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THE INTERNATIONAL COMPILATION OF EXTERNAL TRADE
STATISTICS BY COMPUTER

(Report by the Secretary-General)

1. This report serves to present to the Statistical Commission information on the present status of the work initiated by the Commission at its eleventh session on the subject of the compilation of external trade statistics by computer. The experience of the Statistical Office over the past two years, together with certain general conclusions resulting from that experience, are summarized in Annex I.

2. Annex I was prepared by the Statistical Office for consideration by a group of experts convened by the Secretary-General to advise him in this field and is here submitted to the Commission for its information.

3. Annex II constitutes the report of the Expert Group, which met in Rome from 26 February to 2 March. The group was composed of experts from France, Ghana, Japan, United Kingdom, United States, European Economic Community, Food and Agriculture Organization, General Agreement on Tariffs and Trade, Inter-American Statistical Institute, International Monetary Fund, Organisation for Economic Co-operation and Development, and Statistical Office of the United Nations. An observer from the USSR was also present.

4. It will be seen from paragraph 5 that the Expert Group considered that there was substantial need for a new effort towards the rationalization of the collection, processing, and publication of statistics of external trade by-commodity-by-country at the international level. The group concluded that the provision of an international servicing and computational centre for

processing and making available the data could usefully contribute to this rationalization, and set out a number of considerations concerning the nature and operations of such a centre.

5. In view of the importance of these proposals, the Secretary-General has felt it desirable to present the Expert Group's report in extenso for consideration by the Commission. In addition to the substance of the proposals which the Commission is invited to consider, attention is drawn to the question of the relations among the United Nations, the specialized agencies and other interested organizations, which a co-operative project of this kind inevitably involves. The Secretary-General wishes to encourage such co-operative efforts. Comments on the proposals have been invited from these agencies and organizations, as requested by the Expert Group in paragraph 23 of its report. Representatives of the interested agencies and organizations have, moreover, been invited to meet at United Nations Headquarters immediately before the start of the Commission's session, in order to exchange views on the proposals. The Commission will also have the benefit of the direct expression of the views of the representatives in the course of its discussion.

a number of national and international statistical offices computers to statistical work is just beginning or is under active consideration in

particularly appropriate for such study since the application of electronic and rational means of meeting these needs may be studied. The present time is of computers to re-examine and analyze data, and in order that the most economical probable future, needs for international statistics in the light of the rapidly

that governments and international agencies may make known their present, and other hand, appear to require consideration at the international level in order national and international levels. Certain of the administrative problems, on the development of electronic equipment and are being studied by statisticians at the administrative problems. The technical problems arise mainly from the need

and tabulation of data and has also brought to light a number of technical and show the usefulness of computers for the re-examination, verification, and 2. The experience gained by the Statistical Office in the last two years has of the methodology of automatic data processing (para. 158 (4) m).

(11) The Commission listed as a continuing project of high priority the study printing of trade-by-commodity-by-country statistics (Resolution 6(XI/5), electronic computers in facilitating the rapid processing, verifying and (1) The Commission requested the Secretariat to experiment with the use of

statistical compilation and tabulation to meet modern needs (para. 16); future, work on the use of electronic equipment for purposes of (1) The Commission noted, as a task requiring additional attention, the

statistical compilation as follows: Statistical Commission has been working on the application of electronic equipment 1. In the Report of its eleventh session (E/3375), the United Nations

(Note by the Statistical Office of the United Nations)

THE INTERNATIONAL COMPIIATION OF EXTERNAL TRADE STATISTICS BY EXPERT GROUP ON THE INTERNATIONAL COMPIIATION OF EXTERNAL TRADE STATISTICS

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15 January 1962

3. In view of these circumstances, the Acting Secretary General decided to convene a small group of experts consisting of representatives of governments and international agencies to advise him on this subject preparatory to the 12th session of the Statistical Commission (22 April to 11 May 1962). It has been considered advisable to confine the discussion, at the first stage, to the field of external trade statistics as one which, to a marked degree, exemplifies the advantages of compilation by computer and the technical and administrative problems which arise.

4. External trade statistics are unique among statistical series from the point of view of the large volume of data involved and the regularity with which the data appear. In each country there is a detailed commodity classification normally containing over one thousand items, specified in quantity and value, and sub-classified by partner country. At the international level the need to distinguish the reporting countries adds a further dimension. For almost a century the individual trading nations have provided for one another's needs by exchanging among themselves their national statistics of external trade in the form of published documents. Since the days of the League of Nations, governments have more and more tended to look to international agencies to perform this function. The international publication of trade-by-commodity data is currently typified by the Statistical Office publication "Commodity Trade Statistics" (CTS) showing quarterly the direction of trade in each of the 10 sections and each of the 150 groups of the original SITC (now 177 groups of the SITC, Revised) and covering about 80 per cent of world trade, supplemented by annual matrixes covering the world and showing inter-regional trade in the SITC sections and selected SITC divisions (see the issues for March and April 1961 of "Monthly Bulletin of Statistics"). Besides being available in printed form, CTS data are, prior to 1960, available on about 200 thousand punched cards per quarter, but the great bulk of the cards has severely limited their use; economists wishing to re-arrange parts of the data have usually had to compile by hand from the printed source. Some detail below the SITC group level has been published for certain regions by agencies such as the OEEC and EEC but, in general, a country requiring detailed commodity information about other countries' trade still has to have recourse to the publications of the other countries with all their difficulties of translation and conversion of units and of classification systems. Existing arrangements, it should perhaps also be noted, require governments to supply similar tabulations and cards to a number of different agencies of which they are members.

