a remarkable achievement. Although circumstances will differ in other countries faced with rapid inflation, the basic approach of the Indonesian program represents a promising model of anti-inflationary policies. The principal factor in the Indonesian case was the clear recognition from the outset that a stabilization program could not succeed if it did not attack directly the underlying causes of excessive monetary expansion, i.e., the budget deficit and other public sector deficits. The second important factor was the implementation of a selective credit program, which directed new bank credit to economic activities that were essential for the elimination of supply bottlenecks and for the reactivation of existing production facilities, rather than for financing new investment. A third major component was the dismantling of the previous, complex foreign exchange system and the maintenance throughout the stabilization period of a liberal trade and payments system in which the exchange rates were permitted to move according to underlying demand and supply conditions.

The stabilization program did not proceed without encountering temporary difficulties and setbacks, some of which had not been foreseen at the beginning of the period. In meeting each of these, however, the Indonesian authorities consistently sought to apply corrective measures that were consistent with the basic strategy of the stabilization program, rather than to deviate even temporarily from that strategy. This consistency was an important factor in restoring public confidence in the Government's economic policies and, therefore, was essential for the success of the stabilization program.

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The computer system for special drawing rights has been operative from the first allocation of SDR's on January 1, 1970. It is designed to provide comprehensive and up-to-date information on any entry into the Special Drawing Account and to assure the financial reliability and control necessary to satisfy requirements of the Articles of Agreement and liquidity. The allocation was made at a rate expressed as a percentage of quotas (the size of members' quotas determines or affects the use of the Fund's resources and voting; in the case of SDR's, allocations are expressed as a percentage of a member's quota in the Fund) of participants in the Special Drawing Account on the day before the allocation in question. The rate for the first year of the three-year first basic period was computed at 16.8 per cent of the quota, as of December 31, 1969, of each participant receiving an allocation.

In the technical sense, the new asset was established by electronically computing and transferring each participant's allocation onto a computer magnetic tape, since all accounting for SDR's is done by means of a computer.

In devising a computer system for accounting for SDR's, a number of basic requirements had to be met. The system would have to

- account for SDR's and produce accurate financial reports, as well as maintain complete records of transactions and operations in the Special Drawing Account;
- operate with the minimum amount of human intervention and handle transactions and operations speedily;

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1 SDR 1 = 0.888671 gram of fine gold, which equals US$1.
be reliable and at the same time flexible in order to meet any changes that would come about as the use of SDR’s grew and became more diversified;

• and produce all necessary records and information for handling daily operations and transactions.

Indeed, there is now virtually a daily flow of input relating to transactions or operations, and of certain outputs in the form of printed daily control reports (reflecting changes, additions, or deletions to the master file), and of participants’ holdings reports. In performing all these functions, it was planned that a minimum of work should be required from the operator of the system. Accordingly, the data on the input forms are converted quickly to punch cards and transferred to the Computer Center with a maximum turnaround time requirement of about one hour or less, so that operational officers in the Fund can use the information on the computer as a basis for necessary action, rather than having to maintain their own manual records of pending transactions.

For operational purposes, it was also decided that it would be useful for the Fund staff concerned with the operation of the Special Drawing Account early each day to have a report on the holdings of each partici-

Special drawing rights, the new reserve asset being held by 104 participating Fund members, were established by electronically computing and transferring each country’s allocation onto a computer magnetic tape. Allocations of SDR’s made to participating members have the effect of increasing the reserves of those members. The author describes in simple language how the computer system for accounting for SDR’s was devised.

Candelario Trujillo, Jr.

Movements of SDR’s

The principal feature of the computer system is that it was designed to compute and to record, in detail, all movements of SDR’s either from one participant to another or from a participant to the General Account of the Fund (and to any other authorized holders, although at present there are no authorized other holders), or vice versa. A movement of SDR’s from a user to a recipient is accompanied by counterflows of currency from one participant to another, as SDR’s, with certain exceptions, are not used directly in international payments. (The exceptions, at present, are payments to the Fund’s General Account, at the option of

2 Use so far includes the use of SDR’s to obtain foreign exchange; to acquire balances of the user’s own currency held by others; to pay charges and make repurchases (transactions between a member and the Fund in which a member reacquires its own currency from the Fund in exchange for gold or currencies acceptable to the Fund) to the General Account; and, at the option of participants, to receive in SDR’s remuneration payable by the General Account.
participants, for repurchases, charges, or payments of remuneration by the Fund's General Account, again at the option of participants.) SDR's are first exchanged into convertible currency through the mechanism of designated transactions, and records of the appropriate exchange rates for the currencies used in such transactions are maintained. Through this system, detailed as well as summary statements are produced along with other types of statistical information required by the Fund Articles of Agreement and Rules and Regulations.

