ottawa, Canada.

CHAPTER 1

GENERAL CONSIDERATIONS

Statisticians are justifiably proud of the notable progress made in their discipline during the past two decades. The growth in the quality and the volume of the statistical data of the national systems in all parts of the world has been singularly impressive. A comparison of the national statistical series shown in the *League of Nations Statistical Yearbook, 1931/32*, and the *United Nations Statistical Yearbook, 1952*, provides striking evidence of this development.

This progress has not been fortuitous. It has been brought about by an increasing awareness on the part of government, private institutions, and the public alike, of the importance of quantitative information in the formulation of intelligent decisions.

The expansion in the non-statistical functions of government is an important factor in the recent growth of official statistics. Public health, factory and food inspection, charities, unemployment compensation, central banking, regulation of security issues and assistance to farmers and home owners are examples of government activities that have been greatly expanded in recent decades. In each of these activities the government keeps records and gathers special information for use in current operations, planning, budget preparation and justification.

The growth and increasing complexity of industry has also stimulated the demand for more and better statistical data. Current statistics on population, its distribution and its income, coupled with data on production and distribution of particular commodities and services, are now considered essential by modern business enterprises in evaluating the potentialities of the market, while the more comprehensive statistical series, such as indexes of industrial production and wholesale prices, are basic tools in evaluating general economic conditions. The present-day importance of government statistics to industry is evidenced by the fact that most business and trade associations actively co-operate with government statistical offices in obtaining them.

Concomitantly, the public itself has become more *statistics-conscious*. As Professor Fabricant puts it, the "increasing public interest in and demand for social statistics rests . . . on the basic premise that the problems of society, as well as of natural science and technology, can be solved by the increase and diffusion of this especially matter-of-fact type of matter-of-fact knowledge. The whole world now seems to hold that statistics can be useful in understanding, assessing, and controlling the operations of society".[1]

[1] Solomon Fabricant, "Factors in the Accumulation of Social Statistics", *Journal of the American Statistical Association*, June 1952, p. 259.

The almost universal recognition of the importance of statistics and the consequent demand for them places a heavy responsibility on the national statistical services.

The functions of a national statistical system are discussed in some detail in chapter 2, while the various types of statistical organization for the carrying out of these functions are dealt with in chapter 3. It is sufficient to state here that, where the national statistical system of a country is highly centralized, the required functions are generally the responsibility of a single statistical office of the government. On the other hand, where the statistical system is highly decentralized and a division of labour exists among the various statistical units of the government, then such functions may not be assigned to one of the units but rather among them. The point to be emphasized is that these functions should be performed, either by a central statistical office or by several offices in collaboration, if a national statistical system is to operate competently and efficiently.

Centralization or decentralization when applied to a national statistical system is here taken to refer to the degree of concentration in some person or organization, of the authority and the responsibility for the collection, compilation and dissemination of national statistics. Complete centralization or decentralization does not exist in any country. Although over-all responsibility may be vested in one person or one organization, it is still necessary to have disassociated statistical units, particularly in the field of operational or administrative statistics. On the other hand, to have what could properly be called a "national statistical system" necessitates the concentration in some person or organization of the responsibility for co-ordinating in some degree the efforts of separate statistical organizations.

The ultimate in decentralization is the complete dispersion of the collection and compilation of statistics without any over-all control or co-ordination. This disconnected and unordered situation cannot be considered a system since it cannot be expected that the different offices working without liaison among themselves will have consistent guiding principles. On the contrary, each one will function according to its own interests and capacity. Given some suitable means of co-ordination, this does become a system and under certain circumstances may prove to be the most suitable.

The ultimate in centralization is the complete concentration of all statistical activities within a single agency. This completely centred situation cannot be considered a system since it does not take into account the operations of the different offices of the many departments of government. It does not provide the means for consultation with departments, a very necessary aspect

of a functioning system. As in decentralization, given some suitable means of co-ordinating, this does become a system which may best fit the conditions of certain countries.

Thus, national statistical systems can range from one where some person or organization has only a watching brief over the statistical activities of numerous bodies, through one where some person or organization has responsibility for integrating the statistical activities of numerous bodies and for undertaking projects of more general interest, to one where some person or organization has responsibility for administering and co-ordinating all aspects of statistics.

It is not possible to specify the optimum degree of cohesion required among the various statistical units. The kind of system required depends upon the country — upon its culture, its economic way of life, its people. All factors exert an influence or pressure upon the nature of the system required. The best system for any country is that one which takes account of these factors in appropriate measure, giving consideration to all and presenting the proper admixture of co-ordinating authority and delegation of responsibility.

Reference has been made above to the disconnected and unorganized situation which can exist when the statistical responsibilities are divided among a number of separate departments with no provision for the degree of co-ordination which would be required for a "system" in the ordinary sense. Since some countries where statistics have not been developed have to begin from this state of affairs, it may be suggested that the first step is for them to decide whether any of the existing unco-ordinated offices can be given sufficient authority to undertake the necessary steps to develop the existing statistical services into any one of the aforementioned systems or whether a new organization has to be created for this purpose.

CHAPTER 2

FUNCTIONS OF A NATIONAL STATISTICAL SYSTEM

Collection, compilation and publication of statistics

The primary and continuing function of a national statistical system is to collect, compile and publish regularly a set of integrated statistics which provide the quantitative information necessary for an intelligent understanding of the economic and social structure of the nation, the forces which activate it, and their interrelationships. The first task of the statistical agency is, therefore, to determine the statistical data which will yield this information. The information required will vary in scope and detail according to the needs of the country.

The subjects on which statistical data are collected must reflect the nature of the country's economy, its stage of development and its institutional structure. In this matter, the least industrialized countries are confronted with serious difficulties which can be met only by advance research and study. This is because many of the conventional statistical series which have been developed in the industrial urban type societies of Europe and North America are inappropriate where the degree of industrialization is low. "Many of the traditional time series which are lacking in these countries would not, in fact, provide very important information concerning these societies. Examples of such series are: employment, unemployment, wages, industrial production, wholesale prices, cost of living, banking, external trade, and national income and product. These series are appropriate and informative in countries where there is an organized labour market covering the greater part of the labour force, an established money economy, a system of commodity markets and a class of entrepreneurs. These series may be but little appropriate and not very informative in countries where the principal productive units are the small agricultural holding and the household craft, where the unit of labour is the family, and where the bulk of trading takes places directly between producer and consumer. Yet the societies which are most in need of quantitative information are those in which these characteristics predominate".[1]

The statistical agencies of such countries must examine the traditional time series before deciding upon their suitability for national use. They must undertake research and study to determine what additional series are required to bring to light the basic economic and social facts of the country, and they must be ready to discard inappropriate series and initiate new series in accordance with the changing needs of the economy.

The statistical system needed to provide this information is one which consists of "not merely an aggregate of the statistics of those activities that fall under specific (government) departmental supervision . . . but attempts a purview of the totality of phenomena and of the interplay of the parts". Thus, "population, production, trade, finance, labour conditions, etc., are not distinct and separate but are closely interrelated . . . The statistics of the country, therefore, should be framed to illustrate these relationships — through common definitions, common classification systems, common mathematical techniques, and the like".[2]

It is of the utmost importance in developing an integrated set of statistical series that the national system should possess a blueprint or master plan of the ultimate scheme. This blueprint should contain, *inter alia*, an account of the principal gaps in the existing collection and publication programme of government statistics, noting the relative priority of obtaining each of the missing series. The plan should, moreover, concern itself not only with statistics yet to be obtained but should contain also an appraisal of the relative usefulness of the various data currently available. A criterion that may be properly applied in evaluating the relative usefulness of a particular series is: does it fit into the over-all statistical scheme designed to provide current quantitative information regarding the basic economic and social conditions of the country? Certain of the statistical series now being collected would not stand up to this test — and for good reason. In the early stages of development, a national statistical system must make use of the statistics at hand which, generally, are the by-products of specific administrative operations of government, such as taxation. In due time, other related information is collected administratively, thus making the initial statistics somewhat more useful for economic and social analysis. Moreover, other series, designed mainly for general analysis and thus not obtained as a by-product of administration, are gradually added to the programme. At such times, the usefulness of the originally-available data should be evaluated in the light of an over-all plan for the collection and publication of an integrated set of statistical series. This would guard against an unbalanced growth in the output of a national statistical system.

In pursuing its objective to collect an integrated set of statistical series, a national system should see to it that every contact between the government and the public yields as much useful quantitative information as possible. This is more likely to be achieved where some national statistical agency co-ordinates the issuance of all statistical forms, questionnaires and schedules prepared by

[1] P. J. Loftus, Paper presented to the American Statistical Association, New York City, 1949.

[2] *The Dominion Bureau of Statistics, Its Origin, Constitution and Organization*, Ottawa, 1935, p. 24.

official agencies. In such a situation, duplication of requests for statistical information is less likely. Standard definitions, identical coverage and comparable time periods are more likely to be used, producing a better integrated, more uniform set of statistics than where the planning and issuance of such forms is the independent responsibility of a number of government agencies.

Since the problems of co-ordinating a statistical publication programme will be dealt with in a later chapter, only a few brief observations will be made here on this subject in so far as they pertain to the functions of a national statistical system.

Since publication costs represent an important item in the budget of a statistical office, a constant review of the publishing programme should be maintained to ensure that each publication meets a definite need, that presentation of the same data in different publications is avoided, that data are published as quickly as possible and that the format of each publication is as attractive and readable as possible. A periodic analysis of the circulation figures of each of the publications is useful in rationalizing the extent of their use with the cost of their preparation relative to the over-all budget.

Statistical standards

In developing a meaningful, integrated set of quantitative data, a national system is directly concerned not only with the types of statistics to be collected but also with the quality of these data. The formulation and application of statistical standards for the various series is of prime importance in advancing the latter aspect of the work of a national system.

The word standard is defined as a "measure to which others conform or by which the accuracy of others is judged". In statistics, the concept *standard* denotes a model or prototype to be strictly adhered to in the preparation of statistical data. Statistical standards differ in detail in accordance with the subject fields to which they relate. Each of them, however, embodies the following: (1) a precise definition of each of the elements of a particular statistical series, (2) a systematic grouping (i.e. classification) of these elements, and (3) specification of methods to be followed in constructing the particular series.

Standard definitions. In statistical work there are many items requiring definition and, if it is necessary to establish connexions or links among any of them, it is necessary also to work out standard definitions.

Standard classifications. Classification is the essence of descriptive statistics for it is the only way to summarize individual observations so that meaningful figures of manageable proportions are produced. Standard classifications, whether used on a national or on an international scale, provide the only method by which common or associated elements of two different bodies of statistics can be compared. They are used and useful in almost every field of statistics. A classification of economic activity allows comparisons between population censuses on the one hand and agricultural or industrial censuses on the other. Standard classifications apply to external trade statistics, production and consumption statistics, price statistics, national income, financial and fiscal statistics — in fact to almost every subject. To the extent that it is desirable to establish relationships between any two or more compilations of statistics on different subjects, it is necessary, to the same extent, to develop standard classifications.

Standard or uniform statistical methods. It is desirable also to establish and use standard or uniform statistical methods. This will tend to develop comparability in statistics from place to place and from time to time. Many statistical processes are liable to error and bias. Some processes are still in the experimental stage and still others are based upon agreed conventions. Therefore, in all these situations, the statistician will be far surer of his results and of comparability by following standard methods.

Statistical standards are a relatively new development and thus have not yet reached the stage of finality and precision of those in certain disciplines of the physical sciences such as engineering. Nevertheless, they are recognized today by all statisticians as fundamental to the continuing improvement of the quality of national statistics. In this connexion it may be added that the Statistical Commission of the United Nations has attached great importance to the formulation of statistical standards suitable for international use and has accorded it a high priority in the work programme of the Statistical Office of the United Nations. Statistical standards have been prepared by the United Nations and the specialized agencies for use in the fields of population, vital statistics, agricultural and industrial censuses, external trade, transport, wholesale prices, labour statistics, national income and finance.[3]

Research in statistical methods and operations

A function of a national statistical system closely related to the formulation and application of statistical standards is that of developing and testing new statistical methods and procedures connected with the collection and processing of data. In many countries, research in statistical methodology is carried on mainly by universities and other learned institutions. These bodies have contributed significantly to the advancement of statistics in general. However, the applied statistician is concerned not only with the improvement of statistical methodology but also with the practical problems encountered in giving effect to new methods.

The study and application of sampling methods by national statistical systems illustrates the usefulness of such activities. The statistical systems of Canada and the United States, for example, have in recent years developed appropriate sampling techniques for obtaining, at relatively low cost, reliable current estimates of the labour force. The sampling method is being used very effectively in India today in obtaining estimates of many kinds of economic and social statistics.

A number of national systems have recently added to their organizational structure separate units concerned solely with developmental work in the fields of applied statistical methodology and operations. These efforts should prove ultimately to be a sound investment from

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[1] See document E/CN.3/181 of the Statistical Commission, which contains an annotated list of statistical standards recommended by international agencies.

the point of view of both the quality of the data obtained and of operational costs.

Co-ordination

Implicit in the above discussion of the various functions of a national statistical system is the importance of effective co-ordination. It is not the intention to consider here the many problems relating to this subject. It must be emphasized, however, that the existence of a statistical authority with adequate powers to co-ordinate the work of the various offices is fundamental to a properly functioning statistical system. If possible, the extent of the co-ordination should not be limited to the activities within and among the statistical offices at the national level, but should extend to provincial or state, and municipal levels, as well.

In the final analysis, statistical co-ordination is designed to produce a well-integrated set of statistics in the most efficient and economical manner. It must therefore be concerned with virtually all aspects of statistical operations. Above all, it is the function of the co-ordinating body to maintain a proper division of labour among the various units which collect and publish statistics. Its main function in this connexion is to eliminate unnecessary duplication as well as all non-essential operations. The co-ordinating body should also be concerned with the quality of the statistics being produced in the various statistical units and should accordingly have the necessary means to ensure that the proper standards and procedures are always applied.

Legislation or other forms of governmental authorization are basic to statistical co-ordination. It is equally desirable, however, that the particular responsibilities of each of the statistical offices be formulated so clearly that it would be unnecessary for the co-ordinating agency to invoke legal authority in carrying out its day-to-day functions.

Training of personnel

The functions described above are primarily of a technical nature. An important non-technical function of a national statistical system is the training of statistical personnel. The statement "good statistics require good statisticians", to be entirely correct, should be amplified to include the observation that good statistics also require good administrators, good field officers, good machine operators, and good clerks who, although not statisticians, contribute very substantially to the success of the operations. A national statistical system should provide the facilities for the training of these categories of personnel to ensure a steady flow of such personnel into its service. If it is not feasible that the national services themselves maintain a training programme, it may be convenient for them to organize and help to maintain adequate training facilities in collaboration with other interested bodies.

A programme of this type, operated on a permanent basis, is especially important in statistically underdeveloped areas where an adequate supply of trained staff is at a premium. A training programme in such areas should be oriented primarily to the needs of the clerical and junior professional statisticians on whom the routine burdens of statistical collection and compilation are heaviest.

A career service

The training of personnel constitutes an element in the larger programme of developing within the government a career service with security of tenure for statistical personnel. In those areas where statistics are relatively undeveloped and the need for additional professional statisticians is most acute, it often happens that a person, freshly trained in statistics, enters the statistical service of his government only to leave after a short time for a financially more attractive position but usually one which makes little or no use of his statistical skills. This loss to the statistical service results mainly from the fact that statisticians have not yet achieved their proper recognition and, as a corollary, are often paid wages considerably below those of persons with comparable responsibilities in other branches of government. Although the situation is not peculiar to the statistically less developed areas, it is certainly most pronounced there.

Independence and objectivity

Among the most important of the functions of a national statistical system is that of assuring that the official statistics constitute objective quantitative descriptions of the society, its resources and the disposal of its means. It is essential, therefore, that the statistics be unbiased by any personal or political point of view. The official statistics may, of course, be used by individuals and by institutions to support personal and political arguments. Such use does not involve any responsibility on the part of the statistical agencies but it does mean that care must be taken to describe the statistical data adequately and with all necessary qualifications in order that their significance may be appreciated by lay readers without requiring that they be interpreted for them by others.

The necessity for complete objectivity of official statistics has the corollary that the statistical agency must, within its own field, possess the same kind of independence of political change as, in most countries, is possessed by the judiciary. That is to say that changes in the political complexion of the legislature should not be allowed to influence the facts shown by the statistics. To maintain this kind of independence, the statisticians must continually give proof of their statistical integrity so that their data will come to be respected by all persons and parties in the country. The prestige which the national statistical system enjoys with the public depends on the integrity, independence and objectivity of the statisticians, and the recognition of these by the public. The statistical system must, therefore, provide that its operations and activities are adequately explained in the press and by means of other public relations activities.

A statistical system should be alert to the changing national economic and social scene and thus be first to recommend to the appropriate government bodies the importance of obtaining quantitative information on new developments where no such information yet exists. The obtaining of such data at the earliest possible time would greatly enhance the prestige of the statistical organization. It should not be considered as a mere record-keeper of the past.

International co-operation

Just as better and more extensive statistics are needed for national purposes so, also, are they needed for international purposes. The United Nations, the specialized agencies of the United Nations and other international bodies are trying to solve many economic and social problems by agreed measures of international action. The statistics upon which many of these decisions are based must be supplied by the national systems. Thus good national systems are basic — without them, statistics will effectively serve neither national nor international ends. The basic importance of good national statistical systems in the provision of good international statistics is precisely the reason for the United Nations Statistical Commission's strong support of activities designed to assist countries in improving and strengthening their statistical systems and for the recommendations to this effect by the Economic and Social Council. The importance of international statistics for national purposes is frequently overlooked. Even if there were no need for international statistics for the use of international agencies, such data would be essential for the effective study by each country of its own stage and rate of progress.

To be useful for such purposes, statistics must be comparable from country to country. Exact comparability in every detail is usually not required. In the field of trade statistics, for example, it has so far not been thought necessary for international purposes for countries to distinguish the 3,000 or 4,000 or more separate items that some countries distinguish in their trade accounts. The 570 items of the Standard International Trade Classification — that is the lowest level of detail in the classification — seem to be sufficiently detailed, at the present time, for almost all international uses.

In other fields of statistics it would not be possible ever to achieve the kind of comparability that is possible for trade statistics. Even if standard concepts, uniform definitions and identical methods prevailed throughout the world, the resulting figures would be truly comparable only to the extent that the economic, financial and social institutions of any two or more countries were similar. In dissimilar conditions, comparability of many classes of statistics can be expected only in general terms and for broad categories.

One of the important requirements of the international system is that countries, in so far as possible, conform with or convert to international standard definitions, classifications and the like. This raises the question of whether, in a given country, there is sufficient flexibility in the legal and administrative regulations under which the statistics are compiled to permit the country to conform to international standards. If not, there are normally two alternatives. It might be possible to change the law or administrative decision. If this proved impossible or inexpedient, it might be possible to obtain supplementary data which could be used to adjust the figures. This process is going on extensively at the present time in connexion with the Standard International Trade Classification. Many countries have adopted this classification and discarded their own. Some countries have expanded the items of the Standard International Trade Classification in order to provide more detailed figures for national purposes. Other countries which were not able to or which did not wish to discard their national classifications have made arrangements to convert their national trade statistics to the Standard International Trade Classification categories for the time-periods and in the detail requested by the United Nations.

National offices should be able also to act as a focal point for the receipt of statistics from the international agencies and, in turn, distribute them to ministries, other organizations and persons within the country. If the real uses of international statistics are to be fully realized, it is very important that national offices make arrangements to place the statistics in the hands of all those persons who can make effective use of them. This is a national and not an international responsibility.

On a more general, but no less significant level, national offices have important responsibilities for the maintenance and development of good international statistics. In the formulation of standard definitions, classifications and methods, the national statisticians occupy a very central place, because it is their judgment and knowledge which must be relied upon to establish the need and practicability of proposed standards. In doing this, the national statisticians must be able to participate fully in international and regional conferences which are held for the purpose of developing and securing agreement upon standards so that their experience may be taken into account in the preparation of new proposals.

National governments are called on from time to time to lend statistical experts for the development of new statistical standards in certain fields, to assist another national government in the application of new standards, or in efforts to improve statistics in other respects. This exchange of experience and talent is extremely important for the improvement of national and international statistics.

A further function which rests with national statistical offices is that of assisting in the operation of training activities, either for the benefit of some particular country or for the benefit of a group of countries. These statistical training activities have become an important part of the international programme, and many persons and offices have contributed substantially to its success. National offices are called on from time to time to collaborate in many ways — from the provision of space and facilities for a training centre to the staffing of groups of instructors.

It is only through the wholehearted, extensive and effective co-operation of the national offices that a useful framework of international statistics is being achieved.

CHAPTER 3

TYPES OF STATISTICAL SYSTEMS

Since the purpose of this Handbook is a broad survey and discussion of organizational and operational problems in the field of statistics, it may be useful to examine whether the statistical systems now existing in the countries of the world can be grouped or classified into logical types. The term *statistical system* is here used to include the full range of national official statistical activities. This includes such bodies as the major statistical operating offices; the specialized statistical offices which may exist in departments or ministries of the government concerned with special subject-matter fields; the statistical functions of provinces, states, cities or other political subdivisions in so far as they are a part of or contribute to the national statistical result; and the official committees, or boards, that have responsibilities related to the national statistical activities — in brief, the national statistical system in its entirety.

The statistical system existing in each country represents that country's solution to meeting the general functions of a statistical system in terms of the national needs, the national interest and resources and the conditions — economic, technical, and political — in the country. The solutions adopted by a country may not be ideal, or represent the best statistical system considering all the national factors. There is no single path of progress through a graded classification scheme of organization types. The different patterns of statistical organization may be examined from various points of view, and this may help in assessing the adequacy of the various systems in their environments and indicating possible directions for improvement.

The different types of national statistical systems may be studied from the viewpoint of the comprehensiveness of the range of topics for which statistics are compiled. They may be examined in the light of the statistical fields which constitute the scheme of national statistics, with a view to determining the subject fields of interest to a given country for which the organizational machinery is adequate, inadequate or non-existent. Such study would point out the specific economic and social fields for which a new statistical organization should be created, or for which the existing organization should be readjusted, in order to produce a comprehensive and integrated body of statistical data.

The study of statistical systems from the standpoint of the degree of technical development would not be merely a grading of the accuracy and detail of the published figures. Countries with particularly difficult problems of data collection or with inadequate resources for extensive and detailed surveys can still reach a high scientific standard by the accurate presentation of the available data, together with an objective critique of their deficiencies.

When mention is made of the general question of statistical organization or types of statistical systems, the degree of centralization or decentralization must be considered. The term *centralization* is here limited to centralization of statistical work in so far as it relates to the ministries or departments at the national level. Even in this limited sense, the terms *centralized* or *decentralized* are not rigid, or mutually exclusive. Centralization or decentralization, as descriptive of national statistical systems, can be only relative terms.

The terms are relative not only because there can be all degrees of centralization, but also because the degree of centralization may be different for different phases of the work of the national statistical system. One phase which might be considered separately is whether the statistical operations — the responsibility for collecting and compiling data — are centralized or decentralized. Another is whether the arrangements for co-ordination — the commissions, committees, councils, "consejos", "juntas", which may exist — are centrally established or not. Yet another is whether the statistical service functions — the tabulating machines, the printing facilities, the publications — are centralized or decentralized. Any one country may be quite centralized in one of these major phases of the work, and quite decentralized with respect to the others.

From one point of view, all statistical systems might be regarded as constituting a sort of spectrum, in which the position of a system is determined by the degree of concentration of authority and responsibility. They may be grouped to some extent into wide bands but the statistical system spectrum, like the colour spectrum, is characterized by adjoining bands which shade imperceptibly into one another. Four broad groups or bands appear to be significant.

1. *Statistical system decentralized by subject with a minimum of control or co-ordination*

A system of this type exists when there are several offices at the national level each responsible for the collection, compilation and publication of statistics in its own field, and where there is some office, group or committee which has a watching brief on the whole field of national statistics. Such a group has no actual control of the statistical activities of the various departments and offices, other than of an advisory nature, but it does provide a certain liaison or cohesion between the various statistical units.

Under certain practical conditions which may exist in a country, such a system may permit greater statistical progress than would be possible if there was an imposition of a legal but ineffective and restrictive control or co-

ordination. All elements of government may not fully appreciate the value of statistical data. But if one department of that government understands the use and value of statistics, then under this system, it may wish and have the resources to develop its own statistics far beyond the national standard. In addition, the system permits effective co-ordination between departments which do appreciate the benefits obtained from mutual consultation.

This type of system has the disadvantage that it usually fails to cover all the areas of statistical interest to the country and several organizations may compile conflicting data on the same subject. Thus there may be inconsistencies, gaps and duplication in the total available statistical information on economic and social conditions.

2. *Statistical system decentralized by subject with a co-ordinating authority.*

This type of statistical organization exists where some office, group or committee has the responsibility and some authority to co-ordinate the statistical activities within the country.

Each office can provide close attention and specialization in its own particular field and can progress from a statistical standpoint in accordance with its interest and resources. Major inconsistencies and duplications between offices tend to be eliminated by the work of the co-ordinating group, which may be effective also in stimulating the production of data in important but neglected fields.

Even with effective co-ordination, duplication of equipment and general services is bound to occur. However, this type of system does exist in some countries where the statistical activities are so extensive that their operation by a single office might be cumbersome, and hence decentralization is advantageous.

3. *Statistical system with a major operating office for general statistics and a co-ordinating authority*

This type of system is based on the idea that certain types of statistics are derived from or prepared for the administrative activities of some department and are of particular interest and importance to that department, while other types of statistics are not a by-product of the administrative work of a single department, but serve the general purposes of several departments and the nation as a whole.

Under this system, statistics of a general-purpose type and which are not automatically derived from the work of any office are grouped into a major statistical office. Such an office might have responsibility for: the population census, and possibly other censuses such as housing and agriculture, which require an extensive collecting organization; vital statistics, which are derived usually from the legal records of the local civic registers; other extensive statistical projects, such as industrial and business surveys, the compilation of external trade statistics; and other statistical compilations not of unique interest to a single government department.

The scope of the responsibility of the major statistical office may vary, but an essential characteristic of this type of national statistical system is that some important fields of statistical work remain the responsibility of independent departments. In addition to its responsibility for certain major statistical fields, and for the provision of general services to other statistical units, the major operating office frequently has the responsibility for the co-ordination of national statistics. Sometimes, the co-ordinating functions are not vested in the major operating office but in another office not responsible for operations, or in an advisory body such as a council or committee.

4. *Statistical system with one department responsible for statistics*

A system of this nature is typified by the establishment of one department within the government to organize and operate a scheme of co-ordinated social and economic statistics pertaining to the whole country. This department collects, compiles and publishes statistical information covering all aspects of the social and economic activities of the people and, in addition, collaborates with other departments of government in the compilation of administrative and specialized statistics.

There are a number of advantages to such a system of national statistics. Highly specialized personnel such as mathematicians, sampling experts, economists and geographers may be used to better advantage from a technical point of view. It is possible, also, to attain a high degree of co-ordination of the programmes and methods of the units within the office. A certain economy may be achieved from the concentration of tabulating equipment, printing services, maintenance of mailing lists, utilization of field services and other general service facilities. Finally, a single national statistical office has certain advantages in obtaining general recognition as an impartial producer of objective data and becomes known as a single source to which official bodies and the public can go for data in all fields.

An essential element, however, in such a system is the maintenance of a satisfactory liaison with other offices and interests which have a need for statistical information and which produce certain data because of, or as a result of, their administrative activities. There be must an appreciation by the statistical office of the needs and interests of the substantive departments, which can exist only with an adequate system of co-ordination of data and requirements, and a programme of consultation which makes full use of the staff of other departments trained in the technical aspects of the substantive work.

Attention has been directed to only a few of the points of view which might be considered in examining the various types of statistical systems in the world today — the comprehensiveness of the range of topics, the degree of technical development and the degree of centralization or decentralization. Others which might be considered are the geographic coverage for the country and the physical dispersion of the statistical offices because of geographic or political organization.

Statistical services decentralized by subject with no central control or co-ordination

Reference has been made in chapter 1 to the situation of countries in which no systematic arrangements have been made for the production of statistics according to a national pattern. This situation existed in many of the developed countries before the necessity for statistical

co-ordination was fully recognized. In all these countries, statistics were developed to meet the needs of individual ministries and departments; thus external trade statistics developed as a responsibility of the customs authorities, birth and death registrations developed in the ministries concerned with personal status, and labour statistics in the ministries concerned with the welfare of the workers. It was inevitable that statistics should grow in this way and the need for co-ordination became evident with recognition of the necessity for the establishment of statistical services on a national scale.

Very few advantages could be claimed for this type of statistical service. Under such an organizational pattern, the statistical output of the country as a whole usually fails to cover all of the areas of interest to the country, and several offices may compile conflicting data on the same subject, so that the total available statistical information on economic and social conditions may be full of inconsistencies, gaps and duplication. Such a situation clearly operates against efficient government administration.

The gaps in the coverage of official statistics, the undesirable inconsistencies, the duplication and the wasteful possible competition between ministries and departments, tend to perpetuate themselves, since no machinery exists for general planning or supervision of the work of the separate statistical units. There is not even an office which can gather and keep up to date information regarding the existence of the separate units, their programmes, relationships, methods and procedures, future plans and progress. No organization exists which could aid the government as a whole intelligently to appraise its statistical structure and its needs, and to facilitate meeting all the statistical needs of the legislature, the executive departments, private business, scientific interests and the general public.

In the course of growth in many countries, it became clear at some point that the stage had been reached where the statistical needs of the country had transcended the statistical needs of the individual ministries and departments and, as a result, co-ordination in some form took place. Because it is believed that most countries wish to escape from the situation of unorganized statistical services, one of the aforementioned systems may be developed in varying degrees. The choice, however, may depend upon the circumstances and the needs within the country.

CHAPTER 4

NATIONAL STATISTICAL CO-ORDINATION

Criticisms about official statistics are voiced by people from different segments of the population: officials or private individuals who use statistics, members of legislative bodies, persons engaged in statistical work, respondents who have to answer statistical questionnaires and the public in general. Typical criticisms levelled at the work of the statistical systems usually relate to timeliness, accuracy, cost of production, inconsistencies between different series of data, duplication of requests for statistical information, reluctance to publish data and lack of proper interpretation within statistical publications.

Such criticisms may be more or less justified, depending on the actual status of statistical work, the impartiality of the observer and the extent to which he is acquainted with the true situation. If a serious analytical study is made of existing statistics, many of these criticisms will be found to be without foundation. Even where the statistics are well organized, some of these deficiencies do exist, and it is necessary to correct them.

All criticism must be taken by those engaged in statistical work as a reminder of the need for constant and critical examination of their work in order to discover those points capable of improvement and to treat them adequately. In many cases, the steps taken to correct the situation will fall within the province of statistical co-ordination, and the extent to which the complaints are justified will indicate the degree of co-ordination effective in the statistical system of the country. In other words, the better the statistical co-ordination, the fewer the complaints, and the less justified will be those that are voiced.

Multiplicity of statistics

The usual situation in a country is the existence of numerous offices which handle statistical data. The resulting diversity of statistics may be accompanied by diversity in quality and in the efficiency with which the data are produced or fulfil their purpose. Variation in quality and efficiency can be found even when a single office produces most of the statistics. This is so because the various types of statistics themselves present special problems of concept, collection and processing, which affect in varying degrees their quality and efficiency.

The situation may vary a great deal from one country to another, but certain aspects of statistical evolution seem to be common to all countries. There has been in the last few decades an accelerated growth of official statistical activities, which is due primarily to two factors: the extension of government activities to new fields, and the increasing realization that it is necessary to use statistical information in both government and private activities.

Generally speaking, the purpose of official statistical organizations is to produce statistics which are needed by the country. These are as varied as the phenomena studied. However, all statistics have one thing in common. They are numerical expressions of society, which, having a thousand different facets, is an organic whole affecting its parts and being affected by them. In our complex modern society, direct personal knowledge and individual experience are not sufficient for acquiring all the facts of a situation and making decisions accordingly. Statistics are the most adequate means of providing abundant and reliable information on such complex phenomena.

By virtue of their close relationship with the various government activities and, consequently, with the various aspects of society, official statistics present the double characteristic of great diversity of content with unity of purpose. For official statistics to achieve their true objective, they must be organized as a system, as parts related in orderly manner to a whole, oriented toward one common purpose. This can be achieved only through co-ordination of statistical activities.

The concept of statistical co-ordination

National statistical co-ordination refers to the process of co-ordinating the statistical services of a country as well as the statistics produced by them. This consists of the application of appropriate measures to achieve an integrated system which will produce efficiently the statistics needed. The measures are many. They may be legal in character or established by mutual consent of the organizations concerned. All are designed to integrate into one system the various official statistical activities, and to stamp on them the common purpose of furnishing the information which the country needs.

Co-ordination related to the type of statistical system

It is likely that a group of unrelated services does not furnish the country with sufficient general and specific knowledge of society in its various aspects. Some aspects are probably covered in great detail, others only superficially. Different definitions for the same thing are probably in use. The quality of the statistics may vary greatly. In this situation, it is evident that statistical co-ordination is needed to cure the deficiencies and achieve an ordered system.

This is not the only case in which co-ordination is needed. The necessity of effective co-ordination of statistics exists as well in a highly centralized system. A great variety of statistics is produced and the absence of co-ordination will give rise to unexplained inconsistencies and unnecessary waste of effort.

The kind of co-ordination needed will vary according to the structure of the system. It is possible that in a highly centralized system a great deal of the co-ordination will

come about automatically. At any rate its achievement will be facilitated, since all the activities are under one direction, are probably in the same location, are carried on under the same working system and have other features in common. Nevertheless, it would be a mistake to conclude that centralization of itself makes co-ordination needless. It can happen that, since centralization entails a very large administrative unit, a sectionalized mentality may be engendered, and there may be as much lack of co-ordination among its divisions as would be the case with entirely separated offices in a decentralized system. However, the unit and chain of command existing in a centralized organization will probably make co-ordination easier. The co-ordination will be carried out among people who work in the same environment, who probably know each other personally, are accustomed to the same working procedures, are part of the same hierarchy and, although working in specialized fields, presumably have some knowledge of what is going on in other parts of the organization.

Co-ordinating the activities of the various statistical offices in a relatively decentralized system implies bringing together, against the same background of ideas, methods and objectives, people who work in different administrative situations and in specific technical fields, with inadequate means of knowing about the work of other offices. To make co-ordination work and to secure the participation of all offices, special legislation may be required giving the co-ordinating agency sufficient authority and providing it with the practical means to do its work. There may be cases of rivalry among the offices of various departments and difficulties in the personal or political sphere which can constitute serious obstacles to the achievement of co-ordination.

Thus the type of organization of the statistical system determines the form that the co-ordination of activities is to take; whether it is to be based on special legislation or on internal directives; whether there will be need for a council with representation of several departments or only the formation of co-ordinating committees; whether the method to be used requires a legal basis or will be carried on by voluntary co-operation.

Elements covered by the co-ordination

The co-ordination of official statistical activities must cover all organizations which handle statistical material, whether they originate, process or use the data.

Offices which collect primary data

The main sources of statistical information are the individuals or units under study, but in the present context it is sufficient to consider the offices which, as part of the statistical system, originate data or are the first to collect them from the original sources. Among government organizations where data are originated, two kinds may be distinguished: offices which are exclusively engaged in the direct collection of statistical observations; and offices which carry out an administrative function in a given field and, in the course of their work, accumulate information which gives rise to statistical data. The former obtain the basic information in the field and accumulate it for statistical analysis. Many investigations, notably censuses, are exclusively carried out by these offices, and this type of data is likely to remain unrecorded in the absence of the deliberate effort to obtain it.

Other social and economic phenomena are recorded by government departments usually in fulfilment of legal requirements established to satisfy administrative needs. Records of this type constitute invaluable sources of statistical information. Vital records, for example, yield a wide variety of data on population. These records have primarily a legal purpose, but statistical offices use them to obtain statistical information on changes within the population. These offices are centres of information which may process some of their own data, or may pass on the information to a statistical office for the required processing.

There are also private concerns and institutions, such as trade associations, which collect statistical information of use to the economy, and should be taken into consideration when co-ordinating statistical activities.

Offices which process statistics

Some offices process statistical observations, either gathered by themselves or by some other organization; they edit and aggregate the data and prepare the final tabulations. These offices may be either administrative or statistical; the former process the data primarily for their own use, while the latter process them into statistical series to be used by other organizations and the general public.

These offices deserve considerable attention from the co-ordinating agency, since technical matters, such as those of definition and classification, which can give rise to problems in the absence of co-ordination, arise during the daily work.

Users of statistics

In addition to offices originating and processing data, there are others whose interests must be considered. These include users of the statistics such as ministries of the government, private business and industrial firms, banking institutions, scientific interests and the general public. In general, all units of a well-organized public administration find it necessary to use statistics. In making decisions related to the needs of the country, administrators rely to a great extent on statistical information for knowledge of economic and social phenomena which affect the citizens. Any co-ordination plan should take into account the needs of the organizations and individuals who will use the statistics.

Co-ordination procedures

There may be numerous types of statistical offices, varying in accordance with the organization of the system. One office may be at the same time collector, processer and user of its own statistics. Another may be exclusively a user and receive its information from offices located in other parts of the government. There may be an office which is both source and user, with the intermediate step of processing in another office. In a relatively decentralized system, many offices of the first type will be found, each office collecting, processing and using its information according to its needs. In a highly centralized system, the central statistical office will collect, process and pre-

sent the data to all users. The distribution of the different statistical activities among the offices will determine the co-ordinating procedures which should be followed to secure greater efficiency and unity of purpose in the system.

The information collected by the source office should be the information that is going to be needed at the end of the process by those using the data. This concerns the manner and the time of recording as well as the characteristics which are significant. Data collected for some other reason, perhaps a legal requirement, may be adapted to the needs at hand. The processing and analysis of the data with precision, and in accordance with technically adequate methods, should be planned to produce the final results when needed. Delays may diminish their usefulness. This involves determining the method of collection and making adequate arrangements for prompt collection, rapid transfer to the processing office, efficient processing and prompt publication of the data or their transmittal to the user even before publication. And it implies doing all this in the most economical fashion, without duplication or waste of effort.

Types of co-ordinating bodies

Statistical co-ordination may be exercised through a number of different measures, the form and character of which will depend on the organization of the statistical system within which they are to work. Some of these measures are concerned with general co-ordination of the whole system while others may be devoted to special co-ordination in a particular field of statistical activity or stage of the statistical process. For example, a central co-ordinating office or a national council of statistics may be particularly well suited to carry out general co-ordination. Committees are usually concerned with a specific field of statistics or a given project requiring special attention, and act as auxiliaries to the statistical system. Other auxiliary bodies, such as national focal points for distribution of information, are usually devoted to a single phase of the process.

Central co-ordinating office

Whether the system is centralized or decentralized, its co-ordination may be under a central office. In the former case, the co-ordination is usually undertaken in the central statistical office which carries out all or the majority of the statistical activities. This is an internal co-ordination among the different units or sections of the central office and an inter-office co-ordination regarding the needs of the users and source data in operational or administrative statistics. It may be assumed that, in the central statistical office, the different sections are themselves co-ordinated to meet the over-all needs of national statistics — by co-ordinating the work programmes of the sections, assigning new programmes and deciding on the application of technical standards such as standard classifications.

In the case of a relatively decentralized system, the co-ordinating office gives the guidance which makes it a system. The existence of the office should be based on legislation which provides sufficient authority and financial resources for it to operate effectively.

Even in a relatively centralized system, co-ordination will be necessary with the other offices outside the office specifically charged with this responsibility. The legislation of many countries includes express provisions which place within the central statistical office the responsibility for co-ordinating the official statistical activities. Such legal authority can seldom be relied upon alone, without the friendly co-operation which it is essential to foster. This brings into harmony the requirements of the legal provisions which established such offices and the objectives of the statistical system, thus furnishing the government and the public with the greatest possible volume of information, without duplication of effort, waste of funds or confusing inconsistencies.

National council of statistics

The national council of statistics which exists in several countries is another type of organization for co-ordinating statistical activities. Such a council, commission or board is usually found in relatively decentralized systems, and is designed to bring together the representatives of a number of statistical offices located in different branches of the government. Through this representation the various offices should feel equally responsible for co-ordinating the system and thus participate wholeheartedly in the activities directed toward that objective.

The basis on which the councils are organized varies greatly from one country to another. In some, the councils are groups formed on the initiative of the participating organizations and, based only on voluntary agreements, may not have legal existence. In other countries, they may have been authorized by executive decree to cover departments of the government. In still other countries, they may have been established by a special law with control over the statistical activities of all official and semi-official institutions in the country. In some cases, these councils are consultative groups set up by the central statistical office, presided over by its chief, and the application of their decisions may be optional for the offices concerned. In other cases, the councils are the highest authority, having executive offices charged with carrying out their resolutions which are compulsory for the offices concerned. There may even be legal penalties for failure to comply with the resolutions.

There are also instances in which the council includes representatives of private institutions engaged in statistical activities, or whose members constitute an important group of respondents. While these institutions are not bound by the decisions of the council, their participation is valuable in developing goodwill and co-operation in official statistical work. They will be assured that their statistical needs and their ability to furnish data to the government have been considered.

In many cases the council is an adjunct to the principal operating statistical office which provides the services required by the council. Such a combination of a council and an operating office can be very effective in achieving co-ordination and in effecting an integrated series of national statistics.

Special co-ordinating committees

Special committees with representatives from the interested organizations may be required to solve special problems in a particular statistical subject or technical area. Examples of this are the committees on vital and

health statistics established in several countries. The formation of these committees, like that of the national councils of statistics, arises from the desire to bring together a group of people concerned with the same problems in order to solve them through mutual co-operation and agreement. These committees may be permanent, created by special laws or decrees, and may act with wide powers in their field of responsibility; or they may originate entirely in friendly agreements among the various agencies, or have a temporary status to solve a given problem.

The statistical organization representatives on a committee are usually the specialists in the particular field. The work is conducted on a technical level, becoming in many instances personal consultation among the statisticians of the different offices. The atmosphere of direct relationship among colleagues, without formality, produces much more satisfactory results. In forming committees, it may be advisable to include representatives of private organizations and producers' or workers' associations which are concerned with the subject under study.

National statistical conferences

The national statistical conference is another type of co-ordinating technique. These conferences, composed of representatives of the offices in charge of the various statistical fields and of regional and local statistical offices, do not work on a continuous basis but meet periodically. They may convene to solve fundamental problems affecting the entire statistical system — reorganization; over-all programmes of official statistics; relations between the offices of the national government and those of regional and municipal governments; adoption of standard classifications for general use; and training and regulation of statistical personnel. They may also convene to solve problems in particular fields, such as vital statistics, agriculture and public finance. Generally, the conferences do not study the problems of detail met and solved in the everyday work of statistical offices, where the committee mechanism is particularly useful.

There are many other practical measures which may be instituted to improve the co-ordination within the statistical system of a country. The satisfactory co-ordination of all official statistical activities can be achieved only if there is some one person or organization responsible for this function, enjoying adequate legal authority, possessing sufficient autonomy and technical capacity and having the full co-operation of all concerned.

Practical measures for co-ordination

Planning of work programmes

It is effective in promoting general co-ordination to review the work programmes of the statistical offices of the government. This makes possible an over-all national statistical programme with immediate and long-term objectives. It assists in the distribution of the resources of the system in accordance with the needs, and in the planning of adequate coverage of all the aspects of society which it is of interest to investigate.

The review of the work programmes may be better accomplished through a mechanism in which the offices affected are represented, such as a national council of statistics. In this way, the consolidation of programmes may be achieved by bringing into harmony the points of view of all the participants. Through joint planning of all statistical programmes, arrangements can be worked out whereby one office will collect and process data needed by several other offices, thus improving the over-all efficiency of the system.

For some of the offices to give up tasks which they have been accustomed to perform, and to consent to their performance by other offices, requires good relations among all offices and acceptance of the competence of the office selected to do the work. Programme planning of new statistical tasks may be facilitated since the needs can be studied in detail and assignments made to the offices which are best able to carry out the work.

An appropriate opportunity for periodic review of the work programmes of the various offices may occur when budgets are prepared. If the requirements of the work to be undertaken are planned together in the light of available resources, a more economical utilization of the resources may be achieved. Success in this respect may be limited, however, since the co-ordinating agency may not have authority over the budget appropriations of other offices. Difficulties may be encountered, especially when it is intended to carry out new statistical tasks for which new funds will be needed. In these cases, it may be necessary to convince the government budget office, and probably also the legislature, of the need for appropriating funds for the programme. It should be much more effective for several statistical offices to act together through the co-ordinating body than for the office which will be in charge of the new programme to attempt this task alone. The co-ordinating body may be best able to determine the relative importance of the various statistical programmes and to establish a scale of priorities for carrying them out.

Review of questionnaires and forms

Frequently the co-ordinating body reviews and approves the questionnaires used by the statistical offices. Thus it is possible to visualize, both as a whole and in detail, the statistical data available to the government, the respondents who furnish them, the offices which process them and the uses to which the data are put. The co-ordinating body can keep track of the statistical data and is in a better position to establish the necessary connexions among the various offices participating in the statistical process, thus improving over-all efficiency. The design of a questionnaire requires consideration of the characteristics of respondents, the methods of collection, the concepts and definitions of the data, the manner in which they should be tabulated and analysed and the precise needs of those who use them.

In a statistical office, the function of planning and designing the schedules may be concentrated in one unit with personnel sufficiently skilled to decide all relevant points in consultation with the units that use the questionnaires. In a relatively centralized statistical organization, this function becomes an internal process within the central office. In a relatively decentralized system, special legal provisions may require the submission of questionnaires to the co-ordinating body, or offices participating in a council may voluntarily submit their questionnaires for consideration by the council.

There are several instances where a central statistical office has legal powers to review the questionnaires of other offices. In at least one case, this authority is so broad that it covers all questionnaires used in the collection of information (except some of a financial nature) including administrative forms such as those used for making applications, and it is provided that the questionnaires cannot be used without the prior approval of the co-ordinating body. In other instances, the authority is not so comprehensive and the review is based on voluntary co-operation of the offices.

The criteria which may serve as a guide in reviewing statistical schedules are diverse.

1. Foremost is the criterion of minimum duplication in statistical work. If the central office has a complete file of the questionnaires in use by various statistical offices, duplication may be detected. Where duplication exists, permission to use a new questionnaire may be withheld and arrangements made for one office to have access to the information collected by another office within the limits of legal provisions and regulations concerning confidentiality.

2. The review may extend the usefulness of the data being collected by adding questions or by designing tabulations to meet several requirements.

3. The concepts and definitions relating to the questionnaire may determine in large measure the usefulness of the data; this is particularly true in cases where the subject is closely related to other subjects for which statistics are available.

4. The formulation of the actual questions is of great importance to avoid erroneous, obscure or biased answers.

5. Finally, the questionnaire should place the least burden upon respondents consistent with obtaining the information. The data should be solicited with no more frequency than actually required and should conform with accounting systems and other records maintained by respondents.

These points may be reconciled by a round-table examination of the questionnaire by a group of experts in the given field, representing the office in charge of the inquiry and those which use the data. To permit profitable discussion, special efforts should be made to give the committee members opportunity to study the matter well in advance. It may be necessary to rely on more complex means of consultation for satisfactory review, and to maintain constant contact with the interested organizations.

Establishment of technical standards

The establishment of technical standards is most important in the co-ordination of the statistics produced by the government and in the improvement of the technical quality of the data. The co-ordinating body should be in a good position to take the initiative in formulating technical standards for general use by all the offices.

The setting forth of standard classifications for such things as geographic divisions, causes of death, commodities, industries and occupations is important. The various offices processing data on population, agricultural production, school attendance, housing, and the like, should be in a position to publish the material according to the same geographical classification of the civil divisions of the country, and comparability will permit a more adequate study of the various regions or divisions of the country. Similarly, if the data on wages paid, workers employed, raw materials used, and finished products processed are arranged in accordance with a single industrial classification, more intelligent study of the various industries will be possible.

Among the technical standards that may be established by a central co-ordinating body are the definitions of certain terms such as urban population, illiteracy, wages received, industry and farm, which lend themselves to different interpretations and which should be defined precisely to avoid inconsistencies and confusion. The general use of standard definitions establishes confidence in the comparability of data referring to the same subject published by different offices.

Technical standards which are to enjoy general acceptance should not be imposed by the co-ordinating body. They should be formulated on the basis of consultation and participation of specialists in the respective fields who may be applying the standards developed. Technical committees are the most appropriate instruments for this work. They may be set up with the exclusive purpose of formulating such standards and convened whenever improvements appear necessary or special problems arising from their application require solution. Included in this field is the adoption for use within the country, and the adaptation to its own conditions, of standards and classifications recommended by international organizations.

Exchange and selection of personnel

Frequent consultation between the technical personnel of the various statistical offices is valuable in the co-ordination of statistical activities. In this field the co-ordinating body may play a useful role. In some cases, it may arrange loans of personnel when one office of the system has a special project in which other offices may help. For example, in a census undertaking it might be appropriate for experts in agricultural statistics to be transferred for some time to the census office, to assist with problems in their particular field.

The co-ordinating body may, in certain circumstances, help statistical offices by recruiting personnel and may aid in determining the requirements which should be met by applicants. It should be in a good position to know where technicians in the various fields are to be found and to establish liaison with universities for selecting their best graduates for employment in the field of statistics. The co-ordinating body may help in the organization of training courses in the statistical offices, co-operating with them to make it possible for personnel from several offices to benefit from the courses given in one of them. It may be in a position to organize a national programme of fellowships for statistical personnel to receive specialized training abroad and plan how to derive optimum benefits from international programmes of technical co-operation.

Publications as aid to co-ordination

Publication programmes may further the objectives of co-ordination. It frequently happens that the co-ordina-

ting function may carry with it the responsibility for issuing statistical publications which gather together numerical information on various aspects of the life of the country. The most common case is that of the general statistical yearbook. For its compilation, the office relies on many sources of information and on many processing offices, and this provides an opportunity to exert its influence to co-ordinate, standardize and improve many series. Once again the importance of standard classifications is evident since they permit orderly arrangement of the yearbook material as well as material for other publications, such as monthly statistical bulletins. The publication deadlines which must be met serve co-ordination by requiring the statistical offices to supply their information promptly, and the co-ordination can promote a wholesome spirit of competition to improve this aspect of the production of statistical data.

The co-ordinating body may utilize special bulletins or statements designed for the information of the personnel of the statistical offices to promote the acquaintance of these officials with each other. Publications containing lists of the employees of the various offices, indicating fields of specialization and work programmes, make consultation and co-operation among staffs much easier. Publications giving news of the activities of the statistical offices and the programmes undertaken by them are particularly useful.

Finally, in some instances the publication facilities available to the statistical offices are inadequate and release of data is delayed. The office responsible for co-ordination may take the initiative for making special arrangements for the printing facilities of one office to be used by others.

Other practical measures

There are other practical measures which the co-ordinating body can use to improve the co-ordination of national statistics, depending on the resources at its disposal and the ingenuity of its officials. It may arrange for several statistical offices to share the mechanical tabulation equipment available to one of them, or to establish a pool of this kind of equipment for service to several offices. Arrangements may be made for inclusion of additional questions in a given periodic inquiry when another office needs special information from the respondents covered; also for using one group of interviewers, who have received special instruction, in several projects of data collection. If the co-ordinating body is always ready to investigate the many opportunities which are presented, and possesses the required technical ability, and enjoys the goodwill of the other statistical offices, it can do much to improve the quality and efficiency of the national statistical system.

The co-ordinating personnel

It is necessary to have capable personnel, wholeheartedly devoted to the work of co-ordination. The success of the undertaking depends in no small measure on the personal relations and direct contact between those responsible for co-ordination and those in charge of the various statistical fields.

The functions of the co-ordinator are particularly delicate. They involve relationships with various offices which are working in different and possibly ill-defined administrative spheres and fields of activity, and which may resent intervention in their work. In these circumstances it is easy to offend personal and professional sensitivities. The person in charge of co-ordination should have the ability to get along with people, a sense of tact, effective power of persuasion and initiative. He should be capable of arousing enthusiasm in others and of gaining their interest and co-operation. And he should have a sound practical and theoretical background to be able to handle problems at the technical level required.

The members of the staff should also possess these qualities in large measure and, in addition, should have specialized knowledge in the subject matter studied by the offices with which they will work so that they can understand the problems. They should have an over-all concept of the government statistical programme to appreciate the role of their own sphere of work within the whole. This may be achieved through exchange of ideas and through mutual assistance among the staff of the co-ordinating office.

Evaluation criteria

It is desirable for the co-ordinating authority to know with certainty whether its work is effectively promoting the co-ordination of the various statistics produced by the national system. Although it is difficult to establish objective criteria for measuring the progress of co-ordination, some aspects of statistical work can be observed which assist in measuring the degree of co-ordination achieved.

Plans of national scope

The existence of statistical programmes related in orderly manner in a single plan of national scope for all the statistical activities of the government is one of the principal indications of progress on the road toward co-ordination. The fact that the statistical offices have agreed to integrate their individual programmes into a national plan indicates the existence of a spirit of co-operation, and the likelihood that many of the problems of inconsistency of data and duplication of work have been solved. The co-ordinating body can judge the effectiveness of its work by the willingness of the other offices to participate in these all-inclusive plans, and by the co-operation which the offices voluntarily lend to their implementation.

Technical quality of methods

Only by using the technical methods recommended can it be expected that the statistics will fulfil their purpose of providing the facts prevailing in the various fields. Periodic revisions of the work programmes usually provide an excellent opportunity to assess the advances made by the system following the introduction of new research and working techniques.

Avoidance of duplication of work and expenditure

The existence of duplication is one of the most evident aspects of a defectively co-ordinated statistical system, and one of the points most open to criticism from outsiders, especially from those concerned with the best use of public funds. Unnecessary duplication of work, and hence of expenditure, may be detected when work

programmes are examined and when questionnaires are reviewed, but it is necessary to be ever on the alert for possible sources of duplication which elude that scrutiny. Savings may be made by arranging for the work or equipment of one office to be utilized by other offices, avoiding the need for multiple efforts. Such measures may serve as a guide in evaluating progress in the prevention of duplication. Of course some duplication in collection is unavoidable, and duplication in analysis may be desirable since it may be useful in comparing the effectiveness of different techniques; also some duplication in publication is necessary since data presented in one publication may be basic to the data presented in another, e.g., census data used in conjunction with vital statistics in measuring population trends.

Consistency and comparability of data

Discrepancies in statistical data or estimates referring to the same thing, and lack of comparability of data which are logically related, sometimes occur when the data are produced by different organizations which are not co-ordinated. This probably constitutes the most obvious shortcoming to an outside observer and is likely to jeopardize the confidence of the public in the statistical system. These deficiencies are particularly apparent to those who analyse and use the data, and their comments are particularly pertinent. The frequency of such observations can serve as a guide to the progress being made in the elimination of these deficiencies.

Adequacy for the needs of users

Statistical data must reflect above all the purpose for which they are intended. It is difficult to judge objectively whether the statistics produced by the system are satisfying the needs of those who use them, but it is possible to ascertain to some degree the success attained by observing the extent to which the statistics are requested, and whether the demand is increasing or diminishing, both on the part of the government and of the public. If the statistics are not being used, this indicates that there is something about them which diminishes their utility, that they are not well adapted to the purposes of those who should use them, or that their existence and usefulness are not realized.

This limitation of use may be due to the lack of statistical-mindedness among the potential users. If this is the case, the co-ordinating body should do everything possible to foster statistical consciousness. The only justification for the statistics and the efforts made in producing them is the use which is made of them. The more intense this use the more efficient the system will be. In practice there will be stimulation from both sides. The users will request from the offices the statistics they need and will wish to have them at the right time. If the statistics are sound and adequate, the officials and the public will be stimulated to use them more frequently.