5. Though the United Nations experiment in compiling "Commodity Trade Statistics" by IBL 7090 computer (described in more detail in Annex IV) has been restricted by financial limits on computer time and on the amount of data which could be published, it clearly indicates the advantages of the storage and transmission of data on magnetic tape (a single reel of tape, for instance, per quarter holds the CTS data rather than 200 thousand cards) and the revolutionary advantage of computers for converting currency, quantity and codes and for making the re-arrangements, aggregates and comparisons which governments and international agencies would find useful for purposes of analysis. In fact, it appears most likely that the appetite for various arrangements and comparisons of international trade data is so great that it could never be satisfied by a program of publication that would be within the capacity of any government or international agency; the only final solution of the problem would appear to be the storage on magnetic tape of the necessary detail combined with the complete and rapid access to it which is provided by electronic computers.

6. Experience has shown that the operation of such arrangements would require thorough administrative and technical planning, close liaison among the governments and international organizations concerned, and the continuous exercise of vigilance and ingenuity in detecting and meeting technical difficulties as they arise. It is thus difficult to see how the objectives could be met without centralization of the steps which bring detailed national data onto magnetic tape expressed in standard units and identified by standard codes and thus ready for general use. In view of these considerations it is hoped that the Expert Group will provide advice as to whether it is appropriate to try to meet by concerted international action needs for external trade data which are partly national and partly international and, if so, what specific needs would best be so met and what is the best way to meet them. In studying these questions the Group is requested, inter alia, to provide advice on the following points:

- a) The basic arrays of data which are best suited for regular publication to meet the general needs of governments and international organizations;
- b) The commodity level at which data in standard units and identified by standard codes should be available on magnetic tape for further processing by computer to meet special requirements of governments and international agencies;

- a) The administrative arrangements best suited to providing the data at (a) and (b) in the most economical way while minimizing the necessity of governments to report similar data to the various international agencies of which they are members.

7. Basic arrays of data are published periodically by a number of international organizations. Probably the widest coverage is contained in the United Nations "Commodity Trade Statistics" and related series which is referred to in paragraph 4 above. It would be feasible to extend this material in order to publish data for the G77 and groups without partner country analysis each quarter and with partner country analysis once a year. The service would be speeded up if the data for each reporting country were processed and published, perhaps in loose-leaf form, as soon as received. This would avoid the necessity, which exists if data are published in commodity rather than in reporting country order, of delaying publication until the most tardy country has reported. If this were done, periodic publication in commodity order could also be arranged or this function could be performed by individual international organizations starting from the basic tapes produced centrally.

8. It is recognized that no limited number of arrangements of the data can meet all the needs of governments and agencies. The problem to be considered is how to meet the changing requirements for data, other than those in the basic arrays, on short notice and in the most economical way. The requirements would be met if detailed data could be stored on magnetic tape in such a way that a minimum of ad hoc programming would permit the extraction and re-arrangement of the desired information at the desired level of detail. For this purpose decisions have to be made as to the nature of the detail which is to be stored on tapes and as to methods of providing ready access to it. The full detail available on magnetic tape on a quarterly basis might well be at the SITC sub-group level (4-digit code). In this connection it is interesting to note that the re-arrangement into other economic categories devised by the Statistical Office of the European Economic Communities is designed to start from SITC data at the sub-group level. The SITC, Revised, has 1,312 items (5-digit code) and it would be possible to maintain basic records on tape at that level if the Group felt that the added burden on governments of reporting so much detail were justified. It would also be possible to arrange to record data at different levels for different commodity classes.

9. Whatever general scheme is adopted, it will probably be desirable to arrange that countries shall not be expected to report full detail in commodity classes in which they have little trade, but may report at whatever level is most meaningful, showing the full detail only where the magnitude of the trade justifies doing so.

10. The basic publication and the basic tape discussed above could, if so desired, besides the summaries by commodity already mentioned, other summaries by partner countries and by reporting countries or by a combination of the two likely to be required. The summaries immediately available on the tape need not be the same as those available in the publication. A possible regional grouping of partner countries is suggested in the second part of Annex II. Enough countries are currently reporting on the basis of the SITC to permit reporting country totals to be made quarterly for any or all of the following regions: North America, Common Market, EFTA.

11. A general scheme of cooperation. If the necessary administrative arrangements could be made, it might be envisaged that each government would supply its basic trade-by-commodity-by-country data to a single international service center. The data would ordinarily be supplied in the form of punched cards or magnetic tape of the sort, and using the code systems and units of quantity and currency, normally produced by the reporting country; the cards or tape would usually be accompanied by the corresponding tabulation for use in checking^{1/}. It would have to be understood that the center would undertake to distribute the processed data within a predetermined period after the receipt of the raw data from governments. The center would then, on behalf of all governments and agencies, use computer techniques to transform the data somewhat as follows:

- a) convert to common units of quantity (metric) and a common currency (U. S. dollars or thousands of U. S. dollars);
- b) convert, where necessary, to a common commodity classification (the SITC, Revised, United Nations Statistical Papers, Series M, No. 34);
- c) convert to a common numerical partner country code;

^{1/} Almost all makes of computer will accept data input and produce output on standard 80 column IBM cards. The international transmission of trade data is, thus, possible without manual intervention.

- d) subject the converted data to agreed mechanical checks of accuracy and, in cooperation with the reporting country, correct errors discovered (see Annex I, paragraph 3);
- e) make the agreed basic summaries (see paragraph 10 above);
- f) prepare the magnetic tape containing basic data (see paragraph 8 above) for distribution to governments and international organizations; corresponding cards could be supplied to users preferring them and arrangements to supply the data on punched paper tape could probably also be made;
- g) produce and distribute the basic quarterly publication (see paragraph 7 above).