Providing a Basis for Audit

The system also provides the basis for audit by providing a detailed and analytical classification of the SDR Chart of Accounts. During 1969, as part of the Fund's preparations for the operation of the new reserve asset, the Electronic Data Processing (EDP) staff in the Treasurer's Department had the task of designing, programming, and then testing a computer system which would record transactions, maintain appropriate files, and produce accounting and financial reports and financial statistics for internal and external use.

During this time, the aims of the automated system were established and a model was prepared. The work included the design of output reports, master files on magnetic tape and disk, a system for verifying the accuracy of input data, and the writing and testing of the component programs. It also included performing a "systems test," which was run against hypothetical transactions of various types, to ensure that all the computer programs forming part of the system were in good order. The system allows these programs to be operated on several other computers in the Washington, D.C. area, should the need arise to use a "backup" computer for emergency use.

For several reasons, programs are all written in COBOL (Common Business Oriented Language). COBOL uses English words and phrases which can be read and understood by nontechnical personnel with a minimal acquaintance with electronic data processing. COBOL programs written for one type of computer usually can be run on a different type of computer with a minimum of modification. In addition, it was considered that the costly, time-consuming process of program testing would be simplified and that the documentation of the programs would be facilitated by the use of COBOL, as, in many instances, the fact that computer instructions are written in English means that a COBOL program in effect provides its own documentation. Since documentation of this character is easily understood, a person other than the original programmer can be called on to finish or modify a program at no great inconvenience or cost.

Advantages of the Computer Scheme

Since the special drawing rights scheme would cover uncharted ground, there was a great interest in devising a computer system that could handle all possible forms that the transactions and operations would take. From the beginning of the planning stage, it was felt that one advantage offered by systems analysis would be the provision of a more comprehensive design. A computer scheme differs greatly from a manual system, which tends to proceed on the basis of a narrower concept of what may be required. An example of this is the opening of books of account and the posting of entries by hand as required by actual operations without necessarily attempting to make advance provision for a comprehensive analysis of likely future types of operation. In contrast, a computer system offers the advantage of using a broader logic and thus of providing an opportunity for a deeper and more comprehensive analysis of future possibilities.

A Modular Design Concept

The SDR computer system is modular in design. It is not one large, comprehensive system but is composed of several smaller, independent yet cohesively organized program units. These programs can be changed or sub-
stitution as necessary without requiring an overhaul of the whole system. There are three main processing programs, ranging from a total of 500 coded instructions for the smallest to 6,000 for the largest. These instructions are the means by which a computer compiler program—the "software"—interprets the processing steps by which the data are to be manipulated. Given the fact that the SDR scheme is an innovation with the potential for growth and diversification of its operations and transactions, such an approach was chosen so as to be able to accommodate necessary future changes quickly and with the minimum disturbance to the relevant established part of the system. It is expected that this combination of flexibility and stability will prove beneficial not only in saving time but also in avoiding the errors and the losing of control that often occur when electronic data processing systems are changed. Several changes have been made without any difficulties since the system first became operational.

The heart of the modular system is an analytical accounting numbering system in the form of a master SDR Chart of Accounts. The Chart of Accounts, developed by the Fund accounting staff, is categorized to provide several degrees of detailed information. It contains approximately 275 major account and sub-account categories, each having a separate description. The numbering scheme is such that subaccounts may be tied in with any of the major categories.