Timeliness of publication and dissemination

The prompt and timely publication of the data is an aspect of great importance. The entire process of production of the data may be very efficient, and yet the system can fail completely in the last step if the facilities are inadequate for publishing the statistics promptly. The period of time spent between the collection of the original data and the publication of the final results varies according to the characteristics of the data but may be used as a measure of the efficiency of the system. The shorter that period can be made, without lowering the technical quality of the methods, the greater will be the progress toward the objectives of the statistical system.

Need for periodic review

The main criteria for measuring the adequacy of a system of co-ordination in the national statistical system may be considered at the time of annual reviews of work programmes or the more fundamental examinations made from time to time. It is possible to conclude that progress has been made towards achieving a co-ordinated system when such reviews reveal: a statistical programme which reflects in harmony the data from various fields; methods in keeping with the most advanced techniques; a reduction in unnecessary duplication; improvement in the comparability of data; and timely publication and wide distribution of the material. But this does not mean that the goal has been reached. Co-ordination is a day-to-day task which must not be neglected for a single moment. There will always be new requirements within the framework of the system which will require new adaptations so that the efficiency of the system will not be jeopardized.

CHAPTER 5

LEGAL PROVISIONS FOR A NATIONAL STATISTICAL SYSTEM

Statistical legislation should contain measures designed to give form to the statistical policy of a country and to lay down a definite plan for the organization and development of a system of statistics.

Since not all individuals or public and private enterprises feel obligated to furnish information for statistical purposes unless required to do so by law, legal authority is almost universally essential for the collection, compilation and publication of national statistics. On the other hand, such legal authority in a country should normally protect the enterprises and individuals concerned from improper and non-statistical uses of the information furnished in confidence by the respondent to the statistical authority; from liability to taxation, regulation, military service and the like. This applies equally to statistics collected:

1. On an *ad hoc* basis,
2. At long intervals (such as the census), or
3. As routinely established weekly, monthly or annual series.

One of the prerequisites for successful statistical operation, therefore, is the existence of legislation which is:

1. Adequate to meet every likely situation,
2. Practical in its application in the enumeration or collection stages, and
3. Enforceable upon the public, first by education and persuasion and second by recourse to compulsion, if necessary.

The development of economic and social statistics has been a matter of slow process of trial and error over the past hundred years. The development of legislation governing the collection of statistical material has also been a matter of slow progress subject to similar vicissitudes. Today, however, the point has been reached, particularly in the statistically well-developed countries where the general requirements of a statistics act are fairly well defined. In most countries it should be possible to frame legislation which will form a basis for a comprehensive system of general statistics adequate to the necessities of the country and in keeping with the demands at a particular point in time.

Review of national legal provisions

Although legal systems, practices and terminology follow a great variety of patterns as among countries, and legislative bodies vary considerably both in authority and organization, there is, generally speaking, a common pattern of legislation in such functions of government as the provision of statistical services. Though these functions are less developed in some countries than in others, the basic principles of legislation for statistical organization and co-ordination are inherently the same, even though the patterns and methods of application may vary considerably. Variation in application and phraseology is essential if the legislation is to meet the variety of situations found within the area of independent nations which have differing economic and social patterns and variations in cultural background.

As applied to statistics and statistical organization, *legislation* embraces a wide field of regulatory enactments such as acts of parliaments and legislatures, ordinances, statutory rules and regulations, decrees and similar legal documents which contain provisions concerning statistical matters generally. These may be found arising out of legislative enactments or out of directives and instructions issued administratively.

Functions of the legislative and executive bodies

It is the function of the legislative branch of government to ascertain the need for laws and to enact all necessary legislation. Once a bill has passed through the law-making machinery and becomes a statutory law, then the principal function of enforcing and administering the statutory provisions becomes the duty of the executive branch of the government. It may be, however, that the legislative body is not satisfied with the effect of the legal provisions of the statute or with the administration of the service. In this event the legislature only can supply the remedy, which is usually effected by the adoption of a new law or an amendment to the laws in force.

Many statutes contain provision for the issuance of regulations to give effect to the intent of the law. The government may authorize the responsible member of the executive (minister, or chief statistical officer in some instances) to make regulations which will govern the collection of all or any part of the statistical series. He may also be given the power to prescribe the schedules to be used, to determine the information to be collected by, say, the census, and generally to regulate those matters which do not affect the rights and privileges of the individual.

If response is made compulsory upon individuals and enterprises then this provision should be contained in the statistical law. It should not be included in administrative regulations. Under these conditions, in framing statistical legislation, the delegation of powers should be carefully scrutinized, particularly if they are to impose mandatory obligations upon the public. On the other hand when response is not a compulsory condition, the laws, generally speaking, give the minister or chief statistical officer the power to conduct such surveys and statistical investigations as he may deem necessary. In other matters, the delegation of power to the minister or chief statistical

officer usually refers to those which are concerned with the content of forms, methods of collection and details of instruction.

Fundamental principles of drafting legislation

Because the preparation of a sound law is most essential to the operation of a statistical service in any country, the initial drafting should be the responsibility of those familiar with the operations of a statistical office. This will ensure that the legislation, besides meeting the above requisites, meets the further tests of being technically adequate and reasonable of application in every respect. Therefore, the initial step should be taken by the technicians within the statistical system.

In the second stage, it is necessary to bring together the expert in the subject-matter field and the legal draftsman to ensure that the law when enacted will stand the tests of legal procedure and, at the same time, will not impose undue hardship upon the public. Another important factor to be considered at this stage is the place of such legislation within the general framework of other legislation and its constitutionality within the legal framework of legislative powers. Any legislation or requirement imposing obligations and penalties upon the community requires special care in its preparation.

To ensure that the legislation concerning statistics will meet all these and many other conditions, it must be borne in mind that just as statistical application requires special training and experience, so too, legislative drafting is a science which requires an experienced and well-trained legal mind. Very few people know "how to write a law" which is clear in its intent, legal in its application, scientific in its administration and generally capable of enforcement.

Drafting hints

Obscurity, vagueness, ambiguity and qualification should be avoided in drafting statistical legislation. Redundancy and repetition are often common faults and the failure to define all the technical terms may lead to considerable trouble and obscure the proper interpretation of the law, particularly when court action is necessary. Provisos, which have always been popular in legislation, should be avoided because they are usually unnecessarily complicating and seldom achieve their objective of clarifying the basic requirements of the clause to which they are appended. Simple, short, straightforward sentences are preferable to long and complicated ones. Affirmative language is preferable to negative language.

Some legislative draftsmen are opposed to the inclusion of repealing clauses, the contention being that previous inconsistent laws are automatically repealed when the new legislation is finally approved. This is a moot point and it is recommended that the question should be decided by following the usual practice within the country.

Finally, all provisions should be reasonable and capable of application. Otherwise they may be impossible of enforcement, may introduce the question of validity of the legislation generally, and may create a situation which can seldom be resolved by the competent legal authority.

Provisions designed to meet changing conditions

Every section of the legislation should be considered from the long-term point of view so that it will meet the necessities brought about by constantly changing conditions. It is, of course, unreasonable to expect that the first or even the subsequent statistical laws will be perfect or will meet all the situations which might be encountered in setting up or even reorganizing a statistical system. However, it is possible and desirable so to construct statistical legislation that the need for amending legislation will be held to a minimum. It is suggested that too much specificity regarding the collection of particular series of statistics should not be contained in the legislation, but should be left to the final decision of the chief statistical officer under the direction of the responsible minister. This would permit a desirable flexibility in the collection of the series and would enable the chief statistical officer to initiate the collection of new series of data and discard obsolete series. A general clause is required dealing with the collection, compilation, analysis and publication of statistics in such matters as population, migration, education and other matters, which are generally the responsibility of the central statistical operating office, together with a closing clause which permits the chief statistical officer to prescribe in other matters regarding statistical data. The legislation should also contain a section which permits the government to authorize the minister or chief statistical officer to have any special statistical investigation made that is deemed desirable and to prescribe the manner and the means by which such an investigation shall be made. It must be recognized that certain sections should be more specific, particularly when they deal with matters which involve other organizations, but here again the forms and the methods of collection should not be detailed in the legislation but should be left to regulation.

Essential features of legislation

The essential features of a satisfactory bill, as outlined by the American Bar Association a few years ago, are four in number:

"1. Conformity to constitutional requirements,

"2. Adequacy of the provisions of the law to its purpose,

"3. Co-ordination with existing law, and

"4. The utmost simplicity of form consistent with certainty."[1]

In writing the provisions of a statistics law, constitutionality is a most important factor, requiring as it does extreme care and impartiality in fitting the legislation into the general framework of the existing law. To have the statistical law or any part of its provisions labelled with the stigma *unconstitutional* does more to undermine the system than anything else. To err in this regard is the unpardonable sin on the part of the technician who supplies the basic material and the legal draftsman who puts it into legislative form. The problem may not be so involved where a single body holds complete sway in all matters relating to the government of the

[1] *Final Report of the Special Committee on Legislative Drafting*, Chicago, American Bar Association, 1921.

people; this is, where there are no provinces (or states) and local (or municipal) governments already vested with collection, analytical and publication jurisdiction in certain fields related to their administrative practice.

Tobey [2] suggests that: "The body of the bill, if properly drawn, will tell exactly what it is all about without wasting space and time with several 'whereas's'. The best practice also leaves out all headnotes."

This is sound advice to be followed in writing legislation for the collection of data, where it is necessary to impose obligations upon respondents, such as industrial and manufacturing firms, wholesale and retail establishments and the public generally.

The title should be short but at the same time it should express the content and subject matter of the bill. In this particular field, it can generally be covered by the short title of three words — *The Statistics Act*.

The body of the legislation concerning statistical matters or those sections and clauses which deal with the actual subject matter of collection of basic data should:

1. Be complete in itself (this is the preferable situation); or

2. Provide for the setting up of regulations in some areas (this is quite satisfactory, provided the authority is limited to actions which do not impose penalties. These are usually administrative in nature and cannot impose penalties other than those specified in the law); and

3. Make specific reference to other existing legislation (where there may be conflict with other legislation relating to statistics, reference should be made specifically to such other legislation in order to remove doubt).

Mandatory and permissive legislation

Generally speaking, statistical laws fall into two broad categories — those which are mandatory and those which are permissive in their intent, both as they apply to the statistical system and to the respondent public. Each has relative advantages within the framework of statistical organization, because some clauses must, of necessity, be imperative in their application and instruction, while others may leave certain matters to the discretion of the appropriate minister or statistical officer. The choice of which to use depends, of course, upon the condition which the particular section or clause is to control or regulate. Generally speaking, in the English context, mandatory legislation is expressed by use of the word *shall*, while the word *may* is usually employed to indicate the permissive legislative provisions.

It is difficult to formulate a general pattern for mandatory or permissive sections as this is very closely bound up with cultural backgrounds and national customs. The connotations attached to words in different languages also play a large part. It is possible, however, to state some broad principles. In general, the mandatory clauses should not cover the details of the data collected in these fields. For example, it should be mandatory that a census be taken at regular intervals but permissive as to the content of the questionnaires and instruction manuals.

Creation of a central statistical authority

Should it be desirable to have a single administration for the collection of data, the legislation should provide for the establishment of a central statistical authority charged with the responsibility of creating a statistical office placed under the appropriate member of the executive and of determining the internal structure of such an office. The law should define the operating, promotional and co-ordinating functions of the central statistical office, the duties of which should be, in general terms, to:

1. Advise on all matters of statistical policy,

2. Collect, compile, analyse and publish statistical information relative to the commercial, industrial, financial, social, economic and general activities and condition of the people,

3. Collaborate with all other departments of the government in the collection, compilation and publication of statistical records of administration according to the regulations,

4. Take general purpose surveys such as the population and agricultural censuses, and

5. Organize a general scheme of co-ordinated social and economic statistics pertaining to the whole country and to each of the political and geographical divisions thereof.

Creation of a central statistical co-ordinating agency

In some circumstances it may not be desirable to have a single administration of the collection of data. In such a case, it is possible to provide for varying degrees of decentralization in which the co-ordinating body does not in itself collect any large amount of data. This is the system used in the United States and the United Kingdom.

It is essential to have legal provisions fixing the responsibility for statistical co-ordination, whether in a general or in a specific field, and granting the co-ordinating agency the authority to carry out its work. In a relatively decentralized system it is necessary to have clear and specific legal provisions, to support the co-ordinating agency to strengthen the force of its actions and to secure a greater likelihood of compliance.

The legislation which is required for a country in which there is to be a central co-ordinating agency, but where the collection of data is assigned to the departments and offices dealing in each subject matter, can be relatively effective if the central statistical agency is in a position to review the budgets of the statistical units of the government in whatever department or office they may be located. The effectiveness of co-ordination, even when the law specifies this sort of review, may often depend upon the thoroughness with which the co-ordinating body carries out this work. But a discussion of the legal side need not elaborate this and assumes that personnel thoroughly familiar with sources and uses of statistical data will be obtained for this task.

Since budgets are periodic affairs the danger is that, however clearly written into the law, this may become a brief intermittent review and may fall short of a continuous surveillance by the responsible agency as far as duplication, uniformity of classification and the like are concerned. It may be argued that surveillance is implicit in the review of the budgets of statistical offices

[2] *Public Health Law*. Jas. A. Tobey, Commonwealth Fund, New York, 1939.

but in practice the reviewing agency may not insist upon it unless such power is explicit in the law. This may be possible by providing that individual inquiries of statistical units throughout the government be submitted to the reviewing body during the year and not only at the time of the budget. This means that the forms, the procedures, the techniques and the classifications will be subject to continuous scrutiny. The brevity of statement suggested for setting up a highly centralized system will not suffice here – the responsibility of the reviewing unit in relation to other departments and offices should be clearly specified.

If full benefit is to be gained from the statistics collected by different departments or offices, they must be compiled according to common standards and classifications. The central co-ordinating body should be responsible for developing definitions and standards for improving national and international comparability. This responsibility should be specified in the legislation.

The co-ordinating body should also be empowered to: (1) review staff requirements for statistical work, (2) review and approve forms and questionnaires used for statistical purposes and (3) review publication programmes. In some countries the legislation provides for a common statistical personnel throughout the service, in other countries the legislation provides for the establishment of boards and committees charged with the control of printing forms and reports.

These are among the many devices which may be specified in legislation as means for co-ordinating and integrating statistical work. It should be remembered, however, that such devices to be effective should be correlated with the needs of the statistical system and require co-ordination within themselves.

Law enforcement versus education and instruction

Even within those countries which have relatively well-developed statistical systems, it has been found extremely difficult to deal with offences under the mandatory provisions of statistical legislation, particularly in connexion with the *refusal to answer* and the *neglect or delay* phases of providing information.

It is suggested that, while the legislation must provide for court action in some instances, this should be the very last step to be taken after all other methods of securing compliance of respondents have failed.

Great care should be exercised in preparing for court action to see that the main purpose of securing compliance with the law is kept in proper focus, and that retributive thinking does not enter into the case.

The administrator who is ready to stop court action immediately upon receipt of a delinquent report or schedule, will not only command the respect of the judiciary, but will do much towards the improvement of relations between the statistical office and the public.

Every effort should be made to instill in the public mind that the statistical organization of a country is worthy of respect and trust. It is, after all, a service organization charged with the duty of carrying out its share in promoting the general welfare of the community by supplying factual information upon which the people, industry, business and governments can base programmes for improving the state of the nation.

Every effort should be directed towards a constant campaign of respondent education. The use of persuasion to gain the co-operation and understanding of the public is a policy which has borne fruit in most countries.

The production and distribution of reports in the industrial and business series have the effect of making the statistical producer likewise the statistical user. In other words, it is sound business on the part of the statistical service to take the respondents into the statistical system in such a way that they become an integral part of that system and thereby supply the required information willingly. This is more effective than all the compulsion that the court system can provide.

The objective of the competent court is to ensure that the evidence submitted provides the means of determining the truth of any infraction of the law under investigation; it cannot determine the right or wrong of the statutory law under which it reviews the evidence and renders the decision. Therefore, it is the responsibility of the technician and the legal draftsman to be sure that in drafting those sections of the law which deal with the collection of the data from the community, the legal provisions will produce the desired effect.

Legal remedies for protection of the public

The statistical law of any country must be designed for the benefit of the people and must not, under any circumstances, be used against them unjustly. If the basic laws of a country fail to provide the means whereby a respondent may seek the protection of the law against undue duress upon the part of the statistical office or offices, then the legislation governing statistics should provide the means whereby every citizen can secure remedial action. This is necessary in case the statistical authority may be unreasonable in its enforcement, negligent in its duty, or unconstitutional in any of its actions in administering the law. This is usually covered by the provision that no penalty may be applied against any person guilty of an offence without a determination of the offence and application of the penalty by the courts and in accordance with the general laws of the country provided for such cases. If the legislative clauses specify the offence and prescribe the penalty, and the general legislative provisions within the country fail to provide the machinery whereby the respondent may seek the protection of the courts, then provision should be made in the statistical law for such recourse. Further, in such a situation, the statistical law should provide for the right of appeal to a higher court in cases where the respondent is dissatisfied with the decision rendered by the initial judiciary.

All actions against persons under statistical legislation should be determined in the courts. The decision of the court should be final and binding upon both the individual and the enforcement officer, unless either party appeals against the decision.

Confidential nature of information and provision of penalties

Legal protection of the confidential nature of information furnished regarding an individual or an undertaking

should be deemed as an inseparable counterpart of the legal obligation to furnish such information. In some countries, disclosure of such information is permitted with the previous consent in writing of the person or owner of the undertaking, particularly in cases such as the provision of census records for establishment of proof of age. The clauses restricting the use of information furnished in confidence should be rigidly applied in every case if the confidence of the public, industry and business is to be maintained. The penalty clauses which are designed to bring compulsion upon those respondents who refuse to supply information, or who give false answers or who otherwise refuse to comply with the provisions of the statistical law, should, on the other hand, provide for the imposition of penalties upon the personnel of the statistical offices who improperly divulge information, disclose information furnished by the respondent in confidence or permit the unauthorized use of information collected under the provisions of the law.

These conditions apply not only to the unauthorized use of information furnished in confidence but also to the publication of statistical data in such detail as to disclose particulars relating to individual operations or enterprises.

In some instances, it will be found advisable to authorize the officers of other departments of government to perform duties under the provisions of the statistical law. The clauses restricting the use of information furnished in confidence should be designed to permit an officer of another department to be an agent of the other under the statistical law and to be subject to all the penalties for disclosure of information furnished in confidence. Thus inter-departmental co-operation would not be precluded and the confidentiality of information concerning individuals would be preserved.

The personnel and their oath of office

In many countries, the power of appointment of professional and other personnel working in the statistical office is conditioned by other legislation, such as laws relating to the civil service, which provides for the appointment of government employees generally. In such a situation, it may be unnecessary to state in the statistical law the conditions of employment and the establishment of continuity of office unless the statistical personnel is given special status within the administrative structure in the country. In addition to the regular personnel required in the statistical office, the law should provide for the specific appointment by the chief statistical officer of field staff, such as census supervisors and enumerators, and other persons who are necessary for the collection of statistical data. Such personnel are usually employed on an *ad hoc* basis.

It is considered essential that the statistical law require that every person employed in the execution of any duty thereunder, before entering upon his duties, should take and subscribe to an oath of office. This oath should contain within it the solemn undertaking that the person will not, without proper permission, disclose or make known any matter which comes to his knowledge by reason of employment as an officer or employee of the statistical office. This oath should be taken under the laws and regulations prescribed for such purposes within the general framework of the country or in such manner as may be prescribed by the minister or the chief statistical officer.

Conclusion

It is essential that the statistical legislation is not too rigid as regards either the statistical system or the respondent public; it should provide sufficient flexibility in its substantive clauses, at least, to meet a variety of situations. In drafting sound statistical legislation, an appreciation is necessary, not only of the statistical elements and techniques of collection and analysis, but also of their relationship to the institutional structure of the country. Legislation respecting the collection and dissemination of statistical information should never impose an obligation upon anyone if, at the same time, it does not further the interests of the nation at large.

Check list of items in national legislation

A large number of important provisions governing the organization and operation of statistical services are usually included in national legislation relating to the official statistical work of the country. Such legislation may include specific provisions for the creation of statistical organs and offices; a definition of their power, duties and relationships; financial and budgetary arrangements for their maintenance; recruitment and management of personnel; compulsion to report; access to records; and principles for the use of statistical data.

Although the legal systems, practices and terminology are very dissimilar, a comparative examination of the statistical legislation in some twenty countries provides a convenient check list of elements for statistical legislation to serve as a guide or reference for countries which may wish to revise their statistical legislation. It is not implied that the statistical legislation in any one of the countries examined covers all of these points but the full range of possible items, in their various formulations, is given for use as a check list in the process of reviewing and drafting national legislation for statistical purposes.

I. INTRODUCTION

1. Title of the Act, Law, Ordinance, etc.
2. Definitions of terms used in the legislation.

II. STATISTICAL ORGANIZATION AND CO-ORDINATION

A. *General*

Defining the structure of the national statistical system and the status, powers, duties and relationships of all organs and offices at the various levels.

B. *Central statistical office*

1. Creating a central statistical office, i.e. generally the main operating statistical bureau of the national government, regardless of its name.
2. Location of the central statistical office.
   (*a*) The Office of the President or Head of the State.
   (*b*) The Office of the Prime Minister or Council of Ministers.
   (*c*) The Ministry of Finance or Trade or equivalent.
   (*d*) The Ministry of National Economy or Planning Body.
   (*e*) Other Ministry.

(*f*) The office of the comptroller or other autonomous body.

3. Defining the internal structure of the central statistical office and the duties of its branches or sections.
4. Defining the operating functions of the central statistical office.
   (*a*) To collect, compile, publish and analyse statistics.
   (*b*) To furnish and disseminate statistical information.
   (*c*) To organize and conduct national censuses.
   (*d*) To organize and conduct statistical surveys.
   (*e*) To conduct statistical research and develop standards.
   (*f*) To compile and publish a statistical abstract or yearbook of the country.
   (*g*) To exchange statistical publications and maintain library services.
   (*h*) To establish and maintain a permanent record of the statistical activities.
   (*i*) To prepare annually a working programme and budget.
   (*j*) To recruit and control statistical personnel, including transfers, loans, etc.
   (*k*) To request from all government officials data and background information relating to statistics.
5. Defining relations with other offices.
   (*a*) To advise on and co-ordinate the statistical work of all offices.
   (*b*) To direct and control the statistical work of all offices.
   (*c*) To develop and maintain a co-ordinated system of statistics.
   (*d*) To develop programmes, issue regulations, etc., for the improvement of national statistics.
   (*e*) To promote and maintain the application of statistical standards.
   (*f*) To co-operate with all other offices in the production of statistics.
   (*g*) To allocate the conduct of statistical operations.
   (*h*) To supervise and approve all statistical operations.
   (*i*) To promote and develop statistical training within the country, especially for government statistical personnel.
   (*j*) To make periodic reports and recommendations (based or not based on surveys) to the proper authority on the statistical services, activities and personnel.
   (*k*) To review questionnaires, report forms and related documents.
   (*l*) To sponsor national statistical conferences and societies.
   (*m*) To promote and assist non-governmental statistical activities.
   (*n*) To co-operate with foreign and international statistical organizations.
   (*o*) To co-ordinate the use of mechanical equipment.

C. *Statistical co-ordinating body*

1. Creating a statistical co-ordinating body (office, council, commission, committee, etc.) including general functions, composition, structure, secretariat, etc.
2. Placing the statistical co-ordinating body directly under:
   (*a*) The Office of the President or Head of the State.
   (*b*) The Office of the Prime Minister or Council of Ministers.
   (*c*) The Ministry of Finance or Trade or equivalent.
   (*d*) The Ministry of National Economy or Planning Body.
   (*e*) Other Ministry.
3. Defining the functions of the co-ordinating body:
   (*a*) To plan and promote the improvement, development and co-ordination of statistics and the elimination of duplication.
   (*b*) To plan and direct, generally, the statistical activities.
   (*c*) To prepare annual statistical programmes.
   (*d*) To investigate the needs of various offices for statistical information from respondents and other offices.
   (*e*) To investigate the methods used by various offices in obtaining statistical information.
   (*f*) To maintain a continuing study for the improvement of the statistical work of the various offices.
   (*g*) To develop programmes, issue regulations and orders for the collection, compilation, analysis and publication of reports.
   (*h*) To co-ordinate the collecting offices with a view to minimizing the reporting burden, eliminating duplication, and the collection of unnecessary information, reducing costs, etc.
   (*i*) To designate a collecting office which shall collect data for two or more offices.
   (*j*) To have power of final decision in authorizing statistical projects or operations.
   (*k*) To make appropriate arrangements for improving statistical work involving relationships between two or more offices.
   (*l*) To assist the offices, by other means, to improve their statistical work.
   (*m*) To review the budget estimates of statistical offices.
   (*n*) To review questionnaires, report forms and related documents.
   (*o*) To develop and promote the application of statistical standards (including international recommendations).
   (*p*) To require any office to provide information to other offices (except tax bureaux, military services, etc.)
   (*q*) To provide for interchange of information, calculated to improve statistical work.
   (*r*) To determine and arrange with the departments and offices concerned, the furnishing of statistical information to intergovernmental organizations, except for restricted or confidential information.
   (*s*) To co-operate with national groups of scientists and specialists in statistics and related fields.
   (*t*) To make periodic reports and recommendations

to the proper authority on the statistical services, activities and personnel.

(*u*) To publish a bulletin of its activities and related matters.

4. Designating various government departments and offices to participate and co-operate in the work of the co-ordinating body.

III. STATISTICAL DATA

A. *Respondents and access to data*

1. Power of the proper statistical authority to call for information and returns for statistical purposes.
2. Obligation to furnish data and information by offices and respondents.
3. Specifying the type of respondents obliged to furnish data and information.
4. Vesting power in the central statistical organization, or persons designated, to compel disclosure of any facts or figures; methods of enforcement.
5. Access to records by statistical personnel.
6. Right of competent officials to enter any dwellings or offices in cases of doubtful information and access to any relevant document or record requested.
7. Special or new statistical surveys to be authorized by specific legislation.

B. *Fields and methods of collection*

1. Specifying the statistics which the central statistical organization (or other) shall collect, compile, analyse, abstract and publish (including coverage, periodicity, methods, particulars, etc.).
2. Authorizing the collection of statistics by means of sampling.
3. Leaving notice at home or place of business as sufficient requirement to fill up and sign form.

C. *Confidentiality of information and penalties*

1. All collected information to be kept confidential and to be used only for statistical purposes.
2. No individual return to be published or divulged.
3. No report to reveal individual particulars.
4. Improperly divulging information; penalty.
5. Disclosing confidential information; penalty.
6. Unauthorized use of information; penalty.
7. False declaration; penalty.
8. Obtaining or seeking information for which the person is not authorized.
9. Refusal to answer; penalty except for questions specifically excluded.
10. Neglect or delay in providing information; penalty.
11. Forged information; deception; penalty.
12. Wilful refusal or neglect to grant access to records; penalty.
13. Personal liability for damage by officials in case of negligence, etc.
14. Preventing another person from furnishing the information requested; penalty.
15. Conditions under which statistical data may be released by one office to another (or individual).
16. Conditions under which statistical data may be published and disseminated.
17. Judicial jurisdiction and procedure for application of penalties under statistical legislation.
18. Prosecution under legislation only with sanction of proper authority.
19. No prosecution for violations in good faith; for foreign diplomats, etc.
20. Time limit for prosecution for offences against the statistical legislation.
21. Application of fines imposed and recovered under the statistical legislation.

IV. STATISTICAL PERSONNEL

1. Appointment and replacement of the head of the central statistical organization (i.e. chief statistical officer or head of the co-ordinating body).
2. Making the head of the central statistical organization responsible for its functioning.
3. Appointment, management, and replacement of the statistical personnel; qualifications for appointment.
4. Additional personnel drawn from professional groups, university students, etc.
5. Giving to state and municipal employees status of agents of central statistical organization (or co-ordinating body) while performing statistical work.
6. Persons required to perform statistical and census work as a public service; persons exempted.
7. Establishing provincial and local statistical agents (temporary or permanent).
8. Authorizing the detailing or transfer of statistical personnel (either on permanent or temporary basis).
9. Oath of office and attestation; promise of fidelity and confidentiality.
10. Duty of personnel to conform to instructions; penalty for forgery, etc.
11. Refusal or desertion from duty; penalty.
12. Rates of remuneration of census and other statistical personnel.

V. IMPLEMENTATION AND OTHER MATTERS

1. Minister or other authority charged with the implementation of the statistical legislation.
2. Proper authority to make rules for the implementation of the statistical legislation; conditions to amend or abrogate such rules.
3. Determining the financial resources and budgetary arrangements for implementing the statistical legislation.
4. Authorizing agreements with provincial, state, or equivalent governments for the implementation of the statistical legislation (in particular for delegating authority to any provincial office or equivalent); collection by any provincial department or officer of any statistical information; supplying of statistical information by any provincial department or officer.
5. Correspondence, cables, forms, or materials relating to official statistics to be sent free of charge while following regulations; penalties.
6. Right to direct correspondence with all respondents.
7. All statistics prepared for publication to be approved by the parliament, head of the government, minister, co-ordinating body or central statistical organization.
8. Fixing the date when the legislation becomes effective.
9. Repeal of conflicting legislation.

CHAPTER 6

GENERAL PROBLEMS OF DATA COLLECTION

In planning a survey or a data collection there are certain basic principles or considerations which should be kept in mind. The first is flexibility of the plan and its adaptability to local conditions. By flexibility is meant that, in the plan, provision should be made for changes, if needed. Something unforeseen at the time the plan is set up is frequently encountered and unless there is an element of flexibility so that changes can be made if necessary, disaster may result. Concerning adaptability to local conditions, a system of data collection which works well in a highly industrialized community may not work well in an agricultural community. A system of data collection which has proved successful in a highly industrialized country should not be adopted by an agricultural country without a careful examination of the probable effects of using the same techniques in an entirely different context. Similarly, the kind of system of data collection which works well in one part of a large country may not, necessarily, work well in another part. Hence, flexibility and adaptability to local conditions are essentials of any plan for data collection.

Another consideration is that the survey should start out simply; over-elaboration should be avoided; the survey, particularly the initial one, should be confined to the basic data needs. After the basic needs are taken care of, it is time enough to go in for more detailed exposition and greater elaboration of other subjects. Surveys which require several hours to complete on the part of the respondents are too elaborate.

The next consideration is one which might be called common sense. For example, suppose there is the problem of thievery in a community. It would be possible to send a policeman around with a questionnaire asking each person to report how many crimes he has committed. Obviously, the results from that kind of survey would not be very helpful in the problem. Common sense should be used to anticipate, as far as possible, the probable result of a given course of action and the survey designed in terms of securing the desired result.

General considerations affecting decision of whether a survey should be undertaken

Necessity

Usually, neither funds nor trained personnel are available to conduct all the surveys which may be desired. Hence, it is necessary that the surveys be determined in order of importance and that priorities be established within the funds available. Not only the expense and time involved as far as the processing office is concerned, but also the burden and trouble placed upon the respondent should be considered. This burden may be small, for instance, in the case of a household survey, but it can run into a considerable expenditure of money as far as a large business establishment is concerned, particularly if a large number of records have to be searched and considerable data supplied. Hence, each survey should be weighed in the light of whether the results are likely to repay the cost; whether the aim is to supply data to meet specific operating needs of government departments and offices; to supply general economic information for policy purposes; or simply to improve methodology. Among the pertinent considerations are the following: (1) are there any data available which will throw light on the particular problem facing the offices, e.g., from tax returns, from the regulatory bodies, from population registers or from customs records; (2) are there data available which will throw light on the particular subject about which it is desired to secure information; and (3) is any other information available which is sufficiently precise to meet the expressed needs. For example, suppose a survey is conducted to find out what proportion of ex-service men would probably re-enlist under a certain set of assumptions. It would hardly be necessary to conduct a similar survey six months or a year later under the same set of assumptions, unless an extremely high degree of precision was needed. Assuming that the initial survey results were approximately accurate, it could be assumed that the change in six months or even a year would not be sufficient to justify a new survey unless conditions had changed greatly.

Feasibility

Under this heading are considerations such as: is the information available in a form which can and will be reported to the statistical office; has the respondent records available which will enable him to report the requested information. For example, a survey to find out what the population of any city had for dinner yesterday would be feasible. However, if the same people were asked what they had for dinner six years ago last Sunday, there would undoubtedly be a very high rate of non-response or "don't know". These are examples of surveys on a population basis where records ordinarily are not well kept. In a survey of a business enterprise, on the other hand, one would expect to find not only current records but records extending over a period of years. It should be kept in mind, however, that the kind of records which the business enterprise keeps are not necessarily the kind of records which will supply the desired information, or the records may be in a form not readily adaptable for use by the survey.

Moreover, business records on over-all figures over a period of years are more likely to be available than records of individual transactions. For example, financial reports are more likely to be available over a period of years than

those for detailed shipments or detailed information on specific products.

Another question is whether the statistical office is equipped to handle the survey within the time required for the purpose in mind. Are funds and personnel available to complete the survey once it is undertaken. It should also be kept in mind that preparation for major surveys may require several months, and large census-type surveys may require even a year or two of preparation.

Desirability

A check should be made on other surveys being undertaken at the same time which cover about the same group of respondents, in order to avoid duplication of effort and the possibility of encountering unfavourable public reaction. For instance, other large population or population-type surveys should not be undertaken at the same time as a major census of population. Otherwise, the response to both surveys is likely to be adversely affected.

Development of the Plan

After the proposed survey or system of data collection meets the tests as to whether or not it is needed, is feasible, and is desirable, there is the problem of developing the plan.

Identification of the respondent group

The best source of the information required should be ascertained. For example, in a consumption survey, if only broad information is required, data might be collected at the manufacturing level. More detailed information may be secured in progressive stages at the wholesale level, at the retail level, and, ultimately, at the consumer level. At the manufacturing level, the information exists in concentrated form. Hence, only a small number of respondents is necessary and the survey may be relatively cheap and easy to make. Gathering information at the consumer level is the most expensive because of the large number of respondents required in order to secure adequate and reliable figures.

An example of another type of survey is that of factory workers' wages, or, more precisely, the rate of factory workers' wages. Presumably, the manager of a factory could tell what wages were being paid to factory workers. Such information could be ascertained also by means of a household enumeration. However, the manufacturer has information available on hundreds or perhaps thousands of workers; in other words, he possesses a concentration of data which can be obtained more efficiently than data from household sources. Also the manufacturer, in all probability, has better records. In the household survey, there is frequently a tendency to over-report this kind of information or perhaps to under-report under certain circumstances; at any rate, the answers would probably be less reliable than those from manufacturers.

Extent of coverage

After the respondent group has been identified, the next task is to assemble the tools needed for reference such as directories or lists of respondents, maps for cer ain types of surveys, and mailing lists which may be available.

The extent of coverage depends largely on the required accuracy in relation to the cost and the resources available. A sample enumeration is usually quicker and less costly than a complete enumeration and may be sufficiently accurate for the purpose in mind. In commerce and industry it is frequently found that about 10 per cent of the firms may do 80 per cent or more of the business, employ a similar percentage of the personnel, and use a similar percentage of raw materials. Thus a sample survey of the large firms would probably provide quicker and reasonably accurate information, and coverage of the small firms would be unnecessary. This might reduce quite substantially the coverage of the survey and result in a saving of time and money.

Frequency and timing

The frequency of surveys depends on the importance of the survey subject in relation to the resources available and the rate of change in the conditions measured. If conditions change very rapidly, the survey would have to be fairly frequent – perhaps monthly, perhaps quarterly, perhaps semi-annually – to keep abreast of changing conditions. A device frequently used is to have a complete census coverage at infrequent although scheduled intervals – perhaps one-year, five-year, or ten-year intervals – and supplement this by a sample survey on a more current basis.

The survey should be timed carefully, that is, at a time when the information sought is best available to the respondent and within the time needed. For example, in a survey of agricultural production it would be necessary to wait until the harvest is over before the farmer could report what was produced on his land, while for field crop prospects and estimates of probable yield, it would be necessary to make the survey before the end of the harvest season.

A related consideration is the convenience of the respondents. For instance, a farmer does not have time or interest to talk with government survey teams when he is in the midst of harvesting. A similar situation arises in highly seasonal industries. A survey should not be made at the peak of the season when the manufacturer is probably too busy to make out the returns. On the other hand, if the survey is delayed too long, the manufacturer may not be available or his records may be stored away.

Methods of data collection

Among the methods used for the collection of data are personal interviews, mail questionnaires, telegrams and the telephone. Several of these or other methods are sometimes used. This is one place where common sense is essential. If the respondents are illiterate or the mail service is poor, obviously, a mail questionnaire is not a very desirable way to reach them. On the other hand, the personal interview method is expensive, probably the most expensive method of collecting information, but frequently is the only satisfactory method of ensuring a high rate of response on difficult survey questions. For instance, a detailed survey of consumer expenditures would probably not be feasible on the basis of a mail questionnaire. It is difficult to get the respondent to reply to a mail questionnaire which might take several hours to complete. A personal interview is usually more successful

in obtaining that kind of information, although frequently there is a high non-response rate. Another example is the collection of occupational wage rates. A factory, presumably, has information on what it pays its workers. However, the identical job which one factory classifies one way may be classified another way by a different factory. Hence, it frequently requires a personal interview to ensure comparability between the different respondents.

One device frequently used is the combination of the mail questionnaire and the personal interview. The questionnaire is mailed to the respondent with a covering letter telling him that an enumerator will call later and requesting his co-operation in getting his records in shape so that he can answer the questions. This particular procedure has been followed in some major surveys with good results.

Telegrams, generally used on a small scale because of the expense involved, tend to impress the respondent with the importance of the survey and may result in a quick response and a high rate of return.

Pre-test and follow-up

By a pre-test is meant a pre-enumeration of a limited number of respondents in which the schedule is filled out just as in the full survey. The advantage of this is that it enables the detection of errors and problems in advance of the data collection which, otherwise, might go undetected. There is considerable economy in a reasonable pre-test to determine practicability. If it is found that the survey presents difficulties to the respondent, the plan may be modified to take that into account. It is also useful to discuss the plan with the respondent, even though he is not asked to complete the schedule. With respect to follow-up, once the enumeration has started and the initial response is back, there is need to reduce the volume of non-response in most cases, to ensure that the response is representative of the universe. Too frequently statistical offices have a tendency to mail the questionnaire, urging an early return, and then tabulate those that are returned as representing the universe. As a matter of fact, a response rate of no higher than 10 per cent is not unknown. It is very difficult to assess the meaning of a 10 per cent response. Follow-ups should include at least a second mailing and perhaps a third or subsequent mailings in order to decrease the amount of non-response. If there is still a sizable non-response rate, it is well to make a sample survey of non-respondents to determine whether their characteristics are similar to those of the respondents.

Publicity and public relations

Frequently, statisticians and statistical offices pay too little attention to the public relations involved in a survey or to the need for favourable publicity. The reaction to a survey will vary greatly, depending upon the people dealt with, the country or the locality. Good public relations may reduce substantially the cost of the survey and, at the same time, substantially improve the response rate. On the other hand, bad public relations can spoil the survey. For instance, many people do not like to answer questions on their income and they particularly do not like to report their income to local enumerators. Apparently, there is a feeling that the enumerators will not respect the confidential nature of such returns. A strong public relations programme may do much to allay the resentment caused by such personal questions and to reduce substantially the rate of non-response.

In order to improve public relations, so as to get favourable publicity, the use of such devices as associations, the facilities of the Press, of magazine articles, journals, and so on, are practical. It must be remembered, however, that bad public relations may result from the schedule itself. The only contact which most of the respondents have with the survey organization is in completing the schedule and good public relations dictate that the schedule be one which is designed in an attractive manner and with clear instructions, so that the respondent may know that the statistical office is making the survey in a thoroughly professional manner.

Development of the questionnaire or schedule

Standard terminology and definitions

In view of the widespread interest in international comparisons, it is well in preparing terms and definitions to keep in mind the United Nations standards, so that comparisons with other countries in similar situations will be possible. It is even more important that the definitions and terminology be such that they can readily be understood by the respondents. Make sure that the terminology is terminology that the respondent will understand. If the survey is a survey of business, use the terms the business man uses; do not confuse him with technical statistical expressions.

Adaptation to local conditions

The matter of adaptation to local conditions was stressed initially but it deserves further emphasis. A system of data collection or a schedule design which another country uses should not be adopted unless it has been examined from the standpoint of its applicability to the country concerned. A survey of the labour force developed in terms of a country which has a system of factory employment is not suitable for a country where there is a large volume of home industry. For instance, when is a person unemployed under conditions of working in the home as against being unemployed in terms of the factory? While much can be learned from the experience of other countries, the important question is whether the inquiry applies to the country concerned and, furthermore, whether it applies to the particular locality or the universe that the survey is to cover. A survey of households in a large city or metropolitan area is not the same kind of survey and may not produce the same kind of response as a survey in a predominantly agricultural area.

Conformity with record-keeping practices of respondents

Questionnaires should conform with the record-keeping practices of the respondents. They should use terms similar to those which are used by the respondent: in so far as possible ask for information which he already has available and which he is accustomed to use for his own purposes. Frequently it will be found that, although this is not exactly what is wanted, a minor modification may make it serve the purpose and a much better rate of response will be obtained than if the respondent is asked for information which is difficult for him to supply

without considerable work. In surveys of employment by industry, information is often collected on the basis of payroll records. It would be more precise to ask for the number of workers at a certain time. However, that is not the kind of information most employers keep. On the other hand, all employers keep payroll records. The payroll period may be a week, it may be two weeks, etc., so that a count of names on the payroll does not give precisely the number employed at a particular time. It may include some people who have been on the payroll for part of the period only, because of hirings or separations during the payroll period. Nevertheless, that kind of count is sufficiently precise for most purposes and it is much easier to obtain than an exact count of employment on a particular day or at a particular time. Another type of record which business enterprises usually have available is the inventory type of record and this might be adapted to the needs of the survey.

Preparation of instructions

There is probably no ideal way of writing the instructions on a questionnaire. However, some of the things to avoid in preparing a questionnaire and in writing instructions might be noted. One of the things to avoid is instructions which run to great length. Instructions should be brief. They should be clear. To ensure that the instructions convey to respondents the meaning the statistical office intends is extremely difficult but it is essential to the success of the survey. It is better to put the instructions near the item to which they refer. In this way they stand a much better chance of being read than if they are on separate sheets of paper or on the reverse side. Instructions on such elementary items as where to return the form and how to return it, and who is making the survey, should be included. A further point is that it is usually better to attach the instructions, if they are on a separate sheet of paper, to the form in order to keep the schedule and the instructions from being separated. Not infrequently, as a schedule received through the mail gets routed through a business establishment, the instructions get separated unless they are fastened to the schedule.

Amount of data to be collected

Again, repeating a point made earlier, over-elaboration should be avoided, at least in initial surveys. Try to confine the survey initially to basic data needs and become more elaborate later. Avoid what is called "respondent fatigue" – the wearing out of the respondent. This may result in his being unwilling to supply any information. One failing which some statisticians have is to consider a questionnaire as a kind of case history rather than a basic tool for developing statistical measures. Some statisticians are interested in going over individual schedules from the standpoint of seeing what kind of a story an individual schedule makes. This may be of interest to the statistician but it may result in putting items on the questionnaire which are not necessary for the basic statistical requirements of the survey.

Multi-purpose collections

It is desirable to consider the feasibility of combining surveys or adding two or three items, to an existing survey in lieu of organizing an independent survey. An example of this is the use of what are often called *operating documents* to collect statistical information. Thus, an application form which is processed as an application might also be suitable for collecting statistical data. A tax return which is used basically to collect a tax might also have an additional item for a broader statistical purpose. Questions designed to secure information on employment and unemployment, or the incidence of hazards which are covered by a social insurance system are sometimes added to social insurance forms. On the other hand, an operating document should not be overloaded for statistical purposes and, vice versa, a statistical questionnaire should not be overloaded for operating purposes. If so, neither purpose will be served satisfactorily.

Respondent anonymity

As a general rule, it is desirable that the respondent be identified both on mail questionnaires and personal visit enumeration, but there are exceptions. In certain situations, the respondent may feel that the answers might be used to his disadvantage and he may not return the questionnaire or he may not give correct answers. Anonymity should prevail where information given by respondents may be harmful to them. However, it should be kept in mind that if the respondent is not identified, follow-up is almost impossible.

Design for processing efficiency

It is essential that the form be designed for processing efficiency. The ultimate purpose for which the information is being collected should be kept in mind so that the next step, the processing of the data, may be done efficiently. For example, the essay type of answer is an extremely difficult one to code and to tabulate. On the other hand, the *yes* or *no* or *multiple choice* types of answers are very simple to code and to handle by machine tabulation. If the material is to be tabulated by machine, it is desirable to include space on the schedule itself for coding boxes inserted at the places where it is intended to use them.

Selection, training, and supervision of enumerators

Selection

In selecting enumerators for personal enumeration, the broad objective – i.e., to obtain as honest an answer as possible from the respondent – should be kept in mind. For example, you do not need a mathematician to do this, in fact a mathematician may be a relatively poor enumerator. The most desirable type of person is one who is reasonably intelligent and is respected in the community. One device is a simple intelligence test in order to ensure that the enumerator is reasonably intelligent. If confidential information is to be collected, the enumerator should be a discreet person who will not disclose the information that he has obtained.

Training

Part of the training plan should include practice in enumerating. One helpful device which has been frequently used is to have the enumerators, while they are in training, interview each other and fill out schedules. The training given the enumerator should consist not merely of lectures by the instructor, nor should it be

simply a matter of turning over some training manuals or written instructions to the enumerator and expecting him to go out on his own. A little practice enumeration will assist greatly in providing well-trained enumerators.

The instructors should be people thoroughly familiar with the purpose of the survey and how it is to be processed, as well as with the questionnaire and schedule itself. The instructor must be able to answer the questions of the enumerators being trained.

Manuals and written instructions

On large-scale surveys, written instructions or manuals are a necessity to ensure uniformity by all the enumerators over a large area. In the case of small-scale surveys, written manuals and instructions are not so essential, especially if all the enumerators are trained together.

Field supervision

All decisions do not necessarily have to be made at central points. There should be sufficient flexibility in the plan to allow the field supervisor to make minor modifications to suit conditions which might be somewhat different in the particular area in which he is working. One of the important jobs of the field supervisor is to check the work of the enumerators, certainly during the first few days, to ensure reasonable uniformity and conformity with the plan and the survey instructions.

Miscellaneous

Desirability of post-enumeration survey as a quality check

Post-enumeration surveys as a check on quality are relatively new but are proving very effective in determining the extent of bias and error in the survey results. A limited sample survey is usually sufficient. In addition to the re-enumeration of some of the respondents in the original survey, there are other devices which can be used, such as checking other sources where related information is available.

Confidential nature of survey returns

Certain uses to which the data could be put may have a very adverse effect upon the collection of that data or upon the future collection of data of the same general character. Generally, the individual schedule collected in this type of statistical survey is seen only by the people in the office concerned with the collection, and the information is released only in the form of statistical tables and summaries in such a way that the identity of any individual respondent is not revealed. The practice in many countries is that data collected for statistical purposes will not be used for purposes of regulation. The information is available on an individual respondent basis to the office which has collected the information or, under certain conditions, to a limited number of other offices. Beyond that, the general practice is that the statistics are made public only in a form which does not reveal the identity of the individual respondents. This has worked very well in building up a good relationship between the respondent and his government, since the former is assured that the information supplied will be treated in confidence and will not be used for enforcing regulations.

Required versus voluntary reporting

Much of the data collected is collected on the basis of voluntary co-operation on the part of the respondents. The other extreme is the collection of information under penalty of law, with the government having authority to fine a person or even put him in prison if he refuses to supply the information requested. Many of the statistical offices which collect information on a voluntary basis believe that the quality of the information is better than could be secured under a mandatory system. The type of collection which will prove most effective depends on such a variety of conditions that no hard and fast rules can be laid down. Most countries use both types.

Conclusion

Some of the most important things in data collection may be briefly summarized as follows: make the survey programme sufficiently flexible to take care of unforeseen circumstances; use a common-sense approach to consider the eventualities which may result from alternative courses of action; confine the initial survey to the basic data needs; avoid over-elaboration; try especially to see that a return is secured. The best survey plan in the world, or the best schedule, is not worth very much if the respondent does not return the schedule or if the information wanted is not forthcoming and in a form in which it can be processed.

CHAPTER 7

GENERAL PROBLEMS OF DATA PROCESSING

Tabulating systems are an essential part of statistical organizations in that they are the medium whereby statistical information is assembled, arranged or rearranged into the form required for presentation in statistical tables or reports. Data processing techniques may be simple or complex depending upon the source data, the form into which the data must be organized and the resources of time and money available. The particular processing method adopted must be based upon an analysis of the job itself, the time element, cost factors and the facilities at hand. Under these conditions, it would be impossible to prescribe a model tabulating system, ideal for all surveys, at all times and in all countries. It is thought preferable to outline the tools available for data processing, to indicate certain special features of tabulating equipment which facilitate processing, to mention some applications suitable for specific purposes and to set out some of the factors which should be considered in planning and operating a tabulating system.

Data processing tools are broadly of two kinds: manual, utilizing tally sheets, tally cards, or other types of paper and card stock forms; and mechanical, utilizing machines of some description. The latter may be divided into three groups: (1) those dependent on neither the punched card nor the tape technique, (2) those dependent on the punched card technique and (3) those dependent on the tape technique.

Manual data processing tools

Tally sheets

The tally sheet, one of the oldest and simplest data processing tools is, for numerous purposes, still useful. It consists of a blank table or form with proper captions and stub-headings indicating the items to be tallied. The enumeration, counting or recording is done by making a series of marks, one for each item. The tally sheet produces tabulations of one or more variables usually without cross-classification. As each source document is analysed, a mark is made in the appropriate section. Totalling of the tabulated results is facilitated by blocking tally marks in groups of five.

For simple tabulating jobs where the volume is relatively small, the tally sheet has probably no equal even when mechanized processing equipment is available. This method is particularly useful when the source documents are of a design which does not readily permit the use of faster tabulating techniques. The tally sheet tabulating process requires only a fraction of the amount of paper used by other methods but is slow and tedious.

Tally cards

The tally card is a form of card or paper stock, with appropriate captions, on which the facts to be tabulated are recorded, usually in code form. The tally card offers greater tabulating flexibility than does the tally sheet but it is more complicated and hence less useful. A tabulation can be obtained by this method simply by sorting the cards into groups according to one variable and then re-sorting each group by a second variable. Additional sorts produce further cross-classifications to the extent that is possible with the number of variables on the tally card. As a tabulating medium the tally card is, at best, complex and slow. If the tabulating job is relatively simple and the volume small, the tally sheet is preferable. If, on the other hand, the tabulating project is complex or if it is simple but the volume large, then mechanical methods are, normally, preferable.

Marginal cards

The principle of the marginal card is relatively simple. Holes are pre-punched into the cards at regular intervals along one or more edges and the process of transferring information to the cards consists of punching slots into the cards at positions representing the information required in each case. The amount of information which can be placed on a card depends primarily upon the size of the card and its layout. Cards are slotted by means of several devices ranging from a hand slot punch to a multiple key punch. Sorting is accomplished by means of a needle which is run through the holes designating the classification desired. When the needle is raised all cards slotted for the particular information drop out. When sorting is completed, a count of the cards in each group produces the information required for a tabulation.

The marginal card has limited use in statistical applications. The cost of cards is relatively high while slotting and counting are slow. It is used chiefly in personnel records, sales analysis and payroll analysis, where the number of cards involved is small.

Mechanical data-processing tools not dependent on the punched card or tape technique

Adding machines

There are numerous types of adding machines, both in the single and duplex or multiple bank category. The principles of operation, however, are similar for all makes and models. Keys, representing digits from 0 to 9 or 1 to 9, are depressed for any total to be tabulated within the capacity of the machine and amounts are printed on a recording tape by striking a print or type bar. The machine accumulates figures recorded and prints a total or sub-total when the appropriate keys and print bar are depressed. The chief difference between a single and a duplex or multiple bank adding machine is its capacity

for simultaneous tabulation of factors of information. A single bank adding machine accumulates and records amounts for only one item at a time. A duplex bank adding machine, on the other hand, permits simultaneous accumulation and recording of two amounts. Multiple bank adding machines accumulate and record as many amounts as they have banks – some machines have as many as 20 banks.

Adding machines are suitable for tabulating jobs for which cumulative totals are required while unit counts are only of secondary importance. The process, however, is a slow one and is further complicated by the fact that it does not lend itself to any simple procedure for verification as to accuracy of the results. Checking of tabulations is usually accomplished by producing two complete additions and (1) comparing tape totals or (2) reading entries from source documents against machine tapes. Both methods are time consuming so that adding machines are slowly giving ground to faster and less costly techniques.

Calculating machines

Calculating machines are classified into two broad categories – rotary calculating machines and key-actuated calculating machines. The former includes such makes as the Odhner, Frieden, Brunsviga, Madas, Curta, Marchant and Monroe and the latter, the comptometer, and the Burroughs calculator.

Rotary calculating machines may be fully automatic, semi-automatic, or hand operated. The multiplier and multiplicand or divisor and dividend for a problem are placed into the machines by depressing keys or levers. Calculations are completed by depressing the motor bar on fully automatic machines; positioning the carriage and depressing the motor bar and other keys on semi-automatic machines; and manipulation of levers or dials on hand-operated machines. Maximum operating efficiency can generally be achieved quickly since the touch technique is not essential for efficient operation.

Key-actuated calculating machines may be key driven or motor driven. Their capacity depends on the number of keyboard columns for totalling and on the number of overflow digits for the answer. Digit keys, 1 to 9, are provided for each column of the keyboard.

While, in some respects, key-actuated calculating machines are similar to single-bank adding machines, they differ in that they are not equipped with listing mechanisms. The accumulated amount or difference resulting from the depression of any one key is immediately registered on the answer dial. While all keys are used for multiplication, division and subtraction, usually only those for digits 1 to 5 are used for additions. This technique permits operation by touch and thus aids in the achievement of maximum operating efficiency.

While the primary use of key-actuated calculating machines is in the addition of amounts from source documents and in the addition and balancing of tabulated data, these machines are used extensively for calculations involving multiplication and division. The latter operations can be performed on them with considerable speed and accuracy.

Tabulating by the peg-board process

Another device which has been adapted to certain types of tabulating projects is the peg-board. This is a device, consisting of a peg-bar and a peg-board, which facilitates an orderly arrangement of questionnaires so that totals may be easily added, usually on key-actuated calculating machines. The peg-bar portion of this device is a metal bar, of some 20" to 36" in length, equipped with metal pegs equally spaced at suitable intervals. The peg-bar is mounted on a wooden board varying from 20" × 18" to 36" × 18" in size. Up to 50 or 60 questionnaires, depending upon the width of columns, are stripped or pegged on the bar so that the same column of each questionnaire is visible to the operator. Horizontal additions of similar items of information can thus readily be made by a calculating machine operator. A sliding guide rule is used to facilitate passage of the eyes across the board. Totals for each item, as determined, are entered on a blank questionnaire of the same design, referred to as a recap sheet. To ensure accuracy of accumulated horizontal totals, vertical additions of each column, regardless of unit of measure, are usually made so that a two-way grand total may be obtained for each group of questionnaires. In practice, it is found that some operators do not use the board, preferring to place the peg-bar containing the questionnaires flat on the desk and use a steel bar or ruler as a guide.

This technique is applicable to jobs necessitating the addition of totals for individual items on a number of questionnaires. It is not applicable to tabulation projects involving complex cross-classifications.

Bank proof machines

The bank proof machine was designed primarily for use in banks to speed up sorting, listing, proving and endorsing of cheques. However, it has been used for the tabulation of certain types of statistical data with considerable success because of its tabulating capacity and other tabulating features. The machine has the facility to tabulate and to accumulate up to 24 different facts of information at one time. Technique of operation is simple and much the same as on any standard adding machine. The bank proof machine records amounts for each item of information on individual tapes and all amounts on a master tape, indicating opposite each item of information recorded on the latter the particular compartment in which the information has been accumulated. Production on bank proof machines is generally somewhat higher than on standard adding machines. Addition of statistical data applicable to standard adding machine tabulation can be done equally well or, in some cases, better on bank proof machines. Questionnaires having numerous items of information, for which accumulative totals are required, are particularly suited to the bank proof method of processing.