12. Agencies or governments receiving tapes or cards from the center would re-arrange the data and further prepare them by computer for publication or analysis. They would profit by not having to duplicate the basic steps taken centrally. The reporting government would also benefit by not having to report detailed trade data to more than one place.

13. The Expert Group may wish to recommend the principles on which such a scheme should be based and to discuss the general form cooperation might take, it being understood that existing procedures for reporting to international organizations shall continue until all technical and administrative details of the cooperative scheme have been worked out. Experience with computers has shown that a period of overlap between the old methods and the new should be planned when computer techniques are introduced so that unforeseen technical difficulties in the application of the computer will not cause a hiatus in the appearance of the data.

14. In considering ways of relieving governments of the necessity of supplying trade-by-commodity-by-country data simultaneously to a number of international organizations and of relieving the organizations of the need to duplicate much of the data processing, the Statistical Office has been impressed by the advantages of centralizing preliminary processing in a single place. The technical advantages are obvious: only one group of technicians has to master the details of converting national data into standard form, verifying them and summarizing and preparing them for distribution; only one computer programme has to be written for this purpose and checked out. The technicians can be highly specialized and routines can be

rigidly established to minimize the chances of error and delay. Economies in the rental of computer time and in the use of personnel are to be expected from a large scale relatively continuous process as compared with the smaller scale and necessarily sporadic operations which would be the result of dividing up the work of original processing. A center would also be able, at the request of governments or organizations, to do special computer jobs involving the data of many reporting countries at once.

15. The cost of central processing by computer would, of course, vary with the periodicity and the degree of detail required. The cost of renting computer time to do a minimum of processing would probably be about \$50,000 per year. If a variety of arrays or considerable detail were required, the cost of machine time might well be multiplied by two or three. Printing and distributing data would cost from \$15,000 per year up, depending on the size of the issues and the number of copies distributed.

16. The Expert Group will wish to make a recommendation to the Acting Secretary-General on the feasibility of the sort of cooperation here discussed. If it considers that a scheme of cooperation is desirable, it may wish to recommend that arrangements be made for processing trade-by-commodity-by-country data centrally and may also wish to make suggestions as to how administrative and technical matters may best be arranged and what time-table might be aimed at for setting a scheme in operation.

Annex I

Some Technical Questions Relevant to Cooperative Processing
of detailed Trade-by-commodity-by-country Data

1. Standardization of Commodity Classification. It is assumed that the 1960 revision of the United Nations Standard International Trade Classification (SITC, Revised) and its numerical code will be used in basic international tabulations. Countries are currently supplying data to the Statistical Office either on the basis of the 177 groups or the 625 sub-groups of the SITC, Revised, the Office now publishes trade-by-commodity-by-country data at the group and section levels only.

2. Coding of partner countries. Recoding by computer is very easy but, if countries wish to be able to publish data (without recoding) in the original order in which they appear on the tabulations, cards or tapes produced by a center, agreement on a standard coding of partner countries will have to be reached. The coding currently used by the Statistical Office is given in annex II. The individual digits do not, it should be noticed, play the same role in summarization by computer that they do in summarization by ordinary punched card equipment. Each country would, however, have to report in sufficient country detail to satisfy all users.

3. Checking of the data by a center. Electronic computers offer magnificent facilities for the verification of data in all their details. After conversion of the data to dollars and metric quantity units, the Statistical Office makes the following checks:

- a) whether partner country detail adds up to group totals (independently reported in national units and converted);
- b) whether group totals add to section or grand totals (independently reported in dollars);
- c) for each individual group-by-country entry, whether the quantity, value and unit value bear reasonable relations to the corresponding magnitudes in the previous period for the same group and partner country.

The tolerance limits can be varied in accordance with experience. A message is written whenever a comparison falls outside of the prescribed limits. Statistical personnel thus have to examine only what the computer has found to be unusual; as a

rule only a few dozen entries per reporting country. Of these most are not errors but peculiarities of the trade and what errors there are usually result from errors in the data reported by governments. If a cooperative scheme is used, agreement will need to be reached on the checks to be applied and corrections to be made by the center on behalf of all subsequent users.

4. Standardization of cards and tapes. Cooperation will be the more fruitful the more readily the output cards and tapes of the center can serve without readjustment as inputs of others. As stated in the body of this paper, most makes of computing equipment will accept IBM cards as input and will produce output on IBM cards. There are, furthermore, for certain pairs of makes, machines that will write information from tapes of the one directly onto tapes of the other. Annex III suggests a standard "card form" to be used on cards and tapes. The center could readily, in making the changes in units and codes mentioned earlier, also, if it were agreed, put the data in a standard card form for the convenience of subsequent users. Governments would continue to use the card or tape forms that fit their internal procedures; the conversion to international form would be made by the center.