The Main Component Programs

In the SDR computer system the main component programs are as follows:

(1) An edit program that processes all SDR input data relating to the daily transactions on punch cards. Editing may involve the deletion of unwanted data, the selection of pertinent data, the application of format techniques, the insertion of symbols such as page numbers and typewriter characters, the application of standard processes such as zero suppression, and the testing of data for reasonableness and proper range. The edit program ensures that the data fields contain the correct information. An important output of this program is a voucher which is printed from the input transaction cards and is the main mechanism for ensuring accuracy by which transactions and data elements are controlled. A control feature is that the voucher will not be printed by the computer unless all the data elements are correct.

(2) The file maintenance program is designed to maintain the basic file, to update it as required, and to make modifications to the file as the need arises. The program provides a means by which erroneous information can be extracted and the correct data inserted.

The program also provides a change report which reflects all changes made to the file.

In addition to the financial data that can be recorded by the computer on a daily basis, separate tables of country codes and of country and currency names are maintained; these tables are also easily modified to incorporate changes.

(3) The report programs compute and produce for each participant information on its net cumulative allocation of SDR's and its holdings as a percentage of its cumulative allocation; they also produce a summary of transactions and operations between participants and between participants and the General Account, as well as details of any currency conversions that were required in a transaction involving the designation of participants. A report on the source and use of SDR's by various categories of operations and transactions is also regularly produced; as is a schedule of interest and charges on SDR's, which reflects a participant's charges on cumulative allocations, interest on its holdings, and any net charge or net interest to date. In support of this schedule, the program also prepares the monthly statement that is mailed to each participant and that shows its holdings and uses (if any) of SDR's. In addition, calculations are made for purposes of calculating and entering interest, charges, and assessments at the end of each financial year.

From the edit program, which is the first, all these programs have various control devices built into them to ensure that erroneous data in the input forms and punch cards are not accepted by the system and that coding or other mistakes are quickly identified.

General Description of the System and Flow of Information

Once the documentation (usually a cable communication from the participant's fiscal agency) relating to the use of SDR's is received by the Fund, the relevant data and information are manually transcribed on input forms from which cards are keypunched. The manual process of completing these input forms provides the initial means for checking the accuracy of the recording of each transaction. Control elements for checking operations and transactions in SDR's include such items as total numbers of SDR's and totals for the currency or currencies to be used in the transaction. Control element are the numbers of SDR's being used and the appropriate exchange rates for the currencies. In a transaction that involves a currency conversion, the computer program double-checks that the exchange rate calculation used to arrive at the total amount for the transaction is correct. The computer system also furnishes a double check by providing for the automatic computation of these items and provides for the conversion to magnetic tape of this information for file update.
ing and reporting purposes, independently of the manual preparation of the input forms.

The next operation of the system is to edit (i.e., to check) all data to ensure that the input is correct. The edit computer program of the system checks for any errors in keypunching or format, and provides a further check of all entries relating to the transactions that are necessary both for the preparation of a voucher and for the preparation of a transaction record from which the SDR file is maintained. The edit program performs numerical checks on the information in an input form, i.e., value dates, participants’ numbers, account numbers, debits and credits (by amounts), currency conversion rates and the amounts of currency, and the codes for the input records.

All information that passes the first edit and agrees with the predetermined control elements is then processed through a subprogram (in the edit process) that produces a voucher with a preassigned voucher number. The edit program also uses an account table and a country and currency table for purposes of printing account names on the voucher. The voucher is printed only if the data are accepted by the edit program. If the data are not accepted, a notation that the information for the voucher is incorrect will be printed by the computer and the processing of that transaction will stop. In such a case, the data elements that do not meet the conditions of the edit are printed so that they can be easily recognized by the staff for rechecking and for making the necessary corrections. When corrected, the data are keypunched and reprocessed on the computer. The program then goes into a second main phase and updates the master file. This is an automatic operation through the file maintenance and update program without requiring any action either by the computer operator or the programmer.

The master file for SDR accounts is maintained on a disk for purposes of updating the Special Drawing Account master file. During this processing cycle, a cumulative or monthly journal may be produced as necessary. A change report that reflects all additions, modifications, and deletions of data to the master file is also produced. This computer routine writes the updated master file to magnetic tape or disk to maintain a current master file for purposes of producing the appropriate reports. The updated master file remains on disk so that it is input into the next operational computer phase.