Mechanical data-processing tools dependent on the punched-card technique

The large volume of data produced by statistical organizations and the extensive cross-classifications which provide the basis for social and economic analysis would be impossible without the punch card and the equipment engineered to use it. Due to the complex nature of the

machines and their uses, only a brief outline can be given here. Further details are readily obtainable from the manufacturers of these machines.

The basis of the punched-card method is the punch card. This is a simple device made of paper stock, precision manufactured as to thickness and size. The cards are divided vertically into 45, 80, 90 or some other number of columns and horizontally into 12 positions or the necessary combinations to form at least 10 positions. A substantial amount of information pertaining to a person, farm establishment, etc., can be recorded in a punch card merely by punching holes into the possible column-positions provided. The punched holes represent statistical data which can be sensed by punched-card tabulating equipment, counted and recorded on dials or paper. The principal punched-card tabulating equipment includes card counting sorters, accounting machines, electronic statistical machines, and other ancillary equipment.

Key punch and verifier machines

Card punching is basically the first operation undertaken in a mechanical tabulation installation. Source data must be punched into the cards in a predetermined form before other equipment can take part in the processing operations. Although key punch machines vary considerably in design and speed of operation, they are identical in this respect that they convert source data into punched holes when an operator strikes numerical or alphabetical keys. Key punch machines normally feed, position and eject punched cards automatically, thus leaving the operator free to read data from the source document and strike the proper keys.

Some key punch machines are equipped with devices which automatically duplicate identification and other data common to a group of cards. Duplication of information is accomplished by placing a pre-punched master card into the duplicating rack or card programme drum. Information may be duplicated in any portion of the card. This feature speeds up punching production and reduces errors in the duplicated fields of the card to a point not possible by repetitive striking of the keys.

Punched cards produced on key punch machines are subject to human as well as to mechanical error and, hence must be verified. Verification is merely a repetition of the key punch operation by a second operator who reads the same source documents and strikes corresponding keys on the verifier. The verifier compares the key depressed with the hole previously punched in the card causing the machine to stop or indent the card in case of a discrepancy between the two operations.

Mark-sensed punching, utilizing reproducing punch machines

One of the several functions of a reproducing punch is that of originating punched cards directly from source data. The source data must, of course, be recorded on a standard-sized punch-card document which eventually becomes the punched card itself. The punch-card document is divided, for this purpose, into mark-sensing columns, each column being the equivalent in width of approximately three punch-card columns. The reproducing punch is equipped, for this purpose, with a mark-sensing device capable of reading pencil or special ink marks from punch-card-sized documents and automatically converting them into punched holes. Additional columns may be punched by ancillary equipment or key punch machines.

Card counting sorters

The simplest tabulating device in the punched-card tabulating machines category is the card counting sorter. This machine is equipped with a limited number of counters – generally one for each position of a punch-card column. Its capacity is limited, in any one pass of the cards, to the tabulation of information from any one of the punch-card columns.

The primary function of the card counting sorter is to record on counters the number of punched cards containing information in each of the possible positions of a single column, the number not punched at all, and the total number of cards involved. In addition, the machine is capable of counting cards punched in any one of a combination of positions in a single column. This facility, however, is limited in that only one combination can be counted at any one pass of the cards through the machine. Information recorded on the counters must be transferred manually to a tabulation sheet since the machine is not equipped with a printing device.

The card counting sorter has, in the past, served statistical organizations well and even today plays a prominent role in a tabulating installation. It is particularly suitable to tabulation jobs having relatively small volumes of punched cards or to jobs having a large volume of cards but requiring tabulations for a limited number of columns. Card counting sorters are particularly useful in an installation which cannot justify the greater capacity and more complex tabulating machines.

Accounting machines (or tabulators)

Card counting sorters are not adequate where accumulated totals are required. The accounting machine accumulates totals and performs a function complementary to that of the card counting sorter. Both types of machines are generally essential in a mechanical tabulation installation. Punched cards must be pre-sorted into particular classifications or groups for which cumulative data are required. The accounting machine has no facilities for arranging punched cards in the order required for tabulating purposes.

Some of the chief features of the accounting machine are:

1. Control devices provide flexibility of operation in that numerous variations can be wired into the machine to control tabulation of data; the controls also permit automatic operation of the machine.

2. A print unit consisting of both alphabetic and numerical type bars permits the machine to print information on a report read into the counters from the punched cards.

3. Counters can be impulsed to add or subtract information from punched cards into the same counter group, depending upon the direction indicated through the controls.

4. The machine lists information on a report from individual punched cards; accumulation of information for groups of punched cards can proceed during the listing operation.

5. The accounting machine accumulates and prints information on a report for groups of punched cards.

6. Automatic printing controls direct the machine to print minor, intermediate and major group totals. These three group totals can be printed automatically, if desired, as soon as all cards comprising each group pass through the machine.

7. The machine permits selective listing of information from distinctively punched cards only.

8. In the course of tabulating information, the number of cards listed or accumulated can be determined and the results printed on the report.

9. A device prints letters or figures opposite each line of totals printed or information listed on the report to identify the particular group of cards involved.

If the accounting machine did no more than accumulate totals, its usefulness in a mechanical tabulation installation would be limited since tabulations of this nature could be done at considerably less cost on adding machines or by the peg-board and the calculating machine technique. It is to meet the need of classifying accumulative data according to diverse factors that the accounting machine has particular application. Punched cards can readily be sorted on ancillary equipment into any classification or cross-classification and totals accumulated on the accounting machine for each cell of information desired. The accounting machine facilitates tabulations of a complex nature which would be too costly to obtain by other techniques.

Electronic statistical machines

The electronic statistical machine is one of the latest developments in tabulating equipment on the market. Due to its tabulating capacity and operating flexibility, this machine supplants, for many purposes, the card counting sorter. Furthermore, having the facility to accumulate two amounts, it performs, in a limited sense, the function of an accounting machine. For statistical work requiring accumulation of many totals, however, the electronic statistical machine does not replace the accounting machine in that its accumulating capacity is insufficient to meet such needs.

Tabulating capacity and operating flexibility of the machine are due, for the most part, to a network of digit emitters, selectors, unit counters and numerous other devices all of which are readily controlled through a plugable control panel.

In addition to a number of other functions, the electronic statistical machine was designed to:

1. Count cards for as many as 60 different single or multiple-digit classifications.

2. Arrange cards into required groups consisting of any combination of punched classifications.

3. Recode punched classifications into other classifications not punched into the cards.

4. Add amounts for specific classifications in one or two counters.

5. Print results on one or two report forms of convenient size.

6. Summary-punch indications, counts, and total amounts in cards when one or two summary punches are connected.

7. Check distributed counts with total counts.

8. Edit punched data for discrepancies.

Development of the electronic statistical machine not only solved numerous tabulating problems but also simplified coding procedures. Whereas formerly, for convenience of tabulating, it was generally best to limit coding to a minimum number of classes required for any single characteristic, it is now possible to code in detail to meet any eventuality. While the card counting sorter, at one pass of the punched cards, produces tabulations most readily when classification is limited to one column, there is no such limitation in the use of the electronic statistical machine. The latter is not concerned with how many punch-card columns are involved or the amount of coding detail covering a particular characteristic but rather into how many classes information is to be tabulated.

Careful examination of the functions for which the electronic statistical machine was initially designed shows that the number of tabulating and other data processing applications available in a statistical organization for this machine are of considerable extent. The machine is particularly useful for elaborate cross-classifications in the course of which some of the other functions of the machine, such as recoding of punched classifications, editing, sorting, etc., can be utilized at the same time and at little extra machine time cost.

Ancillary data processing equipment

In addition to the primary punch-card units in a mechanical tabulation, there are numerous other ancillary pieces of equipment designed to aid in the processing of statistical data. The need for any one or more of these machines in an installation depends entirely upon the extent and coverage of the statistical system: the number of surveys being conducted (1) on a continuing basis and (2) of an *ad hoc* nature, and the detail in which the information is required.

Calculating punch machines

The calculating punch was designed primarily to simplify tabulations and to meet the needs for computed statistical data. From basic information punched in a card or a series of cards, the machine can multiply, divide, add, subtract or perform any combination of these operations and punch one or more results in each card, or in a following card. Furthermore, some models of the calculating punch can be connected to an accounting machine and other machine units for a card-programmed calculation. In this case the accounting machine reads from a punched-card calculation factors and coded instructions with respect to calculations required. Calculation factors are introduced into counters of several machine units and computations made by the calculating punch while a storage unit holds all figures until they are needed. When computations are completed, results are printed on a report by the accounting machine or punched into a card by the punch unit of the calculating punch. If desired, results may be printed for immediate use and also punched into punched cards for further processing.

Although the operating speed of a calculating punch is relatively slow in comparison to other punched-card processing equipment, it is, nevertheless, many times faster than any manual calculating machine. The machine operates at varying speeds from a minimum of about 500 to a maximum of several thousand cards per hour. The number of punched cards processed depends entirely upon the size and number of calculating factors involved in each operation.

Collator

Punched cards are frequently not in the order essential for tabulation, manual examination, further punching or similar operations. The collator is a machine specifically designed to facilitate placing and checking of punched cards to secure the order desired. The chief functions of this machine are merging, selecting, matching, sequence checking and multiple column selection.

The merging and selecting functions of a collator are comparable to manual placing of records in and extracting them from a file. Merging is the process of bringing together two sets of punched cards into one set in a given sequence. Selecting is the function of extracting specific cards from a file for manual examination or some independent processing operation. In the case of merging, both secondary and primary sets of cards must be in the same sequence.

The sequence checking function of a collator is the process of verifying the order of cards in a set to make certain that all cards are in their correct order. This operation may be performed in the course of merging. The matching function, on the other hand, is the operation of comparing two sets of cards to determine whether or not they are in the same sequence. Both sets of cards remain in separate groups throughout.

The multiple column selection function includes a variety of operations all of which are, basically, selecting cards having a specific identification. This function of the collator can now be effectively accomplished on the electronic statistical machine.

Interpreters

The function of an interpreter is to print on a punched card the same information as is punched in it. Interpretation of both numerical and alphabetical punching is possible. Some card punch machines interpret during the punching operation, thus eliminating the need for an interpreter.

The interpretation of punched information is primarily for the purpose of aiding visual reading of information punched in the card. This may be necessary when large numbers of punched cards must be handled for manual checking, filing and sorting.

Reproducing punch machines

The principal functions of the reproducing punch are gang punching, reproducing, comparing, mark-sensed punching and summary punching. Combinations of these operations may be carried out at one pass of the cards through the machine. Speed of operation is at about 100 cards per minute.

1. Gang punching. This feature of the machine permits automatic transfer of punched information from a master card into one or more detail cards following it. From 1 to 86 columns may be gang punched at one pass of the cards through the machine. Gang punching may take the form of:

(*a*) Straight gang punching, i.e. punching into detail cards information which is identical to that in a master card,

(*b*) Interspersed gang punching, i.e. punching information into detail cards which is identical to that in a master card except that master cards are interspersed throughout the set of cards, and

(*c*) Offset gang punching, i.e. punching information into columns of detail cards other than those punched in the master cards.

2. Reproducing. This function of the machine permits automatic transfer of punched information from a set of source cards into blank or partially punched cards. The reproducing function is particularly useful for replacing worn-out cards, production of a duplicate set of cards to speed up tabulation, and automatic punching of information common to two or more sets of cards. Reproducing may take the form of:

(*a*) Straight reproduction, i.e. punching information from source cards into the identical or different columns of a second set of cards,

(*b*) Field selected reproduction, i.e. punching information read from one of two punched fields on source cards into a single field on reproduced cards, and

(*c*) Selective reproduction, i.e. reproducing, partially or completely, certain source cards only.

3. Card comparing. This function of the machine permits checking two sets of punched cards for agreement in the data punched and in the sequence. Comparing may be either simultaneous with gang punching and reproducing or a separate operation.

Sorters

Punched cards produced on a card punch are not usually in a sequence suitable for preparation of statistical reports. This means that an intermediate operation must be introduced whereby cards are arranged or classified into groups or sequences according to numerical or alphabetic data. The sorter is designed specifically to arrange punched cards for subsequent tabulating and, in some cases, for other ancillary processing operations.

In addition to straight sorting, special devices on the sorter permit it to:

1. Select cards with an alphabetic or numerical code combination within a limited number of adjacent columns.

2. Count all cards passed through the machine.

3. Match master cards with detail cards.

4. Sort all cards following a master card according to the punching in the master card.

Punched cards can also be sorted on a card counting sorter or on an electronic statistical machine. The latter, in particular, simplifies sorting because of its special selecting feature.

Summary card punching

Summary card punching is the automatic conversion of totals accumulated in machine counters into punched cards. Summary cards may be produced on a reproducing summary punch in combination with an accounting machine or on a summary punch connected to an electronic statistical machine. Summary card punching has two basic purposes:

1. To reduce card volume, so that tabulations comparable to those initially produced for minor divisions of classification can be mechanically prepared for major divisions of classification without the necessity of passing detail cards through tabulating equipment a second time.

2. To produce punched cards which summarize information from one field of one card and the same or a different field of another card.

The electronic statistical machine equipped with one or two duplicating summary punches will produce punched cards showing sufficient identification for subsequent tabulation purposes, two accumulated amounts, and total counts for each of up to 60 units of information. All information from accumulating and unit counters can be punched into summary cards while in the course of being printed on a report. Four punched cards are required to record summary information when all 60 counter units are used.

The use of summary cards produced by the electronic statistical machine and duplicating summary punch equipment, or the accounting machine and reproducing punch eliminates for most purposes the costly process of using work tables as a means of assembling initial tabulations for small divisions of classification into larger ones.

Tape tabulating systems (digital computers)

As the demand for statistical data increased, manual tabulating methods gave way to systems involving adding and calculating machines and these, in turn, to card tabulating equipment. It now appears that, in the case of, large volumes in which timeliness is an important factor statistical data cannot always be processed quickly enough solely by the use of card tabulating machines. Much attention has been given to this problem and part of the answer seems to be the use of some form of electronic computers. These machines process data at considerably higher speed which is due chiefly to the fact that computers operate with magnetic or paper tapes rather than cards. Both operating instructions and the basic data are transferred to the tapes which pass through the computers to produce the results in printed tabular form. Many of these computers are in the experimental stage and are not used extensively in statistical work.

Conclusion

This brief outline of data processing equipment indicates the variety of the tools available for the production of statistics. Because of the complex nature of much of the equipment, the question frequently arises in a statistical organization as to the extent to which a statistician should be familiar with the data processing tools.

Mechanical tabulation technicians generally feel that tabulation problems which the statistician may have should be turned over to them for advice and solution. It is generally agreed that statisticians need not be tabulation experts but that they should have a working knowledge of data processing tools and techniques. Many statisticians are required to design questionnaires. The format of a questionnaire should depend largely upon the data processing tools which will be used to assemble the raw data from source documents into tabulated form. The processing technique should be determined, in so far as possible, when the questionnaire is designed rather than after it is completed in the field and is ready for processing. The processing technique can best be determined by the statistician who is familiar with the raw data as well as with the finished product.

If the statistical requirements are presented to the tabulation technician as a complete tabulation programme, he can plan his tabulation procedure in a logical sequence. The statistician unfamiliar with tabulation techniques may ask for information arranged in a manner which may cause unnecessary work. Consultation with the tabulation technician may avoid such situations. Other arrangements may be worked out which will be equally satisfactory and result in a net saving of many machine-days of operation. An understanding of the capacity of the machines may permit the statistician to obtain additional information at little extra effort and cost.

The organization of an efficient tabulating system can best be achieved by co-operation between the statisticians familiar with statistical problems, the raw data to be processed and the tabulated results required; and the technicians familiar with data processing tools, the peculiarities, capacities and application of tabulating equipment, and the manner in which machines should be organized into a working unit.

Some elements of a plan for punch-card processing

The initial planning of a punch-card activity depends much upon the knowledge and experience of persons professionally interested in office methods. Once this is completed and operations begin, those in charge of this activity are concerned with three basic functions – to plan, to execute, and to evaluate. These functions are related – good planning depends upon experience in evaluating similar operations; execution of the plans must be controlled; evaluation of operations provides the necessary clues to performance, efficiency, cost, utilization of resources and success or failure in meeting objectives. Only after such evaluations can improvements be made. These may involve changing or modifying plans and operations with a subsequent re-evaluation of the results.

The sound evalution of machine operations requires consideration of personnel questions, as well as those related to the purely mechanical aspects of the work. Too much emphasis has been placed in the past upon the work that machines do. Machines are no better than the people who use them. They require intelligent direction and control if they are to produce worthwhile results. The supervisor of the tabulating machine department has at his disposal a productive capacity which he may use well or poorly. Some of the essentials for success are: (1) to specify clearly the work to be done; (2) to determine the regular work loads; (3) to schedule all jobs and operations; (4) to keep adequate control of operations;

(5) to collect operating data; and (6) to evaluate and improve.

Specify clearly the work to be done

The successful performance of any job requires a complete understanding of the objectives and the procedures to be followed in meeting them. The supervisor, in consultation with those responsible for the collection and analysis of the statistical series, must determine which tabulations are necessary and how the tabulations should be presented. In addition, priorities on receipt of source documents and on delivery of completed tabulations should be established.

Once having established the priorities, it is possible to determine the jobs and operations which must be performed. It is necessary to specify each and every operation within each job and to record all operational details of the work to be done. These form the basis for making up manuals of procedure.

At this point it is useful to draw an operational flow chart of the various jobs. This chart should show symbolically every function or step necessary for each regular procedure. Regardless of the technique involved, it is highly important that a clear representation of every operation be established on paper for all regular jobs. Flow charts are highly useful in conveying instructions to operators and clerks and provide information to the technical officers concerned with the basic information for control over operations.

Having established the objectives of the job and the procedures necessary for carrying out these objectives, the operators' manual of procedure may be prepared. This means that, for each operation or job step involved, detailed technical information and instructions must be provided. This information is of greatest value to the individuals who will operate the machine and actually carry out the functions entailed in the various operations. It is in the operators' manual only that reference should be made to technical machine terms. It is also advisable to provide wiring and setup diagrams so that the operator may refer to pictures and illustrations of the operation involved. This eliminates complete dependence upon the interpretation of words.

Manuals of procedure have great value as training aids when new operators are required, or when operators must be transferred to other machines or to other jobs. The value of written instructions lies in the fact that they may be read as many times as desired, and do not require repetition by the supervisor. The use of charts, exhibits and illustrations, on the other hand, reduces the number of times written instructions need be read. Manuals of procedure, if they are to serve their purpose to the best advantage, must be kept up to date.

Determine the regular work loads

The development of the manual of procedure and the job specifications is the qualitative determination of the job. The next step is to consider the quantitative aspect of the work to be done. Once regular work has been specified, it is essential to maintain accurate knowledge of the work load. Records should be kept of the actual volume of documents, cards and reports and how the volumes fluctuate. Knowing this, time factors may be applied to each operation.

Peak loads cannot be eliminated, although frequently they can be reduced. The important thing is to know when such peak load periods exist and how much of a work load is present at a peak load period. These are the times during the month when scheduling becomes most essential. Knowing the work load and volume, the next step is to convert these volume figures into time factors. The time factor will be the scheduled or standard time applying to the particular operation to be run at a particular time.

Clerical functions are the least predictable. They depend so much upon the human variable that they must be, at best, an estimate. Such time factors are determined by experience with the type of clerical functions involved, or by experiments, e.g., the time of processing a certain number of items.

For key-driven functions, this determination may be more precise. The time for a key-driven operation may be determined from production records which have been kept on previous performances. This suggests that the supervisor must continually keep records of production for each operator to establish average rates of production for individual operators as well as for the section.

In case of the automatic functions, time is determined more scientifically from the supervisor's knowledge of machine speed, setup time and handling time. Knowing the volume of cards to be processed and the speed of the machine, the machine time can be calculated by dividing volume by speed. This determines the number of machine hours required for the operation. To this machine time must be added a certain amount of setup time, which is required in all machine operations, and represents the time for handling the cards, selecting the proper control panel, adjusting the machine, running an operations test, etc. As the work proceeds, there is additional operator activity involved in handling the cards, adjustment of the machine, checking the work in progress and other details. These functions are usually called operator-handling time. The total time for each operation, therefore, must be the sum of the setup time, the machine time and the operator-handling time. To facilitate the calculation of machine time, or the conversion of volume into time, certain charts or tables have been printed by companies which manufacture the machines and are available to machine processing units. These charts and tables are designed to tell the supervisor the machine time corresponding to any particular volume of cards being used on any particular machine. They, of course, cannot tell how much setup time or handling time to apply to the operation. These must be worked out and applied by the supervisor for his particular installation. Such operational efficiency factors are of extreme importance to the supervisor and become an essential determination that he must make in any evaluation process. Regardless of how these time factors are determined, it is important that they be recorded, either on a work sheet for machine loads, on the schedules, applied to the flow chart or applied to the operator job description.

Machine hours considered together with the length of the work week lead directly to the machine requirements and to machine costs. In like manner, operator costs may

be calculated. Inclusion of costs of cards, forms and other materials, as well as overhead or burden costs which the activity must carry will give the total estimated cost.

When one desires to compare the costs of alternative methods, the same process must be applied to each method under consideration. Obviously cost is not always the only criterion in making a choice of method.

Schedule all jobs and operations

Scheduling is the process of fitting jobs into a logical time table. It is a budget of time that provides for beginning and completion time of units of work. Before any scheduling can be done within the machine room, it is essential that *Due-In* time of documents be fixed or *Due-Out* time for the final reports be established. The processing time is merely the difference in time between the start and finish time for particular jobs.

In determining the processing time, the supervisor must consider the flow chart which has been developed, the time factors which have been calculated for each operation, the machines required and the operator capacity. It must be decided which operations must overlap in order to reduce the processing time, or at which point several operators or several machines must be used.

In scheduling, it is advantageous to keep the batches of cards as large as possible. When cards are in small batches, operational efficiency decreases because a greater amount of time is spent at each operation in the setup of the machine and the handling of the work, compared to the amount of machine time involved in the particular function.

Machine schedules are sometimes employed to great advantage by indicating on a chart the jobs to be run on a specific machine. Opposite each machine is indicated the time at which certain jobs are scheduled to take place on that machine. A schedule of this type is not as valuable as the procedure schedules discussed previously because it does not show the *Due-In* and *Due-Out* times on the several jobs. On the other hand, it is more valuable from the standpoint of studying machine utilization. This is helpful in scheduling additional or unforeseen jobs because there is readily apparent on the machine schedule which machines have already been scheduled, and which machines are available for additional work. Schedules, whether they be plotted by jobs or by machines, should show how jobs, machines and operators are co-ordinated for most efficient operation.

In the same way, personnel schedules may be developed. However, it is common practice in most machine installations to associate operators either with a particular job, or with a particular type of machine, in which case there is no need for a personnel schedule. By associating operators with either job or machine, the scheduling technique is simplified so that it is necessary only to co-ordinate jobs and machines. It should be remembered, however, that all such schedules are things to be changed; they are work sheets on which decisions are recorded as they are made, and can represent nothing more than what is known about the work to be done. For this reason, work schedules must be kept flexible.

Keep adequate control of operations

Effective processing control requires proper grouping for economical operations, identification of cards in process and efficient routing from machine to machine. Flow charts and schedules are extremely valuable in this connexion. All cards and trays of cards should be identified in a standard way. The routing of work may be controlled either by a chief operator, or by assistant supervisors who are familiar with the procedures involved and can watch the progress of the work from machine to machine until the final reports are produced. A more formal method is the use of a job ticket which is a card listing the name of the job and each operation. This job ticket should move with the batch of cards from the beginning to the end of the procedure, and serves in many cases as a convenient record on which certain operating data can be recorded.

The objective of process control is to maintain control over the physical movements of cards. This control requires uniform identification. Supervisors must depend upon operators to record certain operational data pertaining to job, operator, machines, volume and time. This should show actual facts for each operation. There are many ways of obtaining operating data from the machine room as the work is being completed. Mention has already been made of the job ticket – on this can be recorded the machine used, the operator employed and the time and volume of the job. Another common operation record is the machine operation record. A separate card or form is placed on each machine unit, and whenever an operator uses that machine he records on this operation record the job involved, the operator who used the machine and the volume and time of the work. Another method is the use of the operator's report. In this case, each operator fills out a report showing jobs which have been worked on during that day, the machines used and the volume and time pertaining to the various operations. Still another method is to employ the unit record for each operation. A separate card, preferably a punch card, may be filled out to show the same operational data as before and the unit record punched for each operation. In this way, various studies may be made by automatically classifying and summarizing time and volume either by jobs or by machines or by operator.

Other factual information of management importance relates to cost, number of hours, maintenance data, overtime and idle time data. To make cost studies, certain basic information must be obtained which shows salaries of operators, machine service charge, cost of supplies and burden or overhead costs.

Care should be taken that clerks and operators do not feel that they are being subjected to surveillance as they record operating data. If so, the information recorded will likely be wrong, and hence the programme will probably be unsuccessful. On the other hand, if care is taken to explain to all operators that the recording and use of such data is in no way an attempt to check up on individuals, but is a medium for determining the most effective procedures, they will be more likely to co-operate in giving the correct information both from the standpoint of their own interests and those of the tabulating service.

Evaluate and improve

When operating data and other facts have been collected their classification and summarization makes possible the evaluation process. Evaluation is the critical comparison of classified summaries to determine their proper relationships.

Since the supervisor has the job of co-ordinating jobs, machines and personnel, we may expect any evaluation that he may make of his department will be a valuation of the same three factors. For each job that he performs, he can make summaries of volume, time, cost, hours and overtime. As the time and cost pertaining to each job are summarized, there are then available the necessary figures and facts to bring alongside the reports which grow out of the jobs. Only by adequate comparison of the results with the cost and time of producing these results can a correct evaluation of the job be made.

For each type of machine, summaries may likewise be made of the volume, time, cost, number of hours, overtime, idle time and maintenance time. Such studies contain essentially the same information, but since the information is classified differently, different aspects of the machine operations may be examined. In machine studies, one is usually interested in maintenance cost and time, and utilization of machines.

Comparison of such summary data indicates weak points in the operations. Comparisons show machine utilization, such as the ratio between the time the machine is actually used, and the time that the machine is available for use on a regular work basis. Operation efficiency may be determined by the volume of cards and the actual time to complete the operations on a given machine or type of machine.

Performance may be studied by examining the comparison between the actual results of doing the work whether by job, machine, or by operator, and comparing this actual performance with the schedule or standard time set up for performing the work.

Many other comparisons are possible. The more common evaluations are: cost per document processed, cost per tabulation produced or cost per job. It is only through such analysis that intelligent decisions can be made for improvement. Out of such evaluations will come certain changes which the supervisor will make in his plans for the next month or the next quarter. The best standard in the world against which to measure a given department's activity is to measure its own performance during the previous month.

Conclusion

The elements of good operation of a machine tabulating service discussed above do not represent a one-time job. On the contrary, they are continuous and repetitive. Adaptation to changing conditions is a continuous problem of a statistical service. Requirements, methods and personnel change continually. In a well managed machine service there should never come a time when it is impossible to incorporate into the procedure changes and improvements which result from an evaluation of the activity.

The importance of good personnel relationships cannot be overstressed. Sound principles of selection, placement and continual training must be maintained. Delegation of certain responsibilities to operators consistent with their training helps maintain high morale.

CHAPTER 8

GENERAL PROBLEMS OF PUBLICATION

The demands for data have increased greatly in recent years, and, in most countries, these requirements can be met only by publication and not by the simple expedient of producing a few typewritten copies. Demands change, too, from year to year, and unfortunately for the statistician's peace of mind, new demands arise more frequently than the old subside, and he is likely to be left with little time or budget to print studies, which from his vantage point and through his professional eye, he sees to be very much worthwhile.

In a broad statistical organization, there are competitive demands on publication funds from diverse quarters which can be met only in part. In fact the pressures, from without and within, for new publications in competition with each other and with older established periodical reports, present a problem of no small magnitude to the director of a statistical organization.

Of similar or greater importance in some countries are pressures or prohibitions against the printing of certain information. The solution to this problem would seem to depend on the provision of more satisfactory legislation to give statistical bodies greater freedom and autonomy. These are measures outside the jurisdiction of the statisticians themselves but which they can help to establish by the sustained observance of strictly objective and scientific standards.

National statistical publications (excluding census results) may be classified broadly into three groups:

1. General-purpose statistical publications, issued regularly. These publications – monthlies, bi-monthlies, quarterlies and annuals – are essentially source books of statistical series relating to the various aspects of the current economic and social situation within a country.

2. Special-subject publications, issued regularly. These include census, vital statistics, transportation, industrial and price reports, external trade, agriculture, mining and marketing publications.

3. Special studies and *ad hoc* reports, issued as the occasion warrants.

The discussion which follows is confined to general-purpose statistical publications, particularly to monthly bulletins, although certain of the observations are equally pertinent to the other types of publications.

Scope and coverage

Inasmuch as a general statistical publication is designed primarily to serve the statistical needs of many people with a wide variety of interests, rather than one or several groups with special interests, its subject matter is, by definition, limitless. In actual fact, however, its scope is limited by the following considerations:

1. The number of statistical series that are available on a current basis, i.e. at monthly, bi-monthly, quarterly, or annual intervals.

2. The size of the budget assigned for its production.

3. The amount of time required to produce each issue.

One of the principal requisites of a publication of this type is that it contain current figures and each delay in its issuance lessens the usefulness of the data.

Taking into account these limitations, the growth in the subject matter of national statistical publications over the past 15 years is most impressive. Before the last world war, current statistical bulletins generally contained selected tables on production, external trade, prices and finance. With few exceptions, the present-day bulletins contain tables relating to the many facets of the current economic and social life of the nation. The growth in the scope of statistical yearbooks has been equally impressive.

The headings of the main sections of the present-day national publications differ, of course, from country to country, depending upon the particular classifications used. The tables included under the particular headings in most of the bulletins and yearbooks, however, attempt to cover the following subject fields:

Population	Manufacturing	External trade
Vital statistics	Construction	Wages
Manpower	Transport	Prices
Agriculture	Communications	Public finance
Mining	Internal trade	Banking

A study of the growth in scope of the subject matter suggests, moreover, that it has been a planned rather than a haphazard development. Clearly, the national systems have endeavoured, during recent years, to develop statistics of general interest to the public.

Although the subject matter of a statistical bulletin is, in principle, very extensive, the particular series shown under each of the subject-headings are, characteristically, summary in form. For example, a monthly statistical bulletin normally shows current figures relating to total employment, and perhaps to total employment divided into broad groupings of industries or occupations for the country as a whole, and perhaps also for its principal legal or administrative sub-divisions. It does not generally, however, carry statistics relating to employment in each particular industry or occupation in each town, city or state. Similarly, the section dealing with external trade contains, as a rule, tables showing the total value of merchandise imported and exported over a given period of time, also total imports and exports analysed by origin and destination, quantity and value of principal imports and exports, general price and quantum indexes, as well as other summary statistics. A typical publication on

external trade statistics would, on the other hand, list for almost every individual commodity class the quantity and value imported and exported by origin and destination.

It is, in fact, neither wise nor practical that the data in a statistical bulletin be other than summary in form. The publication of all available current statistics under one cover would be most uneconomical since it would contain much detailed information of interest to a limited, special group of readers only. Such detailed information is more suitable for a separate report than for a statistical bulletin proper. The issuance of a large bulletin containing detailed statistics would, moreover, extend appreciably the production time of publication, thereby reducing its usefulness.

Many of the national systems have made considerable progress in limiting the contents of current statistical bulletins to summary statistics, e.g., national aggregates and indexes. It is interesting to note that the bulletins which contain excessively detailed tables are usually those that have been in existence for many years. Bulletins which have been extensively overhauled have about them the appearance of a house after its "spring cleaning", free of many items which have outlived their usefulness.

The publication of detailed break-downs of statistical series in a general-purpose bulletin is certainly not warranted where the same information is available in a separate, special-subject publication. In addition to extra cost, such data tend to overshadow, by their sheer volume, the summary tables which should constitute the basic data of a current bulletin.

Of course, detailed statistics collected currently should be included in a general-purpose bulletin if no other current publications more suitable for such data are available. In this situation, however, the issuance of the detailed data as a separate publication should be considered at the earliest practical time.

As mentioned earlier, a prime requisite of a current statistical bulletin is that the data constitute current quantitative information, i.e. that each successive issue show, for most of the series, new figures which keep the information up to date. In general, therefore, tables which are limited to annual data only should not be the subject matter of current statistical bulletins. Certain types of annual series, are, however, extremely useful in a current publication. For example, population and national income estimates (generally computed for the year as a whole) are often used in conjunction with other current series.

The contents of each issue of a statistical bulletin need not be confined exclusively to a fixed set of current tables. Many countries rotate certain tables for which current figures are available on a quarterly or semi-annual basis only. Moreover, *ad hoc* tables of current interest are also included in a number of national bulletins from time to time.

Special articles and commentaries on economic and social matters sometimes appear in the introductory sections of statistical bulletins. These articles are generally of a narrative rather than of an analytic character and fall into one of two broad categories: (1) those which summarize all the major national economic and/or social developments of the current period (month or quarter) and (2) those which deal more exhaustively with a particular subject of current interest, for example, cost of living, population or industrial production. It is generally held that such material may serve a useful purpose. Its inclusion, however, may appreciably lengthen the production time of the publication. This need not be so if the analysis or descriptive material is prepared by persons not directly concerned with the other operations connected with the preparation of the bulletin. There is the further possibility that the publication of such articles might place the national statistical service in a difficult situation with regard to certain government offices when their analyses tended to conflict in some way with official policy. This problem may be successfully met by discussing the article with the appropriate authorities prior to its publication. However, the statistical objectivity must be retained.

There is the further question of what quality a series must attain before it is advisable to include it in publications. It is usually held that statistics should not be hurried into print simply because they are available but, rather, should meet minimum standards of reliability. There should be continuous work on the improvement of series which fail to meet the minimum standards, until they are judged suitable for inclusion. On the other hand, an argument for early publication of below standard series is that the resultant criticism leads to their improvement; if they are suitably qualified so as not to be misleading, no great harm can occur. In a distribution of deaths by causes, the allocation of 20 per cent of cases to the category *unknown* is obviously undesirable but the table may still give useful information and is a starting point.

The pattern of publication of a series should be carefully considered. In a vital statistics annual, it might be desirable to allocate space only in alternate years to two subjects, for example, occupational mortality and motor vehicle accidents. This prevents excessive repetition and yet makes available reasonably up to date figures.

One problem of publication is how to make available unpublished data. In the health and other fields, localities might be able to make good use of data contained in the files of statistical offices. Consideration might be given to publishing, from time to time, a list of available *unpublished material* which interested persons might consult at the statistical office or obtain in typewritten or multigraphed form if they were willing to pay the expense of such preparation.

Presentation

The first concern of statisticians is to produce and publish accurate statistics. However, good statistics which are poorly presented may have a very limited audience. The primary aim in presentation is to make the statistical tables and general format as attractive and readable as possible. The type of reproduction employed as well as the paper are, of course, important. These, however, are subject to budgetary considerations and are often outside the control of the statistical service.

There are a number of matters relating to presentation which are the direct responsibility of the national statistical service. One such matter relates to the time periods shown for the various statistical tables in a bulletin. The

use of an identical time-stub for all tables in the same publication is of great help to the reader since it enables him to combine, relate, or compare several series for the same time period without having to resort to other issues of the publication.

For the same reason, the publication of all index numbers on a common base period is highly desirable. This is a more difficult matter since the various index number series usually originate at different periods of time. This problem may be partially resolved by selecting as the base period the point at which the maximum number of index series can be shown on the same base.

A second important element is the length of the time-stub, i.e. the number of observations shown for each statistical series. This varies considerably among the current national bulletins and even among the tables of the same publication. In considering what constitutes an adequate time-stub for statistical tables in a current bulletin, it should be remembered that the publication of the latest available figures alone on various subjects, without an accompanying set of earlier figures for the same series, limits considerably the use of the data. As a corollary, the more extensive the time series the more useful the data. In practice, the length of a time-stub is determined largely by the availability of data and space.

From the standpoint of the user, a time-stub should include, as a minimum, observations for each of the last 13 months to permit a comparison of the latest figures with those relating to the corresponding month or quarter of the previous year – a requisite for economic and social analysis. It should also include annual data for a minimum of three years preceding the current data. In addition, corresponding data for one or more pre-war years are useful for purposes of comparison.

The argument has often been advanced that since most of the figures in a current bulletin are repeated in successive issues, it would be sufficient to publish the entire tables once or twice a year along with monthly or quarterly supplements containing new and revised figures only. Attempts in this direction have not been successful simply because most users have neither the time nor the inclination to keep a set of statistical records up to date. This task becomes especially onerous and new sources of error may be introduced when, as frequently happens, revisions follow upon revisions for a particular series.

The usefulness of a statistical bulletin is also greatly enhanced by the extent to which each series is internally consistent over the time period shown. A break in the comparability of a statistical series is usually unavoidable, often resulting from an improvement in the quality of the particular series, for example, improved scope or coverage, or new weights in the case of an index. From the standpoint of the user, every effort should be made to extend the revised series as far back as possible, ideally, to the point where the previous series originated. Where this is not feasible, the nature of the differences between the old and revised series should be clearly stated in a footnote to the table.

Breaks in comparability over time occur more frequently in index number series than in other time series since the majority of the indexes are composites of several or many series joined together by a set of weighting coefficients. A substantial change in an important component series or the use of a new set of weights is sufficient reason to start a new index. On the other hand, there are instances where, although the changes introduced in indexes were relatively minor, the national services have begun publication of a new series at the point where the change was made, thus preventing the user from comparing the movements of the index over the entire time period shown in the publication. In the case of index numbers, such a degree of accuracy is not warranted. A splicing of the two series, with a breakline indicating the point where the splicing occurred, is highly desirable in all cases where the change in scope or method has not materially affected the index.

Even if every effort is made to preserve the comparability of a particular time series, breaks in the internal consistency of a series do occur with the resultant need for explanatory notes. The customary method of describing these breaks in continuity is by the use of footnotes to the table proper. Footnotes, however, have their limitations. More often than not, the space at the bottom of each table is at a premium and, if several footnotes are necessary, it becomes essential to limit their respective texts to the bare essentials – often a very difficult task.

The chronic shortage of footnote space can be alleviated by establishing a separate section of the bulletin in which are inserted the descriptive notes of all major revisions in the issue when such revisions are first shown, accompanied by an appropriate symbol in the boxheads of the particular series signalling these changes. The publication in each issue of a cumulative listing of the major revisions together with the dates of the issues containing the detailed notes would provide the reader with detailed explanatory material which could not possibly be contained in the footnotes.

Footnotes are not, of course, limited to descriptions of breaks in the continuity of a particular time series. They are also used to describe the scope and coverage of data as well as the methods of computation employed. Here too, considerations of space tend to limit the amount of information that can be shown. In many countries, a most useful device consists in publishing supplements – annual, monthly, or weekly – to the bulletin, which contain detailed descriptions, explanatory notes, definitions and methodology relating to each of the regularly published series. When new and revised series are introduced in the bulletin, detailed notes are included in the current bulletin, thereby permitting the reader to maintain his supplement on an up-to-date basis until a new edition is issued.

The format of a bulletin, the layout and organization of its statistical tables, etc., are elements of considerable importance in determining the degree of its readability and general attractiveness. Since this aspect of presentation involves many technical details which merit closer examination than is possible here, remarks on this subject will be limited to one general observation, namely, that the overcrowding of pages with statistics and footnotes is, more often than not, a regressive measure of economy. Statistics in general are difficult enough for the layman to comprehend – an excessive amount of them on a single page will assuredly frighten him away. It is preferable to present the series in an uncrowded manner even if it

entails the exclusion of certain data, rather than publish the maximum amount of quantitative information available at the expense of impairing its readability. The wider use of graphical methods is recommended. These effectively portray the movement of statistical series and aid the reader in interpreting them.

Publication

As mentioned earlier, a primary requisite of a statistical bulletin is that it contain current figures. In meeting this requirement, a national statistical service must endeavour not only to collect and process the bulletin data as rapidly as possible but also seek every means at its disposal to expedite printing and distribution of the publication.

Delays in the scheduled issuance of a statistical bulletin may be due to one or a series of bottlenecks in the publication process. From discussions with officials of various national services, however, it appears that the principal bottleneck arises at the printing stage. This is especially so in the case of bulletins which are habitually behind schedule. The difficulties generally arise from either inadequate printing facilities in the area, or the absence of a priority for printing of the bulletin in those instances where it is printed by the government service itself. Whatever the causes, timeliness of the data should be the primary consideration. If printing bottlenecks cannot be surmounted successfully, then an alternative reproduction process should be considered as a means of shortening the production time. There is nothing more disappointing to the user of a current statistical bulletin than to receive a handsome, well-printed, but out-of-date publication.

Assuming that the printing phase of the production process is under control, the success or failure in issuing a statistical bulletin promptly depends essentially on the extent to which a time schedule is strictly adhered to in all the other phases of the operation. The cut-off date for the receipt of bulletin statistics should be scheduled at the point in the calendar when the maximum number of statistical series shown in the bulletin become available. Since no single date can be selected on which all data will be available, certain series will have to await publication in the subsequent issue. This is not particularly serious in the case of a current-type publication. It creates a much more difficult problem of scheduling for a yearbook when the figures received after the deadline have to wait a full year before publication.

An attempt to meet certain publication problems

An interesting experiment in attempting to solve certain publication problems which has been carried out in some countries is the establishment of a board or committee to review the publication programmes of the statistical services. In general, the functions of such a board or committee are:

1. To eliminate all unnecessary publications.

2. To ensure that each publication retained meets a need that can be clearly demonstrated and fully justified.

3. To review the composition and general format of material in each publication.

4. To review every new publication – from the point of view of justification and presentation – before it is released for distribution.

5. To standardize the publications wherever feasible.

As a rule such boards are composed of senior administrative officers who are permanent members and statistical officers in charge of subject matter who rotate annually. Meetings of such boards are usually held every two or three weeks and a record of the proceedings is usually kept.

Eliminating unnecessary publications

In one country, a substantial reduction in the statistical publication programme was made by establishing three categories of publications:

1. Reports – documents of wide and continuing interest or importance.

2. Memoranda – documents of less general interest or importance, published in smaller editions.

3. Reference papers – occasional releases on specialized topics, usually of a research nature.

By use of these categories, and by arranging to have distribution attuned to them, it proved possible to reduce substantially the size of editions in many established publications. The memoranda class proved useful, too, for exploring the claims of new periodicals to permanent establishment. About one-quarter of all releases now fall in this class.

Further important savings were made, without interfering with existing coverage, by eliminating certain elements of duplication. The demand for speed in release of data had led to quick reproduction of most reports by the use of stencils which were typed upon directly; and the demand for a more durable form that would permit of preservation in libraries had led to later reprinting of much of this material from foundry type. It was also found that, by proper planning, large annual reports could be released chapter by chapter, as soon as ready, but in final form, using photolithographic means of reproduction. When all parts were done they simply had to be bound together in order to be given durability. In one country, the entire annual census of industry, including some 170 separate reports, is now produced wholly in this way, and eventually bound in 12 volumes. In addition, a number of publications whose usefulness had diminished for one reason or another were eliminated entirely.

Ensuring that publications meet a need

It is probably a poor head of a section or unit, certainly an unusual one, who cannot demonstrate, to his own satisfaction at least, that the publications for which he is responsible are among the most important issued by the entire organization. The average section chief is likely to have a file of appreciative references to his reports, extracted from letters or the press. Less complimentary comment may not have been included, may not even have come to his attention. Indeed, there is practically no report that does not meet some need of certain members of the public. The most that can be done, generally speaking, is to weigh the relative extent or importance of the demand, and establish categories similar to those to which reference has been made above.

As a guarantee of need, it is useful to maintain a pricing policy on publications. The price may be calculated to cover cost of paper and press work only, and while it may

not produce a large return in relation to total cost of production, it does provide assurance against wasteful or unnecessary distribution. It is helpful to study the records of sales, subscriptions and requests, for guidance in categorizing the various releases.

A publications record card may be designed to provide a coherent picture of the printing and disposition of every edition of each report. Each card might show for one publication the changes that have befallen it over a five-year period with respect to such matters as size, format, title, copies printed, distributed at time of publication, held in stock to meet later demands, etc.

Keeping coverage up to date

Publications have to be weighed not only against one another. There may be parts of a single report much less essential than others. The boards or committees usually review the contents of individual reports, table by table, with the officers in charge of their preparation. There may be cases when the main justification for a particular tabulation is that it is a continuation of a series that has been published for many years. There may be cases where the responsible officer is himself in doubt about the need for the continuance of a publication and a little encouragement is all that is needed to induce him to drop it.

In some of the newer statistical bureaux, this matter of elimination of series, or shortening of historical series, may not yet be a problem, but it is certain to become a problem in time. Periodical review by officers not directly concerned with the preparation of the publications seems a provision worth making.

Each series discontinued provides for the possibility of a new series being started, or of a special study being published, within the limits of a fixed publications budget. Consideration of the case for new publications is a further duty of such boards. Final responsibility in this matter rests, of course, with the chief statistical officer, but his time for considering all the pertinent details is limited. The fact that each specialist in charge of subject matter has to justify before his peers each new publishing project, results in a more objective consideration of the enthusiasm for publication expansion.

It should be stressed that the function of the board or committee should be purely advisory, essentially, to the chief statistical officer, but in actual practice, it should be advisory rather than inquisitorial or dictatorial in its relationships with the specialist in charge of the subject matter whose publications are under review. These officers are responsible persons and the basic function of the board or committee is not to subject them to inquisition or to lay down policy, but to help them reconcile their publishing problems in a manner not incompatible with the over-all statistical publication programme. The answer to the question of what to publish and what not to publish, the problem of coverage and need, should remain basically with the subject specialist, and he should be a person of sufficient professional competence and integrity to provide it.

An increasingly common external aid to his judgment should not pass unnoticed. There are now few subject areas that cannot draw upon the considered opinion of a statistical arm of the United Nations or a specialized agency thereof, or a conference of statistical experts sponsored by one of them, to assess what it is important to publish. International needs may not correspond entirely to national needs in any one country, but consideration of them helps greatly to put the national needs in a fresh perspective.

CHAPTER 9

ELEMENTS OF BUDGET PLANNING

The principle of the budget presupposes that the resources and requirements for a given undertaking, service or organization are known and fixed well in advance of the actual expenditure. This is seldom the case, particularly where special projects of an urgent nature or changes in policy may arise during the period to which the budget applies. Then too, it may be discovered that sufficient funds have not been provided for a certain specific item or items to carry the work through to a successful conclusion, during the budget period. The remedy in such situations is, of course, either to postpone completion of the work to a subsequent budget period, to give up the work or to ask for a supplementary budget to finish the job.

Generally speaking, statistical organizations are financed by the government as one of the services it provides out of the revenues of the country. It is therefore essential that the government concerned be provided with the detailed information needed to justify the expenditure of funds allocated during each fiscal period.

This is usually done in the form of a detailed estimate of the funds that will be needed some months in advance of the fiscal period, and is required in order that the budget may be considered by the officers of the statistical organization. The individual budgets are then usually submitted to the financing department in order that the government may review all requests for funds needed for the operation of all the services it provides to the public.

Definition of a budget

In the organization of government, a budget may be defined as a plan or outline which expresses the financial considerations of a government's operating programme for the fiscal period in terms of money, indicating the estimated cost of the services and projects which make up the programme and the means whereby it is to be financed.

The term has come into general usage when discussing the finances of most countries. For instance, in the history of the United Kingdom the budget is an annual statement of the finances of the country, which is placed before the House of Commons by the Chancellor of the Exchequer. A budget system was adopted in the United States, in 1921, when the Bureau of the Budget was created. Under this system, the President is head of the budget system, under which the budget is compiled by the Director of the Budget and the Bureau over which he presides. The Budget is required to be submitted to Congress at the beginning of each regular session. Fiscal periods vary. In some European countries the fiscal year ends with the calendar year, in others at the mid-year, in still others at the end of the first quarter in each year. The budget is invariably introduced in the representative house, that is, the House of Commons, Chamber of Deputies, House of Representatives, etc., depending upon the legislative procedure in the country.

The definitive form of a budget varies from one country to another and the manner of presentation and adoption is conditioned by legislative custom and practice. In general principle, a budget is the annual statement laid before a legislative body and expresses, in the form of financial estimates, the plans of the executive government.

This definition describes broadly a government budget as a whole, which includes the estimated revenues and expenditures of all departments, organizations and services operated and financed by the government.

The fundamental difference between budgets of government and budgets of operating departments is that the government budget involves the total income and revenue derived chiefly from taxation and the allotment of the funds to its departments for the operation of their services. In a departmental budget, the income or funds required is expressed in terms of appropriations provided by the government from its consolidated funds. These appropriations are to provide funds for particular programmes, operations and services, and are, in fact, a summary of the details of the expenditures to be incurred during the next fiscal year by each department or organization of the government.

In most countries, the budget is prepared to cover a definite period of time, usually the government fiscal period of a year or in some cases two years. In some instances, provision is made for budgeting on a project basis and involves programming the undertakings in their entirety, extending, in the case of a statistical project or operation, from the planning stages, through collection, tabulation, and analysis, to the publication of results. The project budget does not make it necessary for the chief statistical officer to limit the administrative plans to a single fiscal period. This type of budget may and quite probably will extend over two or more such periods, but it does require the establishment of a fiscal calendar. It is well in this situation to control the expenditures by providing the estimates in such a way as to indicate clearly the amounts required and the services expected under each item in each fiscal period.

The budget for a statistical system, whether it is the responsibility of a single organ of government or dispersed among a number of operating departments, still represents only a small part of the government activity. The consolidated budget of the government presents a plan for all the activities of the government during a fiscal period.

Purpose of the budget

The budget as it applies to a statistical operation or any other service of government should be set forth in ac-

cordance with government regulations and in sufficient detail to facilitate consideration by the officials in charge of the administration of the operation, and by those of the finance department who review the budget.

The details of the budget should serve as a medium of control of expenditures and the basis of the information on operating costs, during the period to which it applies.

The budget which presents a plan of the activities of a statistical organization should be prepared under the direction of the chief statistical officer who, in the end, is responsible for the proper expenditure of the funds provided for statistical work. This enables the administration to know where the organization stands financially at any given time, and provides the basis for making a more satisfactory budget for each succeeding fiscal period.

To secure the most effective control of the budget, it is advisable to co-ordinate all the functions of the accounting system including cost control with the directors in charge of the various statistical units within the system.

The budget cycle

A budget may be considered as coming within a cycle which has three phases. These are: (1) budget planning and formulation, (2) budget adoption and (3) budget control. This chapter deals primarily with *budget planning and formulation*, the first phase of the budget cycle. The second phase in the cycle, *budget adoption*, is of no particular concern in this context, as the adoption of a statistical budget is conditioned by the general practice in each country.

Cost control, which is part of the third step in the budget cycle, is an important facet in budget planning and formulation and in budget control, and is described in the following chapter. Cost control is not only the means of indicating the trends of expenditures within the funds provided for the various items of the budget, but it is also a primary basis on which future budgets are planned and formulated.

Budget planning

The planning and formulation of the statistical budget should take into consideration the plan and detail in which the government considers the total budget. This is essential in order that the totals of certain expenditures such as salaries, supplies, communication services, etc., which are common to all departments, may be known. The general plan and details in which the departmental budgets are to be submitted are usually established by the financing department. This plan should provide for the inclusion of items of expenditure which may be peculiar to various operations.

The planning of the budget should include not only the consideration of all the normal functions of the operation but also of any new projects and of any increase or decrease of normal operations. New projects or increased operations may stem from different sources, such as (1) requests from industrial or other organizations, (2) directives of the chief statistical authority that certain programmes of activity be undertaken or continued, (3) recommendations of officers within the organization for the continuation of work projects or for additional projects and (4) legislative changes.

The planning of the budget is therefore, to a considerable degree, a continuous operation during the fiscal period. All new projects should be discussed with the chief statistical officer and supporting statements showing the details of the project should be submitted and an estimate of the cost prepared. This will apply also in the event of requests for the continuance of any special or non-continuing projects. Established projects should be examined from the standpoint of efficiency.

Budget planning is an important stage of the budget cycle. It not only has a direct bearing on budget formulation but also serves as the basis of cost control. It is during this stage that the items of expenditure for which appropriations of funds will be requested are considered and decided upon.

Budget formulation

Budget formulation or preparation is so closely allied to budget planning that one may be considered as practically part of the other. It is during this stage that the estimates submitted by the various units of the statistical organization for their operations are consolidated into the specific appropriation items to which they apply and which comprise the total budget of the organization.

These appropriation items should be presented in accordance with the titles, detail and order set forth during the planning stage. In some instances, the appropriation items may be sub-divided into allotments for specific services.

In some countries, for example, funds are approved by the legislative authority for each department and its branches as separate appropriation items. These items and allotments are usually designated by a code number in order that comparable items for all departments of the government service may readily be compiled.

In accordance with this plan, the consolidation or separation of services within the appropriation items may be conditioned to some extent by the statistical system which operates within the country – if the system is highly centralized the distribution might be as follows:

1. *Administration* – providing funds for the general administrative services such as staff organization, accounting and cost control, purchase and distribution of supplies and acquisition of space.

2. *General statistical activities* – providing funds for the routine statistical operations of the subject-matter divisions such as foreign trade, labour and prices, industry and merchandising, health and welfare, etc., and for central services to the divisions such as typing, printing and mechanical tabulation.

3. *General purpose surveys* – providing funds for decennial or quinquennial censuses such as population, agriculture, distribution and fisheries.

4. *Specific items for major projects* – providing funds for other major undertakings such as *ad hoc* surveys. Note: This item may be taken as a single appropriation and segmented by project or under separate items for each major undertaking.

If the system is highly decentralized, the above suggestions may be followed in the case of large organizations or the budget arranged to show the items of expenditure as segments of the estimates for each

department, but care should be taken to ensure that the budget can be summarized to produce a comprehensive picture of the statistical services.

Each appropriation item should show separate allotments under headings such as: salaries, stationery and office supplies, travelling expenses, etc. The allotments, therefore, may provide for these expenditures for all divisions of the service to which the item applies. For example, the salaries allotment of the item for general statistical activities would provide for the salaries of all employees of the statistical units or offices, with the exception of any special projects which may be in operation under other items. This means that the funds provided must be allotted by units or offices for their various expenditures and an internal system of cost control may be maintained by the administration.

If considered advisable, this system can be expanded to show the various allotments by the divisions or sections of the organization. In preparing a budget along these lines, consideration should be taken of the detailed and increased accounting required of the various central services for the payment of salaries and accounts, and the acquisition of supplies, equipment, etc.

Under certain government regulations, disbursements for all departments are made through the financing organization. In such cases, the budget or budgets for the statistical system should be subordinated to, and never in conflict with, the over-all plan of financing and control of expenditures, but at the same time it should be prepared in such a way that it is possible to arrive at a true assessment of the statistical needs.

In some countries, officers attached to the financing department of the government are established within each of the operating departments for the purpose of effecting the expenditures for services provided by one or more specified departments. The cheques for disbursements may be issued through one central paying office. Close liaison with these control officers is essential and an appreciation of their functions within the system of government will lead to beneficial co-operation resulting in an improved statistical service.

To obtain the information for the formulation of the budget, each statistical unit or office should be provided with forms in which the various allotments, as set forth in the plan of the budget, are shown. This not only ensures that no items will be overlooked but permits examination of the requirements in detail. Any items which are not self-explanatory should be supported by a statement showing the details and reasons why the funds are required. These forms should be submitted to the officer in charge of the preparation of the budget, by whom they should be reviewed and consolidated.