Annex II

Partner-Country List and Code currently used by the Statistical Office

241 U. S. Amer.	316 Mexico	388 Norway	458 Bulgaria
251 Canada	318 Nicaragua	394 Sweden	464 Czecho.
	324 Panama	396 Austria	466 Germany, East
274 Argentina	326 Paraguay	398 Portugal	468 Hungary
276 Bolivia	328 Peru	404 Switzerland	474 Poland
278 Brazil	334 Uruguay	414 Iceland	476 Romania
284 Chile	336 Venezuela	416 Ireland	479 E. Eur. nes
286 Colombia	339 Lat. Am. nes	426 Greece	
288 Costa Rica		428 Turkey	484 Aden
294 Cuba	364 Belg. Lux.	434 Spain	486 Bahrain
296 Domin. Rep.	366 France	436 Finland	488 Kuwait
298 Ecuador	368 Germany, Fed.	438 Yugoslavia	494 Qatar
304 El Salvador	374 Italy	439 W. Eur. nes	496 St. Arab. nes
306 Guatemala	376 Netherlands		498 Jordan
308 Haiti	384 United Kgd. m.	454 USSR	504 Cyprus
314 Honduras	386 Denmark	456 Albania	506 Libya

514 Israel	610 Dahomey	714 China Mnlld.	834 Oth. As. nes
516 Iran	618 Ivory Coast	718 Korea, N.	838 Port Asia
518 Iraq	624 Mali Rep.	724 Vietnam, N.	
524 Saudi Arab.	625 Senegal	728 Out. Mongol.	864 Jamaica
526 Yemen	626 Mauritania	731 Japan	866 Trinidad T.
528 Oth. Arab.	628 Niger	754 Burma	868 Bahamas
534 Lebanon	634 Upper Volta	756 Ceylon	874 Barbados
536 Syria	636 Guinea	758 India	876 Bermuda
538 UAR	638 Equat. Afr.	764 Pakistan	878 Br. Guiana
544 Sudan	644 Cent. Af. Rep.	766 Malaya Fed.	884 Am. St. nes
546 Ethiopia	646 Chad	768 Singapore	894 Neth. Antil.
548 Somaliland	648 Congo Bra.	774 Sarawak	896 Surinam
554 Fr. Somaliland	654 Gabon	776 Brunei	898 Guadeloupe
559 Mid. E. nes	656 Cameroun	778 N. Borneo	904 Martinique
	658 Madagascar	784 Hong Kong	906 Panama C. Z.
564 Australia	664 Reunion	786 St. As. nes	908 Amer. nes
566 N. Zealand	666 Togo	794 Afghanistan	
	674 Congo Leo.	796 China Taiw.	924 Fiji
568 So. Africa	676 Angola	798 Cambodia	926 Papua
584 Br. E. Afr	678 Mozambique	804 Laos	928 Aus. N. Guin.
586 Gambia	684 O Port. W. Af.	806 Vietnam Rep.	934 O. S. Oceania
588 Ghana	686 Sp. Cent. Af.	808 Indonesia	936 O. S. Europe
594 Mauritius	688 Liberia	814 Korea, Rep.	954 Caledonia
596 Nigeria	694 Algeria	816 Philippines	956 Guam
598 Rhod. Nyas.	696 Morocco	818 Thailand	958 Oceania nes
604 Sier. Leone	698 Tunisia	824 Nepal	964 Areas nes
606 Zanz. Pemba	704 Africa nes	826 Ryukyu Isl.	966 Unspecified
608 Oth. St. Afr.			985 Fisheries
614 Cent. W. Afr.			991 Spec. Cats.

Suggested Partner Country Totals and Subtotals

Developed countries	Middle East
Underdeveloped countries	Sterling M. E.
Eastern Europe, Mainland China, etc.	Other M. E.
Sterling Area	Australia, N. Zealand, So. Afr.
Africa	Central Africa
	Other Africa (Alg., Mor., Tun.)
North America	China Mainland, etc.
Latin American Republics	Other Asia
Western Europe	Japan
Common Market	Asia, nes
EFTA	Other Countries
Other Western Europe	Sterling America
Eastern Europe	Countries nes

Annex III

Suggestion for Standard Card Form for Trade Statistics

<u>Cols.</u>	
9-13	Period code
15	Quality units code
20-23	Reporting country code (left justified)
27-30	Partner country code (left justified)
35-41	Commodity code (left justified)
47-58	Quantity data (right justified)
59-72	Value data (right justified)

Annex IV

Outline of the Procedure used by the Statistical Office in processing
Trade-by-Commodity-by-Country Data by Electronic Computer

1. Most data are sent to the Statistical Office by governments on punched IBM cards via air express collect. Each government uses its own card format. Some governments send machine tabulations or printed or typewritten tables; these are coded where necessary by the Statistical Office and punched onto cards by an outside contractor. The United States provides data on tape (converted from Univac to IBM tape by a machine made by the Ampex Corporation). The volume of cards (or the equivalent) for about three dozen reporting countries is about 300,000 per quarter.

2. The Statistical Office prepares "programme cards" for each reporting country which describe the national card format, currency unit, quantity units, commodity code, partner country code.

3. A contractor transfers the programme and data cards to tape.

4. An IBM 7090 machine, on which time is rented from a contractor, processes the tape. It converts units, commodity and country codes into standard form.

5. The data are sorted by the 7090 into the inverse of reporting country-by-SITC group-by-partner country order and data having identical codes are added.

6. The checks described in paragraph 3 of Annex I are made and error messages are written on a tape which is then printed.

7. The Statistical Office examines the printed error messages and makes correction cards where necessary. The corrections are transferred by the contractor from cards to tape and then incorporated by the 7090 into the main tape. (This corrected tape is used in the next quarter to check against the new current tape).

