

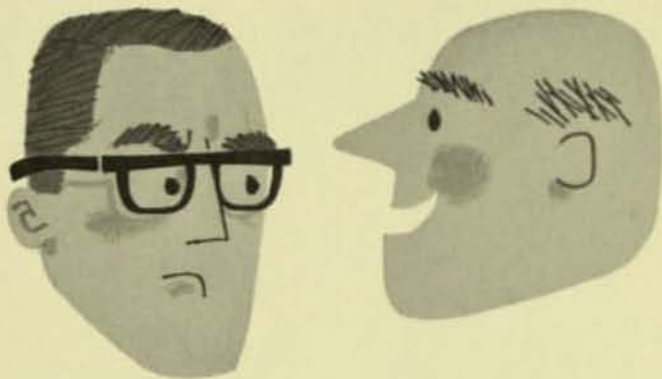
NCR

ELECTRONIC DATA PROCESSING
WRITTEN FOR THE LAYMAN

Book 1. What is Data Processing? # 8436

1

*What is
Data Processing?*



INTRODUCTION

In spite of the fact that the application of electronics to business problems is moving ahead at a rapid rate, only a relatively few people are thoroughly conversant with the new and exciting subject of ELECTRONIC DATA PROCESSING.

Consequently, it is the intent of this series of brochures to bring the entire subject of EDP down to earth . . . to put it into the everyday language of the "layman," where it belongs.

To do this, we have enlisted the help of a friendly little guy by the name of Pete. He is a likable character . . . and we think you will enjoy his company.

Pete has one very pleasing trait which we think you will appreciate . . . he takes the straightforward approach to everything he says and does. We can assure you that, while at times Pete might tend to be corny, he will never bore you with technical terminology . . . nor will he confuse you with complicated discussions and descriptions of his subject matter.



The best way to get started is to ask ourselves two very logical questions:

- 1 What is meant by the term Data Processing?
- 2 What practical purpose does it serve?

To answer this question, we can discuss one of Pete's Accounts Payable—a \$140.00 purchase made by his wife at the Elite Dress Shoppe. We can discuss this transaction because, when Pete recovered from the shock associated with the thought of a vanishing balance in his checking account, he, for all intents and purposes, became a Data Processor.

Here are some of the DATA PROCESSING operations he performed:

1. He mentally CODED the bill as an item payable to the Elite Dress Shoppe.
2. He performed a series of COMPUTATIONS to determine whether the sales tax had been figured correctly . . . and to see if, by chance, the salesperson had made an error in addition.
3. Finding everything in order, he SORTED the \$140.00 bill into a file containing other items to be paid.
4. At the end of the month he SUMMARIZED all bills in his Accounts Payable File . . . that is, "totaled-them-up" . . . to determine whether his bank account had a balance of sufficient size to pay all his outstanding bills.
5. He then performed the unpleasant task of RECORDING the amounts due each vendor onto pieces of paper called checks.



6. After all the checks were written, Pete completed the sequence of events by **COMMUNICATING** with the separate business houses to which the checks were made payable. Some of the checks Pete delivered in person ... others, he mailed.

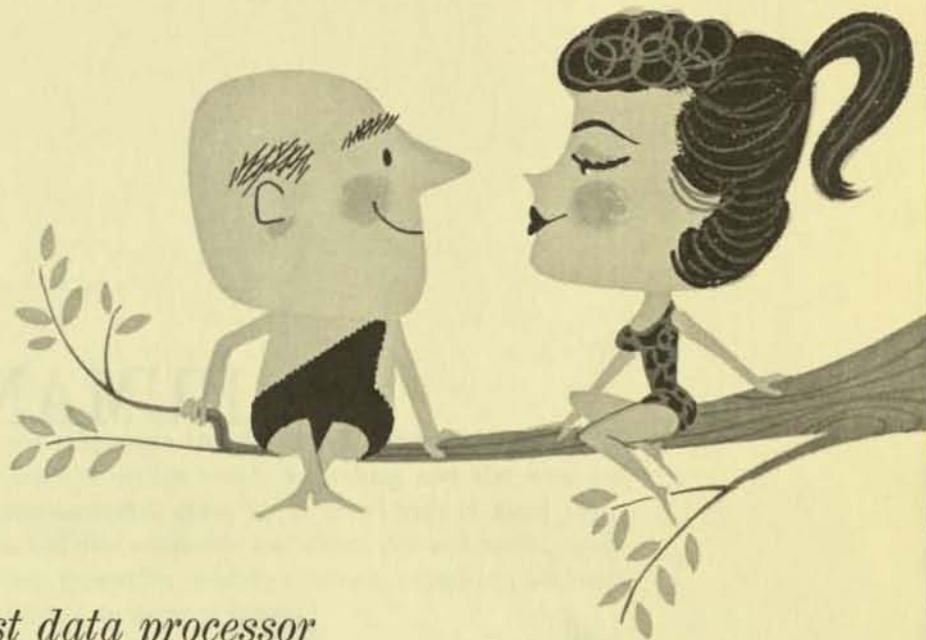
Thus, referring to the above example, we can say that **DATA PROCESSING** is made up of six basic elements: Coding, Computing, Sorting, Summarizing, Recording, and Communicating.