This consolidation and the supporting details should then be submitted to the chief statistical officer for his consideration and approval. After receiving this approval, the budget should be returned to the budget officer for the preparation of the details and explanations of the various allotments which comprise the budget. This is a very important factor in the preparation of the budget. The explanations of various allotments which are common to all services, such as salaries, procurement of supplies, etc., will undoubtedly be along a pattern established by the government budget office and will be largely self-explanatory. However, some expenditures are peculiar to certain departments, new projects may be proposed, or some continuing operations may require expanding, all of which should be explained in such manner and supported by such details as will provide the information for the consideration of the officials concerned with the budget during its progress from the formulation stage to its approval by the government. The explanations should include factors other than those mentioned above, such as authorized annual increases in salaries, the trend toward increasing or decreasing costs of supplies and services and requests for expansion of present services according to the procedural pattern in each country.

Occasions may arise where a statistical organization, at the time of preparing its budget, did not foresee special projects or additional expenditures which may have to be effected during the fiscal period in which the budget operates. Should the progress of expenditures indicate that funds will not be available to meet the additional expenditure, the additional funds may usually be provided through the medium of supplementary estimates.

The completed budget in draft form, with its supporting details, should then be submitted to the administration officials for review and amendment where necessary, prior to its submission to the chief statistical officer, for his examination and concurrence as to matters of policy and the operating programme as set forth in the budget.

At this stage, the budget leaves the originating organization for transmittal through the regular channels to the head of the ministry, for his approval and inclusion in the budget of the department.

Form of the budget

There are certain broad principles in making up a budget which have general application in most countries, but, in view of the fact that these are to be found in varying degrees, it is not practical to consider them in detail. There are many elements or items of service which might be included in an outline for a budget, but, because all departments may prepare their estimates under a general plan, suffice it to mention here but a few of the illustrations which may have significance within the framework of a statistical system.

There should be a proper unit classification of the appropriation items. This type of classification system may be set up in various ways. The following illustrates one of the most common practices: to permit a ready analysis within the budget of the funds required to operate the statistical services: (1) by the principal units or offices, (2) by the various functions and (3) by the nature of the service provided. Such a classification provides the three primary bases needed for accounting purposes, and for the control of expenditures within the statistical system during the fiscal period to which each applies. It also provides the comparable information needed in the preparation of subsequent budgets.

1. *A classification by the unit of organization* – to indicate the expenditure of each of the main units or offices and the total amount appropriated for each, without reference to the purpose of the expenditure, except as certain titles may explain. Note: In a highly centralized system this classification may not be necessary in the

estimates submitted to the legislative body but care should be taken to ensure that the information is readily available through the cost control unit or by some other means.

2. *A classification by various functions* — to indicate unit of operation within broad general functions, such as administration, continuous statistical operations, local government co-operation, field operations and *ad hoc* surveys.

3. *A classification by character of service* — to indicate the nature of the expenditures such as salaries, travelling expenses, enumeration fees, freight and express, postage and telephones and printing of reports.

If funds are derived from sources not within the normal framework of budgetary appropriations provided by the government, such as subsidies, special taxes for statistical purposes, payments for tabulation services, censuses of local areas and other income from non-governmental sources, and if these funds form part of the sources which may be used for operating expenses, then a fourth unit of classification may be necessary, i.e. *Classification by source of funds*.

The three typical illustrations which follow indicate some of the items which might be included in a statistical budget using, for instance, units 2 and 3 of the classification system illustrated above.

Illustration A lists a number of items of service which might usefully be isolated wherever funds are provided for such services so that they can readily be consolidated for the entire system. These items may constitute also the main items of the appropriation provided for the administration of the statistical system.

ILLUSTRATION A

Appropriation item: *Administration of the statistical system*

Allotment No.	*Character of service*	*Amount required*
1	Salaries: (*a*) Permanent staff (*b*) Temporary assistance	
2	Travelling expenses	
3	Freight and express	
4	Postage and telephones	
5	Office supplies – stationery and equipment	

Illustration B lists a number of additional items of importance of the type which might appear in the appropriation provided for the routine or continuous statistical operations:

ILLUSTRATION B

Appropriation item: *Continuous statistical operations*

Part 1. Headquarters operations

Allotment No.	*Character of service*	*Amount required*
1 to 5	As in Schedule A	
6	Printing of statistical reports and publications	
7	Photographic supplies, including microfilm and microstat	
8	Contributions to – (*a*) National statistical organizations (*b*) International statistical organizations	
9	Memberships in technical organizations	
10	Scientific journals and other reference material	

Part 2 Territorial and local government co-operation

11	Fees for services provided by (*a*) Territorial (state or provincial) governments (*b*) Local (municipal) governments	

Part 3. Expenses of field operations

12	Routine field (sampling) organization: (*a*) Enumerators' fees (*b*) Travelling expenses	
13	Routine field (new firms and collection of delinquent returns) organization: (*a*) Enumerators' fees (*b*) Travelling expenses	
14	Routine field (family expenditure) surveys: (*a*) Enumerators' fees (*b*) Travelling expenses	

Illustration C lists some of the items of service which might be found necessary for operations of short duration, such as censuses, special inquiries, and surveys of an *ad hoc* nature.

ILLUSTRATION C

Appropriation item: *Short term (non-continuous) statistical operations*

Allotment No.	*Character of service*	*Amount required*
1	Special surveys (facilities in welfare institutions, housing facilities or farm machinery) (*a*) Salaries (temporary assistance) (*b*) Professional and other services — enumerators, etc. (*c*) Printing of reports (*d*) Sundries	
	Other items listed here might include:	
2	Decennial censuses (population, agriculture, distribution or fishery) (*a*) Salaries (temporary assistance) (*b*) Professional and other services — enumerators, etc. (*c*) Printing of reports (*d*) Sundries	
3	Quinquennial censuses (population, agriculture, distribution or fishery) (*a*) Salaries (temporary assistance) (*b*) Professional and other services — enumerators, etc. (*c*) Printing of reports (*d*) Sundries	
4	Other *ad hoc* surveys (*a*) Salaries (temporary assistance) (*b*) Professional and other services — enumerators, etc. (*c*) Printing of reports (*d*) Sundries	

General considerations

The organization required for the preparation of the budget and the maintenance of cost control for a statistical operation will depend largely upon any centralized

services which are operated by the country concerned such as central pay offices, treasury offices and departments through which supplies and equipment are requisitioned. If such centralized services are provided, the personnel section may be required to perform the documentation in connexion with staff pay, and the cost control section to provide the financing department with details of estimates and expenditures. With all the variations in practice which may exist, it is not possible to offer any suggestions as to the number of staff required.

It is suggested that all bills for services should be reviewed and attached to the standard vouchers if such are provided for the use of all departments. In such circumstances, it is well to retain a copy of the vouchers for a short period of time, at least until all adjustments have been made to the accounts for the fiscal period and the books closed. If, under the system of central payments of expenditures, the vouchers and the attachments are retained indefinitely by the financing department, retention of the vouchers over a long period of time by statistical services is not advocated. If, on the other hand, the vouchers are not retained by the financing department, then the statistical accounting offices should retain one set of vouchers for a considerable time.

The retention of the vouchers is extremely useful for reference purposes in planning future budgets. They express in detail the actual expenditure of funds which have been made in operating the statistical services and provide the basic information for answering questions relating to individual accounts and for a complete financial examination of the costs of all operations. Should additional detailed information be required concerning any expenditure of funds, the vouchers are usually the main source of such information.

These points are of importance in estimating costs, determining the amount of funds required for future needs and reconciling actual expenditures with the policies of administration. It is useful, in any event, to retain the vouchers of general purpose surveys of the recurrent *ad hoc* type, such as the censuses, and various kinds of sample surveys, until at least the time when the records for similar undertakings are available.

The voucher form should be planned so that it will provide the following information pertaining to the payment which it authorizes:

1. Name and address of payee.
2. Date of preparation.
3. By whom prepared and verified.
4. Brief description of the nature and purpose of the payment.
5. Coding, to facilitate the distribution of the expenditures to the several allotments within each budget item.
6. Signatures of recommendation and approval.
7. Date and number of cheque effecting the payment.

The coding section of the form should provide primarily for the charging of the payment to the allotment of the appropriation item to which it applies, as shown in the budget. This coding should indicate any further distribution of the various allotments which comprise the appropriation item. It may also provide for the distribution of expenditures by units or offices. Under such a system, progressive information may be obtained during the fiscal period for use in budget control and the provision of information regarding the costs of services.

There should be some effective method introduced which will control the execution of the budget. A constant check on expenditures is essential and this routine should be one of the principal duties of the statistical system. In some situations, the financing department will provide a monthly statement of (1) expenditures during the month, (2) expenditures to date, (3) encumbrances of funds to date and (4) funds available for the balances of the fiscal period. These provide an extremely useful means of reviewing the financial situation regularly each month, indicating possible under- and over-expenditures of funds for the various appropriation items and allotments and providing the information which may lead to the solution of the problem by the transfer of funds between the appropriation items and the allotments.

The budget system like all despots and tyrants has disadvantages. It is inflexible and cumbersome. When emergencies arise or mistakes are made in drawing up the estimates, the senior statistical officer may find that it is impossible to modify expenditures to meet the needs caused by a shortage of funds until the budgetary period has elapsed. But despite all this and many other shortcomings, the budget is an essential tool in a statistical organization.

A small *contingent* item is useful under the budget system to provide for unforeseen expenditures which are not chargeable to specific allotments. This item would also give some elasticity to the estimates and allow the chief statistical officer some discretion in the expenditures. This item, however, should be kept very low, in fact the amount should not exceed one or two per cent of the total estimate for all services. A large *contingent* item is generally taken as an admission of failure by the organization adequately to estimate the needs of the organization concerned. This may not apply to requests for *total sum* items for particular projects, which may have to be requested in the estimates but in advance of a determination of the requirements and services needed for a special undertaking.

In conclusion, the main functions of a budget may be summarized:

1. To clarify the objectives of the system in terms of money for all concerned.
2. To provide a plan of work for a definite period and the funds needed to carry out that work.
3. To balance the programme so that too much emphasis is not placed on one service and too little on others.
4. To provide the basis for controlling the operating costs of the entire statistical system.
5. To serve as the basis to measure degree of progress resulting from procedural changes.

CHAPTER 10

COST CONTROL OF STATISTICAL OPERATIONS

The need for control over the expenditure of public funds is generally recognized. Government administrators are obligated to use cost control techniques so that they may be able to direct operations wisely and accomplish most for the amount of money spent.

Cost control is the final phase of the budget cycle and refers to (1) the control of expenditure of funds within the allotments as prescribed in the budget or in government regulations, (2) the cost of operating the various units and offices which comprise the statistical system and (3) the cost of general purpose surveys and special projects. The control phase of a budget cycle is a continuous process in that much overlapping of statistical projects and implementation of plans occurs between budgets.

In examining some of the methods for achieving cost or budget control, it should be kept in mind that a budget is not an end in itself but rather a means for the achievement of certain objectives. Cost control is an administrative device whereby estimated costs and proposed work programmes are measured against actual expenditure, progress made and an over-all assessment of the efficiency of the statistical system is established.

Essentials of cost control

To control costs effectively, it is necessary to establish a system which is adequate to direct the work and, at the same time, provide a means for continuous review of progress to ensure that operations are proceeding according to plan. The degree of success achieved generally bears a direct relationship to the effort and forethought given to planning and organization and to the system set up for its control. Present-day operations are too complex to attempt without a planned approach.

Some of the features of an effective system to control expenditure and to aid management in directing statistical operations are discussed below.

Accounting staff, accounting system, accounting procedures

A prerequisite to effective cost control is the setting up of an accounting unit in charge of a trained accountant familiar with the principles of government accounting and pertinent legislation, and responsible for the maintenance of a set of records pertaining to expenditure.

The next step is the type of accounting system required. It might be argued that cost accounting is the answer to any control system where costs are involved in that it is the only system whereby actual cost per unit of work or per unit of service performed can be determined with any degree of precision. In order that a cost accounting system could function in a statistical organization, it would be necessary to segregate, classify and record costs according to activities performed, and to measure output or services rendered. Since such segregation and measurement of output involve costs which more than outweigh the resulting benefits, cost accounting systems in the sense understood by accountants are not generally used in government organizations. This, however, does not mean that no attempt whatever should be made to distribute costs incurred within the statistical organization to the various units or offices. Cost distribution is essential for effective control of costs but the method whereby it is accomplished need not be as precise as in cost accounting procedure.

An accounting system adequate for a statistical operation involves: (1) accounting procedure to control expenditure as required by legislation and inherent in budget appropriations and (2) accounting procedure to control expenditure of units within the organization.

To understand the need for a dual purpose accounting system, it is necessary to bear in mind first the form and detail in which the budget is required by government regulations and second, the need for segregation of expenditure as an aid to management and control of expenditure within the statistical organization. A budget is normally expressed in terms of appropriation items and allotments of expenditure which means that it presents such details as wages and salaries, travel, postage, rent, telephones and telegrams and other services common to the operation of a statistical organization and indicates, in each case, the estimated amount of money which will be required for a fiscal period. When the budget is adopted, funds are provided for each appropriation item and allotment of expenditure approved. An accounting procedure should be established so that the condition of each allotment may be determined readily for control purposes. Accounting procedure required to provide the necessary information for an expenditure distribution of this nature may be very simple and the staff for its effective operation relatively small. Information pertinent to the maintenance of these accounts can be obtained without difficulty. For example, salaries and wages, the major expenses for a statistical operation, can be derived from a summation of cheques issued, while all other expense items can be segregated, as to detail required, from vouchers submitted for the expenditure. Current summarization of accounts and their comparison with amounts provided for the respective allotments establish a balance between expenses incurred and funds allotted. At the end of the fiscal period, totals for each account form the basis for preparation of the final statement of expenditures. This statement, showing budget estimates and expenditures, gives those interested in government expenditure the necessary data relative to the cost of operations.

On the other hand, the accounting procedure for controlling expenditures of the units within the organization, although of a more complex nature, need not meet cost accounting precision. Its purpose is to control the cost of work programmes rather than to balance income and

expenditure. To accomplish this phase of budget control involves the following steps:

1. *Allocation of appropriations to units or offices*

To ensure an equitable distribution of money provided in the budget, it is well to allocate funds to each unit or office according to estimated needs for the fiscal period. This allocation of funds may be determined from information on which the budget was formulated. Should revisions in estimated expenditures within the organization be necessary, changes in original unit allocations may be made to reflect current requirements. Allocation of funds to units or offices not only provides control over the expenditure of funds but also facilitates the distribution of the funds in the interests of the whole system.

2. *Recording of expenditure for each unit or office*

Items of expenditure can be determined for each unit or office if the accounts are maintained in sufficient detail to show the type of expenditure and the unit by which incurred. Where several work programmes are undertaken by one unit, it might be useful to segregate costs according to each work programme.

3. *Prompt action in cases of over-expenditure*

Cases of over-expenditure should be determined and reported promptly for action. Causes for over-expenditure may be due to:

(*a*) Inadequate provision for expenditure. Correction of this condition may require review and readjustment of allotments, within appropriation limits, for units concerned.

(*b*) Assignment of additional work. The period covered by budget planning, together with the period to which budget estimates apply, is too long to foresee all work programmes which may have to be undertaken. When unforeseen projects arise several courses of action are possible. If minor adjustments only are involved, readjustment of expense allotments may be made. If the problem is one of additional staff requirements, temporary reassignment between units or offices may be possible without too much disruption of work since all units may not operate at full capacity at the same time. Minor readjustment of other allotments may also be made within the appropriation limits without serious effect on the work programmes.

Assignment of new work programmes to certain units or offices may involve re-scheduling work within the units and offices concerned. Priority for completion of projects may be determined and those least essential may be deferred, or carried into the next fiscal period when additional funds are provided. Major additions of work may necessitate re-scheduling of vital parts of the whole plan of operation. If original work programmes must be proceeded with as planned, major additions of work may necessitate requests for supplementary appropriations through normal channels.

Planning and scheduling of work programmes

A programme of operation planned in advance and scaled within the framework of budget estimates is essential. This provides an estimate of performance expected, forms the basis for delegation of supervisory authority and authority over expenditure, is an aid to management and serves as a yardstick of intentions against which actual performance can be measured. It is important that the plan of operation be flexible. Since operational plans must, of necessity, be prepared far in advance of actual operations they can be, at best, mere approximations. Flexibility is, therefore, essential to permit adjustment as deemed advisable under normal and emergency shifts in programmes.

The organization of a statistical system is generally of a complex nature in that it embraces the collection, processing, analysis, preparation and distribution of a wide variety of statistical data. It includes not only subject matter units and offices engaged in the collection and processing of statistical information but also auxiliary units responsible for such services as mechanical tabulation, composing, printing, addressographing, supplies, distribution of publications, personnel management, drafting, translation, mail and forms control. For purposes of the budget, preliminary plans for work programmes to be undertaken must be designed months in advance of the fiscal period to which they apply. Although proposed plans may pass through numerous stages of revision before adoption through the normal channels, they permit operations to get under way. Tentative schedules may also form the basis for determining allotments for each work unit and thus serve as a control over expenditure.

Scheduling is an essential part of planning. It is the process of outlining work projects in an orderly sequence with time allowance for the completion of each stage. A schedule, supplemented by production rates, is an important cost control tool in that it shows how much time each project will require. This aids in the co-ordination of all projects within the framework of the organization.

Preliminary plans for each unit are fundamental to the operation and cost control of a statistical organization in that they establish the basis for:

1. Work programmes which must meet broad objectives.
2. Policies governing operations.
3. The organization pattern — the relationship between units and offices and the scheme of operations whereby work will be directed and co-ordinated.
4. Budget formulation.
5. Guiding cost controls until such time as final plans and schedules of work are drafted.
6. Preparation of final plans and schedules of work programmes.

In order that plans and work schedules may serve the objectives of the initial drafting, they should set out, for each project, such information as: nature of the assignment, volume of work involved, staff requirements, approximate time when each phase of work will begin and end, materials and equipment required, standards for quantity and quality of production and extent to which service units will be called on for assistance and periods during which it will be required.

Replanning and re-scheduling of work programmes

It has been pointed out that preliminary planning and scheduling are carried out months in advance of the period

to which they apply. Replanning and re-scheduling of work programmes is a systematic follow-up, adjustment, or revision of the preliminary plans made possible by further or more complete information becoming available in succeeding months. Replanning and re-scheduling may be necessary because of numerous factors which become effective *prior to*, or *during* the fiscal period.

Factors which may necessitate replanning and re-scheduling as a result of changed conditions *prior to* the fiscal period may be due to:

1. Legislative action resulting in revision of appropriations, curtailment or expansion of work programmes, and initiation of new programmes.
2. Increasing or decreasing trends in costs during the period between budget formulation and budget adoption.
3. Events affecting labour supply and demand.
4. Preliminary planning inadequate for actual needs.

Factors which may necessitate replanning and re-scheduling *during* the fiscal period may be due to:

1. Operations proceeding at a rate substantially different from that initially expected.
2. Increasing or decreasing trends in costs.
3. Emergency conditions, which may cause projects to be abandoned temporarily or new projects undertaken. Resources, including personnel, equipment and funds, may be seriously curtailed. An unbalanced situation may develop as between availability of equipment and personnel.
4. New legislation affecting the statistical system.
5. Improvements in mechanical procedure increasing production.

Major changes in original plans and schedules may have far-reaching implications with respect to control over expenditure. These may involve: (1) revision of quality standards and production rates, (2) modification of work programmes, (3) changes in organization and readjustment of functions, (4) revision of fund allotments, (5) reallocation of personnel, processing equipment and service facilities and (6) reorganization of methods and procedures.

Reallocation of service costs to subject matter units

The number of service units in a statistical organization may depend upon the extent to which such services are centralized. Services most readily adaptable to central direction are mechanical tabulation, stenography and typing, composing, addressograph, printing supplies and equipment.

Although service units require allotment of funds for their own operation, they may be organized to facilitate progress of work programmes undertaken by subject matter units in which case the cost of their operation should be reallocated according to services provided. This is useful in determining the extent to which subject matter units or offices avail themselves of service facilites.

Ansis of service costs reallocated to subject matter units permits an assessment of:

1. Whether or not there is a disproportionate use of service facilities.
2. Total cost of printing publications, forms, etc.
3. Over-all cost of each work programme undertaken.
4. Relative costs of units and offices doing work of a comparable nature.

Forms control

Forms control measures are being increasingly used in many statistical organizations. These measures have been fruitful in securing the elimination of unnecessary forms, in the consolidation of forms and in the simplification of complicated forms.

Since most statistical forms require manual editing as well as mechanical tabulation by means of adding machines, punched-card equipment, or some other method, forms designed with the object of simplifying clerical and tabulating operations offer possibilities for significant economies.

Forms should be designed to:

1. Create a favourable mental attitude on the part of the employee toward his work.
2. Ensure the attainment of optimum production in entering information.
3. Facilitate the use of or reference to the data after it is recorded.
4. Reduce to a minimum, error in entering or extracting the information.
5. Achieve maximum economy with respect to paper and printing costs.

Methods and procedures

An organization carrying on diverse projects is likely to utilize some methods and procedures which do not stand up under tests of efficiency and economy. Initial practices take root and become firmly fixed in the course of time and may become resistant to change. Constant progress in methods, procedures and technological developments makes equipment obsolete from time to time, resulting in statistical procedures becoming antiquated unless constant vigilance is maintained. Efficiency and economy of operation may be maintained in a statistical organization if some means is provided for a periodic and systematic review of existing situations and availability of new techniques and improved equipment. For example, critical examination of existing practices may show that manual editing might be replaced by mechanical editing and manual punching by mechanical punching. Adding machine tabulation might be applied to certain surveys with no appreciable loss in accuracy. In fact, the scope for ingenuity in the development and application of new methods and procedures within a statistical organization has endless possibilities. The need of the best possible methods applicable to a particular job is obvious.

With the growth of a country's economic stature, the demand for additional statistical services expands. Expansion in demands increases pressure on the funds which cannot always be increased in direct proportion to the additional cost of services required. The adoption of efficient practices goes a long way towards increasing output of the system, thus releasing funds to assist in meeting the increased demand for services.

Progress in revision of office practices may be accomplished in several ways:

1. Setting up a methods and procedures committee charged with the analysis of office practices and recommending changes considered desirable.

2. Setting up a methods and procedures unit within the statistical organization.

3. Placing responsibility for revision of office practices on some person within the organization.

4. Securing the services of an outside organization specializing in methods and procedures.

As a general rule, the revision of office methods and procedures is most successful when planned and carried out by persons or groups within the organization. However, the calling in of outside organizations with wide experience has proved effective in some situations, particularly when there is frequent consultation with the personnel actually engaged in the work.

In any case, success depends largely upon the selection of personnel for the task and the spirit of active co-operation which should exist at all levels of the organization. Periodic reviews of the methods and procedures already established are important.

Production standards

As the functions of statistical organizations grow, the need for measurement of performance as an aid to the control of expenditure becomes more urgent. The measurement of production performance may take various forms and degrees of precision depending upon the particular case; each situation must be examined on its own merits and performance standards determined on the basis of the existing situation.

Suitable statistical production standards may be established in several ways:

1. Setting up trial tests comparable to the job contemplated and maintaining records of time and production.

2. Keeping records of time and production on a job in operation.

3. Applying a rate of production set for one job to that of another, allowing for differences between the jobs.

4. Establishing a standard of production by relating the volume of work involved to the number of persons employed and to the period of time alloted.

Factors governing the setting of production rates are so complex that they cannot be dealt with adequately in two or three paragraphs. It is sufficient here to draw attention to the fact that the problem exists, that it requires a solution and that the solution is of vital concern to the operation of statistical organizations.

Personnel management

Personnel management plays a vital part in the effective control of expenditure. Efficiency and economy of operation are facilitated by the following:

1. Thorough analysis of employees' education, experience, aptitude, temperament and other factors before assignment to a position. Employees assigned to a job for which they are not suited or for which they have a particular dislike will not produce to the full extent of their ability.

2. Adequate training of personnel and intelligent instruction and direction so that each employee will know what he is to do and how to do it.

3. Insistence upon reasonable standards for work performance, and incentives, such as promotion, for above-standard performance.

4. Proper planning of operations so that slack periods do not alternate with periods of overtime work.

5. Prompt removal of unsatisfactory employees. Unsatisfactory employees are not only costly in that they fail to produce material results but they tend to destroy the morale of efficient workers so that they too become less productive.

6. Prompt action in filling vacancies. Vacancies on a staff may disrupt work to the extent that in some cases, particularly where team-work is essential, efficiency of operation may be impaired and objectives not accomplished on schedule.

7. Prompt settlement of employee grievances relating to working conditions, pay and other causes. Production bears a relationship to the contentment that employees experience in their working environment. Prompt settlement of grievances is essential to optimum production.

Other considerations

Periodic reviews and submission of reports to the appropriate authorities are essential for maintenance of control over work progress, activities not yet begun, status of funds, personnel situation and special problems.

Reports are useful aids in establishing measures for cost control only if they are brief, to the point, frequent and regular.

Prompt analysis of reports and immediate follow-up of unexplained or unwarranted deviations from original plans are essential for correction of situations before they get out of hand. Unless reports are analysed and followed up promptly by action, their effectiveness is lost. It is important that a cost control system receive the active support of the chief statistical officer and the senior personnel, otherwise it will not be accepted throughout the organization where its success or failure is, in the last analysis, determined.

Conclusion

That cost control devices are essential to the efficient and economical operation of a statistical organization is generally recognized. The particular form they are to take and the extent to which they are to be incorporated into a cost control system, however, is not so evident. What might be practical in one statistical organization may not be practical in another. The size of the organization, degree of centralization, nature of surveys and degree of staff specialization, are some of the important factors in determining the most suitable cost control system. While some phases may be worked out with precision, others may be fairly rough.

In designing systems involving cost records, it is always important to keep a balance between the cost involved in their implementation and operation, and the results obtained. While elaborate systems can be established, they may be so involved as seriously to delay work programmes and result in an increase in the cost of operation of the organization.

CHAPTER 11

PROFESSIONAL STATUS OF STATISTICAL PERSONNEL

In recent decades statisticians have been playing a much more important role in the affairs of nations than they did formerly. The demand for statistics of the highest quality by governments, business, economists, social workers and others, has increased enormously. This is accounted for partly by the growing complexity of the modern world, but even more by the fact that many governments today have accepted wide responsibility for the welfare of the citizens and have embarked upon a wide variety of social security measures. To function efficiently, such governments must have a basis of sound statistical information to assist them in formulating their policies. Governments which do not have well developed statistical organizations are severely handicapped.

Another outstanding reason why the work of statisticians has become so much more important is that national statistics of the highest quality must be provided, if effective measures for international action are to result from the operations of such organizations as the United Nations, the specialized agencies, and other international bodies. All this has meant an acceleration in the demand for statistics and a much greater emphasis upon the qualifications of the statistician.

Clearly, from the national and international points of view, the professional statistician has high responsibilities and ranks with other scientists whose work promotes progress and ameliorates the lot of mankind.

If one looks at this matter from the point of view of needs in specific fields rather than from the general national or international point of view, the same conclusion is reached. One of these fields is census taking. A prime reason for the census is to supply basic data to determine electoral representation. But the census has far wider uses than this. It constitutes, under the modern system, nothing less than a periodic stock-taking of the people, designed to show from the widest angle the point that has been reached in the general progress of the nation. Fundamentally, the importance of the census hinges upon its analysis of the human element or manpower of the country. The people themselves are, after all, the basic asset of every State. They constitute, moreover, the background against which almost all other facts must be projected if the latter are to have real significance. The well-being of the State – physical, moral, economic – (including such varied phases as birth and death rates, education, transportation facilities, financial conditions, etc.), together with its ills in any form, can be comprehended and interpreted only when placed in true perspective with population statistics. Linked with other statistical data, the census rounds out the information which assists governments and business in directing their affairs.

Another important field is that of vital and health statistics – from the demographic as well as from the public health point of view. Statistics of births, marriages and deaths provide the raw materials out of which a picture of the current growth and change of population between one census and another may be constructed. They also provide the national indicators of community health which guide health administrators in deciding where the emphasis should be directed in their programmes for combating disease and prolonging the life span. Statistics of illness keep health officers informed on the incidence of various diseases. The productive working time lost through illness and through premature death produces an effect on national production and national income which is important to the economist and the social scientist as well as to the health officer. Vital and health statistics point out the intimate relationship between economic and physical well-being, between community and individual health.

Statistics of industry indicate the extent to which a country has become industrialized and its potential for the production of specific commodities. When adequately developed, they supply numerous key economic barometers. Industrial statistics by kinds of business and by commodities on a current basis are of much interest to business.

In all fields, both national and international, the work of the statistician is fundamental for comprehending the numerical aspects of the problems to be dealt with, for setting more or less isolated phenomena in their proper perspective, for indicating the significance of parts in relation to the whole and for substituting realistic data for wishful thinking, biased claims and political oratory. In short, statisticians help to shape business policy, they furnish navigational guides for the ship of state, they help social agencies which work for the welfare of the people and they help students and the general public to have a more realistic view of the complex economic and social environment in which they live. Statisticians have reason to be proud of their science and to feel that they are making important contributions to economic and social progress.

The status of statisticians is related, on the one hand, to recognition of the uses and importance of statistics, and, on the other, to the characteristics of statisticians themselves. The variety of scientific and specialized skills required to produce the statistical information now in demand emphasizes the need for professional statisticians of the highest competence.

The task of the statistician is to assess the reliability of data. He is concerned with methods of measurement and with methods of collecting, tabulating and analysing data,

and must be familiar with the fields from which the observations come. His functions include research, consultant service, field work, instruction and technical writing. Statistical work in all fields requires a knowledge of the theory of statistics. This theory is in itself a subject of scholarly interest and research, both on account of its applications and because of its relations to philosophy and to mathematics.

The educational qualifications usually required of a professional statistician is the successful completion, at the university level, of a course of study in mathematics, theory of statistics and a specialized field in which statistics can be applied. Postgraduate study is highly desirable. Such academic training or its equivalent is often acquired through part-time study. Many statisticians acquire professional status through experience supplemented by study of the needs of the subject-matter field in which they are working.

Many statistical offices permit their professional personnel to take time off for advanced study and, in fact, some countries provide financial assistance in cases where such study is likely to prove of particular advantage to the organization. Most countries encourage their statisticians to become members of professional statistical societies or organizations and to participate in national and international meetings which provide for an exchange of views on the result of studies made and experience acquired in statistical fields.

The practice of permitting the professional statisticians to accept invitations to participate in university teaching by giving courses and lectures in their specialized fields, and encouraging them to contribute articles of a scientific nature to professional journals is followed by statistical organizations in a number of countries. Such activities point up the growing professional status of the statistician. They are also morale builders and help to prevent complacency and deterioration. Since statistics is a comparatively new and dynamic science, it is particularly important that the professional statistician keep abreast of new developments.

In addition to the educational qualifications already mentioned, the professional statistician should possess insight and imagination, training in statistical techniques and a faculty for self-expression.

Professional statistical personnel are usually recruited from the universities. Close liaison should be maintained so that promising students will be encouraged to specialize in statistical study, and will be aware of the opportunities in government statistical services.

A statistical office requires personnel with various attributes and at several levels of classification and salary. It is essential that statistical grades should be created to parallel the administrative and scientific grades in other government departments. Problems can arise when a general civil service organization controls the hiring and promotion of the statistical personnel of the various departments and offices. These problems may be met if grades and salaries are set by, or in consultation with, persons who have a proper appreciation of the qualifications and importance of statistical personnel.

Statistics is a particularly important tool in a wide variety of fields. Consequently, people in many professions and businesses collect, analyse, present and interpret data as part of their jobs. It is sometimes difficult if not impossible to distinguish between these people and professional statisticians. The latter may have perhaps greater knowledge of statistical principles and greater ability to develop new methods to meet new requirements. The non-statistician works primarily in one of the sciences other than statistics and is transferable into another branch of his own science or into an allied field. The professional statistician, on the other hand, may transfer with relative ease from statistical work in one field to statistical work in another.

Within a statistical organization, frequent meetings of the professional staff for the exchange of views and discussion of specific problems are beneficial both to the organization and to the professional staff.

If the value of statistics was recognized everywhere, the professional status of statisticians would be high in every country. Unfortunately this does not seem to be the case. Whether or not it is the case in any particular country may be ascertained by considering some criteria by which that status can be judged. These might be:

1. Appointment of statistical personnel on the basis of merit.

2. Promotion of statistical personnel on the basis of merit.

3. Security of position for statistical personnel.

4. Objectivity of statistical activities.

5. Disassociation of the statistician from politics.

In a country where the government realizes the vital importance of reliable statistics and is prepared to live up to its responsibilities in this connexion, appointments will be made on the merit basis. Ability to produce work of high quality will be the first consideration. Statisticians, like other professional people, have to be specially educated and trained and the salary grades for professional statisticians should correspond to those in other fields of professional endeavour in the government service. The appointment of persons without the necessary qualifications, through patronage or favouritism, can only result in the non-fulfilment of the statistical requirements of the country.

Clearly, promotion within the statistical service of the country will also be on the merit basis. In general, statisticians in government service are professional people with ambitions to serve the State. But they are human and compete for opportunities which will give their abilities greater scope and increase their earnings. To be passed over by those less competent than themselves leads to frustration and shattered morale, a condition not conducive to the best statistical work.

The country will see to it that the statistician has security in his position. Where civil servants are at the mercy of every change of government, it is impossible for the civil service to function with high efficiency. Good statistical organization on that basis is hopeless. There will be a lack of that continuity in the work which is essential to success. Periodically, a fresh start will have to be made. The experience laboriously acquired by previous incumbents in statistical offices will be lost.

Even during the period when they hold their positions, the statisticians will be looking out for more secure positions. The turnover will be heavy. It is impossible to develop an adequate statistical system under such conditions.

The country will see to it that the statistician is permitted to be objective. That is, he should be permitted to compile and publish statistics for purely statistical ends. Statistics which are intentionally biased or moulded to support a point of policy may be more harmful than no statistics at all. Eventually there will be a lack of confidence in such statistics and the country will lack an essential medium of information for its progress. On the other hand, if the statistician is recognized as being truly objective and his activities as purely fact-finding, he will receive public support which will further the development of a comprehensive integrated statistical system.

Lastly, the statistician will not want and should not be permitted to take part in political activities. The intervention of the professional statistician in politics will hamper that impartiality which is the foundation of statistical objectivity and progress.

These five cardinal principles must be recognized if statistical systems are to be developed which will provide the quality and quantity of statistical data adequate for the country's needs. Governments which adopt these principles as a matter of policy provide the qualified statistician with the opportunity of attaining high professional status. There will be attractive vistas to stir his ambition, instead of blind alleys to discourage him. There will be scope for his abilities and training, instead of frustrations. He will have that contentment of mind which is necessary for the best effort because his work has been recognized as highly essential for the good of the country and the welfare of the people.

CHAPTER 12

TRAINING OF STATISTICAL PERSONNEL

Statistical organizations throughout the world are becoming increasingly interested in the problems of training statisticians and other personnel who require specialized skills for the collection, compilation, publication and analysis of statistical data. This chapter deals with two complementary fields of training which are of interest to statisticians and to statistical organizations. The first concerns the need for and possibilities of training within a statistical office or by co-operative action of several departments and offices within a given country; the second is the international aspect of the problem which often involves training outside of the technician's home country.

No attempt will be made to define too exactly just what is meant by the word *training*. Some employers have substituted for it the phrase *employee development* and others have used the term *employee education*. There is, of course, no sharp dividing line between education and training. However, as the term is usually used, training implies the imparting of knowledge and experience to an individual for relatively specific or vocational purposes. Thus, statistical offices train enumerators, coding clerks, office machine operators, supervisors, administrative officers and analysts. The aim in each instance is the transmission of knowledge and skill for practical application to immediate problems. As an adjunct to training of statistical personnel, consideration should be given to advancing the academic qualifications of employees in order to speed up the programme of development within the organization. In many types of training, the acquisition of knowledge and the performance of work is a simultaneous process. Under good training procedures, the trainee should participate in doing, observing, discussing and reading or listening to lectures about a subject which, in nearly all instances, is directly related to the work in which he is, or will be, engaged. If he is in a staff position or one which requires him to have a knowledge of over-all objectives, techniques and subject matter, the trainee may require a relatively thorough theoretical orientation which has wide applications and may be in the general field of what we term *education*. For the truly educated man there is no sharp differentiation between theory and practice – if it is good theoretically it must be practical as well; and if it is sound practice, theory must follow it.

In many countries, government departments and offices are learning much about training from private business and industry. The impetus for training programmes has been accelerated during times of relatively high employment, when manpower shortages have reached an acute stage, and industry and business in many countries have been compelled to develop techniques and training materials for the solution of their staffing and operating problems. Governments, too, have been faced with these problems and have adopted similar measures for their solution; in fact, training has now become a normal function of the government service. Some even have special authority to send a number of selected employees to colleges or other educational centres, for brief periods of time, for academic as well as the more vocational type of training.

Training within the home country

The primary responsibility for the training of statistical personnel rests, and must continue to rest, with those in charge of the statistical services in each country. Impressive advances have been made in certain countries through the institution of training programmes with or without the assistance of advisers or consultants provided by international organizations. Training programmes within the country have been conducted by the statistical offices and other departments, using the training resources available in the country in universities, state and municipal offices, other national organizations and private industries, such as business machine companies and banks. Although these programmes are not adequate for the training of skilled technicians in such fields as statistical sampling, analysis of productivity or demographic analysis, they are often sufficient for the training of semi-skilled employees in various fields of statistical operation such as administration and management, general work processing and simple statistical techniques, including the elementary concepts of analysis and use of data. Examination of a detailed list of training fields envisages a sphere of statistical training that is very broad – broad enough to encompass *all* the functions of *all* the employees of the statistical office, not merely the statistical functions as narrowly defined in terms of mathematical and other advanced techniques relating to the collection, compilation and analysis of data. This means that the training programme must be planned over a period of time, with courses of different length and with a variety of subjects, rather than a single course for the training of all employees.

The training of as many employees as possible in their home office has many advantages. Such training fits easily into the work programme as a normal function of operations and supervision. Employees can concentrate on their subject in the normal setting in which they work. The problems presented are the real ones of their own office, not the exercises of an academic institution or the problems of other offices or other countries. And, of course, there is no language problem – no problem of a difficult tongue or of a difference in terminology of the

subjects under discussion. Probably most important of all, even though training does take an employee away from other work, training in his home office is relatively inexpensive as compared with training at either a university or abroad. For the average employee, therefore, it should be the function of his own office to provide the necessary training, mobilizing such resources as are available within the staff or in the community, or available from various international programmes.

However, some statistical offices, particularly those in countries without a strong statistical tradition, find it difficult, if not actually impossible, to train members of the senior staff utilizing only the facilities available within their own office or their own country. Even countries with considerable resources may find it advantageous to select members of their senior staff and promising young technicians for training abroad. They have found, for example, that training in the home office or home country presents certain problems which are quite difficult to overcome. In the first place, the trainees may have to perform their regular work in the office in addition to their training. Moreover, it may be difficult for a person in his own country to be objective concerning possible solutions to problems or different ways of performing operations. He may feel that his past actions must be defended lest he lose status in the eyes of his fellow employees. In some cases, the only training available for certain senior staff amounts to self-training, because there is a lack of technicians with superior high-level training and experience. This may be true even when foreign technicians are imported as teachers for the training programmes.

Training outside the home country

Increasing use has been made of the facilities provided by other countries and by international programmes because of the limitations of training in some countries. Some of this training is sponsored and subsidized, while some is arranged on a more informal basis. The interest in training is shared and promoted by international and regional agencies and professional groups in this field, such as the United Nations and the specialized agencies, the International Statistical Institute, the Inter American Statistical Institute, and the various Foundations. Through the influence of such organizations, various programmes for international technical assistance have placed a major emphasis on training as a necessary step toward the development of statistics in statistically underdeveloped countries and for the development and application of international statistical standards.

The United Nations, its specialized agencies (such as the World Health Organization and the Food and Agriculture Organization) and other international bodies (such as the Inter American Statistical Institute) have set up a number of training centres, either on a short term, or on a continuous basis, to provide training in methodology, analysis and other statistical practices. An example of the information approach is seen in the frequent visits of technicians to the statistical offices of other countries – a rather old phenomenon in the development of the statistical profession and government function. Only within the past decade, however, have substantial funds been made available for the more formalized operation of international training programmes which permit many technicians to visit other countries for individual or group study.

Some of the advantages of training the statistician in other countries may be summarized briefly as follows: the technician is freed completely from the technical and administrative duties of his own office. He sees and participates in new methods of data collection, compilation and analysis. He meets other technicians with a variety of backgrounds and experience, especially if he is able to go to a country with a well-developed statistical programme. It is possible for him to be more objective regarding his own office and the problems therein. He can engage in a variety of activities and attain experience in aspects of his work which would not be possible because of his function or status within his own country. He is able more easily to secure and understand the use of technical materials from various countries and international agencies with which he has become familiar in the course of his training abroad. And he returns home with the added prestige of foreign study and travel.

Nevertheless there are limitations as well as advantages in training outside of one's own country. Probably the problem presenting the most difficulty is that of language. Statisticians vary greatly as to mastery of their own language and of a foreign language. Again, the problems which they encounter abroad are often so different from those of their own country that it is difficult for them to apply the solutions which they have seen abroad to the conditions at home. For example, the taking of an industrial census in a country where nearly all business establishments keep books for taxation or other purposes, and where they can be reached within a few days by mail, is quite different from taking an industrial census where it is not customary to keep books and where the mail system does not reach all parts of the country. Similar examples could be found in nearly every field of statistics. This difficulty, however, is not insuperable. It can be solved by more extensive teaching materials drawn from many countries. It is sometimes charged that foreign training is too academic. This, too, is a problem which can be overcome by a better selection of instructors who are familiar with the economic, social and political systems of other countries, and who have a familiarity with those problems which face the statistician.

Considerable care should be taken in the selection of technicians for such training, because the higher the qualification of the trainee the greater should be the benefits obtained from the training abroad. Practically all international training programmes are based on the assumption that the best technicians available for training in each country should be selected for training even though, in the initial stages, the best may not measure up to minimum standards desired from a long-run point of view. Only in this way can gradual development be achieved.

Some of the requirements for training abroad are the following: if a statistician is to train in a country which speaks a language other than his own, he should have a relatively good mastery of the foreign language before he leaves home. Precious time is often lost in attempting to teach a foreign language as part of a technical training programme. The candidate should also have an adequate education for the level of work for which he is being

trained. It is almost impossible to teach sampling to a trainee who has difficulty in understanding simple algebra; or the fundamentals of the content, collection, compilation and analytical techniques of an industrial census to one who has not had an elementary course in statistics. While all technicians do not need to be trained in advanced statistics, at least an elementary course in statistics is necessary to understand the programmes and operations of statistical systems. Some experience as well as a fair education is desirable, otherwise the problems tend to appear academic rather than real.

Advance planning for technicians who are going to study abroad, should occur in the home country in the matter of programming the fields of study and the time to be devoted to each field. It is important that care should be taken by the statistical offices in the selection and preparation of technicians who are sent abroad for training. While this advance programming should not be too restrictive, it should be sufficiently definite so that both the trainee and the trainer will have a specific idea of the fields in which he is expected to acquire special competence.

This advance planning in the home country and by the training office or sponsor is especially necessary if the training programme consists largely of travel or of conferences with individuals rather than participation in organized group instruction. Well-planned travel with advance notice to the individuals or offices to be visited is often profitable. Such travel should not be undertaken, however, without forwarding a statement to the offices to be visited concerning the programme and interests of the trainee, including any specific questions to which he seeks to obtain answers and, if possible, a personal history statement. This advance planning, including correspondence with training agencies or individuals, is time consuming and expensive but is necessary if the training is to produce maximum results.

Relatively few technicians are expert in securing the maximum of information from short conferences with other technicians, yet many of them find that this is an important part of their programme. Comparing individual conferences with group instruction, one finds that conferences have some disadvantages. There is an inevitable loss of time in getting acquainted. In spite of this, the host and the trainee may not become sufficiently well acquainted to face realistically the basic problems which concern them. It may be that the problems discussed are those which are the major preoccupation of the host at the time of the interview, rather than problems which are of great importance to the trainee, or perhaps the questions of the trainee are answered with dogmatic opinions by the trainer. This does not add much to the sum total of knowledge of the trainee. It is preferable to postpone personal conferences until after the trainee has become familiar with the statistical structure and problems of the country in which he is studying.

Group instruction overcomes many of the problems of individual conferences, especially if the group of trainees is composed of persons from various countries or different offices. There is an inevitable intra-stimulation – questions by one person suggest problems, questions or solutions to another. A group keeps the instructor alert; he is less likely to be dogmatic or academic. A group can often get the attention of the best men in the field for at least short periods, even though such men are very busy and might not be available for a conference with one person. Moreover, within a group composed of representatives from different countries or offices, the trainees themselves often become teachers through the exchange of experience or through actual instruction in various phases of the programme. Of considerable importance to the host country is the fact that group instruction consumes less over-all staff time and interferes less with operating programmes. Finally, from the point of view of some trainees, at least, membership in a group avoids the feeling of being alone or different – one of the psychological hazards of foreign training.

Conclusion

In conclusion, the general subject of training in the field of statistics may be summarized as follows:

1. The primary responsibility for intra-office training and for planning of staff training abroad should rest with the home office rather than with international organizations or the organizations in foreign countries. Most of the training of personnel inevitably has to be done within the home office and the preparation of staff members for more efficient service to the statistical organization, including their use in training abroad, should be planned from the point of view of the needs of the home office.

2. To escape the deadly effects of psychological inbreeding and complacency, all statistical organizations, however well-developed, should select key personnel for training in other offices and, if possible, in other countries. Such training need not be formally called training or education. The sessions of professional organizations such as national and international meetings of statisticians, economists, sociologists, etc., and international conferences are also a form of training.

3. Full use should be made of the training and consultation facilities of international technical co-operation programmes, especially by countries which, because of their size or their degree of development, do not have enough trained personnel for statistical purposes, university instruction, etc. Countries should not hesitate to ask for aid in this important field.

4. As statistical competence increases in a given country, more and more care should be taken in the selection of individuals for training abroad so as to obtain the maximum benefit from such training. This introduces competition among technicians and gives impetus to rapid technological development.

5. Professional contacts and technical knowledge in the field of statistics should cross country boundaries as easily as technical knowledge in the various fields of the natural sciences. International organizations such as the United Nations and the specialized agencies can do much to further statistical training by promoting programmes whereby technicians will cross international boundaries for the discussion of their common problems and the possible solutions.

APPENDIX A

DESCRIPTIONS OF TYPICAL NATIONAL STATISTICAL SYSTEMS

* Chart in Appendix B

1. BRAZIL *

Brazil is a federated republic composed of 20 states, four territories, and one federal district. The states (formerly called provinces when the nation was a unitary empire), are divided into municipalities. At present the political and administrative division of the country consists of 1,894 municipalities.

According to Brazilian constitutional tradition, even before the proclamation of the republic, in 1889, both states and municipalities enjoyed the utmost independence in matters concerning their particular interests. This circumstance, and the fact that statistics are housekeeping activities, contributed towards considering them as coming within the realm of the Union, the states and the municipalities. Those three branches of administration have always carried out statistical researches, in accordance with their specific requirements. No one bothered to find out whether or not the same survey was being done by another department of the administration and no co-ordination of activities and results was attempted. Hence, at least three different sets of data on the same problem were sometimes presented.

Attempts to put an end to this unsatisfactory state of affairs were at last successful when, in 1934, the Instituto Nacional de Estatística (National Institute of Statistics) was created. It later became the Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics). This organization, according to the definition of the law, constitutes "a federative entity for the purpose of promoting and enforcing, or technically orientating in a rational manner, the systematic survey of all national statistics, by means of the progressive articulation and co-operation of the three administrative branches of the political organization of the Republic".

The composition of the federation of statistical services depended upon the acquiescence of the states and municipalities which at the time enjoyed sufficient autonomy to deliberate freely upon their own administrative organization, which included statistical activities. In practice, if a state or municipality did not wish to participate in the federation about to be created, the Union would have no constitutional grounds to force it to do so. The Federal Government, which would profit most from the regularity of statistical activities throughout the country, had taken the initiative to create the Institute, and foresaw and determined by law the manner whereby all the efforts and resources which the public authorities could raise for statistical purposes would gradually come under the unifying influence of the new Institute.

On 11 August 1936, a National Statistical Convention was signed in Rio de Janeiro. It was a political agreement whereby the governments of the Union and of the political entities of the republic undertook to determine the measures needed to complete the federated membership of the Institute, and to fix the bases for the constitution and regulation of the National Council of Statistics. The signatories of the agreement were duly accredited by their governments, which later on promulgated laws approving and ratifying the Convention.

The pledged governments agreed to take part in the organization of the Institute by integrating all the statistical services then existing, or to be created later in their field of action. Thus the statistical departments, though administratively dependent upon their respective state governments, became subordinated to the Institute from a technical point of view, in order to carry out their work under a uniform and common plan that would benefit all three levels of government. Each department would continue to have its own financial existence, independent from that which the Institute might have as an entity, with civil rights. And the resources with which the Institute ought to maintain itself would, in principle, be supplied by all the pledged governments.

The direction of the departments coming within this system would be entrusted to employees appointed temporarily by the governments interested. These employees might nonetheless be technicians either from the Institute or from other departments of the system. The personnel would be paid out of the appropriations for the departments, and would be selected by means of competitions (*concursos*), while the Institute would determine the minimum salary and essential requirements for the position.

It should be stressed that when the Institute was created there were a large number of statistical bureaux, both federal and state. These bureaux, known for work already accomplished, came under the technical jurisdiction of the Institute. There was, therefore, a general desire for submission to a higher discipline for the common good. Obviously, the existence of these organs, which are traditional in Brazilian administration, rendered more difficult the enumeration of the compromises and the fixation of the structural bases mentioned in the Convention.

The orientation and basic direction of the activities of the Institute are incumbent upon a collegiate body, the Conselho Nacional de Estatística (National Council of Statistics), in which are represented, under conditions of absolute parity, the political-administrative power of all the governments that signed the Convention. The Council enjoys ample autonomy with regard to the objective of rendering effective the activities dedicated to the planning and carrying out of Brazilian statistical services.

* Based on a paper prepared by João de Mesquita Lara, First Secretary of the Brazilian Society of Statistics. Reproduced as paper No. 34.1 of the United Nations International Seminar on Statistical Organization, held in Ottawa, Canada, October 1952.

The National Council of Statistics is composed of federal and regional organizations. The former consists of

1. Serviço de Estatística Demográfica, Moral e Política do Ministério da Justiça e Negócios Interiores (Demographic, Moral and Political Statistical Bureau of the Ministry of Justice and Home Affairs).

2. Serviço de Estatística Econômica e Financeira, do Ministério da Fazenda (Economic and Financial Statistical Bureau of the Ministry of Finances).

3. Serviço de Estatística da Produção, do Ministério da Agricultura (Production Statistical Bureau of the Ministry of Agriculture).

4. Serviço de Estatística da Educação e Saúde, do Ministério da Educação e Saúde (Education and Health Statistical Bureau of the Ministry of Health and Education).

5. Serviço de Estatística da Previdência e Trabalho, do Ministério do Trabalho, Indústria e Comércio (Social Insurance and Labour Statistical Bureau of the Ministry of Labour, Industry and Commerce).

6. Central bureaux that may be created in other ministries.

The regional organizations comprise the centralizing bureau of the statistical services of the states, territories and federal district. The statistical services now existing, or which might come into being within the scope of the regional and federal administrations, would, perforce, be connected to the corresponding organization.

The highest organ of the Council is the General Assembly, with authority to deliberate upon any subject that may be of interest to the Institute. The Assembly is composed of the members of the Junta Executiva Central (Central Executive Board), representing the Federal Government; the presidents of the *juntas executivas regionais* (regional executive boards), representing the regional and municipal governments; and delegates of affiliated entities. The General Assembly convenes once a year, preferably in the capital of the republic, and determines the programme of general work for the following year. In the interval, the Central Executive Board meets twice a month and resolves *ad referendum*. The Board is composed of the President of the Institute, the directors of the Central Ministerial Bureaux of Statistics, and one representative of the ministries which do not have a central service of statistics.

In every state and territory and in the federal district there is as an organ of the Council, a regional executive board, similar to that of the Central Board. It is the duty of these organs to direct and supervise statistical activities in their field.

It is easy to see how the states, enjoying in the Council the same status as the Union, can make their wishes prevail in the deliberations of the General Assembly. The presence of directors of statistical bureaux from all parts of Brazil, sometimes accompanied by several assistants, renders the yearly meeting of the Assembly very useful and lends greater purpose to the resolutions adopted.

The structure of the Conselho Nacional de Estatística is shown in the chart for Brazil in Appendix B.

The recourse to administrative co-operation to solve this kind of problem is one of the basic principles of the organization and functioning of the Brazilian statistical system. As there was the opportunity of a three-fold approach to the same phenomenon, it was necessary to merge all efforts into one driving force. Each government sector had to work for itself and to the benefit of the other two.

This aim was achieved in practice by distributing the work among the statistical bureaux of each governmental sphere. The national statistical campaign was created with a scope fixed by the Council, including the statistical surveys that must be carried every year throughout the country, under the joint responsibility of the whole "federation of services". By and large, the campaign covers:

1. Surveys of general interest to the three governmental spheres represented in the Institute and based upon questionnaires prepared by the federal bureaux.

2. Surveys of the initiative of federal central bureaux of statistics under special regulations either by virtue of federal law, or by inter-administrative agreement.

3. Surveys to be conducted by means of special questionnaires prepared by regional bureaux, for the purpose of complementing or supplementing the data collected direct by the federal organs.

There is also the regional statistical campaign made up by inquiries within the national plan, carried out in the territory itself, together with the surveys which the Council may approve, and which should cover the municipal limits.

Finally, the municipal campaign includes the local researches that extend beyond the other two plans of surveys.

In the same way that the regional campaign may not restrict the national survey, nor undertake others parallel to those which it has already planned, no municipal plan may in any way clash with the regional, therefore limiting or duplicating its own planned inquiries.

The elements of collection of the national campaign are elaborated by the central federal bureaux, after hearing the regional and municipal organs. With the exception of a few special surveys, the questionnaires are systematically distributed to the informants in three copies by the municipal statistical agency. After being filled in, the schedules are returned to the agency, where they undergo careful checking. After all faults are corrected, the agency keeps a copy for its file and sends the other two to the state statistical department and to the federal statistical service interested in the survey. In this way the Union, the state and the municipality are on an equal footing in so far as receiving the completed questionnaires is concerned.

Both the regional and the federal bureaux may criticize the material which they receive. If they do so and have alterations to make, they exchange information, and the municipal agency is also notified since it is the contact point for the two.

The manipulation of the regional plan is done by the regional bureaux. That of the national campaign comes under the responsibility of the federal bureaux. As the states are also interested in the surveys carried out in their own territories, agreements are made for tabulating

such surveys. In view of these agreements, the federal bureau abstains from doing the tabulation and accepts the figures supplied by the regional bureau, and vice versa; or else the regional bureau undertakes the final treatment while the federal bureau limits itself to temporary enumerations and vice versa. This is an attempt to avoid duplication of the tabulating work.

Among the surveys regularly carried out by the regional statistical bureaux and subject to special processes, mention should be made of the statistical survey of the domestic trends of trade, on account of the uniqueness of the process adopted.

The states, due to the economic and financial autonomy which they enjoy, are interested in knowing regularly the statistical data concerning incoming and outgoing goods in their territories. Several aspects of both political and private economy are tied up with this movement. It happens, however, that the transport organizations are not yet in a position to supply statistical data of their activities so as to enable a complete survey to be made of the trade trends in each federated unit.

The importance of the subject and the incapacity of private enterprises induced the state governments to carry out statistical surveys of imports and exports in their territories. However, a solution more in accordance with the inter-administrative co-operation regime about to be established was foreseen in the National Statistical Convention. It was established in the agreement that all states would undertake to process only the statistics of outgoing goods in accordance with uniform usage, and to state specifically their destinations. The federal bureau in charge of commercial statistics receives from all regional offices these *export* figures, inverts them, adds them up systematically, and so arrives at the *imports* of each state, of goods coming from all the others. The data thus obtained are then supplied to the interested bureaux, which, as stated, do not compile import statistics.