8. Predetermined but variable commodity and partner country aggregates are made from the corrected tape by the 7090.

9. The entries are sorted into commodity-by-reporting country-by-partner country (or partner region) order by the 7090.

10. The 7090 divides the sorted data among three tapes from which the figures are tabulated by an IBM 1401 machine at 10 lines a second on headed sheets ready for photo-offset reproduction. One tape prints the Summary Tables, the second the Detailed Tables, the third the Annex Tables of "Commodity Trade Statistics". Each of the tables has a number of columns per page. The 7090 sets these up by reading sorted data column by column into its memory so that the whole table stands in the memory. The table is then read out of the memory line by line onto the tape from which the 1401 prints the table a line at a time.

ANNEX II

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EXPERT GROUP ON INTERNATIONAL
COMPILATION OF EXTERNAL TRADE
STATISTICS
Rome, 26 February-2 March 1962

REPORT OF THE EXPERT GROUP ON THE INTERNATIONAL
COMPILATION OF EXTERNAL TRADE STATISTICS

1. The Group of Experts met at FAO headquarters in Rome from 26 February to 2 March 1962.^{1/} Mr. O.V. Wells, the Assistant Director-General of FAO in charge of Economics and Statistics, opened the meeting and, after welcoming the experts, drew attention to the tasks in front of the Group.
2. In the Report of its eleventh session (E/3375), the United Nations Statistical Commission initiated work on the application of electronic computers for statistical compilation as follows:
 - (i) The Commission noted, as a task requiring additional attention in the future, work on the use of electronic equipment for purposes of statistical compilation and tabulation to meet modern needs (para. 16);
 - (ii) The Commission requested the Secretariat to experiment with the use of electronic computers in facilitating the rapid processing, verifying and printing of trade-by-commodity-by-country statistics (resolution 6 (XI) 6);
 - (iii) The Commission listed as a continuing project of high priority the study of the methodology of automatic data processing (para. 158 (4) m).

The Group of Experts was convened by the Secretary-General of the United Nations to advise him preparatory to the twelfth session of the Statistical Commission on the extent to which the use of electronic computers would make possible an improvement in the availability of external trade statistics for the

^{1/} The list of experts is attached as Annex I.

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analysis of commodity-by-country trade and to increase the timeliness and efficiency of the desired compilation, and, if the use of computers was indicated, what organizational arrangements were desirable to draw maximum advantage from the computers.

3. The Group reviewed the current situation of the supply of and the demand for international trade statistics. On the supply side it was noticed that international organizations have largely taken over from Governments the task of bringing together the trade statistics of a number of countries based on uniform standards. These agencies included, besides the Statistical Office of the United Nations, the regional economic commissions and agencies of the United Nations grouped by subject matter or representing groups of countries, such as OECD, EEC, IASI, having a community of economic interests. Through their activity the range of international statistics of external trade available to Governments and the public in terms of uniform classification had greatly increased. On the other hand, partly because of the increased supply, the demand for these statistics and for different rearrangement of them has grown to the point that such demand cannot be fully satisfied by any feasible programme of regular publication which is within the capacity of Governments or international agencies to produce or of consumers to use effectively.

4. The increased demand from international organizations for the data has multiplied requests to Governments for the trade figures on which international tabulations can be based and has often made it necessary for Governments to supply simultaneously to a number of international organizations data arranged in different ways and in different degrees of detail. In fact such demands upon Governments have been increasing at such a rate as to prejudice their ability to meet them all. During the course of discussion, it was indeed brought out that left to itself the situation in this respect is likely to become worse rather than better, with further organizations embarking on programmes of collection, processing, and publication of such statistics. The problem could only be solved by very close co-operation among the various international organizations.

5. Out of the discussion of the Group, which dealt with a wide range of topics related to the general problems outlined above, the following general sense of the meeting emerged:

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There was substantial need for a new effort towards the rationalization of the collection, processing, and publication of statistics on external trade by-commodity-by-country at the international level. The Group recommended the steps be taken to bring about such rationalization for the purpose of easing the present and prospective burdens of duplicative systems on countries and on international organizations and in order to make more readily available for analytic and administrative purposes the wealth of data that exists and that can be expected to become available in the future.

It was concluded that the provision of an international servicing and computational centre for processing and making available the data could best contribute to this rationalization. But it is to be noted that not all measures to achieve rationalization have been considered by the Group. There were many problems to be faced in such an enterprise and the Group discussed several of these of this. The remainder of this report deals with the sense of the Group on the following aspects: the nature, location, and organization of the centre; the form of reporting to the centre, i.e., level of detail, the acceptable reporting forms, and the paths of reporting; the relations with other organizations; the question of publication and other outputs of the centre; questions related to data quality and improvement; financing; and problems of the transition period.

The basic data required by the centre

6. It was agreed that the work of the centre should be based principally upon the receipt of quarterly commodity-by-country data sufficient to tabulate at the level of the five-digit code of the SITC, Revised (as is the present practice of EEC in its publication), though it was recognized that many detailed needs, particularly those of commodity specialists, could not be fully met in this way and that Governments and organizations would have to make other arrangements to satisfy demands of this kind.

7. The procedure for supplying basic data was then discussed. It was agreed that magnetic tape provided the most economical means of transmitting the data. Punched cards were also economical and that, where Governments could supply neither of these, tabulations were also acceptable. Where tape or cards are used they should also, where possible, be accompanied by tabulations for checking purposes.

8. It was intended that the arrangements at the centre would be flexible enough to accept data not precisely in the form just described. For instance, countries whose trade in certain commodity classes did not justify the compilation of five-digit detail could report at a lesser level of detail for those classes as appropriate, using five-digit detail only where the nature of the trade justified it. Where countries had not yet completed arrangements for compiling data according to the SITC, Revised, the centre could temporarily accept data according to other classifications if an adequate key were available between that classification and the SITC, Revised. On the other hand, countries may be requested to supply detail for some of the optional sub-headings of the SITC, Revised.