The next program in the system uses, as input, the newly created master file, plus an account, country, and currency table. Another program in this segment of the whole system generates records from the master file for purposes of report processing. At the end of this process, a total for SDR’s is printed on a daily report on holdings which is used for both operational and control purposes. At this stage, another sub-program in effect interrogates the parameter card input to determine which types of reports are due in this processing period. The program checks to see if interest, charges, or assessments are to be calculated. In cases where the processing includes the handling of these items, the program again calls the “update and file maintenance” program from the disk.

At the end of the processing of this segment, a “report generation” program is called. This program calls on the appropriate program subroutines for purposes of data handling and formatting of the reports. Each report is, thus, a segment within the program.

Computer Systems Control

Any computer system, but especially one relating to financial matters, obviously must be secure from the loss of information. Appropriate procedures have been adopted to safeguard the SDR system. The problem of security was handled by fully documenting all the manual and automatic procedures to be followed in operating and recording SDR transactions and operations. (The term documentation means a detailed written description of all aspects of the program and procedures.) All source and input data (which includes input forms and punched cards) after being processed on a computer are filed and locked in separate cabinets. As an additional precaution, the entire master file is transferred every month to tape, and the tape file is locked in a vault located away from the computer. Four magnetic tape backup (or emergency) files, a master file on disk, and all input data are also retained indefinitely.

All the computer programs are maintained both on tape and in the form of cards. All the programs within the system are documented and any change to the system no matter how inconsequential must be approved. This documentation is kept in the Fund with a duplicate set locked in a vault.

All input data are handled on preprinted input sheets prepared by the staff responsible for dealing with operations and transactions in SDR’s. All entries are, of course, manually checked and separately approved prior to being sent to a keypunch unit for subsequent handling by the computer system.

Coding sheets and punched cards are stored for the purposes of backup, so that in the event the SDR master file were lost or destroyed it could be recreated.

The programing controls include the complete testing of each program as well as of the systems and the approval of the systems’ output plus the approval for any change to any program in the system. The operating controls are furnished by means of “run books” for each procedural step in the system. The systems documentation includes a narrative of the entire system, a narrative of each program within the system, flowcharts of the system, and microflowcharts for each

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program and routine within the system. The documentation also includes instructions for restart procedures in case of a systems failure.

The Special Drawing Account has now been fully operational for 12 months. In the first 6-month period, 575 entries, including allocations, interest, charges, and assessments, were made in the holdings accounts of participants, and numerous statements have been prepared and printed by means of the computer system. The system has met all the demands placed on it so far, most importantly the prime requirements of flexibility and reliability. It is fully programed to handle data from the second allocation of SDR's, which will be made on January 1, 1971.

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Automotive Industries in Developing Countries
by Jack Baranson
World Bank Staff Occasional Paper No. 8

Against the background of world industry in which economies of scale are of predominant importance, this book examines the problems of adaptation faced in the transfer of automobile production to a newly industrializing economy. It provides data on comparative production costs in three Latin American countries, the United States, and India and analyzes in some depth the relative cost problem in Argentina, New Zealand and Yugoslavia. From the evidence presented, the study concludes that in 1965 the over-all cost for manufacturing automobile products in developing countries was some 80 per cent above the world market (mainly U.S.) level. A strategy to reduce this excess cost is suggested.

Manufacture of Heavy Electrical Equipment in Developing Countries
by Ayhan Cilingiroglu
World Bank Staff Occasional Paper No. 9.

This study analyzes the attempt of industrializing countries—Argentina, Brazil, India, Mexico, Pakistan and Spain, particularly—to compete in the field of transformers, generators, heavy switchgear, motors, etc. The author finds that the dominance of large international firms and the falling real price of such equipment over time have made the task of the new competitors more difficult.

Case studies of costs of equipment in developing countries include calculations of effective protection and domestic resource cost per unit of foreign exchange saved. They also illustrate some practical problems faced by such manufacturers. For example, essential raw materials, in particular, often cost much more than in developed countries even though they are internationally traded. Finally, the author provides some data on relative price trends which suggest that, over time, competitiveness has improved for some products, and that the infant industry argument may have some validity.

Both Occasional Papers are available in English only at $3.00 from