Since the collection of statistics is in charge of local offices in Brazil in accordance with the distribution of duties already mentioned, it depends almost entirely on the smooth working of the specialized municipal departments. Indeed, more than 80 per cent of all statistical surveys in Brazil are based upon field observation in the municipalities.

This circumstance, besides the abnormal conditions the country had to face due to the war, contributed toward the hastening of the complete integration of the general statistical services of the municipalities within the system of the Institute. As they did not possess technical resources or personnel to carry out the thorough reform needed, the formula of inter-administrative co-operation was resorted to, since it had given such good results in the higher branches.

In 1942, by virtue of a new agreement between the Union and the states, on the one hand and, on the other, the 1,574 municipalities then in existence, it was decided to transfer to the Institute, as a neutral legal entity maintained and directed by the three spheres of the Government, the administration of the general statistics then in charge of the municipalities. The Institute, in observance of its obligations, installed one statistical agency in each municipality and equipped it with the minimum working furniture needed: desk, typewriter table, chairs, bookcase, steel filing cabinet, card index cabinet, typewriter, etc. It created the classification of *statistical agent*, for 2,216 positions with reasonable pay, selection for which was made by public competition. The more important municipalities have a larger number of employees, and in the key municipalities of a region there are better equipped model agencies. These agencies, 120 in number, work as training and instruction centres, and are equipped with mimeograph and calculating machines.

An organization of such magnitude, covering an area of 8,464,000 square kilometres and surveying the whole of the Brazilian *physico-socio-complexus*, requires substantial funds. In 1951, the Institute and the network of municipal statistical agencies spent about 4,500,000 United States dollars.

However, when the time came to hand to the Institute the management of the local statistical services, neither the Union, nor the states, nor the municipalities themselves were in a position to withdraw from their normal budgets the necessary funds. As the solution sought for, though of interest to the federal and regional government branches, would benefit particularly the municipalities, the financial responsibility was placed upon their shoulders. In consequence, a special tax of 10 per cent on entrance fees to all public entertainments – cinemas, theatres, circuses, dance halls, etc. – was created by municipal laws.

The total amount collected – equivalent to 4,750,000 United States dollars yearly – goes to the National Fund of Municipal Statistics, which finances all expenses in connexion with the administration of the system. It should be mentioned that the majority of municipalities have budgets with deficit, and that over 70 per cent of the amount collected comes from the municipalities of the capital cities.

2. CANADA *

Canada's statistical system is highly centralized. Prior to the establishment of this system in 1918 there was a long experience with decentralized statistics. The need for continuity between censuses had been recognized as early as 1905 when a permanent office was set up in the Department of Agriculture. Although this office was responsible not only for the census but for statistical work not covered by other government departments, there continued to be gaps and inadequacies.

In 1912, an interdepartmental commission was appointed " to report on a comprehensive system of general statistics adequate to the necessities of the country and in keeping with the demands of the time". The Commission's report presented a strong indictment of existing conditions – the narrow point of view of each administrative department or branch; the routine and neglect of opportunities for furnishing wider information and service; the lack of expert knowledge of statistical methods; the gaps and restricted scope of statistics; the duplication between the provinces and the Dominion; the serious waste of effort through lack of co-ordination between statistical authorities; and the general "lack of coherence and common purpose in the body of Canadian statistics as a whole".

Following the recommendation of the Commission, the office of Dominion Statistician was created in 1915 and this was followed in 1918 by the passage of the Statistics Act which set up the Dominion Bureau of Statistics. The Act consolidated previous statistical legislation and provided that the new unified organization would take charge of statistics of industry; trade and commerce, both foreign and internal; transportation; and crime; as well as the decennial and quinquennial censuses of population and agriculture.

In addition to the specific tasks so assigned to it, the Bureau was "to collect, abstract, compile and publish statistical information relative to the commercial, industrial, social, economic, and general activities and condition of the people". Particularly significant was the provision for collaboration with other departments, so that departmental records which could be adapted to general statistical use should conform, under arrangements with the Bureau, to the general needs of statistics from the broadest point of view. This was specified more fully in an Order-in-Council of 12 October 1918, authorizing the Dominion Statistician to confer with other departments and make a report on how the ends specified in the Statistics Act for unification of statistical output of the several departments could be implemented. Finally, the inquiries by the Bureau were to be mandatory and penalties were specified for non-response.

Backed by this authority, the first Dominion Statistician began the task of taking over from Dominion departments such statistical work as should properly be done in a centralized bureau, making co-operative arrangements with governments and organizing additional fields of statistics. This made effective the centralization which had been envisaged, and even legally provided for in Canada's constitution, but never carried into operation.

In succeeding years, the large and varied field of operation entrusted to the Bureau by the Statistics Act was effectively occupied. In general it may be said that by 1939 the broad framework of a unified and co-ordinated system of national statistics for Canada had been established, though some important details remained to be filled in, and the whole organization streamlined to bring it up to the highest standard of modern efficiency.

The Second World War brought an unprecedented demand for statistics. The Bureau had to expand many of its series. The need for special statistics of a temporary nature was met in large measure by separate statistical sections set up in war departments and offices. Most of this work was not of general or continuing usefulness and was dropped as controls ceased. Such as was valuable for continuing postwar needs was transferred to the Bureau, thus resuming the principle of statistical centralization.

The increased complexity of the world's social and economic problems in the postwar period, the trend toward social security, the acceptance by governments of responsibilities concerning high employment, all led to increased needs for statistics as an aid to policy making and administration. The needs of non-government users of statistics also have increased due, among other things, to greater industrialization and a growing awareness of the value of statistics to business efficiency. Added to this is the existence of the United Nations, its specialized agencies, and other international organizations, all of which have created a demand for statistics at an international level far beyond anything experienced in the past.

These developments made the expansion of the Bureau and changes in its organization and operations inevitable. Since 1939, the Bureau staff has approximately doubled. The alternative to this expansion would have been the creation of separate statistical units by numerous new departments, economic research branches, government corporations and commissions which have come into existence since 1939 and which use statistics as the primary material of their study and research. Such a course would have greatly increased the costs.

Among the postwar developments were the creation of two new divisions in the Bureau – the Research and Development Division, responsible for integrating and analysing existing statistical data and developing therefrom new series of economic statistics of outstanding importance; and the Special Surveys Division, responsible

* Prepared by the Dominion Bureau of Statistics, Ottawa, Canada.

for the sample surveys and development of scientific sampling techniques – the development of standard industrial and commodity classifications; and the streamlining of operations with a view to greater efficiency and economy. The last mentioned has included the conversion from manual to mechanical tabulation wherever suitable; the installation of up-to-date machinery; radical changes in census procedures; and the establishment of a Forms Control Section and an Advisory Board of Publications.

Present Organization of the Dominion Bureau of Statistics

General

At the head of the Bureau organization is the Dominion Statistician. His principal duties, as defined in the Statistics Act, are: to advise on all matters pertaining to statistical policy, to supervise generally the administration of the Statistics Act, and to control the operations and staff of the Bureau. The Assistant Dominion Statistician is responsible for the internal administration of the Bureau and the external relations which this involves.

There are two senior officers: the Senior Research Statistician and the Administrative Officer. The former acts as adviser to the Dominion Statistician on matters of statistical methodology and as consultant for the various divisions, particularly on problems involving higher mathematical and statistical techniques. The Administrative Officer is concerned with organization and methods from an operational point of view, the search for improved machines, printing and processing methods, and the miscellaneous methods concerned with work routines and working conditions.

The staff of the Bureau numbers around 1,300, of which 63 are in the eight regional offices which are organization centres for the Bureau's sample surveys. The staff comprises professional and technical personnel (classified as statisticians, economists, administrative officers or technical officers) and clerical personnel (including clerks, stenographers, typists and machine operators).

Some general observations on the methods used by the Bureau for the collection, compilation and dissemination of statistical information may be of interest.

The direct enumeration method is used in the census. Enumerators call at every household and obtain answers to specific questions. This, the most complete stocktaking in Canada, provides invaluable data for all kinds of statistical measurements, and bases for intercensal estimates. The second method is the use of questionnaires sent through the mails to individuals or firms, annually, or at shorter intervals. A third method utilizes co-operative arrangements with other government departments, federal, provincial and municipal, which collect statistical information for administrative purposes, e.g., birth, marriage, and death registrations. Finally, there is the sampling method by which trained enumerators, operating from the regional offices of the Bureau, collect information from a scientifically selected cross-section of the population.

Various methods of compilation are employed, depending on the nature of the data, the volume and complexity of returns to be processed, and the information required. In some cases the data are transcribed to ledgers or work sheets; in others, peg-board-type questionnaires are used. The speed and economy of this simple tabulation method are so apparent that more and more of the Bureau's questionnaires are being converted to peg-board operations. Where extensive cross-classification is required and the volume of data is large, punch cards provide the most effective compilation medium.

The data collected, compiled and analysed by the Bureau are made available for general use in the form of Reports (annual, quarterly, monthly or weekly publications of basic importance and wide interest); Memoranda (periodic releases of more limited or specialized interest); and Reference Papers (occasional releases on specialized topics, usually of a research nature). In addition, a large number of special compilations are supplied regularly under special arrangement to business firms and individuals.

An Advisory Board of Publications maintains a constant review of the Bureau's publishing programme with a view to eliminating unnecessary publications; ensuring that each publication meets a specific need; improvement in layout, structure of tabular and textual matter; and the attainment of uniform standards as between divisions of the Bureau.

Administration Division

The Administration Division is responsible for all aspects of the Bureau's administration, including office management, personnel, the provision of office services, and, in general, the promotion of efficiency and economy in the operation of the Bureau.

The Staff Organization Section is responsible for planning and directing all operations relating to personnel administration, including selection and placement, pay and attendance records.

All Federal Government employees are recruited by the Civil Service Commission by means of competitive examinations open to all qualified Canadian citizens. The merit system is also used in filling positions above the entrance grades, vacancies being filled by promotional competitions set by the Commission. Employees advance, too, by re-classification. This is by either of two methods: (*a*) unit surveys, in which all positions within the unit are examined by the Commission and a new establishment set up, or (*b*) by re-classification of individual positions in cases where a substantial change in responsibilities has taken place.

A Health Unit, under the jurisdiction of the Civil Service Health Division of the Department of National Health and Welfare, is maintained in the Bureau. Registered nurses with special training provide emergency treatment for on-the-job illnesses and accidents. Advice and guidance are also given on health and personal problems.

The Office Services Section is responsible for the allocation of office and storage space, the procurement, maintenance and distribution of equipment, supplies, and mail, telephone, stenographic and vari-typer services, and the preparation of questionnaires, reports and other printed matter.

The Cost Control Section is responsible for the prepara-

tion of the estimates of funds required by the Bureau and the maintenance of control of expenditures within the funds provided and within the government regulations. A system of internal cost accounting is maintained to provide a record of the cost of operating each division and section of the Bureau.

The Forms Control Section reviews and designs questionnaires and office forms with a view to avoidance of duplication, simplification of format so as to facilitate economical tabulation, and keeping the costs involved to a minimum.

Agriculture Division

The Agriculture Division is responsible for current intercensal estimates pertaining to agriculture. These include the production, inventories and value of practically all commodities produced on farms.

The Crops Section and the Live Stock Section are concerned with all work pertaining to crops and grain products, and to live stock and animal products, respectively. The Research and Compilation Section deals with work and problems relating to the Division as a whole, including farm income, price and production indexes, compilation of general surveys and research.

Provincial governments aid in the compilation of results for certain surveys. The Bureau provides the questionnaires and does the mailing with the provision of post-free return envelopes to the provinces for returns tabulated by them.

Census Division

The main function of the Census Division is organizing, taking, compiling and analysing the decennial and quinquennial censuses of population, housing and agriculture.

The Population Section is divided into three units: General Population, Occupations and Employment, and Housing and Families.

The Social Analysis Section is concerned with the analysis and interpretation of the data obtained from the census and supplementary data from other sources. It prepares the summary and analysis volume of the census and various monographs and special studies.

For the Ninth Decennial Census, taken in June 1951, many new procedures were adopted. The use of mark-sense documents in the field, the document punch and the electronic statistical machine constituted the major mechanical changes, while, on the organizational side, the decentralization of processing to six regional centres constituted a fundamental departure from previous procedures. Another innovation was in the publication programme, a single printing being made for use in both the preliminary bulletins and the final volumes.

Education Division

In Canada, education is under provincial jurisdiction. The primary function of the Education Division is to coordinate the provincial statistics of education and to supplement them when necessary for the attainment of comparable nation-wide totals. Separate sections of the Division deal with elementary and secondary education, higher education and libraries, and with adult education and research.

The Division works in close co-operation with the provincial departments of education. In the case of certain provinces the basic data are forwarded to the Bureau in the form of the original teachers' reports, while in others, the reports are compiled in the provincial departments and the totals supplied to the Bureau according to a scheme of tabulation agreed upon in Dominion-provincial conferences on education. The statistics of private schools and of universities and colleges, as well as those of libraries and those relating to adult education, are collected directly by the Bureau.

General Assignments Division

The primary function of this Division is to provide special services for economic forecasting. Since capital expenditures on construction and machinery and equipment comprise about one-fifth of Canada's total expenditure on all goods and services, it is of particular value to have advance knowledge of their probable level and effects on employment and income. Experience has shown that it is possible to forecast these expenditures a year in advance with a reasonable degree of accuracy and, consequently, both business and government are forewarned of any sudden changes in trend.

Data on capital expenditures, supply of building materials, construction, building permits and new firms and the nature of their business are also collected. Quarterly surveys of corporation profits are made on a sample basis for all sectors of the economy.

Health and Welfare Division

In the health field this Division covers (*a*) vital statistics; (*b*) the volume of illness and the characteristics of the persons and families involved and (*c*) the measurement of the services provided by hospitals and certain welfare institutions, and the utilization of these services. One feature common to all three is that the events and situations being measured are the constitutional responsibility of the provincial governments so that the basic data must be collected and compiled within the framework of either formal agreements or informal working arrangements between the Bureau and the provinces.

The Vital Statistics Section deals with vital events. The registration records are photographed on microfilm in the provincial offices and the microfilm is forwarded to the Bureau. The tabulation programme is so arranged that the tables required by the provinces are prepared in the process of working towards the national tabulations. The microfilm copies are used also for the preparation of the National Vital Statistics Indexes, which are used by the provinces for verification and control purposes in connexion with the payment of family allowances, old age pensions and other forms of public assistance.

The Public Health Section deals at present with two types of illness: (*a*) general illness and (*b*) selective illness, either for certain kinds of illness or for certain sections of the population.

The most practical approach to the problem of general illness statistics has been found to be the sampling method. This was followed in a nation-wide sickness survey made in 1950–51.

Among selective illness statistics are those of communicable diseases which, under provincial laws, must be reported immediately to the provincial departments of health. Weekly totals are compiled by the provinces and sent to the Public Health Section which aggregates them into a national weekly summary with comparative figures for the previous week and a five-year median. Other selective illness statistics compiled are those of illness in the federal civil service, and statistics of home nursing services rendered by the Victorian Order of Nurses.

The Institutions Section is responsible for statistics on hospitals, tuberculosis sanatoria and mental institutions, including their ownership, administration and operation, movement of patients, revenues and expenditures. For sanatoria and mental institutions, detailed information on the characteristics and diagnoses of patients is compiled. At five-year intervals, similar data are collected for charitable, benevolent and welfare institutions.

The Judicial Statistics Section collects data from the courts and police departments and compiles statistics for each class of indictable and non-indictable offences. Special attention is given to the provision of adequate statistics of juvenile delinquents.

Industry and Merchandising Division

This Division collects and compiles data on the production and distribution of goods and services in Canada.

The annual Census of Industry covers not only production but materials used, labour, wages and salaries, fuel and power used, etc.; in other words, it is in the nature of a general economic survey. Six sections cover: animal products; fisheries; forestry; mining, metallurgical and chemical; general manufactures; and commodity statistics, respectively. The first four compile data covering primary production and follow the primary products through the secondary manufacturing process necessary to convert them into consumer goods. The General Manufactures Section covers the operations of manufacturing firms not specifically covered in the other sections and, in addition, it collates the data reported to the other sections and thus presents a general picture of manufacturing activities. The Commodity Section collects value data on inventories, sales and orders, and conducts research aimed at improving the quality and timeliness of commodity statistics. A central index unit services all sections. It maintains alphabetical and geographical indexes of all manufacturing establishments and centralizes correspondence files.

Standard collection and compilation patterns are followed through the Census of Industry. Establishments whose normal annual production has a value of less than $50,000 report total gross value only, unless they produce important percentages of specific commodities, in which case they report detail of such commodities. The time lag inherent in a detailed series such as the annual Census of Industry is overcome to a considerable extent by the preparation of advance estimates which are reasonably accurate. In addition to the annual census, current surveys on important commodities are made monthly, quarterly or on a seasonal basis.

In the field of distribution, the basic statistical undertaking is the decennial Census of Distribution. The enumerators list the names and addresses of all business establishments in their respective territories and this record serves as the basis for a later mail-questionnaire survey. Different schedules are used for each of the three main types of distributive trade with a further differentiation for special kinds of business within each main trade. There is an abbreviated schedule for small establishments. Commodity breakdowns of sales are obtained from all large establishments and from a sample of the smaller establishments.

While the Census of Distribution provides the basic content and pattern of the distributional scheme, the Merchandising and Services Section collects and compiles current data on retail and wholesale trade, including a detailed analysis of department store sales; on various services including laundries, hotels and theatres; and on the operations of sales finance companies—mainly automotive and household durables. Sales of farm implements and equipment are surveyed annually.

International Trade Division

International trade and other transactions, such as tourist expenditures, and payments of interest and dividends, are of special importance to Canada. Current receipts from other countries for goods and services exported, normally amount to around 25 per cent of the gross national production. Moreover, large sums of money have been invested in Canada by other countries and the analysis of these as well as of the sums which, in recent years, Canada has invested in other countries, particularly in the form of export credits and other loans extended by the Canadian Government is very important.

The basic information on commodity imports and exports is obtained from customs import entries and invoices, and from customs export entries supplied by the Department of National Revenue.

In contrast to the compilation of statistics of commodity trade and of travel movements, which are large-scale operations involving the processing of some 14 million statistical forms in a year, the preparation of many balance-of-payments statements requires the selective use of statistical data and other information from numerous different sources. This necessitates the co-ordination of different kinds of data and their adjustment to a special use in conformity with conceptual principles which serve this use. In covering many balance-of-payments items, questionnaires are sent to different groups of selected principals in Canada through whom particular international transactions pass. Some of these surveys aim at covering all transactions while others are on a sample basis.

A separate unit of the Division deals with international tourist statistics. The figures on volume of traffic are based on an analysis of customs permits and counts made by Canadian customs and immigration officers at the border. The expenditure estimates are on the basis of sample questionnaires.

Labour and Prices Division

Canadian statistics of labour and prices afford an excellent example of a field upon which wartime changes have left a permanent imprint. A very great expansion of industry took place with manpower, wages and prices all closely controlled. The cost-of-living index on which

cost-of-living bonuses were based assumed an altogether new importance and it continues to be used in labour-management relations and the negotiation of wage contracts to an extent hitherto unknown.

The Bureau has recognized the increased importance of labour and price statistics by co-ordinating the branches concerned with these statistics into a Labour and Prices Division. It comprises three sections which deal with employment, unemployment insurance and prices, respectively, and a research section which is concerned with the improvement of the statistical series already established as well as with the development of new ones.

The Employment Section collects and compiles monthly data on employment and payrolls, based on reports from firms in practically all industries except agriculture, government and certain services. Index numbers of employment, payrolls and average weekly wages and salaries are constructed.

Annual surveys obtain data on hours and earnings in a 3-year cycle; in one year hours of work in several ranges are collected; in the second year ranges of earnings; and in the third year, aggregate figures on weekly hours and earnings are obtained.

The Unemployment Insurance Section is, in effect, the statistical branch of the Unemployment Insurance Commission which administers a nation-wide system of unemployment insurance and a national employment service, the basic documents being used for both administrative and statistical purposes. Data on the operation of the Unemployment Insurance Act, labour demand and supply, placement operations, unplaced applicants and unfilled vacancies are compiled. These data provide a valuable index of the trend of unemployment.

Basic information on employment and unemployment in Canada is drawn also from other Bureau Divisions. The Federal Department of Labour compiles industrial disputes records and wage rates, and conditions of work statistics, in order to facilitate its conciliation work. The provinces produce statistics related to the administration of minimum wage and workmen's compensation legislation. The adoption of a Canadian Standard Industrial Classification has helped materially in assessing differences in employment totals and trends due to varying coverage, definitions and collection methods.

The Prices Section collects and compiles price statistics in the fields of retail, wholesale, international, farm and security prices. The basic data are collected by various methods, including mail questionnaires and field agents. While the emphasis is on the production of index numbers, particularly consumer price index numbers, the demand for actual prices is very great and tabulated prices form an important part of the Section's output.

The construction of a new Consumer Price Index to replace the cost-of-living index has been a recent major project. The new index has an up-to-date weighting pattern and a more comprehensive budget, and is superior from the standpoint of index-number technique.

Public Finance and Transportation Division

Public finance in Canada includes federal, provincial and municipal finance. The administrative systems of the Dominion and the provinces are separate and their accounting systems, as well as those of the municipalities which are under provincial jurisdiction, developed independently and differ widely in terminology and setup. One of the major functions of the Division is to gather, from official reports and other sources, data on the finances of the three levels of government and to recast them so as to obtain complete uniform coverage on a comparable basis.

Over the years much work has been directed towards establishing standard practice and usages in the classification of accounts and in accounting and reporting principles and procedures. Successive federal-provincial conferences have been organized to further this objective. Continuing committees work between conferences, drafting proposals and preparing the ground work for conference consideration. Separate sections of the Division deal with federal and provincial finance statistics, municipal finance statistics and federal and provincial government employment and payrolls, respectively. *A Manual of Instructions and Municipal Accounting Terminology* prepared by the Division is now in general use.

The Transportation Section is responsible for statistics of the various forms of land, water and air transport, and public utilities. In some instances, the collection is handled by another department or agency of the federal or of a provincial government, e.g., copies of reports required from railways and air carriers by federal regulatory authorities are sent to the Bureau for statistical purposes. In some instances joint questionnaires are used by the Bureau and the provinces, for example, in the collection of statistics concerning freight and passenger motor-carrier operations.

Special Surveys Division

The growth of health and security measures, the acceptance by governments of an overriding responsibility for high employment, and the problems of postwar reconstruction created an urgent need for up-to-date data on the population and the labour force. In view of the cost of a complete periodic enumeration and the fact that it would be impossible to tabulate and publish the results quickly enough, the sampling method was adopted as the most practical means of supplying such information.

The main task of the Division is the monthly survey of the labour force by means of a scientifically designed sample of households in Canada, which produces an overall picture of the population 14 years of age and over, the size of the labour force, the number employed and the number unemployed. Eight regional offices, located in large urban centres across Canada, are responsible for obtaining the information.

As sampling techniques developed, other applications to Bureau series became apparent. In addition to the labour force, surveys now include a quarterly residential rents survey, a monthly survey of residential construction, a monthly survey of local price data and various surveys on special subjects such as housing characteristics, mortgages, income and expenditure, farm equipment and farm labour. These are undertaken after discussion with the requesting division or agency to establish the need for the information, the data required and the best method of collection. The field operations and the preliminary stages

of processing of the 1951 Census were carried out by the regional offices.

In most instances, the data required are collected by personal interviews, although sometimes mail questionnaires are used. The interview technique, using a small group of trained enumerators, appears to be the more satisfactory, as the quality and response rate are relatively high. Furthermore, the interview approach is much more effective in obtaining the co-operation of respondents.

Mechanical Tabulation Division

All large-scale tabulating work of the Bureau, with the exception of the census tabulations, is centralized in the Mechanical Tabulation Division. After being key punched, the cards are processed through verifying, sorting and alphabetic accounting machines, in order to obtain the desired tabulations. This Division also analyses specific tabulation problems and recommends the most efficient methods for securing the desired tabulations. Machines in use comprise a variety of units of tabulating equipment.

There is also a Calculating Section which operates adding machines, comptometers and various other types of calculating equipment. It performs work which is not readily adapted to punch-card methods.

Research and Development Division

The fields of responsibility of this Division include the national accounts, indexes of physical volume of production and other series combining primary data of the Bureau; the development of new economic statistics to fill gaps in the basic data for the national accounts and for other purposes; special studies of existing fields of economic statistics with a view to improvement in quality; and continuing study of the concepts of the national accounts and related aggregates.

The work of the National Income Section includes annual estimates of the national accounts, quarterly estimates of the main national accounts aggregates, current deflation work and miscellaneous related work.

The Business Statistics Section covers the field of research and development as it applies to the construction of real output series by means of the direct industry approach; it also assembles and processes data from other Bureau Divisions, government departments and outside organizations, for publication in the *Canadian Statistical Review* and other current reports.

Direct collection of data by this Division is limited to special cases, e.g., various kinds of income surveys. Liaison between members of the Division specializing in a particular field of statistics and those in other Divisions of the Bureau working in the same field, is achieved by means of technical panels or small committees.

Information Services Division

The Information Services Division produces *The Canada Year Book*, the official record of Canada's growth and economic progress since Confederation, which is widely used as a reference book, and the *Canada Handbook* which covers the same field but is much less detailed, written in more popular style and profusely illustrated.

The Press and Publicity Section of this Division issues a *Daily Bulletin* containing news summaries of reports published each day, and a list of reports. A *Weekly Bulletin* summarizes the daily bulletins and presents a highlights summary. A news notes supplement provides brief bits of interesting information for newspaper and magazine use. Additional information is supplied to the Press by telephone, special articles are prepared for newspapers and periodicals on request, and material is prepared for radio presentation.

The distribution of the majority of the publications of the Bureau is made through the Publications Distribution Section. A charge is made for most publications, based on the cost of paper and press work only. *The Canada Year Book* and *Canada Handbook* are sold through the Department of Public Printing and Stationery.

The Bureau library has a complete list of Bureau publications, a comprehensive collection of the official publications of the federal and provincial governments, statistical publications of all foreign countries, of international organizations such as the United Nations and the International Labour Office, and statistical journals published by various organizations and statistical societies.

Co-ordination

The British North America Act which established Canada as a confederation placed statistics under federal jurisdiction. The Statistics Act empowered the Dominion Bureau of Statistics "to organize a scheme of co-ordinated social and economic statistics pertaining to the whole of Canada and each of the provinces thereof" and designated the Bureau as the central co-ordinating authority. The performance of this function may be discussed under four headings: co-ordination with the provinces; co-ordination with departments and other agencies of the Federal Government; co-ordination with suppliers and users of statistical data; and co-ordination within the Bureau.

Co-ordination with the provinces

The Statistics Act gave the Bureau the right of access to all provincial, municipal and other public records and directed it to enter into arrangements with the provinces for the delegation of powers, exchange of data and co-operative purposes generally. This does not mean that the provinces may not collect statistics. Four provinces of the ten have statistical bureaux of their own and all collect local statistical information. The Bureau, however, has to establish co-ordination of effort which will meet the statistical needs of all concerned. It does this not by invoking its legal authority but by promoting co-operation and goodwill. On the whole, relationships between the Bureau and the provinces are harmonious. It is generally realized that the co-ordinating function of the central office is essential, and that comparable definitions, uniform methods of collection, compilation and presentation, and avoidance of duplication, are mutually advantageous.

A fruitful method for achieving the desired objectives has been found to be dominion-provincial conferences. These have resulted, in some cases, in formal agreements, in others, in informal working arrangements. The adoption of a Model Vital Statistics Bill by the provinces and the co-operative working procedures in this field provide

an example of the formal agreements, while the arrangements with respect to certain classes of agricultural statistics are of the informal kind. Co-ordination has been facilitated by the preparation and distribution of manuals of procedure such as *Financial Statistics of Educational Activity*, and *Municipal Accounting Terminology*. Visits of Bureau personnel to provincial offices have proved effective in solving many co-ordination problems.

Co-ordination with departments and other agencies of the Federal Government

The task of making data collected or produced for departmental administration fit into a co-ordinated statistical system is prominent among the Bureau's activities. Here too, the conference method and informal consultation have produced worthwhile results. The adaptation of the customs records of the Department of National Revenue to serve statistical purposes has already been described. Relations with the Federal Department of Agriculture provide another example. A considerable volume of statistics is produced as a by-product of its administrative functions and by mutual agreement these become available for statistical use by the Bureau. Liaison with the Department of Agriculture is maintained chiefly by personal contacts, although there is a formal inter-departmental committee which meets from time to time.

The Bureau must be constantly on the alert to make use of new sources of information which will enable it to extend or improve its statistical series. For instance, when a national system of unemployment insurance was adopted in 1940, suggestions were made whereby the records of the Unemployment Insurance Commission would serve statistical as well as administrative purposes and thus much valuable information on unemployment was secured.

Many other examples might be given. A Medical Advisory Committee to the Dominion Statistician has been set up under the chairmanship of the Deputy Minister of Health, with representation from other departments as well as from provincial governments and universities. To this group are brought all questions relating to improvement in existing series, development of new data and publication, which are of interest to the several parties as well as to the public generally. Similarly, representatives of the Department of Trade and Commerce, the Department of Finance and the Bank of Canada sit in on Dominion Bureau of Statistics panels dealing with technical problems.

Co-ordination with suppliers and users of statistical data

Co-ordination is necessary too with industry and business. As in the case of government departments, the suppliers of statistical data are often the users.

Representatives of national associations in the agricultural, industrial and other fields, are frequently invited to participate in the discussions of inter-departmental committees and dominion-provincial conferences. When questionnaires are being revised, interested organizations are frequently invited to make suggestions.

Co-ordination within the Bureau

The Administration Division co-ordinates what might be called the business end of the work. This includes the provision of a number of centralized services covering such functions as staff organization, office services, budgetary expenditures and printing of forms and statistical publications.

On the technical side, co-ordination is facilitated by the fact that specialists in various fields work together in one office. Mathematicians, sampling experts and economists are readily available for consultation.

Nearly all the series of economic statistics which are prepared by the Bureau find their way in one form or another into the national accounts. As a result of efforts to make the accounts present a closed system, many gaps in data are brought to light; there is an internal relation in the accounts so that data are in effect checked by other information gathered from a different source; and the needs of the accounts impose a desirable uniformity on the Bureau surveys whose results fit into them.

Another important aid in co-ordination is the adoption throughout the Bureau of a Standard Industrial Classification which is convertible to that recommended by the United Nations. At the present time, research is under way to produce a standard commodity classification which will render comparable the statistics of industrial production and foreign trade.

The process of ensuring comparability goes further than uniform classifications of industries and commodities. Geographical areas, birthplaces, origins and religions enter into the population census and vital statistics, and the data must be classified identically. Place of residence must mean the same thing in vital statistics, in census and in labour force surveys.

The conference method has proved as useful for internal as for external co-ordination. Interdivisional committees meet frequently. Some examples are a census of industry committee which investigates means of improvement, accuracy, significance and timeliness of the statistics of industry; a technical committee on commodity flow and input-output statistics; a committee on labour income; one on farm income; and one on price indexes.

The Advisory Board of Publications maintains a constant review of the Bureau's publication programme to ensure that each publication is essential, that there is no superfluous material and that there is uniformity of presentation and style.

The task of co-ordinating Canadian statistics has been made easier by the highly centralized nature of the system — on the business side — the economy effected by having all major statistical operations under a single roof; the avoidance of duplication of questionnaires and consequently of unnecessary expense and unnecessary work on the part of respondents; and, on the technical side, the integration of various classes of statistics and the furtherance of economic and social analysis. This does not mean that all problems have been solved. Constant vigilance is necessary to ensure that no possibilities for improvement are overlooked.

3. FRANCE *

In France, the compilation of statistics has always been decentralized. The various government agencies compile and publish the different administrative statistics which come within their competence.

Up to 1940, there existed a Bureau, the Direction de la statistique générale de la France, which had the following main functions:

1. To organize and analyse the large surveys which, by their nature, were beyond the competence of any one government agency.

2. To observe prices and compute various economic indexes.

3. To co-ordinate the statistical work of the French administration, analyse the results of such, and publish the essential facts in yearbooks and bulletins.

In 1941, the Direction de la statistique générale de la France (French General Statistical Service) was amalgamated with a Demographic Service created in 1940, in order to form the Service national des statistiques (National Statistical Service). A service endowed with powerful and modern mechanical means had to be set up quickly, to fill the role of a recruitment service and an industrial mobilization service. But above all, the country had to be supplied with a system of observation and study of collective phenomena which it lacked, since the insufficient means at the disposal of the French General Statistical Service did not permit it to fulfil this role before the war.

In 1946, the National Statistical Service was consolidated with the Institut de conjoncture (Institute of Economic Observation) created in 1938, which had been administratively attached to the French General Statistical Service by a law of 29 October 1940, and with several sections of the Ministry of National Economy. It acquired then the name of Institut national de la Statistique et des Etudes économiques pour la métropole et la France d'outre-mer (National Institute of Statistics and Economic Studies for France and Territories Overseas – N.I.S.E.S.).

Functions and general structure of the National Institute of Statistics and Economic Studies

The National Institute of Statistics and Economic Studies has kept all the functions of the former Direction de la statistique générale de la France (French General Statistical Service) though developing them greatly; in addition, functions of a different order have been assigned to it.

The National Institute of Statistics and Economic Studies constitutes a system of observation of collective phenomena – economic, demographic and social.

The central services of the Institute are: (1) General Statistics; (2) France Overseas Statistics; (3) Economic Analysis (*conjoncture*); (4) Processing Division; and (5) Central Service of Documentation. These services cooperate in observing the phenomena at different stages and complement each other.

The General Statistics and the France Overseas Statistics are divisions of planning, co-ordination and utilization of primary data supplied by surveys. The General Statistics Division includes a section of theoretical studies and sampling, charged with the task of following and perfecting the modern methods of surveys and statistical analysis.

The statistical services submit the results of the processing for statistical analysis. They prepare the completed statistics requested or which appear likely to be used by the Government and the various public agencies; they publish those justifying a large dissemination and which are interesting to private enterprises. The utilization of this statistical material is one of the bases of the works of the Division of Economic Analysis (*Conjoncture*).

The statistical elements, as far as France proper is concerned, are supplied by the Division of Processing which obtains the statistical aggregates through an individual observation of the units which they include. Thus, this Division participates in the setting up of statistical data, either directly through surveys, or through the coordination of specialized records connected with general reference records.

Finally, the Central Service of Documentation gathers, classifies and keeps up to date the information of a statistical and economic nature resulting from the various sources which complete the data furnished by the surveys and records.

The National Institute of Statistics and Economic Studies is in sole charge of producing vital statistics for France proper. On the other hand, decentralization remains, to different degrees, the general rule in the other statistical fields. Most statistical data are still furnished by the various government agencies for the areas within their competence. Even for general large-scale surveys, the conduct of the operation in the field is not handled by the Institute; the population census is carried out by the Ministry of the Interior, and the agricultural surveys by the Ministry of Agriculture. However, the completed schedules are collected by the Institute which does the processing and presents the results. It also provides the agencies in charge of these surveys with technical advice for the drafting of questionnaires and the conduct of the different phases of the operations.

* Based on "Structure de l'Institut national de la statistique et des études économiques pour la métropole et la France d'outre-mer", by F. L. Closon, Directeur général de l'I.N.S.E.E., published in the *Bulletin de l'Institut International de Statistique*, Berne, Switzerland, 1950, Vol. 32, No. 2, pp. 472–482. Submitted as paper No. 27.1 to the United Nations International Seminar on Statistical Organization, held in Ottawa, Canada, October 1952.

No duplication exists, however, between the statistical offices of the government agencies and the Institute which intervenes in their work programme only to co-ordinate their activities, to supply the senior technical personnel they need for processing large masses of documents in its mechanically equipped offices, to centralize statistical results and publish their essentials in yearbooks and bulletins.

In accordance with Act No. 51-711 of 7 June 1951, the Institute is responsible for ensuring that the Co-ordination Committee on Statistical Surveys assumes the obligation for the co-ordination and confidentiality of statistical surveys. The Committee comprises representatives of Parliament, the different ministries and the private sector (agriculture, industry, commerce and the syndicates). It is charged with setting up an annual programme of statistical surveys which receive the *Visa* of the Institute making response compulsory.

Thus, the main duties of the National Institute of Statistics and Economic Studies are as follows:

1. Co-ordination of the statistical work within the whole French administration (participation in the elaboration of the annual programme of surveys of the Co-ordination Committee, preparation of questionnaires, approval of questionnaires to give them binding force, etc.).

2. Execution of special surveys (price studies, sample surveys).

3. Processing of large masses of statistical documents.

4. Editing the rough results of the processing and then presenting and publishing them.

5. Centralization of statistical documentation compiled elsewhere and publication of its main results.

6. Keeping of general records of persons and properties for purposes of statistical and administrative co-ordination.

7. Preparation of studies of the economic situation using statistical data.

The connexion the Institute has with the various government agencies and the assistance which it can render them enables it to fulfil its co-ordinating function in a thorough and more efficient way than the French General Statistical Service, because of a lack of material means and a shortage of technicians, could do it before the war.

From the geographical standpoint, the Institute consists of a main office in Paris and 18 regional offices (1 in Paris and 17 in the provinces). This structure has a considerable advantage in that the National Institute is closer to the subject under study. Hence, after verification, imperfect documents can be corrected, particular points can be studied and initiative taken in close contact with reality. In addition, it facilitates the keeping of general reference records which would be too bulky if they were centralized, and allows indispensable liaison with local public administrations which supply and use these records.

A School of Applied Studies supplies, with a thorough and homogeneous technical instruction, all the directoral personnel of the Institute.

As far as possible, the National Institute of Statistics and Economic Studies provides the technicians requested by the statistical offices of the government agencies and by the statistical sections which are being gradually set up in the various French overseas territories. In addition, a number of its statisticians are working in international organizations.

The various central services of the Institute are dealt with in greater detail below.

General statistics

This Division is essentially an organ of statistical study and co-ordination. In addition, it ensures the direct compilation of certain statistics for which special care is needed in the respective surveys. Its activities are threefold: statistical co-ordination, special surveys, and statistical studies.

A. *Statistical co-ordination*

1. The secretariat of the Co-ordination Committee is responsible for the co-ordination of statistical surveys.

2. It organizes, or provides advice in organizing, large-scale surveys in which several government agencies are interested and the carrying out of which by the Institute are not assured. It sets up, in agreement with the executive agencies concerned, the plan as well as the questionnaires and instructions for the surveys.

3. It examines, in joint meetings with responsible officials from other agencies, their statistical activities with the following purposes:
   (*a*) To exchange information;
   (*b*) To arrange that the statistics compiled by these agencies for their own use are transmitted to the Institute for dissemination;
   (*c*) To avoid duplication of collection by different agencies; and
   (*d*) To secure the application of statistical methods in such activities.

4. It approves statistical questionnaires which the agencies propose to circulate among the public. The obligation to answer the questionnaires is the granting of approval by the Institute.

5. The Division is also responsible for the centralization and publication of statistical information from all sources in the *Statistical Yearbook*, the *Weekly Statistical Bulletin*, and the *Monthly Statistical Bulletin* which has a quarterly supplement.

B. *Special surveys*

The permanent tasks of this group are the following:

1. Study of prices:
   (*a*) Monthly prices relating to family consumption in Paris which include the following items: food, heat and light, manufactured goods, services and miscellaneous. These studies are being gradually extended to provincial towns in which a regional office of the Institute is located. In addition, the study of weekly retail prices of food in Paris consisting of the gathering of prices at some 300 sale points (shops and markets of Paris and suburbs) has been carried on since January 1947;

(*b*) Wholesale prices, relating mainly to agricultural products, industrial raw materials and semi-manufactured goods.

2. Sample surveys conducted by the Institute on its own initiative or upon request of another government agency. These surveys relate to widely different subjects, e.g., marketing of textile products, consumption of meat, fish, eggs and drinks, French internal tourism, construction in urban areas, resources of the aged, facts about France overseas, employment of manpower.

The sampling method is being more and more applied to fields where complete enumeration is difficult. It supplies very important information at lower cost than complete enumeration.

Convinced of the importance of sampling, the Institute concentrates its efforts on the training of technicians and enumerators whose ability is an indispensable condition for the success of this method.

3. Periodic surveys relating to the expenditure of workers' families in the Paris area and in some provincial towns, also of rural families in certain regions. These surveys were not carried out in France before 1946.

4. Periodic surveys on wages and salaries.

C. *Statistical studies*

In this field the activities of the Division of General Statistics are as follows:

1. To compile the results of the processing of surveys, to analyse them, and to present final results for publication. In this connexion may be mentioned the computation of indexes such as wholesale prices; prices relating to family consumption (Paris); retail prices of food, heat, light and manufactured products (province); industrial production; volume of external trade; wages; trends of stocks and shares on the Paris Stock Exchange.

2. To publish the results of the studies in the following publications:

(*a*) *Bulletin mensuel de statistique* (periodic indexes);

(*b*) Quarterly supplement to the Bulletin (in case of very short studies); and

(*c*) Special publications (results of the population census, statistics of the movements of population, statistics of causes of death, theoretical original studies relating to the statistical method and its uses, results of practical researches in the demographic, economic or social fields). The *mouvement économique* (economic trends), a compilation of indexes and methodological notes, is published every decade.

France Overseas Statistics

The Institute has established the Division of France Overseas Statistics to co-ordinate and promote the work of the statistical offices of the territories of the French Union outside France proper.

Some of these territories are responsible to the Ministry of France Overseas, others to the Ministry of Foreign Affairs (Tunisia and Morocco), whereas Algeria is responsible to the Ministry of the Interior. They have different political and administrative status. Only the Ministry of France Overseas has a Central Statistical Office which directs the statistical activities in the areas within its authority.

The Institute supplies technicians for the statistical services overseas, whatever the status of the territory. Such services are functioning in Algeria, Tunisia, Morocco, French West Africa, French Equatorial Africa, Madagascar and Indo-china. Since the statistical problems which exist in these areas are different, they require technical solutions adaptable to each of them. Therefore, a special division for centralizing the data furnished by these different services and co-ordinating their statistical activities is indispensable. Furthermore, the territories and associated areas overseas show important statistical gaps with respect to data needed for economic and demographic policy adapted to their conditions. In view of this, it was necessary to stimulate local governments and to supply them with the technical personnel needed to improve the situation.

The Division of Statistics for France Overseas of the Institute publishes, in co-operation with the Central Statistical Office of the Ministry of France Overseas, a monthly bulletin, statistical yearbooks, publications presenting data on the external trade of the overseas territories of the French Union and special studies.

Economic Analysis (Conjoncture)

The main duty of this Division is to study and analyse economic trends.

From data originally compiled by the Division of General Statistics and also from information furnished by other sources, this office draws a final interpretation of the statistical results, and studies the French and foreign economic situations.

Thus, the papers prepared and published by this section of the Institute are not theoretical studies but conclusions drawn from statistical study and which require close co-operation between economists and statisticians.

Apart from the numerous studies specially required by the Government, the studies of this Division are published in the monthly review *Etudes et Conjonctures* which deals with the economic trends in France and the territories overseas and presents also an analysis of the world economic situation.

This Division also publishes:

1. *Documentation économique*, a quarterly annotated bibliography of the articles published in the principal French and foreign economic reviews, classified according to the subject matter.

2. *Problèmes économiques*, a weekly paper, reviews in co-operation with the *Documentation française*, the French and foreign economic press.

3. Original studies under the general title *Etudes et documents*.

4. A *Note rapide hebdomadaire sur la situation économique* (brief weekly notes on the economic situation).

5. *Conjoncture et mouvement des affaires* (economic analysis and business trends).

Processing Division

The functions of the Processing Division are:

1. The processing of completed schedules of nation-wide surveys and of any large mass of data, either manually or mechanically.

2. The maintaining of general reference records and, therefore, the processing of the documents contained in these records.

3. The preparation of nomenclatures and codes to be used for the punching of cards.

4. The organization of manual and mechanical work in the tabulation units, including the testing of certain material prior to its use or operation.

The work of this Division is dealt with in greater detail below.

Surveys and processing of documents

Movement of population. Population registers of each French municipality are centralized by the regional offices of the Institute and from them are derived the statistics of the movement of population and causes of death.

Census of civil servants. In 1947, a complete census of the civil service employees, giving their distribution by sex, age, marital status, number of dependent children, status, amount of gross and net salary and residence zone was carried out. A new census of state and local employees has been taken, based on the payroll records of April 1950.

Labour turn-over and wages. The systematic compilation of monthly and quarterly figures of turn-over and of salaries and wages paid during 1950 was carried out in co-operation with the Ministry of Finance.

Agriculture surveys. Since 1942 the processing of the yearly agricultural surveys on the areas and means of production of farms has been carried out on behalf of the Ministry of Agriculture. Detailed information on the mechanization of French agriculture has also been collected.

General record keeping

Experience shows that numerous agencies require individual information, for administrative reasons, about many persons (voters, people subject to social security, potential reserve men, taxpayers, rent or pension holders) and of properties, industrial and commercial enterprises, automobiles, real estates and farms.

The National Institute of Statistics and Economic Studies keeps two general records, one relating to people and the other to industrial and commercial enterprises.

The population registers of the National Institute of Statistics and Economic Studies centralize the population registers (births and deaths) of the municipalities and, in addition, include: (1) French citizens born in the French overseas territories or abroad and (2) persons of foreign birth living in France. An identification number of 13 digits (denoting sex, year and month of birth, province and municipality of birth, etc.) is assigned to each person.

The Social Security Agency, the Agricultural Social Security Agency and the Military Social Security Agency, have adopted this identification number for the registration of people insured in the different offices. An important advantage is the avoidance of multiple registrations.

The centralization of birth and death certificates used for keeping up to date the identification records has resulted in charging the Institute with the establishment of a permanent control of registrations of voters. The purpose of this control is to avoid multiple registrations and to check the voting qualifications of the people registered.

Similarly, the Institute has set up a general file in which the industrial and commercial enterprises are referred to by means of an identification number of 11 digits (denoting kind of economic activity, province and municipality, successive owners, etc.) This identification number has been adopted by the Social Security Agency to identify employers obliged to contribute to the social security funds for their employees. Recently, the Ministry of Finance decided to combine the individual records of taxpayers with the general file of the Institute.

The file of industrial and commercial enterprises constitutes, in essence, a general record providing a common reference to specialized records. The consolidation of individual records into a general record increases the uniformity of the statistical information provided by them.

From 1942 to 1946, the annual agricultural surveys were carried out through individual reports of farmers. This permitted comparison of the information furnished by successive surveys covering the same object. It has been used for the setting up of detailed tables on the agricultural structure in 86 *départements* (provinces) and in more than 500 agricultural regions designated by the Ministry of Agriculture.

Because of lack of funds, this file cannot be kept up to date. Since 1947, the agricultural surveys have been made by each municipality.

A general registration of automobiles based on the *cartes grises* (car registration tickets) issued by the *préfectures* has been established. This file, supplies the Ministry of National Defence, the Ministry of Public Works (General Division of Transport) and the automobile industry with statistical information on the automobiles operating in France.

Central Service of Documentation

The services in charge of statistics and of studies of economic observation must have at their disposal an ample documentation, up to date as to current events, theories, methods and facts relating to the French Union, various foreign countries, or the world at large. The Documentation Division is entrusted with the task of collecting and classifying this information. Papers, periodicals, etc., are assembled in the library, and files and card-indexes prepared.

The files of the French General Statistical Service and the economic documentation of the Ministry of Shipping, of the Ministry of Commerce and of the National Library, have been transferred to the library of the Institute. It has the most complete aggregate of documentation existing in France in the fields of statistics and economic studies. The library is open to the public.

The regional offices

Eighteen regional offices form the basic field organization of the Institute. These offices are subjected to a strict discipline in carrying out programmes which are common to all of them. They are, however, de-centralized organs whose individual functions vary among the regions, and they work in close co-operation with public and private bodies in the provinces.

Although persons who favoured centralization thought that the handling of documents and machines in a single large office in Paris would be less onerous and more homogeneous, experience has demonstrated that the present structure avoids the drawbacks inherent in the handling of large masses of documents and presents certain advantages. The chart on page 80 shows the flow of operations. The existence of 18 regional centres assures the Institute of the performance of its duties in a more integrated manner than would be possible if the principle of a single office had been adopted. The proximity of the offices to the population and the facts to be studied, and the possibility of checking on the spot have facilitated the correction of serious errors.

The gradual unification of statistical training and methods has overcome the disadvantages that certain persons feared from the dispersion of offices and tabulation units in 18 regional centres. At the same time the work carried out at the national level by the Institute constitutes an achievement in uniformity of compilation as well as in meeting the requirements of the provinces. This applies particularly to censuses and to general reference records.

In addition to these national tasks conducted according to identical standards, the regional offices, adapting themselves to local conditions, carry on with more freedom of action regional work with the administrative services of the State, the *départements* (provinces), and sometimes with the municipalities, economic regions and with public services, such as chambers of commerce.

Within this particular framework, new ground is being broken in local statistical studies and systematic economic studies. In this new field, slow and careful progress in the use of statistical methodology is essential. Some important results have already been obtained; most of the regional offices have prepared regional economic reports and special studies highly appreciated by the local authorities.

A programme of regional publications (yearbooks, bulletins) has been presenting the activities, and the demographic, industrial, agricultural and social characteristics of the regions have been formulated. Thus the regional offices are information and research centres at the disposal of authorities in charge of public and private affairs and of universities. Because of limited means, it has been impossible for the Institute to give a broader development to these regional activities or to grant all the requests for studies.

Central Unit

The National Institute of Statistics and Economic Studies has a Central Unit in Paris responsible for:

1. The keeping of the part of general records for which no regional office is responsible (lists of French citizens born outside France proper and of foreigners living in France and born abroad).

2. The keeping of the central file of automobiles.

3. The carrying out of summarization for the whole country as well as of other work, where the volume does not justify their being undertaken in the regional offices.

The Applied School of the National Institute of Statistics and Economic Studies

The purpose of the Applied School of the Institute is to teach statistical techniques and economics to the young *administrateurs* appointed upon graduation from the Polytechnic School or after passing a special examination. They will constitute the directoral personnel of the different services (offices) of the Institute in France proper and the overseas territories.

The School has functioned since 1942. It was thoroughly reorganized after the establishment of the Institute in 1946. The period of training has been extended to two years and the new programmes give more emphasis to economic studies and technology. The training covers the following subjects:

1. Statistical method, with a view to describing communities and as a tool of analysis and interpretation in the various demographic, economic and technical fields.

2. Theoretical economic problems combined with economic theory proper, econometrics, economic observation (*conjoncture*).

3. Descriptive economics, including financial legislation, industrial and agricultural technologies, trade, banking and accounting.

4. Various other complementary subjects of a general coverage and indispensable to the instruction and the technical training of the statistician in basic elements of public and private law, living languages, economic and social geography, and the structure of the French Union.

5. Operational methods and procedures.

On leaving the school, the students equipped with theoretical knowledge and experience in practical work are qualified to be assigned to one of the Institute sections. Later, they are charged with different tasks in order to avoid the drawback of excessive specialization.

Instruction is given in close collaboration with the Institut de statistique de l'Université de Paris. The work performed in these two centres is complementary; the programmes are arranged jointly and to avoid duplication they utilize the possibilities offered by the Paris University and the *corps des administrateurs* of the Institute.

The effort to extend statistical education is continuous, both at the school itself, and outside the Institute. The purpose of this is to develop, beyond the framework of state and public services, in the world of research, business, and in other areas of private life, a knowledge of statistical techniques, to emphasize their usefulness, and to have the directive units and research centres become statistically-minded.

In addition to students destined to serve in the Institute, the School admits free of charge students, both French and foreign, for all or part of the available courses and grants them, under certain conditions, a diploma or certificate.

At the international level, the Institute contributes by means of interneship in its services and the courses provided by the school, to the statistical and economic training of foreign officials sent to Paris on scholarships

The school of the National Institute of Statistical and Economic Studies is playing an important role in fostering the expansion of French culture and maintaining the high standards of statistical service.

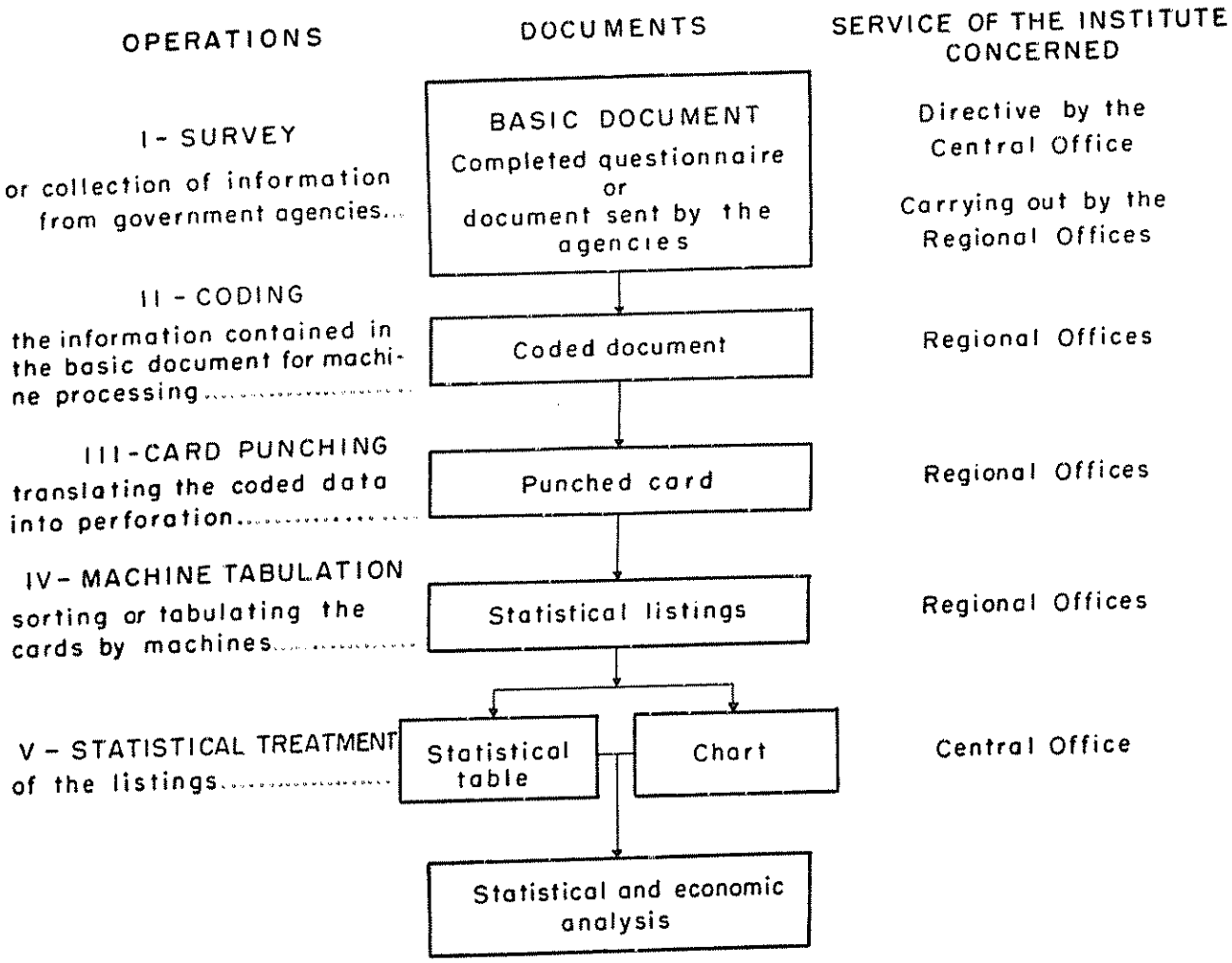
FRANCE

OPERATIONS OF REGIONAL OFFICES

FLOW CHART OF OPERATIONS

(MACHINE PROCESSING)

FROM THE SURVEY TO THE STATISTICAL REPORT



SOURCE: L'institut National de la Statistique et des Études Économiques pour la Métropole et la France d'outre-mer. Paris, juin 1951.