Publication and other forms of information output

9. The Group felt that it was premature to specify at this time the exact form of regular publications.

The period between now and the time the centre can get into successful operation and perhaps also the first period of its operation, should be utilized to examine the advisability of new publications, consolidation and elimination of existing publications, more useful formats, etc. The future decisions in this area would of course take account of the needs, standards, and suggestions of the countries and the various organizations. During the discussion on publication several suggestions were made as to some possible directions that change in publication might take, e.g., annual publication of the five-digit detail; tables on exports by country of destination in order to focus on markets. It was suggested that there was a need for the analysis of world trade by main three-digit groups. It was also suggested that some modification of the grouping of countries now used in United Nations publications might be necessary. But no consensus was reached and, as noted above, the issue was left for later decision. It was indicated that in order to prevent differences in timing with which country information reaches the centre from unduly delaying publication, it might be possible to put out particular publications in two volumes with different timing.

10. In addition to information that will be presented in regular publications, it is contemplated that the centre will regularly issue to Governments and

international organizations with minimum delay a limited number of copies of the detailed reporting country information as each country's report becomes available. This will be issued in any of several physical forms - tape, cards, photo-reproduction of table print-outs.

11. The centre will make available on request, and in the output form requested, any and all information in its possession in any recombination or organization of the data needed. The salient feature of the new arrangements would thus be full access by the participating countries and organizations to all the information made available by countries. For this work, the centre will be ready either to accept machine programmes of the requesting Government or organization or to prepare the machine programmes necessary to meet the particular needs.

12. In order not to lose existing information while the centre is working out its programme, it was recommended that, for the present, international organizations now publishing foreign trade statistics by-commodity-by-country should maintain the general form of their publication programme in accordance with their own requirements, incorporating of course, where relevant, information becoming available from countries not now supplying such data. (The ability of the centre to accept non-SITC data may in fact result in an immediate increase in country data.)

The nature of the centre

13. The general feeling of the Group was that there should be a centre which should maintain a library of statistical data on magnetic tape concerning external trade and compute, tabulate, publish or otherwise make material available to interested Governments and agencies. The kind of machine facilities required, which were likely to be on the scale of e.g., the IBM 7090, and the skilled and experienced personnel needed, were a limiting factor. Moreover it was also clear that the Group did not feel able at this meeting to make definitive recommendations on the geographical location of the centre, but was agreed on the kind of considerations that should go into such a decision.

14. The participants felt that the centre ought to be attached to the Statistical Office of the United Nations in order to avoid the difficulties connected with setting up a new international institution, but in any case to profit by the

knowledge, experience and progress made by the Statistical Office of the United Nations in this field.

15. As far as concerned the geographical location of the centre, it should be one giving ready access at reasonable cost not only to the main computer facilities to be used by the centre but also to the wide range of ancillary equipment that might be necessary for such tasks as converting the different kinds of tapes. The location must also permit rapid communication to and from the centre, both with respect to the transmission of data and with respect to the ease of maintaining checks on the data.

Historical data

16. One of the ways in which the centre could assist Governments would be in providing figures for a run of years which would help in the analysis of trends. Once the centre was in operation, data from a starting date would of course be available, but there would be a problem initially in respect of back years. Many countries would be unable to supply data in respect of even recent past years in full five digit detail, but it was agreed that the centre should seek the co-operation of Governments in exploring the possibilities in this direction.

The transition period

17. Experience with computers has shown that a period of overlap between the old methods and the new should be planned when computer techniques are introduced so that unforeseen technical difficulties in the application of the computer and organization of the flow of material will not cause a hiatus in the appearance of the data. This transition period would provide opportunities for consultations between officials of participating Governments and organizations and the staff of the centre on all technical questions connected with the operation of the centre.

18. The period of transition would thus be used both for experimentation in the best methods of procedure and also as a period in which all advances in technique of collection, checking, relations with respondents can be collated and incorporated into the procedures of the centre. In order to facilitate this full utilization of existing experience, the centre will seek the technical co-operation of those participating international organizations now actually engaged in the collection, compilation, and publication of external trade statistics.

Indirect collection of data

19. While the centre must be considered as the heart of the collection, storing, and output of external trade statistics, it was recognized that there would often be situations in which the most effective and speediest means of getting the statistics to the centre might be through other organizations which, for these purposes, would be acting as indirect collectors for the centre. The kinds of situations in which this might occur are where regional organizations are aiding countries in the reporting and compilation of such statistics or where an organization is collecting data at a finer level of detail than required by the centre and is willing to provide a five-digit combination to the centre. Whether or not these methods of collection will be used will, of course, depend on the relative convenience to reporting Governments and on the relative rapidity of returns made directly to the centre.

Improvement of the quality of foreign trade statistics

20. The main subject of this particular meeting and the purposes of the computing centre recommended by the Group were in the area of the technical handling of whatever foreign trade statistics existed. The object of the centre was to improve the availability of data on international trade statistics. The centre as such would have little to do with the improvement or expansion of national statistics except in so far as the handling procedures had this result. However, it was recognized that the centre could not provide more or better statistics than were fed into it. Several participants at the meeting stressed quite strongly the importance of improving the basic data as part of a general programme of external trade statistics. In this work, the constructive role of various regional and specialized organizations was recognized but it was also urged that the United Nations Statistical Office continue and expand its efforts in this area.