Now, to answer the two questions posed at the beginning of this discussion:

- 1 **DATA PROCESSING** is a term used to describe the combined set of actions which are necessary to completely process individual units of business data ... from original entry, to final entry.
- 2 **DATA PROCESSING** serves the accounting, statistical, and reporting needs of people.

In summary, then, we can say that a **DATA PROCESSING SYSTEM** is any method or procedure used to accomplish accounting, statistical, and reporting functions for business.



MAN *was the first data processor*

Being the inventive creature that he is, man learned early that he needed a language—a set of symbols, numbers, letters, and words with which he could make a record of his business transactions. And, with which he could write books, make a record of things he wanted to remember, write letters to friends, or for a host of other reasons.

Similarly, as machines have come into existence to process business data, a machine-type language has developed. However, there is one basic difference between the use of a human-language and a machine-language. That difference stems from the

fact that machines are nothing more than mechanical or electrical slaves to people.

Even though machines sometimes talk a language of their own, they must be able to translate that language into one which their masters can understand and use.

Stated simply, this language barrier is one of the primary reasons for so much misunderstanding in the field of Electronic Data Processing. However, when you learn to speak the language of a friend from a foreign land, you learn to know and understand him better. Similarly, the more you know about the language of machines, the better prepared you will be to evaluate and apply these wonderful tools to your specific data processing problems.



HUMAN LANGUAGE

1 2 3 4

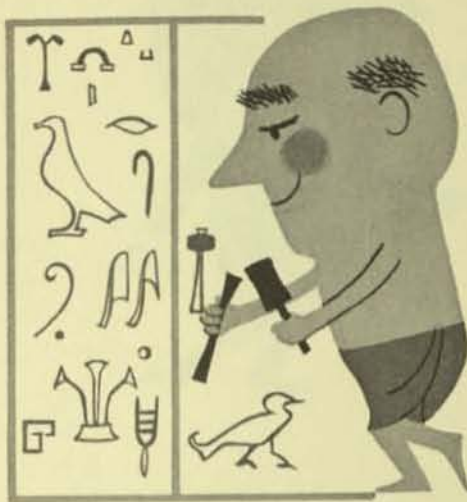
A B C D

H

We humans are accustomed to handling data made up of alphabetic and numeric characters...

We know, for example, that the numeric character for the word "two" is written as "2."

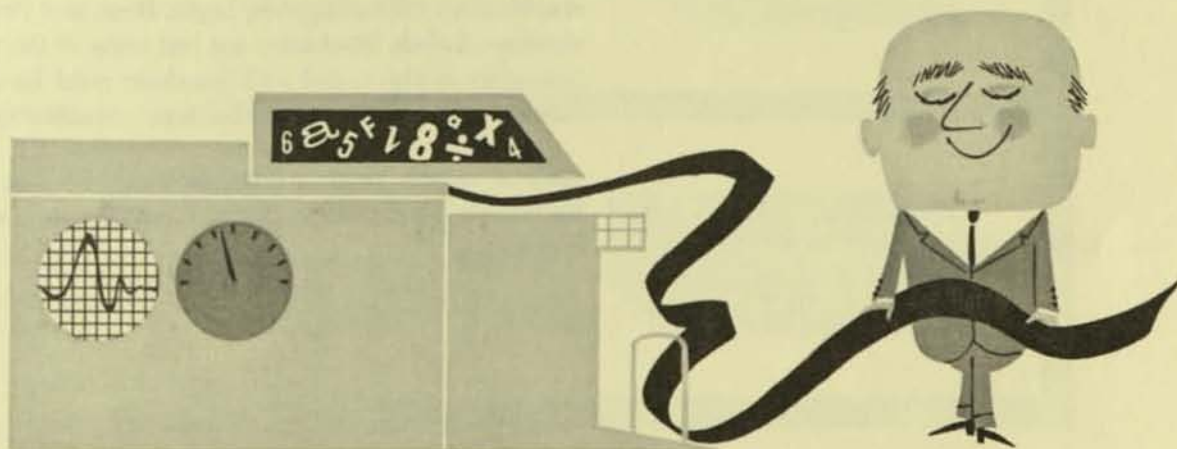
We know, also, that a character shaped with two parallel vertical lines joined at the centers by a horizontal line is an alpha-character called an "H."