4. INDIA *

The statistical system in any country is largely determined by the range of government activities and the manner and extent to which statistics are required and used for purposes of administration. The outbreak of the World War in 1939 revealed the inadequacy of existing statistics in India, particularly with reference to the requirements arising from the new responsibilities assumed by the Government in both military and civil spheres of activity. The system had, of necessity, to be strengthened. The coming of independence, with its responsibilities for wider social and economic functions, led to a further demand for statistics and promotion of statistical activities. More important from the point of view of overall economic policy was the need for a single synoptic picture of the information field and for proper co-ordination and control. An additional stimulus was provided by the growing requirements for statistics by international organizations, such as the United Nations and its specialized agencies, and their attempts to promote standards with a view to securing international comparability. Only in recent years, have attempts been made towards developing an integrated statistical system.

Nature and structure of the Indian statistical organization

The Indian statistical system is broadly decentralized. Its structure is primarily a consequence of the division of responsibility between the central and state governments in a federal constitution and the growing needs of individual ministries for statistics for their own administrative functions. Under the Indian Constitution, this responsibility is shared in accordance with a threefold classification of subject fields. Thus while items like foreign trade, banking and currency, and population, are wholly allocated to the central Government, others like agriculture and education are assigned to the states. There is also a common category of concurrent subjects, for example, industry, where both the central and state governments operate simultaneously to meet their respective requirements. In actual practice, there exists an understanding that, even in fields where the states have the primary responsibility for the collection of statistics, the central Government acts as the co-ordinating authority for the presentation of the data on an all-India basis. Even in the central Government there is a division of subjects among the various ministries. Thus, the responsibility for the collection and processing of the data devolves on statistical organizations in the different ministries of the central Government and in the several departments of the state governments. There are about 40 statistical units in the central Government employing about 2,200 workers and with an annual budget allotment of about 8 million rupees. There are 40 statistical organizations in the 28 states of India employing about 2,800 workers with an annual budget of 8 million rupees. The Central Statistical Organization, set up in 1951 and attached to the Cabinet Secretariat of the Government of India, serves as a co-ordinating and advisory body. During recent years, central statistical offices have been established or are in the process of formation in most of the states with the responsibility for over-all co-ordination within the state. The Central Statistical Organization has the benefit of the advice of a standing committee of departmental statisticians and periodical conferences of central and state statisticians.

Statistical organizations in the central Government

Most of the ministries in the Government of India collect or use statistics in some manner or other and have their own statistical units. They are of different sizes and in varying stages of development and charged with distinctive types of functions. However, they may be divided into the following broad categories:

Organizations processing data as by-products of administration

Included in the first category are a large number of organizations located in the administrative departments and engaged in the processing of the data which are by-products of administration. Examples are the offices of Income-tax Department, Central Board of Revenue, Railways, Posts and Telegraphs, and the Directorate General of Supply and Disposals.

Organizations associated with control agencies

A second important category comprises the various organizations in the Government of India set up for the control of production and distribution of products in short supply. Some of them, such as the offices of the Textile Commissioner, Iron and Steel Controller, and Central Electric Commission, maintain well-organized statistical units and the statistics published by them are of permanent value and are used by other government organizations and the public.

Organizations set up for the collection and compilation of data

This category includes the various organizations established by the Government specifically for the function of collecting and compiling statistical data. These are:

1. *National Census Organization.* Following the taking over of the Indian Government by the British Crown, statistics were mostly by-products of administration, with the exception of the population census which constituted an attempt on the part of the Government to collect statistics as such. The first official census was taken in 1872. Beginning with 1881, the census was taken every ten years. The Indian census is remarkable not only for

* Based on "System of Statistical Organization in India", prepared by the Central Statistical Organization, Cabinet Secretariat, Government of India. Submitted as paper No. 3.4 to the United Nations International Seminar on Statistical Organization, held in Ottawa, Canada, October 1952.

its scale, but also for relative cheapness and accuracy in a predominantly agricultural and illiterate population. This has been possible with the co-operation of the public and of about 600,000 honorary enumerators including government employees, employees of local bodies and teachers. The census is the responsibility of the central Government, but it is conducted with the close co-operation of the state governments. In fact, all the supervisory officials are drawn from the state governments. The Census Office was formerly in the Ministry of Home Affairs. For the 1951 census, however, a permanent Census Act was passed and a permanent post of Census Commissioner and Registrar General was created to take charge of population and vital statistics. The 1951 census was unique in the shift in emphasis to (1) classification of population; (2) maintenance of household lists; (3) preservation of census records and registers in the form of district census handbooks; and (4) sample verification of the count. Plans are being worked out by the Registrar General to evolve an integrated system of demographic and vital statistics on a continuing basis. A national register of citizens has been prepared and it is planned to keep this up to date. This has assumed great importance on account of the introduction of the adult franchise.

2. *Directorate General of Commercial Intelligence and Statistics.* Data relating to agriculture, etc., continued to be by-products of administration and were collected and maintained by low-paid clerks. The work was done in a perfunctory manner, until a great step forward was taken by the setting up of the Office of the Director-General of Statistics, in 1895, for the collection and publication of statistics. In 1905, this organization became the Department of Commercial Intelligence and Statistics and continued to be the central statistical office of the Government of India until the beginning of the Second World War. However, it was increasingly felt that, where a specialized department existed, it should handle the statistics of interest to that department. With the formation of the statistical units in the different ministries during the war, many of the former functions of the Department of Intelligence and Statistics were transferred to the appropriate ministries, and the Director General became responsible solely for commercial intelligence and trade statistics.

3. *Directorate of Industrial Statistics.* Although the government conducted an *ad hoc* investigation on prices on a country-wide scale in 1910, no new fact-finding organization on a continuing basis was set up until the beginning of the Second World War. The need for comprehensive statistics of production and the difficulty in obtaining reasonably complete and accurate data on a voluntary basis led to the enactment of the Industrial Statistics Act, in 1942, and the setting up of a Directorate of Industrial Statistics, in 1944, for implementation of the Act. The Directorate conducts the census of manufacturing industries and publishes a monthly series of indexes of industrial production. The collection of data in prescribed questionnaires and in accordance with instructions laid down by the Directorate is carried out by the state government officers appointed as statistics authorities for this purpose and the processing and publication of the data are done by the Directorate.

4. *Labour Bureau.* The Labour Bureau was set up in 1946. Its main statistical functions are:

(1) Collection and publication of statistics relating to labour including examination of statistical methods with a view to adoption of uniform and scientific techniques.

(2) Maintainance of cost-of-living index numbers for certain selected centres.

(3) Keeping up to date the factual data relating to working conditions collected by the Labour Investigation Committee.

A number of *ad hoc* family budget inquiries have been conducted by the Labour Bureau and reports thereof have been published. The Labour Bureau is compiling and publishing cost-of-living index numbers of 15 centres.

5. *Directorate of Economics and Statistics, Ministry of Food and Agriculture.* The Directorate of Economics and Statistics was set up in 1947 under the Ministry of Food and Agriculture in pursuance of the decision of the Government of India to centralize all services in the field of agricultural economics and statistics. It is responsible for compiling and publishing agricultural statistics on an all-India basis. The data cover the fields of agriculture, fisheries, live-stock and forests, and are collected mostly by state governments in prescribed forms.

6. *Statistical Division of Indian Council of Agricultural Research.* The Statistical Division of the Indian Council of Agricultural Research is essentially a research organization in the field of agricultural statistics and was set up in accordance with the recommendations of the Royal Commission on Agriculture. Its functions are:

(1) To advise on the planning of agricultural and animal husbandry experiments.

(2) To scrutinize statistical programmes and progress reports of the research schemes of the Council and papers received for publication in the Council journal.

(3) To impart training in agricultural and animal husbandry statistics.

(4) To carry out fundamental research on the application of statistical methods to agricultural and animal husbandry problems.

(5) To carry out sample surveys for the improvement of agricultural live-stock and fisheries statistics.

It has done valuable work in introducing the method of random sampling for the estimation of the yield of crops over a large part of India, and in evolving suitable techniques for sampling in allied fields. These are designed so that they can be handled by departmental officers in the states. The Council maintains a centre for research and training in agricultural statistics.

7. *The Indian Army Statistical Organization.* The Indian Army Statistical Organization is a well-developed organization in the Ministry of Defence where the processing of all important data relating to personnel is centralized. It has one of the largest installations in India for mechanical tabulation of data. There is a research unit which has successfully applied sampling methods in various surveys.

8. *Research Department, Reserve Bank of India.* The Research Department of the Reserve Bank of India in Bombay works in four departments. The Division of Monetary Research, in collaboration with other divisions,

produces the *Annual Report of the Bank, the Currency Report*, and various monthly and quarterly reports for the use of the Bank, government departments and the public. The Division attends also to specialized research work relating to stock exchange, bullion markets, public finance and banking problems. The Balance of Payments Division compiles half-yearly statements relating to India's balance of payments and undertakes special studies on related problems including a census of foreign liabilities and assets. It also prepares information required by the International Monetary Fund. The Statistics Division is engaged in the compilation of statistical data for publication in the *Monthly Reserve Bank Bulletin* and also data for the Bank's own internal use which includes a series of index numbers of prices of industrial securities, agricultural and industrial production, profits of joint stock companies and so on. The Rural Economic Division carries out surveys of agricultural indebtedness, rural credit, etc., and makes studies relating to rural finance.

9. *National Sample Survey and other sampling survey organizations.* The difficulties in the way of expeditious collection of data on a comprehensive basis and the limitations of cost and manpower resources brought to the forefront the possibilities of economic surveys on a sampling basis and the setting up of sampling organizations. The most important of such organizations is the National Sample Survey set up, in 1949, for collecting comprehensive information relating to all aspects of the national economy on a continuing basis, and catering, in particular, to the needs of the National Income Committee and the Planning Commission. It is the largest single statistical organization in the country with an annual budget of about three million rupees. The responsibility for technical guidance and tabulation of data rests with the Indian Statistical Institute, as it was felt desirable to utilize to the fullest extent the experience and resources of that organization.

A few other sampling organizations were set up on an *ad hoc* basis, for example, for the All-India Agricultural Labour Inquiry by the Ministry of Labour, the Rural Credit Survey of the Reserve Bank, and the Sample Survey of Manufacturing Industries by the Directorate of Industrial Statistics.

10. *National Income Unit.* The National Income Unit was set up in 1949 and charged with the task of estimation of the national accounts. It is basically an analytical agency using all the statistics made available by the various statistical organizations. This office works under the guidance of a committee set up by the Government and advised by international experts.

11. *The Central Statistical Organization.* The Central Statistical Organization was set up in May 1951 and charged with the following main functions:

(1) Preparation and publication of the *Annual Statistical Abstract*, the *Monthly Abstract of Statistics*, the *Weekly Bulletin of Statistics*, and the *Guide to Current Official Statistics*.

(2) Graphical presentation of current statistics with a view to throwing light on the developing economic situation.

(3) Serving as the channel of communication with international organizations.

(4) To advise the ministries and other government agencies on statistical matters and to arrange inter-departmental discussions on statistical problems.

(5) To co-ordinate the statistical work of the ministries and of other government agencies, with a view to eliminating and preventing unnecessary duplication and reducing the over-all cost to a minimum.

(6) To develop definitions and standards for improving national and international comparability; and to give continuing attention to the improvement of the quality of information required by the Government.

The work relating to statistical co-ordination and statistical publications, previously done by the Office of the Economic Adviser and the Administrative Intelligence Room, were transferred to the Central Statistical Organization. It works under the guidance of the Statistical Adviser to the Cabinet.

12. *Office of the Economic Adviser to the Government of India, Ministry of Commerce and Industry.* The Statistical Section of this office is responsible for the collection, compilation and interpretation of all data relating to wholesale prices, retail sales, etc. The wholesale index series is under extensive revision in consultation with the interests concerned.

13. *The Statistical Section of the Textile Commissioner, Ministry of Commerce and Industry.* This Section collects, on a statutory basis, statistics relating to production of cotton textiles, consumption of raw cotton and coal by cotton textile mills, textile machinery, etc. The primary objects are to fix export quotas, allotment of coal, etc., to check up whether the production of cloth and yarn is in conformity with the cotton textile order.

14. *The Statistical Section of Iron and Steel Control, Calcutta, Ministry of Commerce and Industry.* This office deals with the collection, presentation and interpretation of statistical data in respect of production, distribution, allocation, stocks, etc., for the proper functioning of iron and steel control and production and distribution control.

15. *The Statistical Branch of the Chief Controller of Imports and Exports, Ministry of Commerce and Industry.* A statistical branch is attached to the Chief Controller for maintaining data of interest to the administration of trade controls.

16. *The Statistical Section, Ministry of Education.* This section collects statistics of educational institutions, the number of schools and teachers, expenditure on education by stages and types of education, etc. These statistics are collected from states and universities. There is also a statistician in the Central Institute of Education and an assistant statistician in the Department of Anthropology.

17. *The Economic Affairs Department, Ministry of Finance.* This Department has a statistical section which compiles current statistics of interest to the Ministry. Lately, it has taken over the additional responsibility for the collection and publication of statistics relating to company balance sheets. The responsibility for the monthly and annual blue books relating to joint stock companies has now been transferred to this section from the Department of Commercial Intelligence and Statistics.

18. *Statistical Branch -- Income Tax, Ministry of Finance.* The compilation of income tax revenue statistics has been centralized in this Branch since 1939 and is being done mechanically.

19. *Statistical and Intelligence Branch (Custom and Central Excise), Ministry of Finance.* The function of this organization is to collect, compile and present all-India central excise statistics and certain essential customs statistics and analyse them with a view to assessing administrative efficiency and adequacy of revenue control. The tabulation is done mechanically. The primary data are supplied by the range offices and pass through the hierarchy of administrative officers to the central office.

20. *Directorate of Marketing and Inspection, Ministry of Food and Agriculture.* The statistics collected by the Directorate are being used in the formulation of policy regarding production and distribution of agricultural products, economic controls, fixation of tariff values for agricultural commodities, etc. It also issues comprehensive reports on the production, transportation and marketing of agricultural, live-stock and fishery products, including rice, wheat, grain, barley, groundnut, fish, milk and milk products.

21. *The Statistical Bureau, Ministry of Health.* The Ministry of Health has a Statistical Bureau which compiles data on vital statistics and epidemiology and other health statistics. The data are obtained from the states and published independently on a uniform all-India basis as appendices to the *Annual Report of the Directorate General of Health Services.* The subject of vital statistics has recently been transferred to the Office of the Registrar General in the Ministry of Home Affairs.

22. *Agricultural Labour Inquiry Statistical Branch, Ministry of Labour.* This Branch is in technical charge of an all-India inquiry into the conditions of agricultural workers. The inquiry was carried out during the years 1949–50.

23. *Statistical Unit of the Chief Inspector of Mines, Ministry of Labour.* This Unit is responsible for the compilation, presentation and interpretation of annual data relating to labour employed in mines, wages, hours of work, accidents and production. It also collects, on a monthly basis, detailed data relating to coal mines.

24. *The Statistical Section of the Directorate General of Resettlement, Ministry of Railways.* This Section compiles statistics relating to employment exchanges, labour training and employment in central Government establishment. Tabulation is done on machines.

25. *The Railway Board, Ministry of Labour.* This Board issues an annual report in two parts containing statistics over a wide range of operating statistics as well as results achieved. Volume I gives a narrative and volume II contains ancillary statistical information. The Economic Adviser to the Ministry of Railways has recently initiated a regular publication entitled *Monthly Railway Statistics* which provides key figures on an up-to-date basis.

26. *The Central Water and Power Commission, Ministry of Natural Resources and Scientific Research.* This Commission has two statistical sections. The first deals with statistical problems relating to waterways, irrigation and navigation, and the second with the collection of comprehensive statistics relating to electricity undertakings. There is a statistical section also in the Central Water and Power Research Station at Poona, which advises on statistical problems arising out of the various investigations carried out by the research section.

27. *The Roads Organization, Ministry of Transport.* The Ministry of Transport has a statistical branch which forms an integral part of the Roads Organization of the Ministry. This branch is engaged in the collection, compilation, analysis and interpretation of statistics concerning all aspects of road development. These statistics are published in *Roads Statistics of India.* The Ministry of Transport also collects statistics of motor vehicles through the normal administrative channels.

28. *The Statistical Sections, Ministry of Works, Housing and Supply.* There are statistical sections in three offices of the Directorate General of Supplies and Disposals: (1) Statistical Directorate (Supply Wing), (2) Statistical Directorate (Disposals Wing) and (3) Coal Commission.

29. *Other ministries.* The remaining ministries of the Government of India do not have statistical establishments as such but they collect a good deal of statistical material in the course of their routine activity. Thus the Posts and Telegraphs Department attached to the Ministry of Communications issues an annual report containing statistics relating to postal and allied operations. The Directorate General of Civil Aviation in the same Ministry also issues periodical reports on the progress of civil aviation in India. The Meteorological Department is collecting valuable meteorological as well as seismological data and solar data which are being extensively used by interests concerned with the general or specific aspects of climate and weather. The Ministry of Rehabilitation collects and publishes various statistical data regarding displaced persons in India, by the month and by the quarter.

Statistical organizations in the states. Integration of states

Statistical organizations at the state levels are of more recent origin than their counterparts in the central Government. The Indian Union comprises 28 states. These former provinces were collecting certain statistics for the central Government in standardized Imperial Tables on subjects such as agriculture, education, vital statistics and excise duty. Before Independence, the remaining areas were made up of 550 princely states scattered all over India and in different stages of social and economic development. These princely states, with the exceptions of Hyderabad, Mysore, Travancore and Baroda, had hardly any organizations which produced data beyond what was necessary for the collection of revenue. After Independence, some of them were merged with the former provinces, now called Part A states, and the rest were grouped into administrative units called Part B and Part C states.

Following the recommendations of the Gregory Committee of 1946, statistical bureaux have either come into existence or are in process of formation. Central statistical offices exist in all Part A and Part B states, with the exception of Madhya Pradesh, either as independent statistical organizations, or as part of a combined econo-

mic and statistical set-up. Among Part C states a central office has been set up at Delhi. Some of the Part C states are too small to afford a separate statistical organization.

Some typical statistical organizations in the states are described below:

Statistical units in labour departments

During the last two decades, in view of the increasing measure of provincial autonomy and the consequent need for statistics, some of the states set up statistical units in specific fields such as agriculture and labour.

The growing trade unionism of labour in industrially advanced states like Bombay led to a greater interest in welfare and conditions of living of labour and the consequent collection of data on family budgets and the compilation of cost-of-living index numbers.

The various labour laws such as the Factories Act, and Payment of Wages Act, in the 1930's, prescribed certain statutory returns on employment, wages, etc., and their implementation led to the creation of statistical units for the processing of the data collected. The state of Bombay took the lead in the labour statistics field, and other states also did useful work in this field.

Statistical units in agriculture departments

The development of statistical units in the Departments of Agriculture in the different states is largely due to the efforts of the Indian Council of Agricultural Research in developing a system of agricultural statistics, through normal agencies functioning in the states under their technical guidance.

Central statistical offices in the states

In addition to the progress being made in the formation of central statistical bureaux in the Part A and Part B states following in the wake of the recommendations of the Gregory Committee, the Conference of Central and State Statisticians held in December 1951, gave further impetus to the setting up of such organizations, especially in the Part C states.

It will be seen that the central statistical organizations are in various stages of development. With the exception of the Board of Statistics in Travancore and Cochin, they were all charged with the co-ordination of statistics in the different departments and the publication of a statistical abstract assembling all essential statistical series. There are, however, considerable differences in the areas of responsibility for the collection of statistics as such. Thus, while in Hyderabad statistics are almost centralized, in many other states, agriculture and labour statistics and vital statistics fall generally outside the scope of the central statistical offices. Some of them are responsible for the collection of industrial statistics, as the statutory authority under the Industrial Statistics Act. In Madras, the Central Office is also responsible for the cost-of-living index numbers. Some of the central offices like those in West Bengal and Bombay have been conducting a number of socio-economic inquiries for the collection of data required for the formulation of policy.

The Indian Statistical Institute (1937)

An account of the statistical organizations in India would not be complete without reference to the Indian Statistical Institute which is a non-official organization. It was established in 1937 and has been functioning in three different ways – as a learned society, as a centre of research and training and as an agency for large-scale projects. A special feature of the work of the Institute is the close integration of research, training and the application of statistical methods to a wide range of problems such as the survey of agricultural crops, study of rainfall, floods and social and economic inquiries. Since 1938, the Institute has been holding examinations for the award of certificates and diplomas of proficiency in statistics. The Indian Statistical Institute (jointly with the International Statistical Institute and UNESCO) sponsors the International Statistical Education Centre at Calcutta. The Institute has established branches in different parts of India, and has an official organ of its own, *The Sankhya*. It is currently in charge of the technical work relating to the National Sample Survey.

Co-ordination

As already stated, the need for co-ordination in a decentralized system such as exists in India, and for a single synoptic picture of the information field is being increasingly realized.

The work of the Inter-departmental Committee on Official Statistics set up in 1945, of the Central Statistical Organization in the central Government and of the central statistical organizations in the state governments has already been dealt with. With a view to promoting effective co-ordination, an annual conference of central and state statisticians is being held.

There is no over-all statistics act although in specific fields like manufacturing industries, census and vital statistics, there are statistical acts. The question of framing a model statistics act for adoption by the states is under consideration.

To secure the co-operation of the public, a Statistical Advisory Council which includes representatives of the various statistical organizations, representatives of commercial and industrial organizations, scientific institutions, and other principal statistical interests, is being set up.

With the rapid expansion of statistical activity in India, the acute shortage of qualified personnel presents a difficult problem.

In recent years there has been considerable progress in the matter of training facilities in statistics. Postgraduate degree courses in statistics have been started in a number of universities. Papers on statistics have also been prescribed for degree courses in mathematics and economics. Professional training is being imparted in the Indian Statistical Institute. This has the further advantage that the trainees can take part in the projects under execution. Specialized diploma courses in agricultural statistics are being conducted by the Indian Council of Agricultural Research.

It is customary for the ministers, before approaching the Union Public Service Commission for recruitment, to consult the Central Statistical Organization in regard to qualifications and grades of pay. The question of forming a cadre of statisticians with standardized rates of pay and service conditions is being considered by the Government.

The question of proper co-ordination and review of forms is receiving increasing attention. An important question to be settled is whether the clearance of forms with the Central Organization should be a statutory obligation.

With respect to co-ordination of forms used by state Governments, it may be mentioned that many of them are uniformly prescribed by the central Government under the rule-making powers in respect of enactments in specific subjects, drafted by the central Government for implementation by the states. For example, the collection of statistics under the Industrial Statistics Act is done through identical schedules by the officers of the state governments, appointed as statistics authority under the Act.

The avoidance of duplication, filling of gaps and ensuring a balanced development, taking full account of the requirements for purposes of the national plan, are mainly the responsibility of the Central Statistical Organization and normally such work is being done by working parties in which the representatives of the various interests concerned, the Planning Commission and the National Income Unit are also represented.

The Central Statistical Organization functions as the national focal point and is responsible for the supplying of data required by the United Nations and other international agencies and for initiating steps towards promotion of national standards in conformity, in so far as possible, with international standards.

In discharging its co-ordinating functions the authority of the Central Statistical Organization has been strengthened by a recent decision of the Cabinet that all new proposals for the collection, processing, analysis and publication of data should be sent by all ministers to the Central Statistical Organization and also that, at the request of the Central Statistical Organization, all information relating to statistical organization, methods, post, expenditure, etc., should be made available.

5. JAPAN *

Central structure

Every ministry in Japan contains a statistical bureau, division or section as prescribed in the Establishment Law of each ministry. The Prime Minister's Office has a statistics bureau, and the Ministries of Agriculture and Forestry, Labour, International Trade and Industry, and Welfare have statistical divisions. Other ministries have statistical sections.

The Statistics Bureau of the Prime Minister's Office plays the role of a Census Bureau. It is in charge of the population census and other non-administrative statistics. The divisions or sections of each ministry collect the data necessary for administrative purposes.

The Administrative Management Agency, an external organ of the Prime Minister's Office, contains the Statistical Standards Division which does not collect statistical data but co-ordinates the activities of the statistical agencies of the different ministries on the basis of the provisions of the Statistics Law.

Local structure

The central Government offices make use of the staffs of the statistics section or research section of each prefecture and the statistical officials of each city, town or village, and the local branches of the central government offices. All cities, towns and villages, however small, appoint one or more officials to deal with statistical work. Some of the cities have statistical sections in their offices. The central Government entrusts statistical business to the governors of prefectures and to the chiefs of cities, towns and villages, in accordance with the provisions of the local Autonomy Law. Although these staffs and officials are appointed by the local public entities and not the officials of the central Government, the salaries and allowances for the officials of prefectures are paid from the national treasury, because they are engaged mainly in the business of the central Government. The officials of cities, towns and villages are paid from municipal or village funds.

The statistics section or research section of each prefecture acts as a collecting agency both for the central Government and the prefectural government. These sections are also engaged in analysing the results of the censuses taken by the central Government concerning the administrative area and making use of them for their administration. However, all prefectures and not a few cities undertake their own censuses and surveys of population, factories, agriculture, fishery, commerce, finance of enterprises, prices, cost-of-living, education and other social affairs, and the estimation of their prefectural income.

The local statistical branches of the central Government offices are established by the Ministry of Agriculture and Forestry, Labour, International Trade and Industry, Welfare, Finance and other agencies. The local Statistics and Research Office of the Ministry of Agriculture and Forestry conducts the field surveys for the crop estimates, the growth situation of crops, etc.

History of reorganization

After the termination of the war, the Japanese statistical system was badly disorganized. The first step taken was the appointment of an advisory committee on the improvement of the statistical system. A report was submitted in 1946. At the end of that year, a Statistical Mission from the United States visited Japan and submitted its recommendations concerning the modernization of Japanese statistics. On the basis of these recommendations, the Government took the following steps: (1) the establishment of the Statistics Commission; (2) promulgation and enforcement of the Statistics Law; (3) establishment of a statistics and research division in four ministries; (4) establishment of statistics sections in the other ministries and in all prefectural governments; (5) establishment of the Crop Reporting Office, which is the local branch in each prefecture of the Ministry of Agriculture and Forestry; and (6) an increase in the number of local statistical officials.

The Statistics Commission

The Statistics Commission was an independent organ of the Prime Minister's Office and had the following responsibilities: (1) over-all plans for the improvement and development of the statistical system; (2) examination, standardization, co-ordination and integration of statistical investigations; (3) survey and study of the structure, personnel requirements and management of statistical organs; (4) plans for the training of statistical staff and their examinations; (5) summons of the persons in charge of statistical work in the various administrative organs; and (6) diffusion and propagation of statistical knowledge and supervision of matters relating to international statistics. The Commission did not carry out statistical investigations but examined: (1) the purpose, scope and method of the investigations; (2) the information to be collected and methods of collection; (3) the method and date of publication of the results obtained; and (4) estimates of expenses. The Commission was composed of 15 members and had an Executive Office with three sections – the General Affairs Section, Examination First Section and Examination Second Section – and the Chairman's Council Chamber. The General Affairs Section was in charge of administrative personnel and legal matters and of the diffusion of statistical knowledge. The Exami-

* Based on "The Statistical System of Japan", prepared by the Statistical Standards Division, Administrative Management Agency, Tokyo, Japan. Submitted as paper No. 30.1 to the United Nations International Seminar on Statistical Organization, held in Ottawa, Canada, October 1952.

nation First and Second Sections were responsible for the examination and co-ordination of statistics sponsored by the Government or public authorities. The Chairman's Council Chamber was in charge of matters concerning the Statistics Law, central and local statistical systems and the statistical budget.

Being an administrative commission, the Statistics Commission encountered many difficulties in the performance of statistical administration.

In conformity with the law for reorganization of the government administrative structure passed on 31 July 1951, the Statistical Standards Division was established within the Administrative Management Agency in August 1952, and took over the functions of the former Statistics Commission.

Statistical Standards Division of the Administrative Management Agency

The Statistical Standards Division is composed of four sections – Planning, Examination, Reports Co-ordination and Standards. It should be noted particularly that the powers for designation and approval of statistical surveys granted under the Statistics Law, and the powers for approval, alteration, contraction of approval period, etc., concerning the collection of statistical reports granted under the Statistical Reports Co-ordination Law were all transferred from the Statistics Commission to the Director of the Administrative Management Agency. With the inauguration of the Statistical Standards Division within the Agency, the powers of the Director of the Agency were delegated to the Chief of the Statistical Standards Division by Cabinet Order.

Statistics Council

At the time of the inauguration of the Statistical Standards Division, a Statistics Council was established as a consultative body to the Director of the Administrative Management Agency. The Council is composed of seven persons of learning and experience in statistics, six persons representing organizational units in charge of statistics in the central and prefectural government offices and four persons representing users of statistics.

The Statistics Council has specialized sub-committees on technical matters. These are:

1. Sub-committee on Industrial Classification.
2. Sub-committee on Occupation Classification.
3. Sub-committee on Commodity Classification.
4. Sub-committee on Area Classification.
5. Sub-committee on Construction Classification.
6. Sub-committee on Methods of Sampling Survey.
7. Sub-committee on National Income.

These sub-committees are composed of experts in statistics from the statistical organizations, professors of universities and persons with knowledge and experience in statistics.

Other statistical agencies of the Government

Prime Minister's Office

The Prime Minister's Office contains a Bureau of Statistics whose functions are:

1. Taking population censuses and other national basic censuses and surveys and tabulating the results.
2. Conducting various surveys entrusted by other government agencies and local organizations and tabulating their results.
3. Training statistical staff.
4. Studies in statistical techniques.
5. Collecting and compiling reports and data on statistics.

The work includes the population censuses, monthly labour force surveys, family income and expenditure surveys, retail price surveys, enterprise finance surveys and consumer price indexes.

Ministry of Justice

The Research Section of this Ministry deals with matters relating to arrangement, improvement and planning of statistics concerning legal affairs. It deals with civil statistics, criminal statistics, other legal statistics and statistics of correction and rehabilitation.

Economic Counsel Board

The Statistics Section of the Research Division compiles and analyses economic statistics and makes statistical studies of the fundamental problems necessary to the stabilization policy. The National Income Section of the Division estimates national income and national product.

Ministry of Agriculture and Forestry

The statistics and Research Division of the Agricultural Economic Bureau deals with the statistical planning for administration affairs of the Agricultural Ministry; controls the local statistics and research offices; prepares crop estimates; conducts surveys on arable areas, growth situation of crops, nature of soil, etc.; conducts statistical surveys on agriculture, forestry, live-stock and fisheries, and farmers' economic status; and issues publications.

The Research Section makes a general study of problems and policies and acts as liaison on the adjustment for import and export of agriculture and fishery commodities. The Research Section of the General Affairs Division, Food Agency, conducts surveys on staple foods, beverages and grease.

Ministry of Construction

The General Affairs Section attached to the Planning Bureau co-ordinates the various secondary statistics of the Ministry, and the Housing Planning Section of the Housing Bureau deals with construction statistics, carrying out a monthly statistical survey of the starting of houses and other buildings.

Ministry of Education

The Statistics Section of the Research Bureau makes the annual statistical plan of the Ministry of Education, conducts general surveys and compiles statistics relating to the affairs of the Ministry of Education, gives special technical assistance and advice to other bureaux and sections of the Ministry, the local boards of education and other research and statistics organizations. It gives advice and guidance on special research, study and analysis of the results of surveys in compliance with the requests of other bureaux and sections. It compiles the results of

research, study and statistical surveys, compiles and distributes annual reports, manuals, current reports, etc. The principal surveys are the basic school survey, the school hygienic survey, the school teacher survey and the industrial education survey.

Ministry of Finance

The Research Section deals with the preparation of corporation statistics, and engages in research and study of foreign economic affairs, domestic financial and economic affairs and public finance. The Research and Statistics Section of the Customs Division of the Tax Bureau deals with the preparation of Customs Statistics and Foreign Trade Statistics. The General Affairs Section of the Tax Administration Agency collects the tax statistics. Thus, the Ministry of Finance deals with corporation statistics, customs statistics, tax statistics, bond and security statistics and other secondary statistics in separate sections.

Ministry of International Trade and Industry

The Research and Statistics Division collects, compiles and publishes the results of the surveys of manufacturing industries, business textile goods distribution, production movement, international trade and industry and department store sales.

Ministry of Labour

The Labour Statistics and Research Division of the Secretariat prepares and publishes periodical statistics of:

1. Labour unions and labour disputes.
2. Working conditions.
3. Wages and salaries.
4. Occupations.

It collects, analyses and publishes data concerning foreign trade and domestic labour conditions and makes investigations on living conditions, and wage and employment status of workers. This Division, along with the Women's and Minors' Bureau and the Labour Market Survey Section of the Employment Security Bureau, prepares employment outlook reports, survey of wages by occupation, monthly wage survey, annual labour union survey, reports on labour disputes, labour accidents, employment and wage statistics, labour market surveys, labour standard supervision, workmen's accident compensation, insurance operation, survey of families with female heads, conditions of women's labour, labour status and labour attitude of minor workers, labour conditions of school children under minimum age, minor street workers and accidents of minor workers.

Ministry of Postal Service

The Statistics Section of the Accounts and Finance Bureau co-ordinates the statistics of other sections and publishes secondary statistics concerning accounts, employees, materials, and operations of postal service, telephones, and telegrams.

Ministry of Transportation

The Planning Section of the Secretariat plans the construction and improvement of ports and harbours, and prepares statistics of ports and harbours. The Research Section of the Maritime Co-ordination Division of the Maritime Transportation Bureau deals with maritime statistics, survey of maritime affairs and the dissemination of maritime knowledge. It also collects sea casualties statistics.

Ministry of Welfare

The Division of Statistics and Research of the Secretariat deals with the planning, publicity, collection of data, tabulation, analysis and compilation of vital statistics and other statistics of interest to the Ministry. It compiles statistics of infectious diseases, hospitals, venereal diseases, medical care, nutrition, census of physicians and dentists, public assistance, health insurance, welfare pension insurance, seamen's insurance, repatriates and medical abortion.

National Personnel Authority

The Research Section of the Bureau of Law prepares, collects and analyses statistics concerning the employment status of government employees.

National Rural Police Headquarters

The Planning Section and the Criminal Statistics Section compile and publish general statistics concerning the National Rural Headquarters and criminal statistics.

Supreme Court

The Statistics Section of the General Affairs Bureau in the Executive office of the Supreme Court prepares a quarterly report of judicial statistics. This contains statistics concerning civil, criminal and family affairs.

Statistical work of non-government organizations

Bank of Japan

The Statistics Department of the Bank of Japan undertakes statistical surveys of various accounts of banking institutions, on public finance and money and banking, and the collection of foreign economic statistics. It prepares statistics of wholesale and retail prices in Tokyo, currency issue, movement of national funds, supply of industrial funds, banking accounts of all banks, new loans for equipment funds by industry, receipts and payments of the Treasury and foreign exchange receipts and payments.

Oriental Economist

The Statistical Section of the Editorial Bureau of the *Oriental Economist* calculates the cost-of-living index, stock price index and index of industrial production.

Diamond

The Statistical Section of the Editorial Bureau of the economic journal *Diamond* prepares indexes of wholesale prices and industrial production.

Facilities for statistical training

Among the institutions which provide special training in statistics are the Training Institute for Statisticians attached to the Prime Minister's Office, the Institute of Mathematical Statistics attached to the Education Department, and Tokyo Suginami Public Vocational Guidance attached to the Tokyo Prefectural Office.

The Training Institute provides instruction to government and public officials engaged in statistical work, preparing them for senior posts. The Institute of Mathematical Statistics gives advanced training to scholars not currently employed. The Tokyo Suginami Public Vocational Guidance includes statistical training in its evening classes. In addition, short-term courses are held under the auspices of the Statistical Standards Division, mainly for the employees engaged in the statistical work of the central and local governments.

Statistics courses are also offered to undergraduate and graduate students of mathematics, economics, business administration, etc., in the universities or equivalent institutions. There are no separate faculties of statistics. Various vocational schools also provide instruction in statistics.

6. UNITED KINGDOM *

Official statistics in the United Kingdom have a long history. For example, some records of imports and exports go back to the thirteenth century. The main developments in official statistics have, however, taken place since the beginning of the nineteenth century. The first census of population was taken in 1801; the collection of statistics of births and deaths in England and Wales started in 1837; the first census of earnings of work people in 1886; the first census of production in 1907; the first official cost-of-living index in 1914; the first index of production in 1928; the first official estimates of national income in 1941; and the first census of distribution in 1951.

The work of the government statistical services of the United Kingdom is here described in broad outline only. No attempt is made to describe in detail the statistical work of each government department or all the inquiries involving the use of statistical methods which are undertaken, for example, by the Government Actuaries' Department and the Department of Scientific and Industrial Research and official research and scientific organizations.

Although they have been developed piecemeal, the Government's statistical services have been gradually co-ordinated to produce a comprehensive range of official statistics. The present generation of official statisticians inherits the work of such distinguished civil servants as Porter, Giffen, Llewellyn-Smith, Flux and Macrosty on trade and production statistics, Stamp on financial statistics, Farr and Stevenson on population and vital statistics, and Wood on labour statistics. They, with their successors, have built up the statistical services of the United Kingdom into one of the main branches of the civil service. Every major department now has its statistics division and there is a Central Statistical Office to provide advice and co-ordination for the statistical services as a whole. The organization is described in detail in the section on *Organization*.

The statistical reports now issued by departments range from the full census of population, usually taken every ten years, to regular weekly, and sometimes even daily, statements. The subjects include population and vital statistics; labour, education and social welfare; fuel and power, raw materials and industrial production; food, agriculture, forestry and fisheries; external trade and balance of payments; transport; banking, insurance and finance; national income and expenditure; wages and prices. The *Annual Abstract of Statistics* prepared by the Central Statistical Office contains series prepared by about fifty departments and official bodies.

Broadly, the work of the government statistical services is:

1. To provide statistical and other information needed for the efficient conduct of government business.

2. To bring statistical techniques to bear on the analysis of information, the solution of administrative problems, and the estimation of future trends.

3. To collect and publish information which will be of use to traders and manufacturers in their own business (this may include information relating not only to the United Kingdom but also to other countries).

4. To provide and analyse information which will be of use to research workers in all fields of inquiry in studying conditions in the United Kingdom.

5. To assist in keeping the public informed of economic, social and financial conditions.

The general responsibility for these tasks has never been laid down in any single enactment, but has been accepted by one department or another as the scope of government has increased. The demand for information by business and other private institutions has given further stimulus to the expansion of the government statistical services during the last 25 years.

Not only has the development of the statistical services been marked by an increase in the scope and an improvement in the content of the published statistical reports, but there have been great developments – more particularly during the last 20 years – in statistical techniques and changes in the uses to which statistics are put and the manner in which they are used. Statistics are now used more widely and more intensively both in the conduct of government administration and in private industry and trade. The collection of figures relating to the past is still an important part of the statistical work of the departments, but the main emphasis has largely been shifted to the quick collection and analysis of data about the current situation and the preparation of estimates affecting future operations and their consequences. Today prompt, accurate and comprehensive information as to what is happening is essential to government administration and for the formulation of policy.

This change of emphasis has altered the character of the work of the statistician in the government service. The development of techniques now demands a more expert knowledge of methods of collection, tabulation and analysis of data, a greater familiarity with the application of mathematical theory to statistical methods and often considerable specialization. These enable the statistician to analyse current events and future trends. To make use of this knowledge, he must also be able to take part with his administrative colleagues in the discussion of future policy and to understand the administrative problem to be solved so that he may bring his statistical expertness to bear on it. Thus the statistical services have become more technical and perforce grown more administrative.

* Adapted from *Government Statistical Services*, 1953, with permission of the Controller of Her Britannic Majesty's Stationery Office, London, England.

Collection of Data

It does not matter who collects the basic statistics which government departments use – whether government departments themselves or private associations or individuals – so long as the statistics are accurate and comprehensive. During the last 25 years many large firms, trade associations, nationalized industries and public utilities have built up their own statistical staffs and certain of the statistics they produce are used by government departments. For example, figures of output of iron and steel are collected by the British Iron and Steel Federation; the output of non-ferrous metals by the British Bureau of Non-Ferrous Metals Statistics; the sales of books by the Booksellers' Association; and index numbers of tramp shipping freights are compiled by the Chamber of Shipping. The nationalized industries and the public utility undertakings publish detailed statistics about the coal, electricity, gas, transport and other industries. In addition, a few private organizations – principally market research agencies and the research institutes of the universities – collect some original statistical material; but these private organizations are relatively few in the United Kingdom and most of their work consists in analysing the information collected by government departments and trade associations.

It is to the government departments that business men, trade associations, university research organizations and the public look to supply most of the key statistics relating to conditions in the United Kingdom. The reason for this is understandable. Many trade associations do not cover all the firms in a particular industry or trade and there are always some firms who do not wish to make returns even to their own associations. It is not possible to delegate to trade associations the legal powers given to departments by Parliament. A trade association cannot, therefore, compel its members to provide statistics for government use. Furthermore, the separate collection of figures for each industry may be too expensive and except in large industries, the trade associations cannot employ trained statistical staffs in sufficient numbers to undertake the work. In consequence, not only has statistical information collected by the government departments for their own purposes increased in recent years, but departments are also being called upon to provide statistics needed by traders and manufacturers.

Collection of data by government departments

Some of the statistics which government departments collect arise as a by-product of their day-to-day work. To avoid duplicating requests to employers and individuals for information, the statistics divisions of departments try to establish suitable procedures for turning to statistical uses information which comes to their departments in the ordinary course of business. Thus, most of the information relating to changes in profits, wages and salaries and distribution of incomes, published by the Board of Inland Revenue, is derived from returns submitted for income-tax purposes by private persons and businesses.

When new administrative procedures within departments are being established or existing arrangements revised, their possible effect on the supply of statistical information has to be considered. For example, between 1920 and 1947, the figures of persons employed in different industries were obtained by the Ministry of Labour from the annual exchange of insurance cards made under the Unemployment Insurance Acts. When the national insurance scheme came into operation in 1948, new arrangements had to be devised by which the same kind of information as previously obtained could be derived from the working of the national insurance scheme; otherwise no complete figures would have been available.

Since so many official statistics are obtained as by-products of the administrative arrangements of the departments, the statistics produced are often conditioned by definitions adopted in legislation or by other limitations arising from the way in which the administrative arrangements of a department operate in practice. For this reason, official statistics are sometimes difficult to use and their interpretation may contain many traps for the unwary. For example, the statistics of profits published by the Board of Inland Revenue are of profits as defined for income-tax purposes and the values of imports and exports are those agreed with H.M. Customs for customs valuation. Incidentally, this very close link between the collection of statistics and the administrative arrangements of departments is one reason for the considerable dispersal of statistical work among departments.

Questionnaires

For many important series of statistics, however, it is not possible to depend on extracting figures from information reaching departments for administrative purposes. Instead, the statistics divisions of departments have to organize the collection of the information themselves and to begin by sending out questionnaires. The preparation of such questionnaires is a skilled job, and those who do it must keep constantly in mind how the results obtained are to be tabulated and analysed and what administrative need is to be served. In a previously unexplored field, it may be necessary to undertake pilot surveys in order to decide on the right type of questions before embarking on the main inquiry. It is, normally, the responsibility of the statistics division of each department to prepare the questionnaires and when necessary to arrange for inter-departmental consultation on their design.

To avoid separate divisions of the same department approaching firms or individuals for the same information, the statistics division is generally responsible for the issue of statistical questionnaires by the department. This responsibility is, however, not easy to exercise since the distinction between an ordinary departmental request to the public for information and a statistical questionnaire is often not clear. In addition to such arrangements as may be made within departments for the approval of questionnaires, there is an understanding that, as between departments, the heads of statistics divisions consult each other or the Central Statistical Office when in doubt about the scope of a particular questionnaire. Some duplication of questions in different questionnaires, such as those asking for numbers employed, may nevertheless be necessary in order to check the reliability of the returns.

When a new inquiry is being undertaken, it is always difficult to ensure that the questionnaires are issued to

the right people and the right addresses, so that some are not bothered by unnecessary requests while others are missed. Various registers are compiled for this purpose, for example, the Board of Trade keeps a central register of all establishments in those trades (mining, manufacturing and public utilities) covered by the Census of Production except building and civil engineering establishments, of which a register is kept by the Ministry of Works. A register has also been compiled by the Board of Trade of firms engaged in distribution, for the purposes of the Census of Distribution. The Ministry of Labour has a register of establishments to which it sends monthly labour returns, and the Agricultural Departments have registers of farms. There are inter-departmental arrangements for pooling information to keep these registers up to date and for maintaining a central register of establishments.

Interviews

Statistics can also be obtained by investigators obtaining information by personal interviews with individuals or firms. Often these survey methods are the only way of getting the information required and are used, for example, to estimate consumer expenditure. They can also be employed to supplement the more usual methods of collecting data, particularly as a means of trying out questions to be included later in census schedules and ascertaining in advance the rates of response which are likely. For official inquiries of this kind, the Social Survey Division of the Central Office of Information, which employs part-time field staff, is generally used.

Sampling

In surveys by interviews and still more in the collection of information by questionnaires, government departments rely on results obtained by sampling. The design of the sample inquiry is determined by the statistics divisions, and questionnaires are sent to, or interviews sought with, firms or individuals selected according to a carefully prepared plan. Particularly on subjects for which full information is collected regularly by censuses, sampling makes it possible to obtain additional information, at more frequent intervals, and at low cost, from which estimates can be made within specified degrees of error; and they make it possible to obtain provisional figures long before all the census information has been tabulated and analysed (for instance, the one per cent sample of the 1951 Census of Population).

Although collecting information by sampling saves money and labour, it requires the use of more specialized staff, particularly in designing the form of the inquiry. Accordingly, departments planning sample inquiries may enlist the help of the Central Statistical Office and, if the interview method is to be used, the Social Survey.

Collection of information from small establishments

One of the most important decisions to make in collecting data is whether returns should be asked of all establishments or units irrespective of size. This problem arises particularly in the collection of industrial and agricultural statistics, since the majority of the units are small and account for only a small proportion of total output. It has generally been found expedient, for example in the Census of Production, to ask for returns only from firms employing more than ten persons and for agricultural statistics in Great Britain only from holdings of more than one acre. The labour involved in getting returns from large numbers of small producers, even when full legal powers are available, is often out of proportion to the value of the figures. The exemption limits or *cut-off* points vary in each case. Some commodities, for example, bread and eggs, are produced mainly by small units, which could therefore not be excluded.

Methods of tabulation

The increased amount of work now undertaken by government departments in collecting data and the need to speed up the analysis and publication of the results has meant that considerable attention has been paid in recent years to methods of tabulation. Many of the larger statistics divisions include persons trained in mechanical tabulation, and the Organization and Methods (O. and M.) Division of the Treasury, the O. and M. Divisions in departments and sometimes private commercial companies advise when necessary on mechanical methods for handling data and the use of tabulating aids.

For a small inquiry, it may be sufficient to use cards which can be sorted by hand and to use hand-calculating machines. For the larger inquiries, the use of punched-card machinery for sorting and tabulation is normally essential. Most of the large statistics divisions already have their own installations; for example, the Statistics and Intelligence Division of the Board of Inland Revenue codes, checks, sorts and tabulates 15 million punched cards a year. It is now common practice to centralize in one machine division all the tabulating work of a department, so that the work can be programmed and staff saved. When a department has small or infrequent statistical jobs which would not justify a separate installation, or when a department with its own equipment encounters a peak of work beyond its normal capacity, the Organization and Methods Division of the Treasury can arrange for the tabulations to be done in another department or by a commercial firm.

Statutory and legal powers relating to the collection and publication of official statistics

Some compulsory powers exist for the collection of statistics but even where they exist a department may prefer, for reasons of policy, to rely on voluntary arrangements. Departments are not empowered to delegate to trade associations or anyone else the use of compulsory powers to collect statistics, but occasionally some departmental bodies (for example, development councils) may have such powers conferred on them.

Collection of statistics obtained under compulsory powers

When statistics are obtained as a by-product of administration (for example, statistics of health, postal traffic, imports and exports), the legal provisions governing their collection and publication stem in each instance from the particular powers used in getting the information and not from an Act of Parliament dealing explicitly with the collection of statistics.

Before the war of 1939–45 there were a number of Acts of Parliament in effect empowering government

departments to collect population, production and other specified statistics. During and immediately after the war these powers were supplemented by the use of the Defence Regulations (particularly Defence Regulation 55AA) to obtain additional statistics. In 1947, the Statistics of Trade Act was passed. This was the first Act in the United Kingdom to give more general powers for the collection of official statistics, although there are earlier examples in Commonwealth and other countries.

Statistics of Trade Act, 1947

The general purpose of the Statistics of Trade Act, 1947, is, in the words of the preamble, "to enable certain Government Departments to obtain more readily the information necessary for the appreciation of economic trends", and to consolidate and amend previous legislation relating to the collection of statistics. Section 1 of the Act provides:

> "For the purpose of obtaining information necessary for the appreciation of economic trends and the provision of a statistical service for industry and for the discharge by Government Departments of their functions, it shall be lawful for a competent authority by notice in writing served on any person carrying on an undertaking to require that person to furnish, in such form and manner and within such time as may be specified in the notice, such periodical or other estimates or returns, about such of the matters set out in the Schedule to this Act as may be so specified."

The matters set out in the Schedule to the Act about which persons may be required to furnish estimates or returns are:

> "The nature of the undertaking (including its association with other undertakings) and of the date of its acquisition; the persons normally employed (including working proprietors), the nature of their employment, their remuneration and the hours worked; the output, sales, deliveries and services provided; the outgoings and costs (including work given out to contractors, depreciation, rent, rates and taxes other than taxes of profits) and capital expenditure; the receipts of and debts owing to the undertaking; the power used or generated; the fixed capital assets, the plant including the acquisition and disposal of those assets and that plant and the premises occupied."

The Act is for general use by departments and for the purpose of the Act "each of the following Ministers and authorities shall be a competent authority, that is to say, the Treasury, a Secretary of State, the Admiralty, the Board of Trade, the Minister of Fuel and Power, the Minister of Agriculture and Fisheries, the Minister of Housing and Local Government, the Minister of Health, the Minister of Labour and National Service, the Minister of Transport, the Minister of Supply, the Minister of Food, the Minister of National Insurance, the Minister of Works, the Minister of Civil Aviation and the Minister of Pensions". (Section 17(3)). In addition, the Ministry of Materials Act, 1951, made the Minister of Materials a competent authority.

The Board of Trade is under obligation to take an annual census of production and is empowered to take a census of distribution and other services "in any year that may be prescribed by order of the Board" (Section 2(1)).

Other legislation

The Census Act, 1920, permits a census of population to be taken not oftener than every five years and, in the interval between one census and another, lays down other duties in connexion with the collection and publication of population statistics. The Population Statistics Act, 1938, gives power to the Registrars General for England and Wales and for Scotland to ask, in addition to those questions essential to the registration of a birth, stillbirth, marriage or death, a specified list of additional questions, the answers to which are required confidentially for statistical purposes only and not for registration.

Apart from any powers which he may use under the Statistics of Trade Act, the Minister of Agriculture and Fisheries has compulsory powers to collect agricultural statistics under the Agriculture Act, 1947. Similar powers relating to Scottish agricultural statistics are exercised by the Secretary of State for Scotland. There are special legal obligations on the nationalized industries to supply statistics to appropriate government departments.

Disclosure of information

Whether returns are obtained voluntarily or compulsorily there are legal obligations on statistical staffs of departments regarding disclosure of individual returns, and it is accepted official practice neither to publish information which would disclose the identity of the firm or persons making a return nor to divulge figures relating to individual firms or persons to tax authorities or to the police, except for prosecutions under the regulations authorizing the collection of the statistics. In certain circumstances an official disclosing to unauthorized persons information which he has obtained, or to which he has had access, in the course of his official duties is guilty of a misdemeanour under the Official Secrets Act and liable to a term of imprisonment or a fine, or both.

Legislation authorizing departments to collect statistics usually contains provisions relating to disclosure of information. For example, Section 9 (1) of the Statistics of Trade Act, 1947, enacts:

> "No individual estimates or returns, and no information relating to an individual undertaking, obtained under the foregoing provisions of this Act, shall, without the previous consent in writing of the person carrying on the undertaking which is the subject of the estimates, returns or information, be disclosed except–
>
> "(*a*) in accordance with directions given by the Minister in charge of the government department in possession of the estimates, returns or information to a government department or to the Import Duties Advisory Committee for the purpose of the exercise by that department or Committee of any of their functions: or
>
> "(*b*) for the purposes of any proceedings for an offence under this Act or any report of those proceedings."

Section 9(5) enacts:

> "The following provisions shall have effect with respect to any report, summary or other communication to the public of information obtained under the foregoing provisions of this Act–
>
> "(*a*) no such report, summary or communication shall disclose the number of returns received with

respect to the production of any article if that number is less than five;

"(*b*) in compiling any such report, summary or communication the competent authority shall so arrange it as to prevent any particulars published therein from being identified as being particulars relating to any individual person or undertaking except with the previous consent in writing of that person or the person carrying on that undertaking, as the case may be; but this provision shall not prevent the disclosure of the total quantity or value of any articles produced, sold or delivered; so, however, that before disclosing any such total the competent authority shall have regard to any representations made to them by any person who alleges that the disclosure thereof would enable particulars relating to him or to an undertaking carried on by him to be deduced from the total disclosed."

This latter provision is very important in deciding what information can be published about a particular trade or process where one firm is responsible for all or most of the output. It may, for example, prevent the publication of some classes of statistics separately for England and Wales, for Scotland and for regions where the particulars about a firm might be identified from its predominant position in a particular area.

Organization

The government statistical services have developed within the general framework of the civil service and have no separate written constitution as in many countries. Their organization and their methods of work have been fashioned by experiment in the course of which a common purpose and outlook have been achieved. The relative merits of centralizing all the statistical work in one central bureau, or decentralizing it among department, have been discussed at length in various official reports, as far back as those of the Treasury Official Statistics Committee of 1877–1881, in the Committee of Enquiry in 1920 and in the discussions of the Royal Statistical Society.

Distribution of the work of collecting statistics

In the United Kingdom the work of collecting primary data is, as a general rule, done by the individual departments concerned.

Among the reasons for not centralizing the collection of statistics are:

1. Many statistics are collected as a by-product of the ordinary working of a department in enforcing laws and regulations. For example, the Home Office must, for administrative purposes, collect figures of crime, and the Board of Inland Revenue, figures of profits and incomes. Even if it were desirable it would not be possible to separate the collection of these figures from the other work of these departments.

2. There is considerable advantage in having the collection of statistics closely related to the work of the administrative divisions dealing with the particular industries, trade organizations and public authorities concerned; these divisions can often ease the request for statistical returns and in turn help in interpreting the information received.

3. The ministers and senior officials of each department are responsible for the formulation of policy of their department, and it is frequently necessary for them to have their own statistical staff to collect and analyse the statistics coming within their fields of interest.

4. The task of collecting statistics in the United Kingdom is so big that any central organization would have to be divided into sections broadly similar to those which already exist in the departments. The statistics divisions of many departments are big enough to secure the advantage of large-scale operation in mechanical tabulation and the use of trained staff.

Each department then is largely responsible for collecting the information required in its own field either for itself or for the general purposes of government. Even within a department there may have to be further decentralization. For example, within the Board of Trade the figures of bankruptcies are assembled by the Bankruptcy Department, not by the Statistics Division. The general tendency is, however, towards a greater centralization of statistical work within departments into one statistics division to secure consistency in statistical procedures and to derive economies from mechanical methods of tabulation. In departments where most of the statistics are collected in the course of administration, the Statistics Division is in fact an office drawing from the store of statistical information of the administrative divisions, systematizing the information, analysing it and comparing the results with statistics obtained in like manner in other departments.

All the larger and some of the smaller departments now have statistics divisions including qualified statisticians. Some departments and boards are not large enough to employ their own specialist staff and arrangements have been made for them to consult the Central Statistical Office about the collection and analysis of their statistics. Opportunities for reviewing the statistics collected by such smaller departments are provided in particular on two occasions: first, in assembling the statistics for the *Annual Abstract of Statistics* prepared by the Central Statistical Office, and secondly when, by arrangement with the Treasury, the Central Statistical Office gives them assistance in preparing the statistical tables to be included in their annual reports.