21. Another aspect of the question of quality of the information was discussed in connexion with the general problem of the procedure of checking the returns. The importance of such checking by qualified experts beyond the kind of checking that could be accomplished through machine methods was stressed. On this point it was emphasized that the advances made in quality checking up to this point by various organizations should not be lost in the transfer to the centre but that it

was obviously impossible for the centre to do all the quality checking. That could be provided by detailed commodity experts. Some concern was expressed as to whether the centre could have enough expert staff to do this and it was recognized that this was a difficult organizational problem to be solved.

Financial implications

22. The Group recognized that the proposals being made had financial implications, which may be substantial; it stressed, however, that the services available from the centre and the potential benefits to Governments and to the United Nations and other agencies resulting from its operation should be kept closely in mind in any evaluation of the financial implications. This is particularly important since, in view of the prospective increases in the volume of work in this area, costs under the present arrangements are likely to increase in any event. The Group could not go into details in this matter either with reference to estimating the over-all costs or with reference to specification of the principles of allocation of those costs. It was, however, considered that, if the centre is attached to the Statistical Office of the United Nations, the United Nations should bear the overhead costs of the centre, including basic processing, regular publication in agreed-on formats, and the provision to Governments and interested international organizations of limited quantities of copies of print-outs of all country data (to be made available as each set of country results is ready). It was recognized that it might be necessary for the centre to be specifically recompensed for the marginal costs of any special tabulations provided in the form of tapes, cards, or print-outs. The Group did not feel that it could specify at this time the exact dividing line between "regular" and "special" work, or that between "overhead" and "marginal" costs; nor could it establish the details of a fair and equitable pricing system for "special services". Similar pricing problems occur, and have met with workable solutions within the statistical services of individual countries and there is no doubt that some workable solution can be evolved here.

Relations of United Nations and specialized agencies

23. The Group was informed of certain procedural reservations on the part of FAO and considered that in order to meet the FAO views the Secretary-General should be asked to write to the specialized agencies inviting their comments on the proposals in this report before submission of any paper on the subject to the Statistical Commission.

ANNEX I

LIST OF EXPERTS

FRANCE	Mr. P.L. LAFOREST	Administrateur, Institut national de statistique et des études économiques, Ministère des Finances et des Affaires Economiques; 29 Quai Branly, Paris 7e
	Mr. M. SCHMIDLIN	Sous-Directeur de l'Administration des Douanes Françaises, Ministère des Finances et des Affaires Economiques; 93 Rue de Rivoli, Paris 1
GHANA	Mr. E.N. OMABOE	Government Statistician, Central Bureau of Statistics, P.O. Box 1098, Accra
JAPAN	Mr. Y. KITAGAWA	Statistical Clearance Officer, Statistical Standards Bureau, Administrative Management Agency, Kasumigaseki, Chiyoda-ku, Tokyo
	Mr. K. KAWAGUCHI	Premier Secrétaire, Ambassade du Japon auprès de la Belgique; 1, Boulevard Général Jacques, Bruxelles 5
	Mr. S. KIHARA	Chief of Section, Customs Bureau, Ministry of Finance, Kasumigaseki, Tokyo
U.S.S.R.	Mr. L. LUPANOV (Observer)	Representanza Commerciale dell'URSS, Via Clitunno 46, Roma
UNITED KINGDOM	Mr. W. RUDOE	Chief Statistician, Board of Trade, Horse Guards Avenue, London, S.W.1
U.S.A.	Mr. R.T. BOWMAN	Bureau of the Budget, Washington, D.C.
COMMUNAUTE ECONOMIQUE EUROPEENNE	Mr. V. PARETTI	Directeur à l'office statistique, 188A Avenue de Tervereu, Bruxelles 15
	Mr. M. MESNAGE	Chef de Division à l'office statistique, 145 Avenue Montjoie, Bruxelles 18

FOOD AND AGRICULTURE ORGANIZATION

Mr. S.H. KHAMIS	Chief, Trade and Prices Branch, Statistics Division, Rome
Mr. C.A. GIBBONS	Chief, Trade Section, Trade and Prices Branch, Statistics Division, Rome
Mr. L.P.D. GERTENBACH (Observer)	Chief, Statistics Section, Fisheries Division, Rome

GENERAL AGREEMENT ON TARIFFS AND TRADE

Mr. P. CARRE	Directeur adjoint, Division des renseignements commerciaux, Genève 10
Mr. L. TILL	Chef de la section statistique, Palais des Nations, Genève 10

INTER AMERICAN STATISTICAL INSTITUTE

Mr. D.H. PARKS	Program Specialist, International Trade, Washington 6, D.C.
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INTERNATIONAL MONETARY FUND

Mr. E. HICKS	Assistant Director, Research and Statistics Department, 19th and H Streets, Washington, D.C.
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ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

Mr. S.J. SIGEL	Director, Statistics and National Accounts, 2 Rue André-Pascal, Paris 16e
Mr. R. GROSS	Head of Foreign Section, Statistics Division, Château de la Muette, Paris 16e

UNITED NATIONS

Mr. P.J. LOFTUS	Deputy Director, Statistical Office, New York 17, N.Y.
Mr. W.W. FLEXNER	Chief, Trade, Transports, Energy Statistics, Statistical Office, New York 17, N.Y.

UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL



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THE INTERNATIONAL COMPILATION OF EXTERNAL
TRADE STATISTICS BY COMPUTER
(Statement of Financial Implications submitted
by the Secretary-General)

1. The Statistical Commission at its eleventh session recommended that the United Nations Statistical Office "experiment with the use of high-speed, large-memory, stored-programme computing machines in facilitating the rapid processing, verifying and printing of the data" on international trade analysed by countries and commodities (Res. 6 (XI), para. 6 - E/3375).
2. Pursuant to this recommendation the Statistical Office has for a year been using electronic computers on a limited basis for processing the trade data of some 36 countries in each of the 177 commodities of the United Nations Standard International Trade Classification, Revised (SITC, Revised). This information converted into standard units, arranged so that data for each commodity are grouped together, and covering about 80 per cent of world trade is published in Commodity Trade Statistics, a publication of some 800 pages of tabular matter issued quarterly. The figures published in Commodity Trade Statistics are used by governments, international agencies and private firms and individuals as a source of data for the study of economic and tariff questions. The necessity of extracting figures by hand from this publication has, however, greatly limited the use which can be made of the voluminous data.
3. The experience gained by the Statistical Office in the use of electronic computers for the compilation of commodity trade statistics appeared to point the way to the removal of this difficulty and, at the same time, to reduce the burden under which governments now find themselves supplying detailed trade data simultaneously to a number of international agencies of which they are members. Accordingly the Secretary-General convened a meeting of Experts in Rome from 26 February to 2 March 1962 to advise him, preparatory to the 12th session of the

Statistical Commission on: (i) the extent to which the use of electronic computers would make possible an improvement in the availability of external trade statistics for analysis of commodity-by-country trade, increase their timeliness and efficiency; and (ii) the organizational arrangements which would best draw the maximum benefit, if the use of computers was considered advantageous.

4. Having reviewed the current situation of the supply and demand for international trade statistics, the Experts feel that:

- (i) there was substantial need for a new effort towards the rationalization of the collection, processing, and publication of statistics on external trade by commodity-by-country at the international level;
- (ii) steps should be taken towards such rationalization through the provision of an international servicing and computational centre for processing and making available the data;
- (iii) the centre should be attached to the Statistical Office of the United Nations.

5. The report of the Experts has been circulated to the Statistical Commission as Annex II to E/CN.3/300. The purpose of this paper is to present financial estimates for implementing during 1963, and in a limited manner, the recommendations of the Experts for establishing a central service for processing and making available data on commodity trade statistics. These estimates assume that:

- (a) the centre would receive quarterly trade by commodity-by-country statistics from each government on the basis of the 1,312 commodity items of the SITC, Revised;
- (b) the centre would utilize an electronic computer to convert the data into United States dollars and metric units of quantity, to identify them by standard commodity and country codes, to verify their accuracy and to store the data on magnetic tape;
- (c) the centre would be reimbursed for costs of any special tapes, cards or print-outs requested by governments or international organizations;
- (d) the centre would make arrangements for the processing and publication in limited quantities, of data by country, as they are received and perhaps for an annual publication. The detailed publication arrangements required to be discussed and agreed with the other participants, in order both to avoid duplication of effort and to keep costs to a reasonable level.

6. On the basis of the foregoing assumptions, expenditures will arise under three headings: (i) staff in the United Nations Statistical Office, (ii) rental of machine time for processing data and programming, and (iii) publication of the data.

7. In so far as staff is concerned, it is anticipated that it will be possible to meet the major portion of the requirements in 1963, from within the authorized level of the present establishment. Provision needs to be made only for a statistical clerk (G-4 level) for the twelve months of 1963 = (\$6,000). In addition a provision for travel will be necessary: \$2,000, in 1962 and \$4,000 in 1963.

8. As regards programming and processing of data, it will be necessary to incur expenditures on programming in the last months of 1962 in order to be in a position to make a start with processing data without any delays in the beginning of 1963. It is estimated that the 1962 requirements will be \$32,000 for machine-time for preparing and testing computer-programmes. The machine costs for 1963 will be \$180,000 as shown below:

(i) computer (machine) time costs \$135,000

The estimate is based on a requirement of some 20 hours per month of 7090-time and 30 hours per month of 1401-time, and on the current standard rates for the use of these IBM machines. Mainly because of the increased detail in which data would be processed by the computer, the number of items processed would rise from about 300,000 at the present time, to nearly 1 million in 1963. This work will be performed by outside contract.

(ii) costs of converting data in the form suitable for use on the computer. This work will also be performed by outside contract, and would involve punching of cards from tabulations or other printed sources as submitted by reporting countries. \$36,000

(iii) related supplies, e.g. tabulating paper, magnetic tapes, punch cards, etc. 9,000
\$180,000

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Printing

9. As already indicated the details of the publications programme and the way in which the participants will share in its costs have yet to be discussed and agreed with them. However, it is clear that the annual amount of \$26,000 currently available for the publication of quarterly Commodity Trade Statistics will require to be increased. For the purposes of this paper, it is assumed that this increase would be of the order of 50 per cent. Consequently, an amount of \$39,000 is proposed for this purpose.

10. In summary, the costs for implementing the recommendations of the experts, will for 1962-1963 be the following:

	<u>1962</u>	<u>1963</u>
(i) (a) staff costs [one post of statistical clerk	-	6,000
(b) staff travel	2,000	4,000
(ii) machine time (programming and processing costs)	32,000	180,000
(iii) printing	-	39,000
	<u>\$34,000</u>	<u>\$229,000</u>

The estimate of \$229,000 as shown above for 1963 represents the total annual foreseeable cost of the project. Credits which would in any event be requested in the 1963 initial budget estimates to maintain the present programme in this field would amount to \$116,000 (\$90,000 for machine tabulation costs and \$26,000 for printing). The additional requirement which would arise should the new expanded project be approved would be, therefore, \$113,000.