Over the years man has developed certain tools to aid in recording his written word. As writing and the need for fast communication grew, he invented tools of many sizes, shapes, and uses – hammer and chisel, pen and pencil, printing press, typewriter, adding machine, calculator, accounting machine, to name a few.

Today, giant strides are being made in the use of electronics as a means of processing business data. At no time in history has greater excitement or enthusiasm been generated in the field of data processing than today.

Before we discuss EDP, however, it would be well to look closer at the six basic data processing functions mentioned earlier. The following pages of this brochure are intended to clarify these basic elements, and to serve as an introduction to the subsequent installments in the series—"Electronic Data Processing, written for the layman."



CODING

Business transactions are the individual reflections of the things that happen in a business each day. Since not all transactions are alike, they must be coded for fast identification.

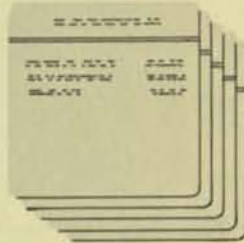
For example, the average business must buy (spend money for) things they need in the operation of their business. The things they buy, of necessity, do not always fall in the same classification. Office Supplies; Light, Heat, and Power; Merchandise; Labor; Machinery are just some of the purchases commonly made . . . and each purchase must be coded according to one of these, or other type, classifications.

And, of course, there are transactions affecting Accounts Receivable, Depreciation, Taxes, Cash Receipts, and a host of others.



This invoice is for office supplies

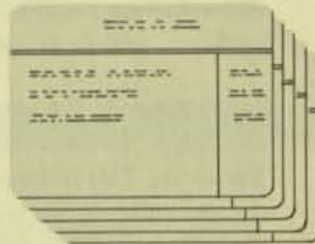
**ACCOUNTS
PAYABLE**



PAYROLL



**ACCOUNTS
RECEIVABLE**



TAXES



The coding of transactions takes many forms . . .

First, the type of transaction can usually be identified by the type of media (paper) on which it is recorded. Sales are usually recorded on a different type of media than are payroll transactions. And, Accounts Payable transactions are usually recorded on different media than are Cash Receipts.

Transactions must often be sub-coded . . .

When talking about Accounts Receivable, for example, it isn't enough to merely identify each transaction as Accounts Receivable . . . further identification is necessary.

One of the obvious sub-codes is by customer. It is important that a sale to John Adams be so identified that it will be charged to John Adams' account. This is accomplished by either writing the person's name on the Accounts Receivable media . . . and/or assigning an account number to the media.

In other words, the act of coding normally consists of placing the proper reference, such as names and account numbers, on the media. This is done so that in the subsequent handling of the data the entries will be made to the proper accounting records, and will be summarized on the proper reports.



**ACCOUNTS
RECEIVABLE**

The image shows three overlapping ledger-style tables. The top table has a header section and a grid below. The middle table is partially obscured by the top one. The bottom table is also partially obscured and shows a similar grid structure.

PAYROLL

The image shows three overlapping payroll tables. Each table features a header section with text and a grid below. The tables are arranged in a staggered, overlapping fashion, with the top table being the most prominent.

**ACCOUNTS
PAYABLE**

The image shows three overlapping ledger-style tables. The top table has a header section and a grid below. The middle table is partially obscured by the top one. The bottom table is also partially obscured and shows a similar grid structure.