Co-ordination in the statistical services

With so many departments individually responsible for the collection of different series of statistics, there has always been a need for some means of co-ordinating their work if duplication is to be avoided and common standards and procedures ensured.

Before the 1939–1945 war, a Permanent Consultative Committee on Official Statistics, on which all the major departments were represented, met at intervals to discuss the form and scope of official statistics. This Committee was set up in 1920; its last meeting was in 1936. It is now recognized that this pre-war machinery for co-ordination was inadequate and was by its character inevitably concerned more with trying to put matters right than stopping them from going wrong.

War-time experience re-emphasized the need for closer working relations and indicated how the government statistical services might work together henceforward with a common outlook and purpose. This is indeed not merely desirable but essential, because:

1. The scope of official statistics of all kinds has widened considerably since before the war

2. Several new departments have been established since 1939 (for example, the Ministry of Food, the Ministry of Fuel and Power, the Ministry of Supply and the Ministry of National Insurance) and the statistical activities of the Government are now more widely and more evenly spread among departments than before the war; and, probably the most important reason of all:

3. Much greater use is now made of statistics in the formulation of government policy; for example, statistics are needed to show changes in the national income, wages and salaries, total consumption expenditure, industrial production, prices, the use of manpower and balance of payments. None of these statistics can be prepared from information collected by one department alone, and information available to a number of departments must be fitted together to build them up.

For all these reasons it has been necessary to develop close relations in the statistical work of government departments.

This has been done in part by assigning to some of the larger departments, such as the Ministry of Labour and National Service and the Board of Trade, responsibility for the whole of the statistical work relating to a particular subject, even though some of the data needed may be collected by other departments. For example, the Ministry of Labour's monthly statistical statements of changes in the distribution of the total labour force in the country are partly based on information supplied by other departments.

The general responsibility for acting as a central advisory consultative and co-ordinating office for the government statistical services as a whole rests on the Central Statistical Office.

Central Statistical Office

The Central Statistical Office was established in January 1941, within the Cabinet Office which is under the general responsibility of the Prime Minister.

Since the Cabinet and its Committees have to make decisions affecting more than one department, it is essential that the statistics on which their decisions are based (for example, statistics of production, consumption, external trade and manpower) should be compiled according to definitions agreed between departments, and one of the most important reasons for establishing the Central Statistical Office was to ensure that statistics were prepared on the basis of agreed definitions and in consistent form. The Central Statistical Office was given as its primary aim and duty the collection from departments of a regular series of figures on a coherent and well-ordered basis.

The main functions of the Office are:

1. To assist the central organs of the Government on all questions involving the use of statistics, and to see that so far as possible the main statistical requirements of the Government are met.

2. To prepare statistical reports and assemble information needed for the Cabinet and its Committees.

3. To maintain general liaison with departments on statistical questions, to arrange when necessary for inter-departmental discussion of statistical matters, and to advise departments on questions relating to the collection, presentation and publication of statistics and on the needs for different classes of statistics, so as to ensure that the main requirements of the Government are met by the various departments.

4. To prepare and circulate statistical reports such as the *Monthly Digest of Statistics* and the *Annual Abstract of Statistics* which contain information obtained from departments.

5. To undertake with its own staff the preparation of original statistical series and estimates which involve the use of data collected from a number of departments and which can be most conveniently collated and analysed by a central organization. For example, the Central Statistical Office prepares estimates of national income and expenditure and index numbers of industrial production.

6. To maintain general liaison with international organizations on statistical matters. Several departments have of course direct relations with individual international organizations in whose work they have a special interest. (The United Kingdom has always taken a leading role in the development of international statistics and in promoting greater comparability between statistics of different countries.)

Apart from these specific functions, the Central Statistical Office helps the smaller departments and boards which have no professional statistical staff, with the aim of promoting a balanced development in the whole range of official statistics. It also has a special responsibility for improving the statistics in those relatively undeveloped fields which fall largely outside the responsibility of any one department.

As a matter of day-to-day relations the statistics division of any department may get in touch direct with the Central Statistical Office on any point on which it needs help and advice. When a question needs to be discussed inter-departmentally, the Central Statistical Office will arrange the necessary meeting. Moreover, the Central Statistical Office, by virtue of its central position as part of the Cabinet Office, may be aware of the need for new and additional statistics arising from discussions in Cabinet and Cabinet Committees and can draw the attention of the departments immediately to it. It can take the initiative in promoting inter-departmental consultation on any subject on which there may be duplication of work between departments or in suggesting new lines for development of official statistics.

Development of uniform standards

If full benefit is to be gained from the statistics collected by different departments, they must be compiled according to common standards and common classifications. Otherwise the data are not comparable and the analysis of the results hazardous. There are often good reasons why departments may wish to compile their figures differently. For example, the Ministry of Labour and National Service may wish to classify an industrial activity under one heading—perhaps to match the scope of wage agreements—while the Board of Trade may wish to classify it under another.

During recent years, a great deal has been done both nationally and internationally to secure agreement on

such matters as industrial and occupational classifications, regional classification, time periods of measurement, and even physical units of measurement. For example, in 1948, the Central Statistical Office, after consultation with departments, issued a Standard Industrial Classification for use by all departments. The nationalized undertakings and some large business firms also use this classification. Steps have been taken to build up a central register of establishments by the exchange of information between departments, so that the same establishments are classified under the same heading in the Standard Industrial Classification by all departments.

Standing inter-departmental committees

To facilitate and co-ordinate discussion on statistical questions, a number of standing inter-departmental committees under the chairmanship of the Central Statistical Office have been established. Copies of the minutes and of the papers discussed may be sent to interested departments not represented at the meetings. The more important of these committees are:

The Working Party on Statistics for Employment Policy which is responsible for reviewing the statistics needed for carrying out the policy set out in the White Paper on Employment Policy, 1944 (Cmd. 6527). It drew up the report on which the Statistics of Trade Act was based, and still keeps under review the working of that Act. One of its sub-committees considers the collection of information on prices and the technical methods to be used in the preparation of index numbers of prices, another discusses the collection of information about family budgets, and, in particular, that needed to estimate consumers' expenditure.

The Revising Committee on Trade Accounts which consists of representatives of the Central Statistical Office, the Board of Trade, and H.M. Customs and Excise, with representatives from other departments as appropriate, reviews proposals made each year for changes in the statistical headings and classifications used in the *Monthly Trade Accounts* and in the *Annual Statement of Trade*.

The Committee on the Censuses of Production and Distribution which serves as a forum for discussing the various needs of departments for information from the censuses. It examines the various questionnaires proposed and reviews the general programme of censuses to be taken.

The Committee on Industrial Classification which was primarily responsible for preparing the Standard Industrial Classification, reviews the use of this classification and studies proposals for its amendment and its possible use in other fields of statistics.

The Working Party on the Statistical Relations between British Government Departments and the United Nations Organizations which keeps watch on the statistical work of international organizations and co-ordinates the views of all departments of the United Kingdom Government in relation to international statistical activities.

Apart from these committees under Central Statistical Office chairmanship, there are other committees of an inter-departmental character held under the chairmanship of individual departments to consider statistical matters falling primarily within the responsibility of these departments, such as balance of payments, crime and population.

Relations with industry, research organizations, and the universities

It is also necessary for statistical purposes to maintain close consultation with trade associations and with statisticians working with industrial firms. To a large extent this consultation is carried on informally between departments and different industries. There are, however, advisory committees set up to give advice on the scope of the censuses of production and distribution and on the questionnaires to be used in them. These advisory committees consist of representatives of industry, trade, organized labour and the universities, who have special knowledge of or interests in the censuses; they help in the drawing up of census schedules and advise on what statistics are available in the records of business firms.

From time to time, *ad hoc* committees composed of both officials and outside representatives have been set up to consider statistical questions. For example, a technical committee appointed by the Ministry of Labour and National Service advises on the preparation of the index of retail prices.

Appreciation of the value of research has encouraged departments to publish as much information as possible and to assist individual research workers by giving them access to unpublished material. However, to promote closer co-operation between the universities and government departments, an Inter-departmental Committee on Social and Economic Research consisting of representatives of departments and of members of university staffs was set up, in 1947, with the purpose, *inter alia*, of informing departments of the needs of research workers.

In addition, membership of various learned societies, such as the Royal Statistical Society, provides statisticians in the civil service with opportunities for discussion with statisticians in the universities, research organizations and trade and industry.

Staff

As explained above, recent developments have made more necessary than ever a high standard of technical ability in the collection, preparation and interpretation of statistics combined with an understanding of the nature of the administrative problems to which they are to be applied.

Before the war of 1939–1945, the statistics divisions of departments were commonly staffed by a selection of executive and, occasionally, administrative officers who were considered to have an aptitude for the work. This method of recruitment did, in fact, produce some statisticians of high accomplishment but it left much to chance. In 1946, a Statistician Class was created in parallel to the administrative grades within the Home Civil Service, and the staffs of the Central Statistical Office and the statistics divisions of departments now include members of this new class. The grades of Assistant Statistician, Statistician, and Chief Statistician correspond to the grades of Assistant Principal, Principal, and Assistant Secretary in the Administrative Class.

The main purpose of the creation of this new Class was to take advantage of the great development in modern

statistical techniques and to maintain the high standard reached during the war when a number of highly qualified statisticians were brought into government service. This Class is normally recruited from university graduates who have taken high honours in statistics combined with some other main subjects such as economics or mathematics, and who have sometimes spent a short time in postgraduate research or in industry.

Members of the Statistician Class have tended to replace administrative officers on statistical work, but the statistics divisions continue to rely on executive and clerical staff for work of a less specialized nature. The latter remain in the general service classes concerned, though some have had special training in statistical work.

Statistics Collected by Government Departments of the United Kingdom

This schedule sets out the general areas of responsibility for the collection of the principal classes of official statistics. It does not purport to be exhaustive. Some departments or other official agencies which collect statistics are omitted, and mention is not made of all the statistics which the departments collect.

DEPARTMENT OR OFFICE AND SUBJECTS COVERED

Admiralty

Production of merchant and naval vessels; output of defence equipment; naval personnel; expenditure on naval forces.

Agriculture and Fisheries (Ministry of) [1], [2]

Acreage of land used for agricultural purposes; production and yields per acre of principal crops, vegetables and fruits; number of live-stock; sales or purchases and prices of agricultural products and requisites; use of agricultural machinery and other equipment; employment on agricultural work; estimates of gross and net output and income of farmers; wages and other farm costs.

Size of fishing fleet; employment in fishing; value and volume of landings of fish of British taking; value and volume of fish landed by foreign vessels.

Air Ministry

Weather conditions; personnel and equipment of the Royal Air Force; expenditure on the Royal Air Force.

Central Office of Information (Social Survey)

Field surveys on various subjects on behalf of government departments.

Civil Aviation (Ministry of)

Operation of air lines, nationalized and otherwise, covering internal and external services; aircraft in service; passenger and freight traffic; accident statistics; airport operations.

Colonial Office

Statistics relating to the colonial territories; financial statistics relating to metropolitan expenditure on colonial administration and development.

Customs and Excise (Her Majesty's)

Imports, exports and re-exports; receipts from customs duties and excise duties; production and consumption of spirits, beer and wines; consumption and stocks of tobacco; receipts from entertainment duty and purchase tax; liquor and other trading licences granted; firearm and dog licences, etc.

Education (Ministry of) [3]

Children attending and leaving school; schools by type and size; teachers in service and training certificate of education examination results; scholarship awards; further education; school meals and milk; finance; costing statistics; educational building.

Food (Ministry of)

Supplies, consumption and stocks of the principal foodstuffs; estimates of per capita consumption; retail outlets for the sale of foodstuffs; estimates of total food consumption and expenditure; surveys on expenditure on food and on nutrition.

Forestry Commission

Forest area; acquisition of land for planting, land planted and forest fires; expenditure on and receipts from forestry operations.

Friendly Societies (Registry of), and Industrial Assurance Commissioner

The number of industrial and provident societies, co-operative trading societies, building societies, friendly societies and collecting societies showing number of members and financial operation of these bodies; industrial assurance.

Fuel and Power (Ministry of) [4]

Coal, other minerals, gas, electricity and petroleum (plant and equipment installed and in use, capital expenditure, labour employed, wages and salaries, productivity, output, proceeds, costs, materials used, disposals, stocks, consumption, prices, etc).

General Register Office [5]

The number and condition of the people; population (estimates, censuses, etc.); births, deaths and marriages; fertility, mortality, morbidity (including mental illness); infectious diseases.

Health (Ministry of) [5]

Statistics relating generally to the health of the people (see also *General Register Office*); statistics relating to the National Health Service — hospitals, training of nurses and midwives, etc.

Home Office [5]

Crime and court proceedings; police; coroners' inquests; public prosecutions; prerogative of mercy; extraditions and fugitive offenders; legal aid; Broadmoor patients; prisons and Borstal institutions and their populations; probation service; child welfare; juvenile delinquency; licensing; aliens; naturalization; explosives; dangerous drugs, vivisection; civil defence; fire service; Parliamentary election expenses.

Housing and Local Government (Ministry of)

Building of permanent and temporary houses;[6] local government finance and rating.[7]

Inland Revenue (Board of)

Industrial profits; wages and salaries under the P.A.Y.E. scheme; statistics relating to income tax, sur-tax, profits tax, death duties, stamp duties, land tax.

Labour and National Service (Ministry of) [5]

Employment and unemployment; wage rates, earnings and hours of work; retail prices and cost of living; trade unions; industrial disputes; factories; industrial diseases.

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[1] And corresponding Departments in Scotland and Northern Ireland.

[2] Fishery statistics for Scotland are collected by the Scottish Home Department.

[3] And corresponding Departments in Scotland and Northern Ireland.

[4] Ministry of Commerce, Northern Ireland.

[5] And corresponding Departments in Scotland and Northern Ireland.

[6] Health Departments in Scotland and Northern Ireland.

[7] Scottish Home Department and Ministry of Health and Local Government, Northern Ireland.

Lord Chancellor's Department [9]

Civil judicial statistics including statistics relating to divorce.

Materials (Ministry of)

Production, consumption and stocks of non-ferrous metals other than those dealt with by the Ministry of Supply.

National Insurance (Ministry of) [9]

National Insurance Acts, that is sickness benefits, maternity benefit, unemployment benefit, widows' benefits, retirement pensions, death grants; National Insurance (Industrial Injuries) Act, that is injury benefit, industrial disablement benefit, prescribed diseases, pneumoconiosis statistics; family allowances; supplementation of National Insurance benefits by National Assistance.

Pensions (Ministry of)

War pensions, grants and allowances.

Post Office

Postal, telegraph and telephone services; wireless and television licences; savings.

Supply (Ministry of)

Statistics of defence production; statistics relating to the iron and steel industry; production, consumption and stocks of light metals; production and orders on hand of the engineering industry.

Trade (Board of) [10]

Census of production and statistics relating to industrial production; production of goods other than of the engineering, food processing, building materials, etc., industries.

Supply, consumption and stocks of raw and other industrial materials (other than those handled by Ministry of Materials and Ministry of Supply).

Census of Distribution and statistics relating to distribution.

External trade; volume of imports and exports and prices and average values of imports and exports; records of the trade of overseas countries.

Wholesale prices; retail trade in food, apparel and household goods.

Shipping movement and movement of passengers by sea and air; tourist statistics.

Trade (Board of) (contd.)

Formation, operation and liquidation of public and private companies; bankruptcy and insolvency; patents.

Statistics relating to life assurance (other than industrial assurance) and to other types of insurance business.

Statistics relating to approvals for and erection of factory buildings.

Transport (Ministry of) [11]

Highways and the operation of the Road Fund; road transport – motor vehicles with licences, current and new registrations; census of mechanically propelled vehicles; licensing and operation of passenger service vehicles; goods vehicles with carriers' licences; trams and trolley vehicles; road accidents.

Rail transport – railway track and rolling stock; availability of rolling stock; operating statistics for passenger and freight traffic; railway accidents.

Inland waterways.

Shipping statistics – merchant vessels on the British Register and under the British flag; analyses of vessels by type, age, size and speed; merchant seamen.

Treasury

Central Government receipts and expenditure; national debt; floating debt; gross capital liabilities and estimated assets; estimates of balance of payments; gold and dollar reserves.

Civil service staffs. [12]

University Grants Committee

Admission of students full- and part-time; courses taken; home residence of students; degrees and diplomas granted; income and expenditure of universities.

War Office

Personnel and equipment of the Army; expenditure on the Army.

Works (Ministry of) [13]

Employment in the building and civil engineering industries and the building materials industries; output of building and civil engineering work, progress of individual projects, issue of licences; production deliveries and stocks of various building materials and components.

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[9] Ministry of Labour and National Insurance, Northern Ireland.

[9] Scottish Home Department in Scotland and Ministry of Home Affairs and Registrar, Royal Courts of Justice in Northern Ireland.

[10] For Northern Ireland some of these subjects are covered by the Ministry of Commerce.

[11] Ministry of Commerce, Northern Ireland.

[12] Ministry of Finance, Northern Ireland.

7. UNITED STATES OF AMERICA *

Organization

In the United States, the statistics necessary for the performance of most central governmental activities have developed within the agencies needing statistical data for operating purposes. Many different Acts of Congress direct various agencies to collect statistical information of designated kinds, some for administrative and operating purposes and others for general public use. Thus, the statistical organization of the United States Government has developed in a decentralized pattern, with many different government agencies concerned with the collection, compilation or analysis of statistical data in specified areas.

There are advantages in such a decentralized organization, particularly where statistical activities are as extensive and complex as in the United States. At the same time, decentralization requires that there be a central statistical office serving as co-ordinating agency, to prevent duplication, achieve balance and develop procedures for an integrated system of government statistics. In the United States Government, this central statistical agency is the Office of Statistical Standards in the Bureau of the Budget, which is part of the Executive Office of the President.

Almost every agency of the Government collects or uses statistics to some degree. It is possible, however, to make certain distinctions in the kind of statistical activity performed, and to group agencies in broad categories of statistical responsibilities. It should be stressed, however, that this grouping is only a convenient device to distinguish among different kinds of statistical activities, and that the three types listed below are not mutually exclusive. The general-purpose agencies, for instance, also perform important tasks in analysis and research; and the statistics collected for administrative use may also serve general purposes.

General-purpose statistical agencies

The foundation of the federal statistical system is a group of agencies designated as general-purpose statistical agencies. The primary function of these agencies is the collection of statistics for general use, and each of them is responsible for the regular collection, analysis and publication of data in specified fields. These agencies and their principal areas of responsibility are:

1. *Bureau of the Census* in the Department of Commerce.

Responsible for all the major censuses, including population, housing, agriculture, manufactures, mineral industries, business, transportation and governments; and for current statistics on population and the labour force, manufacturing activities and commodity production, retail and wholesale trade, foreign trade, and state and local government finances and employment.

2. *Bureau of Labor Statistics* in the Department of Labor.

Responsible for current statistics on non-agricultural employment, earnings, man-hours, labour turnover, industrial accidents, work stoppages, wage rates; industrial productivity; collective bargaining agreements; wholesale prices, retail prices and urban consumers' price indexes; housing construction and publicly financed non-residential construction.

3. *Bureau of Agricultural Economics* in the Department of Agriculture.

Responsible for current statistics on crop and live-stock production and inventories; crop forecasts; food processing and food consumption; farm population, labour and wages; farm management; farm ownership, taxation and finance, and land values and transfers; prices farmers pay and receive; and farm income.

4. *National Office of Vital Statistics* in the Public Health Service, Department of Health, Education and Welfare.

Responsible for compilation and publication of official national reports on births, deaths, marriages and divorces, and morbidity, and for the preparation of life tables.

The *Bureau of Mines* in the Department of the Interior, although not primarily a statistical agency, should also be classified in the general-purpose group. It is the principal source of current statistics on production, consumption and stocks of minerals and mineral products, including coal and petroleum, and on employment and injuries in the mineral industries. In similar fashion, the *Office of Education* in the Department of Health, Education and Welfare, although not exclusively a statistical agency, is the primary source of current statistics on city and state school systems, institutions of higher education, special schools, and public and school libraries.

The resources of these agencies – particularly of the Bureau of the Census and the Bureau of Labor Statistics – are frequently used for the collection of statistics needed by other agencies. Such work may be performed merely by adding supplementary questions to an existing survey, or may take the form of entirely new collections where it is advantageous to use the existing facilities of the general-purpose agencies.

Administrative and regulatory agencies

In addition to the basic statistical series collected by the general-purpose statistical agencies, many important and valuable statistical series are obtained by other agencies of the Government as a by-product of their administrative or operating responsibilities. The primary

* Based on "Statistical Services of the United States Government", prepared by the Office of Statistical Standards, Bureau of the Budget, Executive Office of the President, Washington, D.C. Revised edition, June 1952. Submitted as paper No. 33.1 to the United Nations International Seminar on Statistical Organization, held in Ottawa, Canada, October 1952.

purpose of the statistics collected by these agencies is to supply the agency with information it needs in performing its function, but many of the statistics obtained for this purpose are also of great value to the public and to other agencies of the Government.

For example, the Social Security Administration in administering its old-age and survivors insurance programme produces wage information which forms an integral part of the national income series. Other information, such as employment and the number of businesses in operation, is widely used in statistical series and research projects. The employment security programme administered by the Bureau of Employment Security in the Department of Labor and by state employment security agencies, yields data on unemployment claims, covered employment, job opportunities and characteristics of the labour supply which are used in economic and social analyses by governmental agencies, employers, labour groups, economists and others. The income-tax returns made by individuals and corporations to the Bureau of Internal Revenue in the Treasury Department are an important source of data on the sources and size distribution of income.

A number of economic activities in the United States, particularly in the fields of transportation and public utilities, are subject to federal regulation. Among the regulatory agencies established for this purpose are the Federal Power Commission, for the gas and electric utilities; the Federal Communications Commission, for the telephone, telegraph, and radio and television industries; the Interstate Commerce Commission, for railroads and certain classes of water carriers and contract and common carrier highway transportation; the Civil Aeronautics Board, for air carriers; and the Comptroller of the Currency in the Treasury Department, for national banks. Each of these agencies obtains information on financial and operating aspects of the industries under its supervision, and these data are widely used for statistical purposes elsewhere.

Other agencies which produce valuable statistical data as a by-product of their administrative operations in specialized fields include the Production and Marketing Administration, the Forest Service, and the Office of Foreign Agricultural Relations, in the Department of Agriculture; the Fish and Wildlife Service, in the Department of the Interior; the Immigration and Naturalization Service in the Department of Justice; the Public Health Service, in the Department of Health, Education and Welfare; the Securities and Exchange Commission; the United States Civil Service Commission; the United States Tariff Commission; and the Veterans Administration.

Analytic and research agencies

There are a number of agencies which play an important role in the federal statistical system not through the collection but through the compilation, analysis or interpretation of statistics. These agencies are among the primary users of the data collected by other agencies or for other purposes, and their estimates, analyses or forecasts are an important product of the Government's statistical system.

The National Income Division in the Office of Business Economics, Department of Commerce, for instance, compiles estimates of national income and gross national product which are among the most comprehensive measures of economic activity prepared by the Government. These estimates are based on several hundred statistical series, including data obtained in the censuses of population, manufactures, mineral industries, wholesale and retail trade and agriculture; estimates of gross and net farm income, prepared by the Bureau of Agricultural Economics; and data obtained as a by-product of regulatory or administrative operations of such agencies as the Bureau of Internal Revenue, the Securities and Exchange Commission, the Interstate Commerce Commission, and the Social Security Administration.

The Council of Economic Advisers in the Executive Office of the President is responsible for the continuing analysis and interpretation of economic trends, taking into account the interrelationship of all parts of the national economy. The Council also uses data from a wide variety of sources in preparing important statistical tables relating to the nation's economic budget and to employment, production and purchasing power, which are presented in its annual and mid-year reports. It also prepares for the Congressional Joint Committee on the Economic Report a monthly statistical publication, *Economic Indicators*.

Other agencies which are important users of statistical data include the Office of International Trade in the Department of Commerce, which prepares analyses of United States foreign trade based on data compiled by the Census Bureau; and research units in the Federal Reserve Board, the Treasury Department and the Bureau of the Budget, which use a variety of statistical data in determining various aspects of the Government's financial, fiscal and budgetary policies.

Co-ordination

The need for a single unit to serve as a central co-ordinating agency for the Government's diversified statistical activities was recognized in 1933 by the creation of the Central Statistical Board. This Board had limited authority and its functions were primarily advisory. Its authority was greatly increased in 1939 when, as part of a governmental reorganization, it was incorporated into the Bureau of the Budget in the Executive Office of the President, where it became the Division of Statistical Standards. In 1952, the Division was renamed the Office of Statistical Standards.

Authorities and functions of the Office of Statistical Standards

The Office of Statistical Standards is charged with the Budget Bureau's responsibilities under the following laws and executive orders:

1. Executive Order 8248 (8 September 1939) – Planning and promoting the improvement, development and co-ordination of federal and other statistical services.

2. Federal Reports Act of 1942 – Eliminating duplication in the collection of information from the public, reducing the cost of federal reporting services, and minimizing the burden to the public of furnishing information to federal agencies.

3. Executive Order 10033 (8 February, 1949) – Co-ordinating the handling of statistical inquiries to the United States from international organizations.

4. Budget and Accounting Procedures Act of 1950, Section 103, and Executive Order 10253 (11 June, 1951) – Developing programmes and issuing regulations and orders for the improved gathering, compiling, analysing, publishing and disseminating of statistical information by federal agencies.

By request of the President in November 1950, the Office of Statistical Standards also maintains a surveillance of the publication of statistics by all federal agencies to determine the need for restrictions on the publication of statistical data in the interests of national security. In addition, as the central statistical co-ordinating agency within the federal Government, the Office of Statistical Standards serves as the focal point for United States participation in the statistical activities of international organizations. It is also consulted by other government agencies and non-government groups for information on the adequacy, quality and appropriateness of statistical data for specific purposes.

The administrative officers of the Office of Statistical Standards are the Assistant Director of the Bureau of the Budget for Statistical Standards, serving as chief, a deputy chief and three assistant chiefs, who share responsibility for the work of the Office and its relationships with other parts of the Budget Bureau and with other agencies, and for programme planning in subject-matter fields. The lines between the subject-matter fields cross at many points, and the organization of the Office is kept flexible to achieve the common aim of an integrated statistical system.

Assignments to staff members are made on the basis of subject-matter fields, rather than on agency lines, because integration of federal statistical programmes requires greater attention to alignments in subject matter than to the traditional boundaries between agency programmes. A staff member may be concerned with a number of related fields, and, conversely, a particular field may be of interest to several different staff members from different viewpoints.

The functions of the Office of Statistical Standards are performed primarily through (1) the review and clearance of statistical forms and other requests for information proposed by federal agencies; (2) consultation with government officials, interagency committees, business and labour advisers, and other groups on the needs for statistical data and the most efficient means of collecting the information needed; (3) development and application of standard definitions, classifications and procedures for use by all agencies; (4) review, in co-operation with other parts of the Budget Bureau, of the budget estimates of statistical agencies; and (5) co-ordination of federal statistical activities with requirements of international organizations. These activities, each of which is described below, are closely related, and staff members of the Office of Statistical Standards must therefore be familiar with all phases of the co-ordination process. A staff member reviewing a proposal for the collection of information, for example, must at the same time be concerned with the usefulness of the data to public groups, with the application of standards and with international statistical requirements and commitments.

Review of agency requests for information

The Federal Reports Act of 1942 provides that every agency of the federal Government (with a few specified exceptions) must obtain Budget Bureau approval for any request for information to be sent to ten or more respondents. This means in effect that no statistics may be collected without examination and approval by the Bureau of the Budget. Within the Bureau, this authority is delegated to the Office of Statistical Standards.

The review requirement applies not only to statistical questionnaires but also to administrative forms, such as applications or claims forms. It applies to identical requests for information, whether by questionnaire or other method of inquiry, such as telegrams or oral requests. It also applies to information collected by contracting organizations under the sponsorship of federal agencies as well as to that collected directly by a government agency.

The purposes of this examination by the Office of Statistical Standards are to prevent unnecessary duplication, reduce costs and reporting burdens, and improve the quality and general usefulness of the statistics obtained. Toward these ends, every new reporting plan or questionnaire proposed is examined to see (1) that the information it would obtain is necessary and relevant to the programme of the agency; (2) that the information is not already available from reports collected by the same or any other agency; (3) that the form is as simple as possible and conforms to business record-keeping practices; (4) that it is sent to the smallest possible number of respondents; and (5) that it is collected no more frequently than necessary. Forms which are approved bear a Budget Bureau approval number, usually with a date of expiration. Before the date of expiration, the form must be resubmitted for Budget Bureau examination as to its continued necessity and for any further simplification possible in the light of experience.

Obviously the amount of time spent by a staff reviewer on a proposal and the amount of consultation with other government or non-government groups depend on the character and magnitude of the proposal under consideration. A simple form without ramifications into the interests of other agencies may be reviewed quickly by one individual to whom it is assigned. On the other hand, proposals for larger operations, such as the Census of Manufactures, call into operation many other procedures for obtaining additional advice and consultation.

The Office of Statistical Standards has encouraged individual agencies to establish central points for their own internal clearance and control over report forms originating in their subordinate units. This procedure retains for the Office of Statistical Standards responsibility for final review and approval and enables it to devote primary attention to broader issues of interagency co-ordination. In practice, many important forms receive the continuous attention of both the Office of Statistical Standards and the agency's statistical control office.

Consultation with other groups

In all its work toward co-ordination and improvement of federal statistical activities, the Office of Statistical Standards relies heavily on consultation with other

groups, both government and non-government, for advice and assistance. It has established a number of advisory committees, broadly representative of public and private organizations, which it consults on specific problems. Among the most important of these committees are:

1. *The Federal Committee on Economic Statistics.*

This committee advises on all major problems affecting statistical programmes. It works primarily through sub-committees in specialized areas, on which all federal agencies concerned are represented. For example, the sub-committees on labour force statistics, transportation statistics, standard metropolitan areas, banking statistics and construction statistics make recommendations on the collection, improvement and co-ordination of data in these areas.

2. *The Federal Committee on International Statistics.*

This committee, composed of representatives of federal agencies, was established in 1946 to advise on problems concerning co-ordination of federal statistical programmes which involve relations with international organizations or foreign governments. It also serves in an advisory capacity to the Chief of the Office of Statistical Standards in his capacity as United States representative on the Statistical Commission of the United Nations.

3. *The Advisory Council on Federal Reports.*

This committee, composed of two representatives from each of seven national business organizations and four business members-at-large, was formed at the request of the Director of the Budget in 1942. Its function is to advise the Office of Statistical Standards on methods of improving reporting procedures in order to reduce the costs and burdens and to increase the usefulness of government reports. It operates through an executive staff and a large number of sub-committees, conferences and panels, in close contact with staff members of the Office of Statistical Standards.

4. *The Labor Advisory Committee on Statistics.*

This committee, composed of representatives of the American Federation of Labor, the Congress of Industrial Organizations, and the Railroad Brotherhoods was established at the request of the Director of the Budget in 1945 to advise the Office of Statistical Standards on the interests of organized labour in federal statistical programmes.

5. *The Advisory Committee on Statistical Policy.*

This committee was established by the American Statistical Association in 1951, to advise the Office of Statistical Standards, and through it the federal statistical system, on broad matters of statistical policy. The committee is composed of seven past presidents of the American Statistical Association.

The Office of Statistical Standards also assists and co-operates with committees established for special purposes by other federal agencies, with business committees sponsored by business organizations, and with committees sponsored by professional statistical organizations.

Development of standards

As the central statistical co-ordinating agency, the Office of Statistical Standards takes the leadership in developing uniform standards for use by all agencies. Standard definitions, classifications, techniques and procedures are essential to reduce the areas of ambiguity and apparent conflict between statistical series of different agencies.

Among the standards which have been developed by the Office of Statistical Standards, in co-operation with the principal statistical agencies, are:

1. Standard Industrial Classification.
2. Standard Commodity Classification.
3. Standard Definitions of Metropolitan Areas.
4. Standard Definitions of Employment and Production Workers.
5. Standard Payroll-reporting Period.
6. Standards for the Design of Report Forms.
7. Standards for Statistical Surveys.
8. Standards for the Publication of Statistical Data.

The use of standard definitions and classifications by different agencies increases the comparability of the data. Application of the *Standard Industrial Classification*, for example, is a necessary first step before employment data for a particular industry obtained by one agency can be related to industrial production data for the same industry obtained by another agency. This classification system has also been adopted by a number of business firms and industrial organizations.

The *Standards for the Publication of Statistical Data* were issued in 1947, to reduce the areas of possible misunderstanding or misinterpretation of the Government's statistical data. Similarly, the *Standards for Statistical Surveys* were issued in March 1952 to serve as guides in the planning and conduct of statistical surveys by federal agencies or under government sponsorship by contracting organizations.

Recommendations on statistical budgets

The Bureau of the Budget is responsible for reviewing the annual appropriation requests of all agencies, and for recommending what funds should be included for each agency in the annual budget estimate which the President submits to the Congress. Formerly, statistical programmes were considered on an agency basis, and reviewed primarily in the context of that agency's programme. Beginning in 1949, the Office of Statistical Standards has prepared a consolidated budget in which the statistical system is reviewed as a whole and statistical programmes are reviewed by major subject fields rather than on agency lines.

This is a direct and important aid in accomplishing the objectives of a stronger, more economical and better balanced statistical system. It provides additional assurance that the separate but related statistical activities performed by many different agencies are fully co-ordinated to prevent duplication and unnecessary overlapping. It also provides a means for evaluating statistical activities in a given area in terms of relative usefulness and need, so that emphasis can be placed on those most necessary for a balanced and efficient statistical system for the federal Government as a whole.

Relations with international organizations and programmes

A central point within the federal Government is needed

to which intergovernment and international organizations can address inquiries or from which they can ask for assistance on statistical questions concerning many separate agencies. These functions are performed by the Office of Statistical Standards. It serves as liaison between the statistical agencies of the United States Government and the Statistical Office of the United Nations. It supplies United States data for regular and special United Nations publications. Under Executive Order 10033, it is responsible for clearance of requests from intergovernment organizations for statistical data from all United States Government agencies. The Office is designated as the *National Focal Point* for the United States by the Inter American Statistical Institute, and this facilitates the exchange of statistical information and publications between the United States and other countries in the western hemisphere.

As the statistical co-ordinating agency, the Office of Statistical Standards provides advice and assistance to the Department of State on statistical matters affecting foreign policy, and prepares and obtains agreement among the agencies concerned on statements of official policy on statistical questions in the international field. It also advises on co-ordination of statistical projects included in Point IV and other technical assistance programmes.

Members of the staff of the Office of Statistical Standards serve as members of various advisory bodies to international organizations. The Chief of the Office has been the United States representative on the United Nations Statistical Commission since it was first established, and is also a member of the United Nations Committee on Contributions. Other staff members have served on the United Nations Sub-Commission on Statistical Sampling, the UNESCO Committee of Statistical Experts, and the FAO Committee on Contributions. In addition, the services of particular staff members have frequently been requested by international organizations to assist in special projects, for example, the development of the Standard International Trade Classification; preparation of a manual for the collection of wholesale prices; and surveys of statistical organization, programmes and needs in the various countries.

General principles and practices

Adaptation of basic programmes to emergency needs

The basic federal statistical system should be capable of ready adaptation to meet special emergency needs for statistical information. Since the end of the Second World War the Office of Statistical Standards has placed emphasis on building a strong basic statistical system which could meet current needs for prompt and accurate economic measures, and at the same time, be capable of ready adaptation or expansion to meet any emergency.

Maximum utilization of the facilities, resources and special skills in the regular agencies to meet emergency needs is desirable for many reasons. Use of regular reporting channels makes it possible to collect the information needed at least cost to the Government and least burden to the public. It avoids the necessity for creating costly and duplicative statistical facilities in temporary emergency agencies. Furthermore, continuity in the collection and analysis of statistical data is essential to avoid inconsistencies and gaps in the periods covered.

The burdens imposed by emergency controls are very much reduced by maximum use of existing statistical programmes, but they cannot be altogether eliminated. The information needed in the administration of price and material allocations, for example, includes reporting and record-keeping requirements that are particularly burdensome and cannot be met by adaptation of any existing statistical programme.

Technical aids

A variety of technical aids has been developed to strengthen the efficiency of statistical operations. Among these tools, there are the standard classifications and definitions developed by the Office of Statistical Standards in co-operation with the agencies concerned. Many others, adapted to particular programmes, have been developed within the statistics-collecting agencies.

The Bureau of Employment Security in the Department of Labor has compiled a *Dictionary of Occupational Titles*, based on an extensive file of detailed job descriptions which it maintains, for use by all field offices of the employment service. The Bureau of the Census in the Department of Commerce publishes Schedule A and Schedule B, statistical classifications of the commodities imported into or exported from the United States, which have been developed in co-operation with business organizations and other agencies for use in compiling foreign trade statistics.

Other aids developed within the agencies include various kinds of manuals or guides to aid in particular statistical operations. The Census Bureau has published a comprehensive *Manual of Tabular Presentation* to aid its staff in making tabular materials easy to read and understand. The United States Tariff Commission has issued a manual, *Rules for Tabular Presentation*, to promote uniform presentation of the particular types of data with which the Tariff Commission deals.

Valuable technical material may be found in descriptions published by various agencies on methods used in constructing statistical series and the uses and limitations of the data. The Bureau of the Census includes evaluations of this kind in many of its current releases, as well as in the published results from the various censuses. It has also published a useful monograph, *A Chapter on Population Sampling*, on the application of sampling theory in the work of the Census Bureau. The Bureau of Labor Statistics has published a monograph of technical notes on all its major series, to inform users concerning methods used in preparing the series, *Techniques of Preparing Major BLS Statistical Series*. The Bureau of Agricultural Economics has issued a similar reference book, *Agriculture Estimating and Reporting Services of the United States Department of Agriculture*. Analytic and descriptive notes are usually issued at the time of major revisions of important series, and are often contained in annual statistical supplements or other special issues.

Other technical resources developed within the agencies include catalogues of respondents, master samples and specialized maps. To the extent practicable, these materials are made available to other agencies. Also, the services of technical experts in the Office of Statistical Standards and in the major statistical agencies are frequently made available to other agencies.

The National Bureau of Standards in the Department of Commerce operates a Mathematical Computation Laboratory and a Statistical Engineering Laboratory as part of its function as an advisory and service agency to the federal Government in the physical and mathematical sciences. These offices also supply services to other agencies, primarily in the fields of experimental design, sampling inspection, and process control, and inference from experimental data.

Special equipment

The larger recurring statistical collections of federal agencies are generally tabulated by mechanical means. Punch-card equipment is owned or rented by most agencies which undertake large surveys on a recurring basis.

The recent development of high-speed electronic computers is of great significance for certain types of statistical operations, as well as for mathematical and scientific applications.

Use of sampling

The use of modern methods of sampling has greatly improved the accuracy and speed of many federal surveys, and reduced their cost and the burden of response. Sampling is used, for example, to determine month-to-month changes in prices and employment, to forecast conditions of crops and yield, and to estimate household budgets and savings. It is also used to determine the number of inhabitants in an area and their characteristics, or the number of farms in an area, or the number that have particular characteristics.

Protection of individual returns

In general, all individual statistical returns to federal agencies are confidential. Respondents are thus protected against the disclosure of their affairs to taxing and regulatory authorities or to their competitors. Data from returns collected on a confidential basis are published only in statistical totals or summaries and are withheld if the number of firms reporting is so small that the summary might identify an individual respondent.

In some cases, a federal agency has need for, and the power to collect, the same data on individual establishments that have already been collected by some other agency on a confidential basis. In order to prevent duplicate collection of statistics, the Federal Reports Act specifies conditions in which confidential data from individual establishments may be made available to another agency, with proper safeguards of their confidential status. Protection of individual returns has been so complete that little reluctance is encountered on this score from business firms asked to supply information on their operations.

Federal and state statistics

In many countries the statistical programmes of the territorial or political sub-divisions are directed to some degree by the national government, and national statistics in some cases are obtained by summarizing those of the sub-divisions. In the United States there is no such direct relationship between the federal and state governments. Generally speaking, the states are independent of the national Government in determining and carrying out their statistical programmes. The development of state and municipal statistics has been very uneven: some states and municipalities have fairly comprehensive statistical programmes, while others collect and publish very little statistical information.

An important factor in the growth of statistical responsibilities at the national level has been the shift of many economic interests and problems from local to nation-wide scope. This shift is probably a natural consequence of the national economic development due to the size of the country and the free trade within it; of the fact that many industries operate on a national or interstate basis; and of the interdependence of one region with another.

Although federal and state statistics are generally independent, certain exceptions might be noted. The national reports of vital statistics, for instance, are based on reports from the states. Similarly, there is a joint federal-state programme for collecting monthly information on employment, hours and earnings in non-agricultural establishments. The federal regulatory commissions and bank regulatory agencies have worked closely with state authorities to establish consistency in the reports required by the respective federal and state authorities.

Some important state and local data are obtained by the federal Government in connexion with various programmes administered by the states but financed in part by federal funds. Federal participation in financing such traditionally state-local programmes as public health, welfare and education has resulted in the accumulation of a substantial body of state and local economic, social and financial statistics. Federal interest in some characteristics of all state and local programmes financed in part by the federal Government has tended to make more nearly uniform the types of data states and localities collect on these programmes for their own purposes and transmit to the federal Government.

Government use and support of private statistics

Current statistics in several important fields are collected and published by a number of private publishing organizations and business and financial services. Some of these data are used by federal agencies. In addition, bureaux of business research in some universities sponsor the collection of economic statistics, usually on subjects of special interest to the geographical region in which the university is located.

Statistical information is also collected by many of the trade associations – organizations of producers or manufacturers of a particular product, or of distributors with common interests. Most frequently these statistics are collected from and for the benefit of the members of the association and thus do not include the production or sales of non-members. The figures are not made regularly available to the public. On the other hand, there are a score or more of trade associations whose figures are complete, accurate, timely and generally available, and are used by all persons interested, including government agencies.

There are some instances in which federal agencies sponsor research or statistical projects undertaken by private organizations, on a contract basis. The Department of Agriculture, for example, has contracts with a

number of universities and private survey organizations for a variety of studies on marketing methods, under the provisions of the Research and Marketing Act of 1946. The Department of Defense, including the Army, Navy and Air Force, has numerous contracts for research projects with private organizations; most of these are in technical and scientific fields, but some relate to research in economics and the social sciences. The National Institutes of Health of the Public Health Service administer a programme of research grants to qualified persons, and to public or private institutions, in the general area of medical and health activities. Under the contract research programme provided for in the Housing Act of 1949, the Housing and Home Finance Agency has sponsored economic, financial, urban and technological studies by universities and other non-profit organizations.

A number of other federal agencies have special surveys conducted from time to time by non-federal survey or research organizations, private as well as public and quasi-public. Mention should also be made of the statistical laboratories at Iowa State College and the University of North Carolina, which receive federal funds for the development of statistical methodology and procedures.

Availability of government statistics

Statistics collected by federal agencies are made readily available to persons interested in them. In most cases the statistics are released promptly. Many agencies regularly mail releases on particular subjects to lists of individuals or firms who have requested information on the subject. Press releases are given to newspapers and to more specialized publications, such as trade or farm journals.

For most statistical surveys, preliminary bulletins are issued which present as soon as possible partial or incomplete tabulations of the data, before the completely edited summaries are ready for release. Final results of many periodic surveys are printed regularly in monthly or quarterly publications of the agency or in special reports, and are later summarized in yearbooks. For large activities, such as censuses, the final results are generally released both in complete volumes and in separate leaflets dealing with one phase or one locality.

In general, statistical material which is issued in the form of press releases, preliminary bulletins and the like is distributed by the agency free of charge. Final results published in the form of bound volumes, as well as most of the monthly, quarterly and annual publications of statistical agencies, and many printed leaflets, pamphlets and similar documents are printed and sold by the Government Printing Office at nominal prices.

Agencies which publish a considerable amount of statistical material issue catalogues of all the material available, usually classified by subject and with instructions for ordering. Catalogues or listings of publications and releases are issued by the Department of Agriculture, the Bureau of the Census, the Bureau of Labor Statistics, and the Bureau of Mines.

Statistical responsibilities of United States federal agencies

Major responsibilities of executive departments and independent establishments for collection or analysis of statistical data

EXECUTIVE OFFICE OF THE PRESIDENT

Bureau of the Budget

Office of Statistical Standards
Co-ordination and improvement of federal statistical services.

Office of Budget Review
Preparation of the Budget of the United States; preparation and analysis of federal budgetary and fiscal data.

Council of Economic Advisers
Analysis and interpretation of economic data and appraisal of federal activities bearing on the national economy.

National Security Resources Board
Analysis of data pertaining to availability and requirements for natural, material, production and manpower resources from the standpoint of planning for national security

DEPARTMENT OF AGRICULTURE

Bureau of Agricultural Economics
Statistics on crop and live-stock production and inventories; crop forecasts; food processing and consumption; farm population, labour and wages; farm management; farm ownership, taxation and finance; land values and transfers; prices farmers pay and receive; farm income.

Agricultural Research Administration

Bureau of Human Nutrition and Home Economics
Income and expenditures of rural families; food consumption.

Farm Credit Administration
Data on farm lending agencies and activities under the FCA; statistics on loans; statistics on farmers' co-operatives.

Forest Service
Extent, growth and drain of timber resources; stumpage, log and lumber prices; lumber distribution and consumption; administrative statistics on national forests, forest fires, etc.

Office of Foreign Agricultural Relations
Foreign agricultural statistics, including production, stocks and utilization, international trade and prices.

Production and Marketing Administration
Market information on the supply, demand, movement, quality and prices for major agricultural commodities in the principal markets and producing areas. Commodities reported include live-stock, meats, wool, fresh fruits and vegetables, dairy and poultry products, grain, hay, feed, cotton, cottonseed, tobacco, rice, honey, blackstrap molasses, naval stores, and others.

(More specialized administrative or operating statistics are collected by other units within the Department of Agriculture, such as the Bureaux of Animal Industry and Dairy Industry in the Agricultural Research Administration, Federal Crop Insurance Corporation, Farmers Home Administration, Rural Electrification Administration, and Soil Conservation Service.)

DEPARTMENT OF COMMERCE

Bureau of the Census
Censuses of population, housing, agriculture, irrigation, drainage, manufactures, business, transportation, mineral industries and governments. Current statistics on population and the labour force; manufacturing activities and commodity production; cotton ginning; retail and wholesale trade; foreign trade; and state and local government finances and employment.

Bureau of Public Roads
Statistics derived from reports from state highway agencies on construction, finances and administration of highways; traffic characteristics with respect to volumes, weights and types; motor vehicle registrations

Civil Aeronautics Administration
Statistics on characteristics and utilization of airports, airways and air navigation facilities; distribution and utilization of registered aircraft; certificated airmen and airmen schools; inspection and maintenance activities; violations of Civil Air Regulations.

Maritime Administration
Ship statistics on world merchant fleets; employment and wages in U.S. maritime industry; ship utilization and performance; cargoes carried in U.S. foreign trade.

National Bureau of Standards
Research in statistical methods (primarily in physical sciences) by Mathematical Computation and Statistical Engineering Laboratories.

National Production Authority
Statistics on supply and requirements of manufactured products, primarily metals, for use in administering the Controlled Materials Plan and other emergency production controls; estimates of private non-residential construction.

Office of Business Economics
Estimates of national income, gross national product and related series; analyses of consumer income and expenditure data; foreign transactions of the U.S.; foreign investments and balance of international payments.

Office of Industry and Commerce
Analysis of area potentials for industrial development and relocation of plants; records of trade association activities.

Office of International Trade
Analyses of data compiled by Census Bureau on U.S. foreign trade, and of trade and production of other countries.

Weather Bureau
Complete weather records; weekly summary of weather and crop conditions.

DEPARTMENT OF DEFENSE

Army Corps of Engineers
Information on characteristics of vessels using U.S. channels, waterways and ports, and weight and type of commodities carried.

DEPARTMENT OF THE INTERIOR

Bureau of Mines

Statistics on production, consumption and stocks of minerals and mineral products, including mineral fuels; and statistics on employment and injuries in mineral industries.

Bureau of Reclamation

Reports on irrigation systems, status of irrigable lands and related data on construction and operation of irrigation products.

Fish and Wildlife Service

Statistics on production, storage, transportation and prices of fishery products; fish landings; data on fish and wildlife resources.

DEPARTMENT OF JUSTICE

Bureau of Prisons

Federal prison and disciplining reports, criminal docket reports; reports on prisoners in state and federal penitentiaries and reformatories.

Federal Bureau of Investigation

Reports on crimes known to police; age and sex of persons fingerprinted.

Immigration and Naturalization Service

Alien registration and immigration statistics; applications for and certificates of naturalization.

DEPARTMENT OF LABOR

Bureau of Employees' Compensation

Administrative reports of injuries covered by federal and District of Columbia workmen's compensation laws

Bureau of Employment Security

Current statistics relating to the federal-state employment security programme, including reports on local public employment office placement, unemployment insurance claimstaking and related operations; labour market manpower analyses; state and area agricultural labour market data; selected industry and occupations studies; employment and wages covered by unemployment insurance; contributions and benefit payments, and disqualifications and appeals.

Bureau of Labor Statistics

Current statistics on employment, earnings, man-hours, labour turnover, labour conditions in foreign countries, industrial accidents, work stoppages, wage rates; collective bargaining agreements; industrial productivity; occupational outlook studies; housing construction, publicly financed non-residential construction; wholesale prices; retail prices and consumers' price indexes, family income and expenditures; and distribution of incomes.

Wage and Hour and Public Contracts Divisions

Statistics derived from applications and other administrative forms used in administration of wage, hour and child labour legislation.

Women's Bureau

Studies of employment trends and opportunities, working conditions, and other significant economic changes relating to women workers.

DEPARTMENT OF STATE

Division of Foreign Reporting

Co-ordination of economic reporting demands on Foreign Service posts.

DEPARTMENT OF THE TREASURY

Statistics on receipts, expenditures, public debt, and other aspects of federal government finance; monetary statistics.

Comptroller of the Currency

Condition, operations and supervision of national banks.

Bureau of Internal Revenue

Financial statistics on businesses and individuals, based on income tax returns; miscellaneous production and other statistics related to taxed commodities.

Bureau of the Mint

Domestic production and consumption of gold and silver; foreign monetary statistics.

Office of International Finance

International capital movements.

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

Statistics on money and banking, covering especially Federal Reserve Banks and "member banks" of the Federal Reserve System; indexes of industrial production; consumer credit and finances; department store activities.

CIVIL AERONAUTICS BOARD

Financial and operating statistics on U.S. air carriers; accident reports involving aircraft.

FEDERAL COMMUNICATIONS COMMISSION

Financial and operating statistics on the telephone, telegraph, and radio and television broadcasting industries.

FEDERAL DEPOSIT INSURANCE CORPORATION

Statistics on insured banks, on all banks in the United States, and on deposit insurance.

FEDERAL POWER COMMISSION

Financial and operating statistics on the electric utility and natural gas industries; statistical reports on industrial power generation and capacity.

FEDERAL SECURITY AGENCY

Office of Education

Basic statistics on city and state school systems, institutions of higher education, special schools, public and school libraries; public school employment; financial data.

Office of Vocational Rehabilitation

Financial and administrative statistics from state agencies on operation of federal-aid programmes for vocational rehabilitation.

Public Health Service (including National Office of Vital Statistics)

Statistics on births, deaths, marriages and divorces; life tables; morbidity reports; medical, dental and hospital statistics; inspection reports; financial and administrative statistics from state agencies on federal-aid health programmes and on hospital construction.

Social Security Administration

Collection and analysis of data on covered workers, beneficiaries and benefits under old-age and survivors insurance, recipients and payments under public assistance, child health and welfare services, and operations of federal credit unions; compilation and analysis of data on social security financing, private health and welfare plans, and over-all data on all social security and related programmes.

FEDERAL TRADE COMMISSION

Administrative reports from export associations; financial statement data from non-listed companies; occasional special studies.

HOUSING AND HOME FINANCE AGENCY

Office of the Administrator

General statistics on housing; housing research programme.

Federal Housing Administration

Operating statistics on mortgage insurance operations under the National Housing Act.

Home Loan Bank Board

Statistics on non-farm mortgage finance, including financial reports of Federal Home Loan Banks and Federal Savings and Loan Insurance Corporation; savings and loan associations; mortgage debt, recordings and foreclosures

Public Housing Administration

Operating statistics on public housing.

INTERSTATE COMMERCE COMMISSION

Financial and operating statistics on steam and electric railroads, pipelines, interstate water transportation, freight forwarders, and certain classes of contract and common carrier highway transportation

MUTUAL SECURITY AGENCY

Collection and analysis of basic economic data pertaining to countries participating in the Mutual Security Program, and of data on operations of this programme

NATIONAL SCIENCE FOUNDATION

Statistical information on scientific research and development, availability and utilization of scientific manpower, and the exchange of scientific information.

RAILROAD RETIREMENT BOARD

Applications, claims and payroll reports for railroad retirement benefits, unemployment compensation and sickness insurance.

RECONSTRUCTION FINANCE CORPORATION

Statistics derived from applications and other administrative forms used in connexion with loans

SECURITIES AND EXCHANGE COMMISSION

Application, registration and administrative reports under the securities and public utility holding company legislation, including financial statements of companies with securities listed on national securities exchanges.

SELECTIVE SERVICE SYSTEM

Statistics on the registration, classification, deferment, selection, examination and induction of men aged 18 and over liable for service under the Universal Military Training and Service Act

TENNESSEE VALLEY AUTHORITY

Financial and operating reports on projects subject to TVA, and from municipalities purchasing TVA power; wage rates and other economic data in TVA areas.

U.S. CIVIL SERVICE COMMISSION

Federal executive employment and turnover data, and other federal personnel statistics.

U.S. TARIFF COMMISSION

Statistics on quantity of production and quantity and value of sales of synthetic organic chemicals; studies of production costs in specific industries.

VETERANS ADMINISTRATION

Operating reports on veterans' benefits, including pensions, life insurance, medical care, loans, etc.

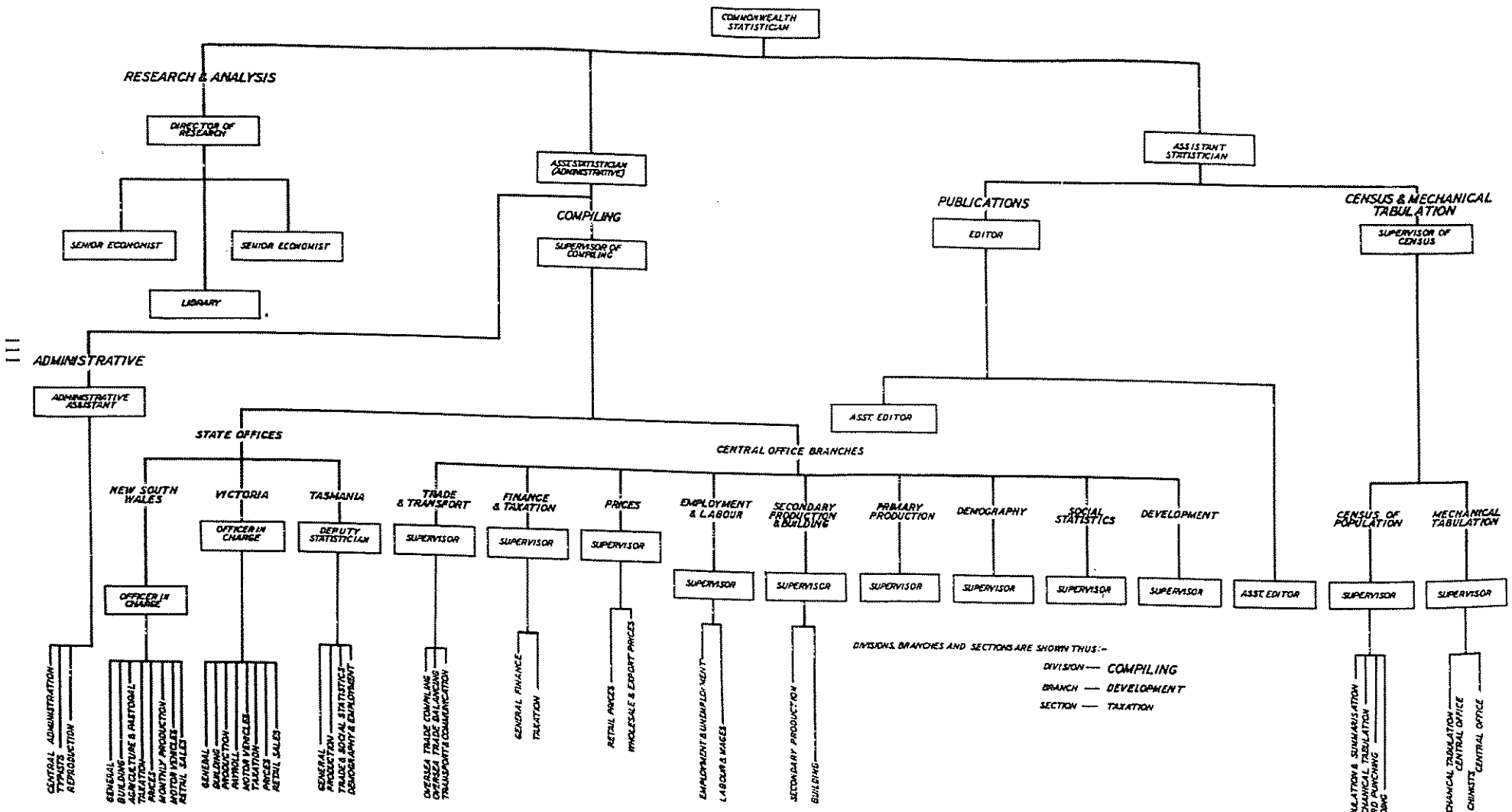
APPENDIX B

CHARTS SHOWING THE ORGANIZATION OF TYPICAL NATIONAL STATISTICAL SYSTEMS AND STATISTICAL OFFICES

* chapter in Appendix A

AUSTRALIA

ORGANIZATION CHART OF THE BUREAU OF CENSUS AND STATISTICS



SOURCE: BUREAU OF CENSUS AND STATISTICS, FEBRUARY 1951

BRAZIL

STRUCTURAL SCHEME OF THE BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS

FEDERATIVE ORGANIZATION DIRECTLY UNDER THE PRESIDENCY OF THE REPUBLIC

GEOGRAPHICAL SERVICES SYSTEM

I – National Council of Geography (General coordination and leadership)—Created by Decree No. 1,527, of March 24, 1937, and regulated by resolution No. 31, of July of the same year, of the General Assembly of the N.C.S.

- **A — ADMINISTRATIVE BODY — General Secretariat of the Council**
- **B — Deliberative bodies**
  - General Assembly..... (The members of the Central Governing Body, representing the Federal Union, the presidents of the Regional Governing Bodies, representing the Federated Units and two representatives of the integrated private organizations.) — Meetings are held in an annual session, inaugurated on July 1, in a combined assembly with the G.A. of the N.C.S., under the chairmanship of the president of the Institute.
  - Central Governing Body..... (The president of the Institute, the Director of the Service of Geography and Physiographic Statistics, as secretary-general of the Council, a technical delegate of each Ministry, a special representative of the Ministry of Education and Health, on behalf of the official institutions for the teaching of Geography, a special representative of the Ministry of Foreign Affairs, as the Council's agent for international relations, a representative of the Government of the Federal District and a representative of the N. C. S.)
  - Regional Governing Bodies.. In the States and the Acre Territory. (Of variable composition but keeping up the possible similarity with the Central Governing Body.)
- **C—Advisory-consultative bodies**
  - Technical Committees..... 4 "Permanent Technical Committees" (Land surveys, Cartography, Physiography, Human Geography); as many "Special Committees" as may be necessary.
  - Staff of Technical Advisers.. National advisory staff interlocked with the Central Governing Body (40 members elected by the G.A. of the Council); 21 Regional Advisory staffs interlocked with the respective Regional Governing Bodies (5 to 20 members each, elected by the Central Governing Body; 2-years term of office.

II — Operative scope (Federative co-operation)

- **A — Federal organization**
  - Central Executive Body.... SERVICE OF GEOGRAPHY AND PHYSIOGRAPHIC STATISTICS (Created by Decree-law No. 1,350, of July 20,1939.)
  - Cooperative Agencies
    - Ministry of Agriculture: NATIONAL DEPARTMENT OF MINERAL PRODUCTION { Geology and Mineralogy Division; Water Division; Mineral Production Fostering Division }; NATIONAL DEPARTMENT OF VEGETABLE PRODUCTION: Land and colonisation Division; NATIONAL DEPARTMENT OF ANIMAL PRODUCTION: Fish and Game Division; NATIONAL CENTER FOR THE AGRONOMICAL TEACHING AND RESEARCH: Agricultural and Ecological Institute; FOREST SERVICE; METEOROLOGICAL SERVICE
    - Ministry of Traffic and Public Works: FEDERAL INSPECTORATE OF DROUGHTS WORK; FEDERAL RAILWAYS INSPECTORATE; NATIONAL HIGHWAYS DEPARTMENT; POST AND TELEGRAPH DEPARTMENT; NATIONAL DEPARTMENT OF PORTS AND NAVIGATION
    - Ministry of Labour: NATIONAL DEPARTMENT OF IMMIGRATION
    - Ministry of Education and Health: NATIONAL MUSEUM; NATIONAL OBSERVATORY
    - Ministry of Finances: STATE PROPERTY DIRECTORATE
    - Ministry of Foreign Affairs: FRONTIERS DIVISION
    - Ministry of Justice: NATIONAL ARCHIVES
    - Ministries of War and Navy: GEOGRAPHICAL AND HISTORICAL SERVICE OF THE ARMY — MARINE BOARD (Conditioned cooperation)
- **B — Regional organization**
  - Public Offices and Institutes operating as central geographical bodies: ACRE TERRITORY :Department of Geography and Statistics. — AMAZONAS: General Secretariat of State. — PARA: Directorate of Public Works, Land and Traffic.—MARANHÃO: Directorate of Public Works. — PIAUI: State Department of Statistics. — CEARA: Directorate of Traffic and Public Works. — RIO GRANDE DO NORTE: General Secretariat of State. — PARAIBA: Secretariat of Agriculture. PERNAMBUCO: State Department of Statistics. — ALAGOAS: Directorate of Traffic and Public Works.—SERGIPE: State Department of Statistics. — BAIA: Directorate of Geographical and Meteorological Services. — ESPIRITO SANTO: Geographical, Geological and Hydrographical Institute. — RIO DE JANEIRO: Engineering Department.—FEDERAL DISTRICT: Department of Geography and Statistics. — SÃO PAULO: Geographical and Geological Institute. — PARANA: Land and Colonization Department. — SANTA CATARINA: Land and Colonisation Directorate. — RIO GRANDE DO SUL: General Secretariat of Agriculture. — MATO GROSSO: Land and Public Works Bureau. — GOIAZ: Department of Propaganda and Economic Information. — MINAS GERAIS: Geographical Department.
- **C — Local organisations** ..... Municipal Governing Bodies, Staff of Reporting Agents and Municipal Services with geographical activities.

STATISTICAL SERVICES SYSTEM

I – National Council of Statistics (General coordination and leadership) — Created by Decree No. 24,609, of July 6, 1936, and regulated by Decree No.1,200, of November 17 of the same year.

- **A — ADMINISTRATIVE BODY - General Secretariat of the Council and of the Institute**
- **B — Deliberative bodies**
  - General Assembly..... (The members of the Central Executive Board, representing the Federal Union, and the presidents of the Regional Executive Boards, representing the Federated Units.) — Meetings are ordinarily held in an annual session inaugurated on July 1, in a combined assembly with the G.A. of the N.C.G., under the chairmanship of the president of the Institute.
  - Central Executive Board..... (The president of the Institute, the directors of the 5 Central Offices of Statistics, representing the respective Ministries, and representatives appointed by the Ministries of Traffic and Public Works, Foreign Affairs, War and Navy.) — Meetings are ordinarily held on the first working day of each fortnight.
  - Regional Executive Boards.... In the Federal District, in the States and the Acre Territory. (Of variable composition but keeping up the possible similarity with the Central Executive Board.)
- **C—Advisory-consultative bodies**
  - Technical Committees..... 9 "Permanent Committees" (Physiographic Statistics, Demographic Statistics, Production Statistics, Circulation, Distribution and Consumption Statistics, Social Welfare Statistics, Social Assistance and Insurance Statistics, Statistics of Education, Cultural Statistics and Administrative and Political Statistics); as many "Special Committees" as necessary.
  - Staff of Technical Advisers.. 36 members in charge of 29 sections and 7 representations. Election by General Assembly; 4-years term of office.

II — Operative scope (Federative co-operation)

- **A — Federal organization**
  - Central Offices of General Statistics:
    - SERVICE OF DEMOGRAPHIC, MORAL AND POLITICAL STATISTICS — Ministry of Justice and Internal Affairs.
    - SERVICE OF ECONOMIC AND FINANCIAL STATISTICS — Ministry of Finances.
    - SERVICE OF PRODUCTION STATISTICS — Ministry of Agriculture.
    - SERVICE OF SOCIAL INSURANCE AND LABOUR STATISTICS — Ministry of Labour, Industry and Commerce.
    - SERVICE OF EDUCATION AND HEALTH STATISTICS — Ministry of Education and Health.
    - SERVICE OF GEOGRAPHY AND PHYSIOGRAPHIC STATISTICS — Ministry of Traffic and Public Works. (Provisionally under the presidency of the Institute.)
  - Cooperative Agencies..... Services and Sections of specialised statistics in various administrative departments.
- **B — Regional organization**
  - Central Offices of General Statistics..... ACRE TERRITORY: Department of Geography and Statistics. — AMAZONAS: State Department of Statistics. — PARA: State Department of Statistics. — MARANHÃO: State Department of Statistics. — PIAUI: State Department of Statistics. — CEARA: State Department of Statistics. — RIO GRANDE DO NORTE: State Department of Statistics. — PARAIBA: State Department of Statistics. — PERNAMBUCO: State Department of Statistics. — ALAGOAS: State Department of Statistics. — SERGIPE: State Department of Statistics. — BAIA: State Department of Statistics. — ESPIRITO SANTO: State Department of Statistics. — RIO DE JANEIRO: State Department of Statistics. — FEDERAL DISTRICT: Department of Geography and Statistics — SÃO PAULO: State Department of Statistics. — PARANA: State Department of Statistics. — SANTA CATARINA: State Department of Statistics. — RIO GRANDE DO SUL: State Department of Statistics. — MATO GROSSO: State Department of Statistics. — GOIAZ: State Department of Statistics. — MINAS GERAIS: State Department of Statistics.
  - Cooperative Agencies..... Services and Sections of specialised statistics in various administrative departments.
- **C — Local organization**..... Municipal Statistical Agencies.

CENSUS SERVICES SYSTEM

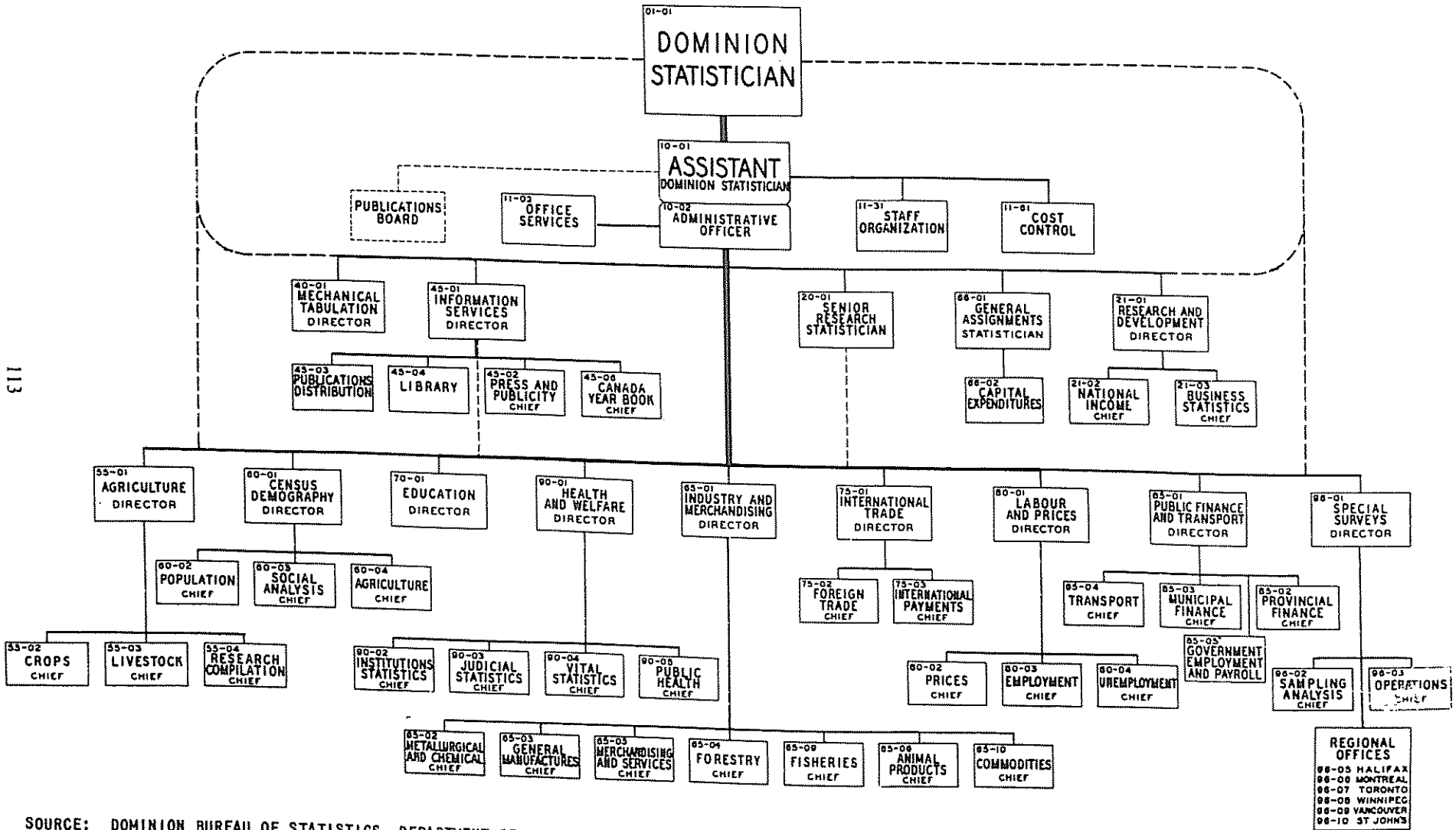
This third national system of organs of research also forms an integral part of the structure of the Institute, likewise purporting to bring to light the real conditions of Brazil. Its mission, however, is to take the decennial GENERAL CENSUS OF THE REPUBLIC (every year ending in 0), comprehending its demographic, economic and social aspects. Consequently this third branch of the Institute convenes every year ending in 8 to function for a period of 5 years. It is controlled by the NATIONAL CENSUS COMMISSION, with the assistance of similar regional and municipal bodies, and has for its executive organs (which constitute the NATIONAL CENSUS SERVICE) the CENTRAL CONTROL — split into four administrative, technical, publicity and co-ordinating divisions—; the REGIONAL DELEGACIES (one in each Unit of the Federation); the SECTIONAL DELEGACIES (as many as necessary) and the MUNICIPAL DELEGACIES (one in each municipality).

NOTE — All the executive bodies of the permanent branches of the institute are endowed with specialized libraries covering their respective fields. The majority is equipped with suitable photo-cartographic equipment. Some have their own printing shops. Annexed to the General Secretariat of the Institute the following function as central organizations: — a Library, a Mechanical Testing Service and a Printing Plant.

SOURCE: "STATUTE, BASIC PRINCIPLES AND SOCIAL LEADERSHIP OF THE BRAZILIAN STATISTICAL SYSTEM", BRAZILIAN INSTITUTE OF GEOGRAPHY AND STATISTICS, RIO DE JANEIRO, 1940.

CANADA

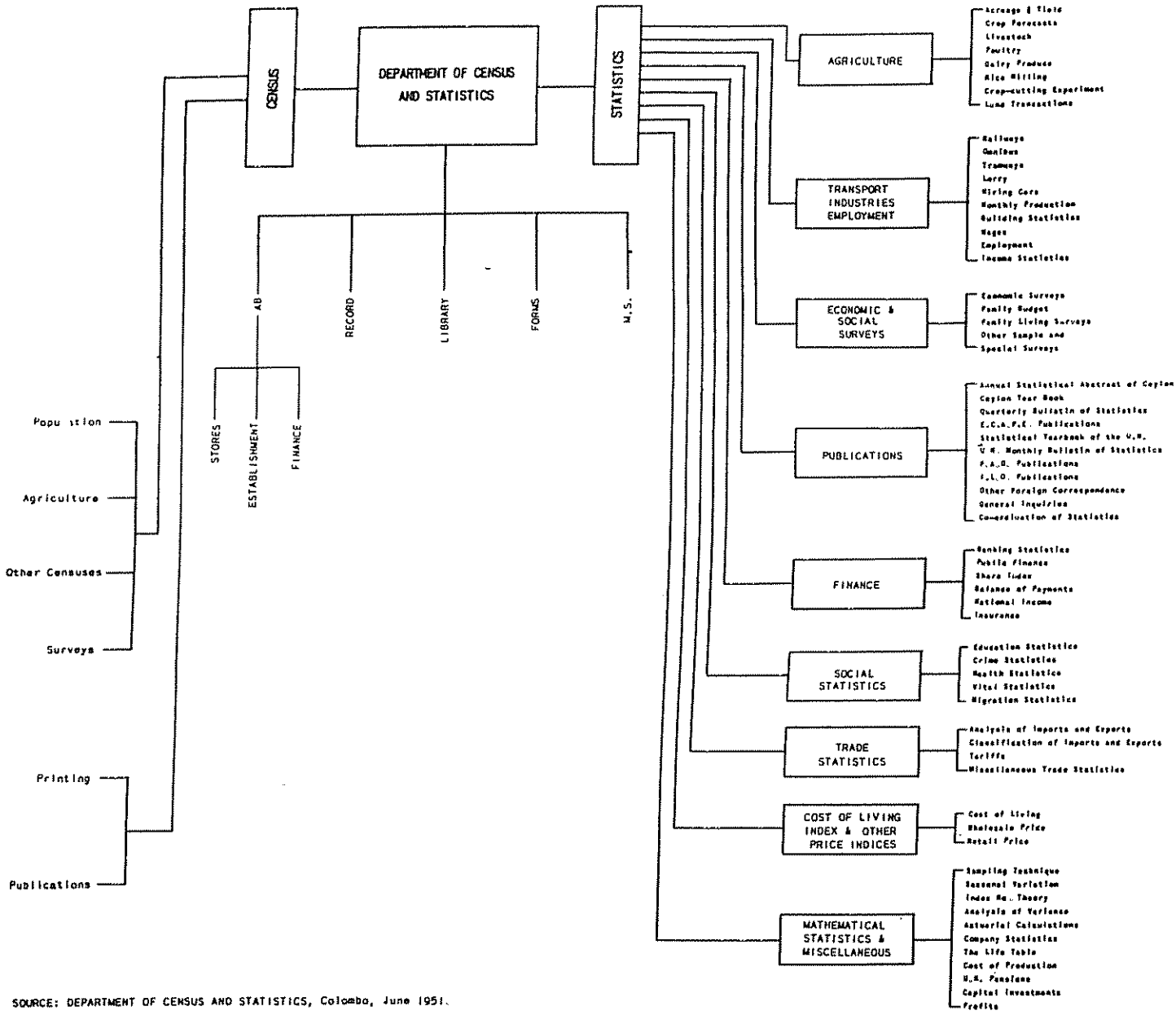
ORGANIZATION CHART OF THE DOMINION BUREAU OF STATISTICS



SOURCE: DOMINION BUREAU OF STATISTICS, DEPARTMENT OF TRADE AND COMMERCE, APRIL 1, 1952.

CEYLON

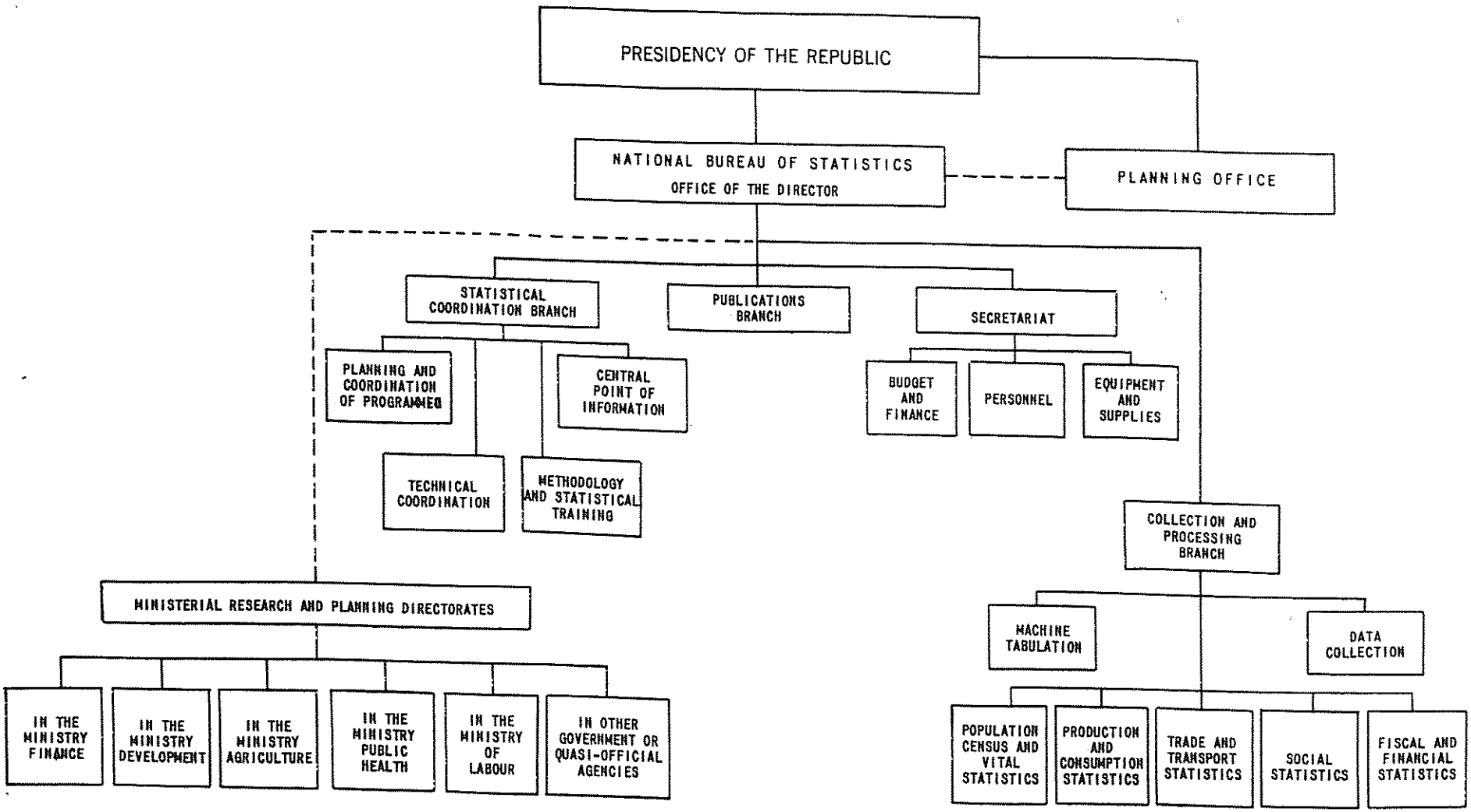
ORGANIZATION CHART OF THE DEPARTMENT OF CENSUS AND STATISTICS



SOURCE: DEPARTMENT OF CENSUS AND STATISTICS, Colombo, June 1951.

COLOMBIA

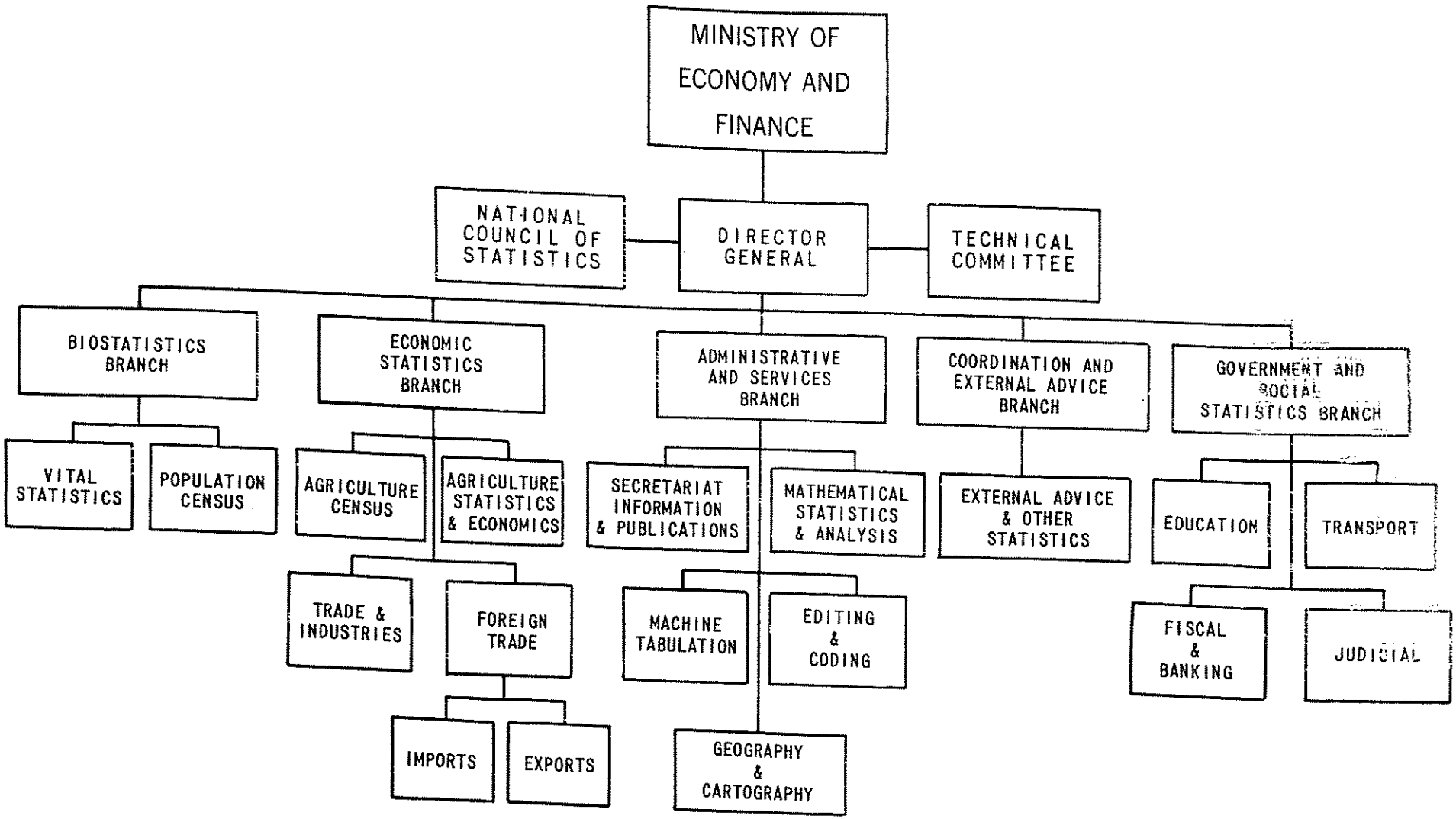
ORGANIZATION CHART OF THE NATIONAL STATISTICAL SYSTEM



SOURCE: UNITED NATIONS STATISTICAL MISSION TO COLOMBIA, 1951.

COSTA RICA

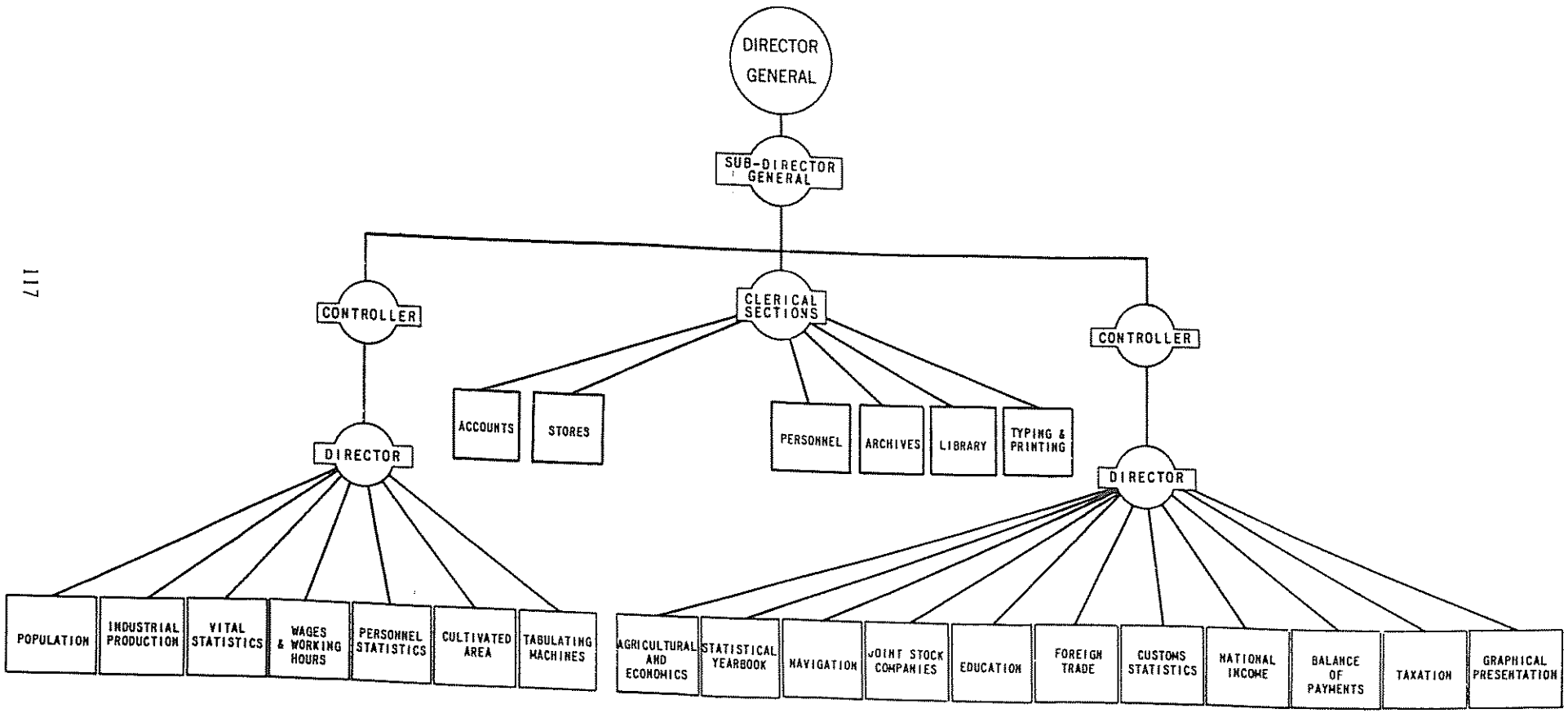
ORGANIZATION CHART OF THE GENERAL BUREAU OF STATISTICS AND CENSUS



SOURCE: DIRECCION GENERAL DE ESTADISTICA Y CENSOS, MINISTERIO DE ECONOMIA Y HACIENDA. SAN JOSE, MAYO DE 1951.

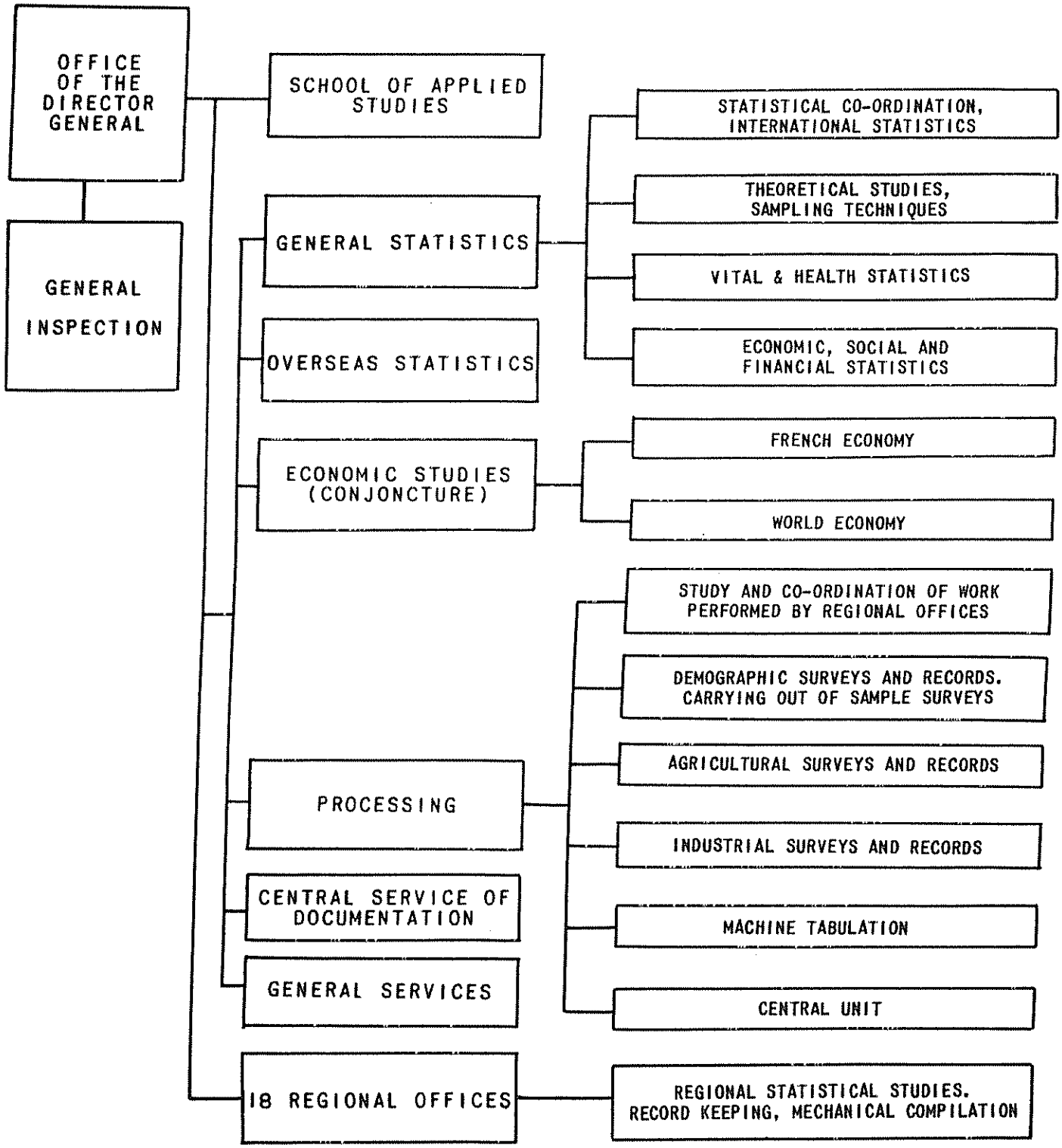
EGYPT

ORGANIZATION CHART OF THE STATISTICAL DEPARTMENT



SOURCE: STATISTICAL DEPARTMENT, MINISTRY OF FINANCE AND ECONOMY, 1951

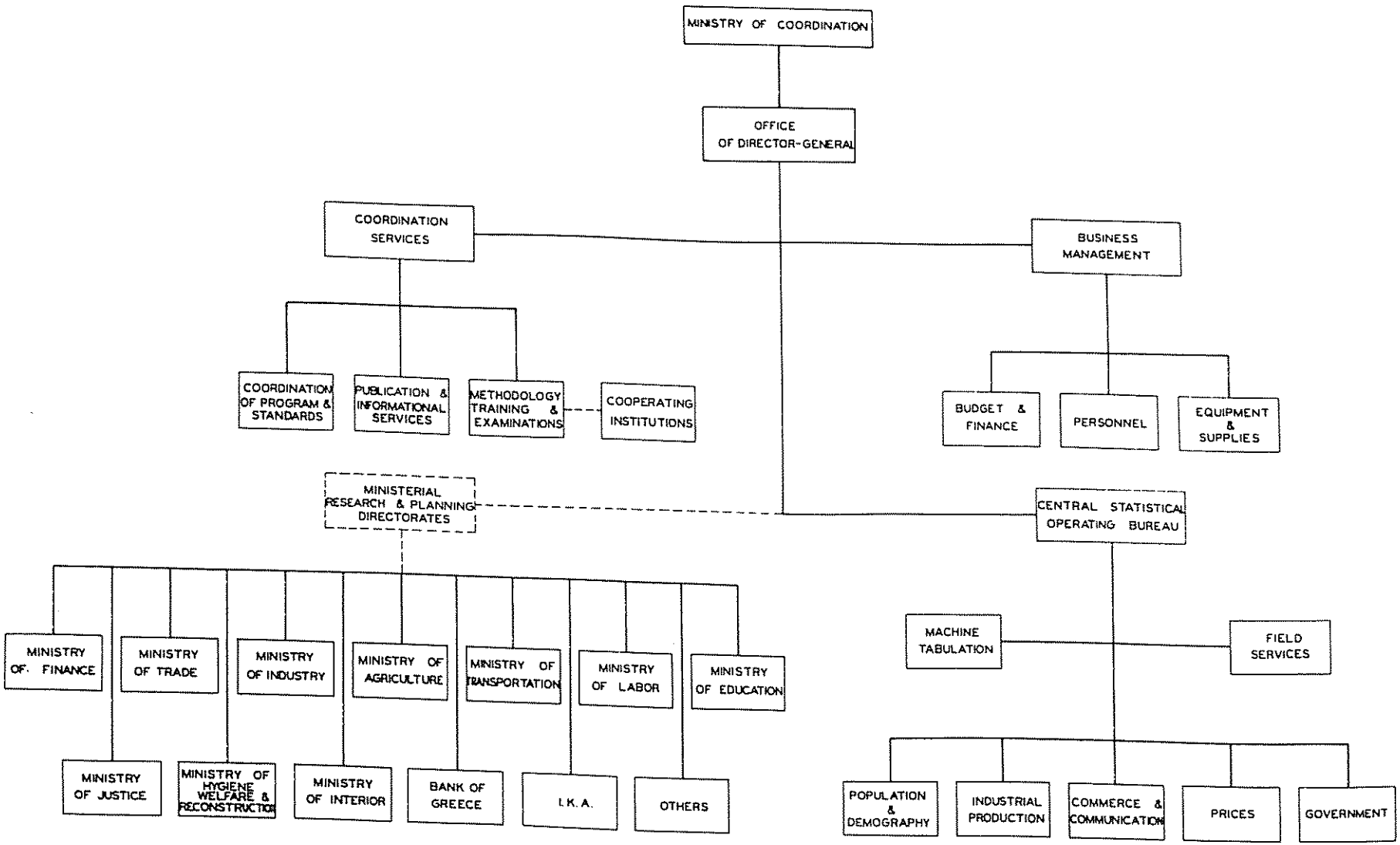
ORGANIZATION CHART OF THE NATIONAL INSTITUTE OF STATISTICS AND ECONOMIC STUDIES



SOURCE: L'INSTITUT NATIONAL DE LA STATISTIQUE ET DES ETUDES ECONOMIQUES POUR LA METROPOLE ET LA FRANCE D'OUTRE-MER. PARIS. JUIN 1951.

GREECE

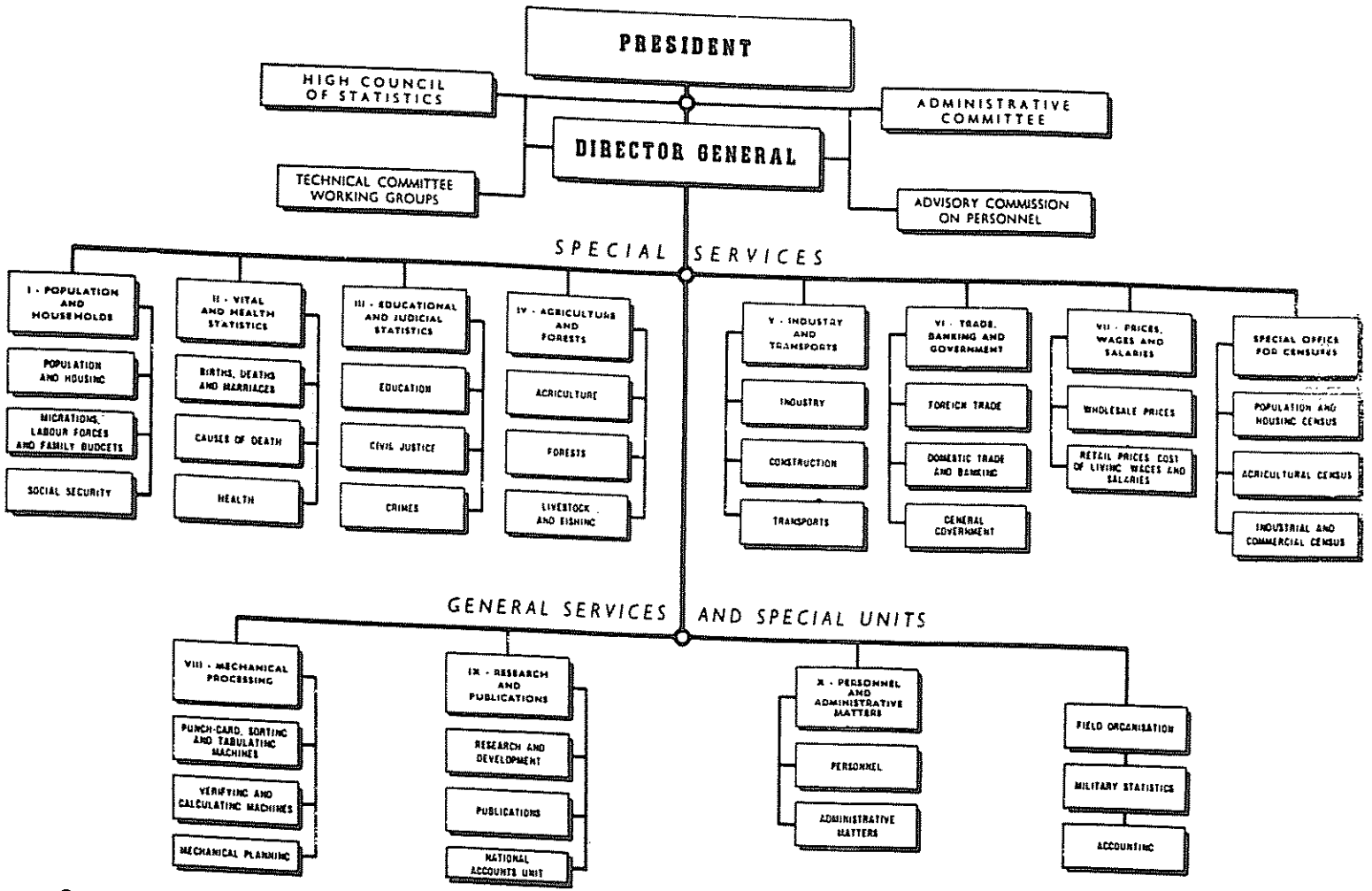
ORGANIZATION CHART OF THE STATISTICAL SERVICES



SOURCE: UNITED NATIONS STATISTICAL MISSION TO GREECE, 1952

ITALY

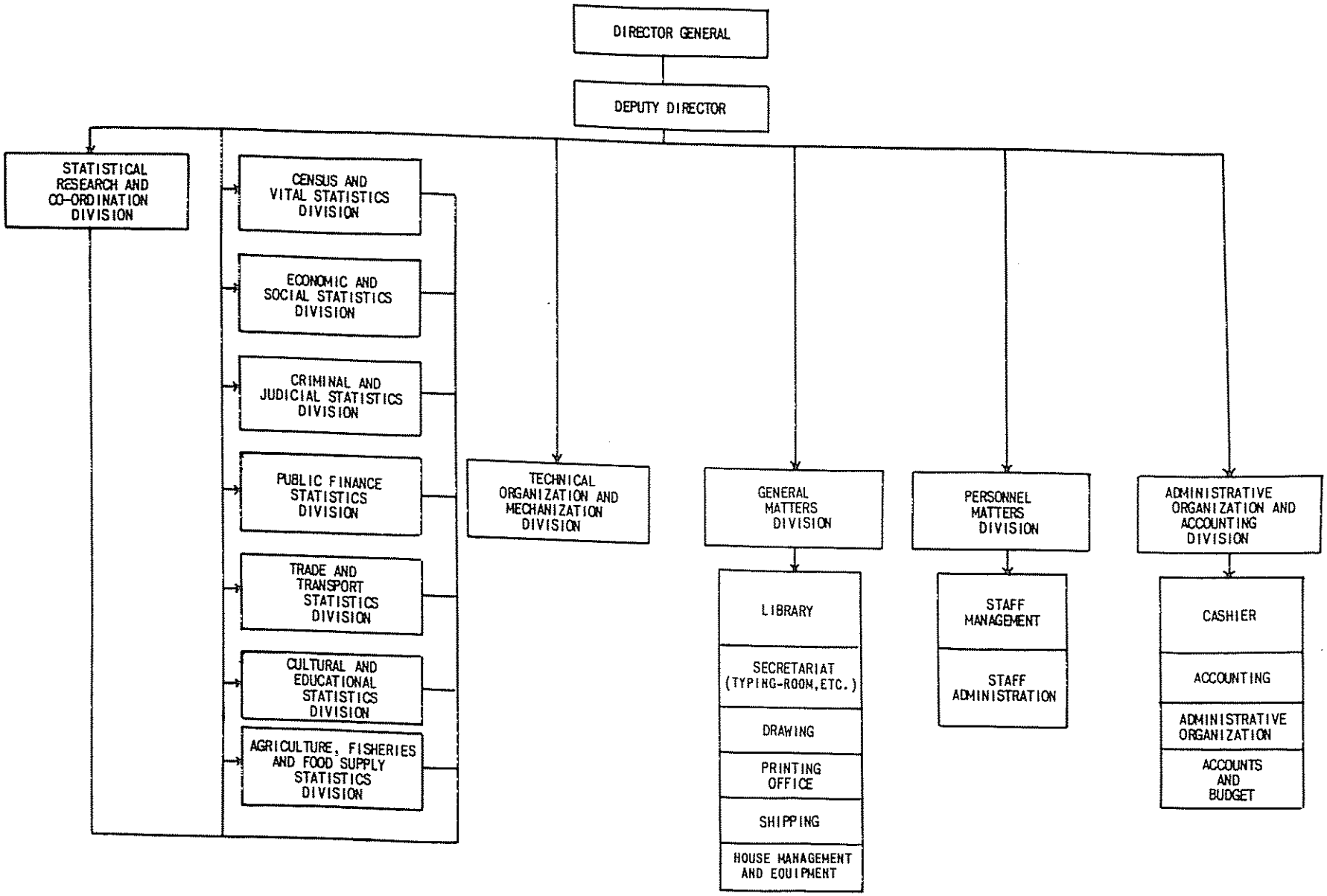
ORGANIZATION CHART OF THE CENTRAL INSTITUTE OF STATISTICS



Source: Italian Statistical System, Central Institute of Statistics, Rome, Italy, 1953

NETHERLANDS

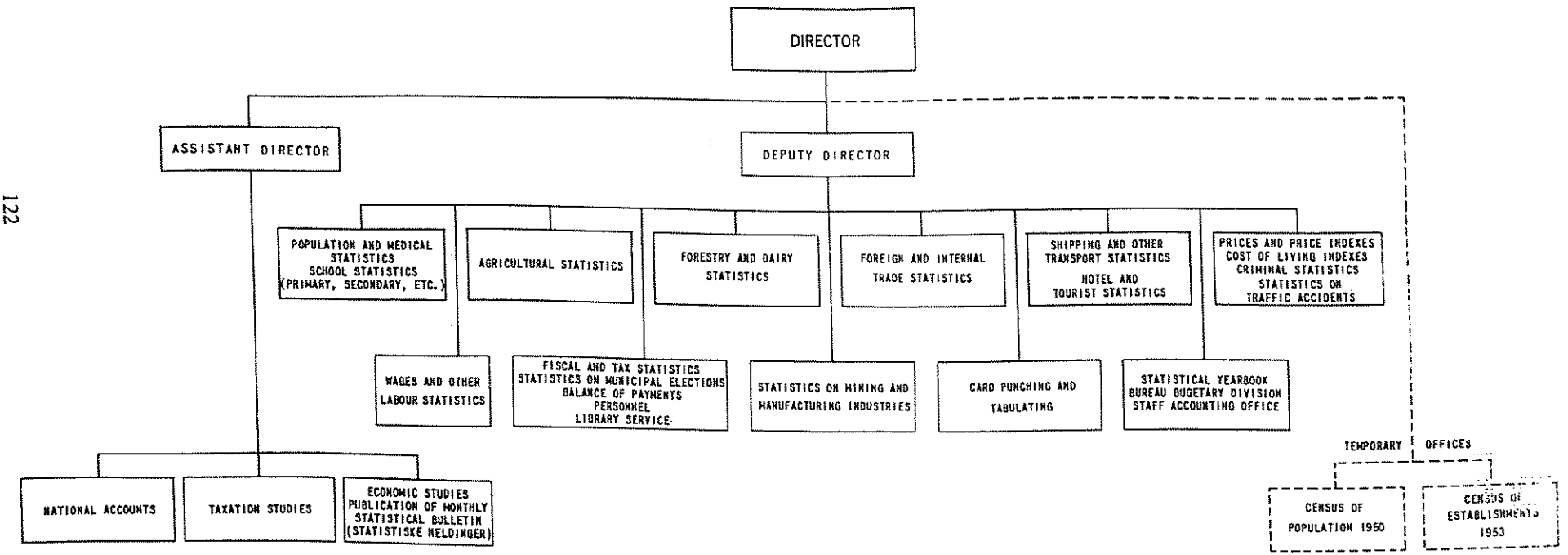
ORGANIZATION CHART OF THE CENTRAL BUREAU OF STATISTICS



SOURCE: CENTRAL BUREAU OF STATISTICS, MINISTRY OF ECONOMIC AFFAIRS, 1950

NORWAY

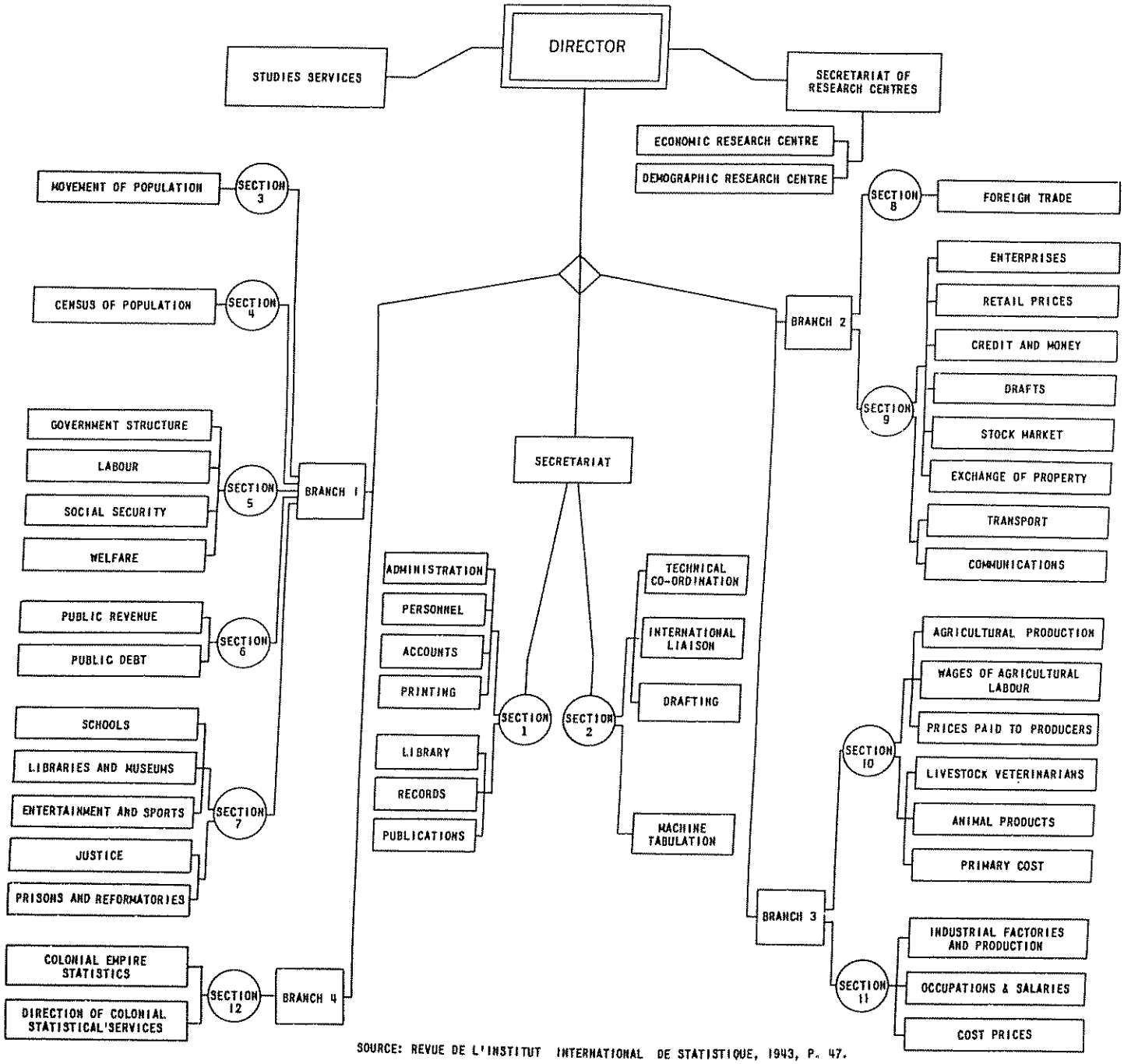
ORGANIZATION CHART OF THE CENTRAL BUREAU OF STATISTICS



SOURCE: CENTRAL BUREAU OF STATISTICS OF NORWAY, 1951.

PORTUGAL

ORGANIZATION CHART OF THE NATIONAL STATISTICAL INSTITUTE



SOURCE: REVUE DE L'INSTITUT INTERNATIONAL DE STATISTIQUE, 1943, P. 47.

APPENDIX C

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Problems of Collection and Comparison of Migration Statistics–by M. Lacroix.
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Business Meetings of the International Union for the Scientific Study of Population.

Volume II. *United Nations World Statistical Congress*, containing the following major sections:
Statistical Activities of the United Nations.
Statistical Activities of the Specialized Agencies.
Recent Developments in Statistical Activities of National Governments.

International Comparability of Statistics.
International Demographic Statistics and Population Problems.
Comparability of National Income Statistics.
Volume III. *International Statistical Institute*, containing the following major sections:

Part A
Special Meetings.
Statistical Methodology Section.
Social Statistics Section.

Part B
Demographic Statistics Section.
Contributed Papers Not Discussed.

Volume IV. *Inter American Statistical Institute*, containing the following major sections:
Proceedings of the First Session of the Inter American Statistical Institute.
Papers and Working Documents of the First Session of the Inter American Statistical Institute.
Appendices.

Volume V. *Econometric Society*, containing the following major sections:
Statistical Analysis of Economic Relationships.
Econometrics and Private Business.
Econometrics of International Economic Relations.
Statistical Inference.
Economic Growth and Fluctuations.
Theory of Choice and Utilization of Resources.
Econometrics and the Prevention of Inflation and Unemployment.
The Future Role of International Statistical Societies.
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