SORTING

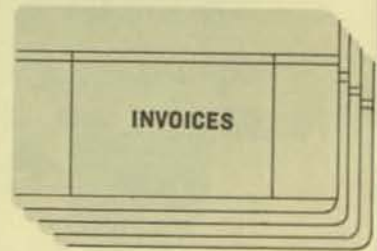
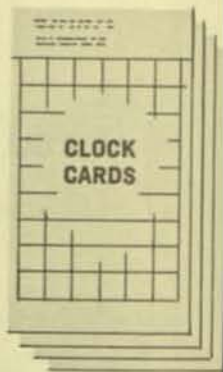


SORTING consists of arranging data into individual groups . . . each group having common characteristics.

After the data has been properly coded the next step in the sequence of Data Processing events is to sort the data into like groups.

In most businesses the major sort is accomplished by the very fact that the transactions occur within, or are directed to, individual departments.

For example, all Payroll media originates in, or is forwarded to, the Payroll Department. Consequently, the only media the Payroll Department is normally concerned with are those affecting Payroll Transactions.



ACCOUNTS
RECEIVABLE
DEPT.

Within the Payroll Department, however, the media must be sorted into its proper detail classifications—by employee, by department where the work was performed, by type of labor, and so on.

PAYROLL
DEPT.

EMPLOYEE
CLOCK CARDS

DEPARTMENT
CHARGE TICKETS

EMPLOYEE
EARNINGS RECORDS

PAYROLL
CHECKS

ACCOUNTS
PAYABLE
DEPT.

It is important to remember that efficiency in Sorting is dependent, to a large degree, upon the degree of efficiency employed in Coding the data. Similarly, if the data is improperly sorted, it will run the risk of being entered on the incorrect accounting records. In other words, each step in the chain of data processing events is dependent upon those things that have been done to the data in all the previous steps.

COMPUTING

$$2 + 2 = 4$$

COMPUTING, for the most part, consists of applying a mathematical process to the data . . . very often this application of a mathematical process creates new data.

FOR EXAMPLE, the Payroll Department receives a clock card, properly coded as belonging to Robert Smith, employee number 896.

Since this company pays its employees every two weeks, a second clock card, during the sorting process, will be sorted behind the first week's card for employee 896.

The arithmetical process, then, consists of determining the total hours worked by employee 896 . . . multiplying the total hours times his pay rate to arrive at his gross pay . . . calculating the various deductions . . . and subtracting the deductions from the gross pay to determine the net pay due employee 896.

This data . . . gross pay, deductions, and net pay . . . becomes new information entering the system, and must be considered in the subsequent steps of the Payroll Data Processing procedures.

SMITH, Robert

896

8 hrs

8 hrs

8 hrs

6 hrs

4 hrs

CLOCK CARDS

SMITH, Robert

896

8 hrs

8 hrs

8 hrs

8 hrs

8 hrs

34

+40

74 HOURS

X 3.00

\$ 222.00

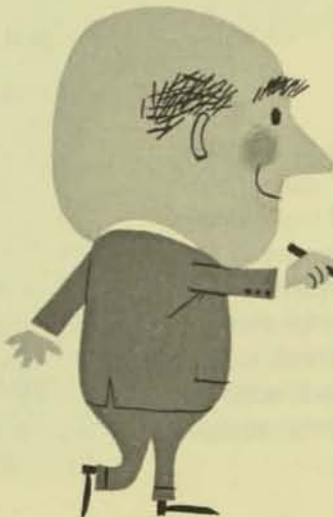
INCOME TAX 18.00

SOC. SEC. 7.00

INSURANCE 5.00

UNION DUES 4.00

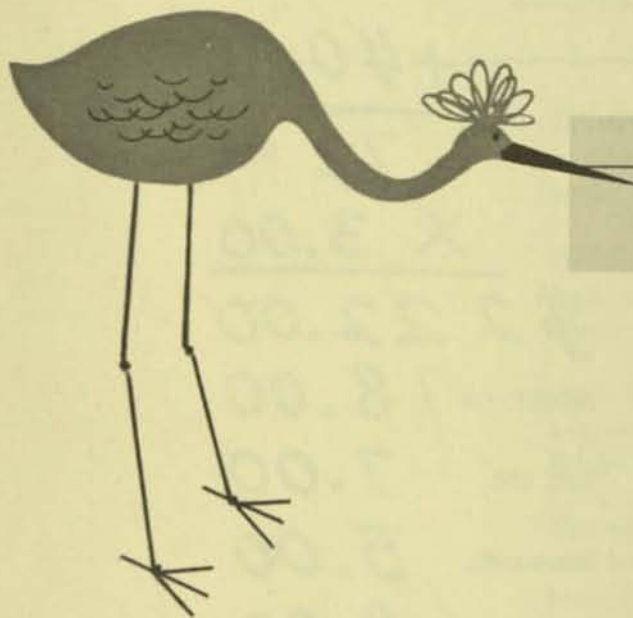
\$ 188.00



SUMMARIZING *and reporting*

The purpose of the summarizing function is to organize detailed data into a more concise form. In the new form, it becomes, more or less, a "bird's-eye" view of all transactions within a given classification. And is, in effect, new data created from other data already recorded.

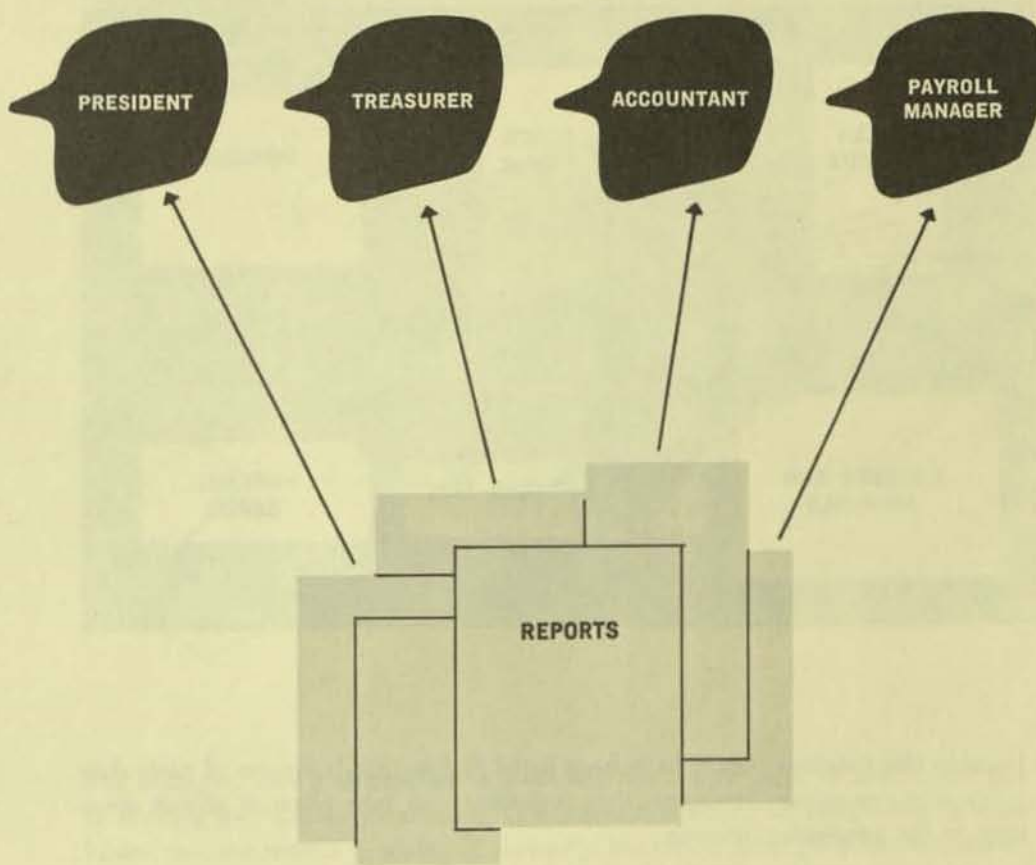
The box score of a baseball game is a "bird's eye" view of all the things that occurred in the game. To get a more detailed review of the game we can go back to the inning summaries . . . or to get an even more detailed description, we can refer to the play-by-play account of the game.



	HITS	RUNS	ERRORS
REDS	9	6	0
CUBS	7	4	1

This same philosophy is true of business reports—they are a "bird's-eye" view of business transactions. A dollar and cents report of sales by department is a summary of the sales transactions for each department. A dollar and cents report of sales by product is a summarization of all sales within each product class. And, a dollar and cents report of sales by customer is a summarization of sales to each customer.

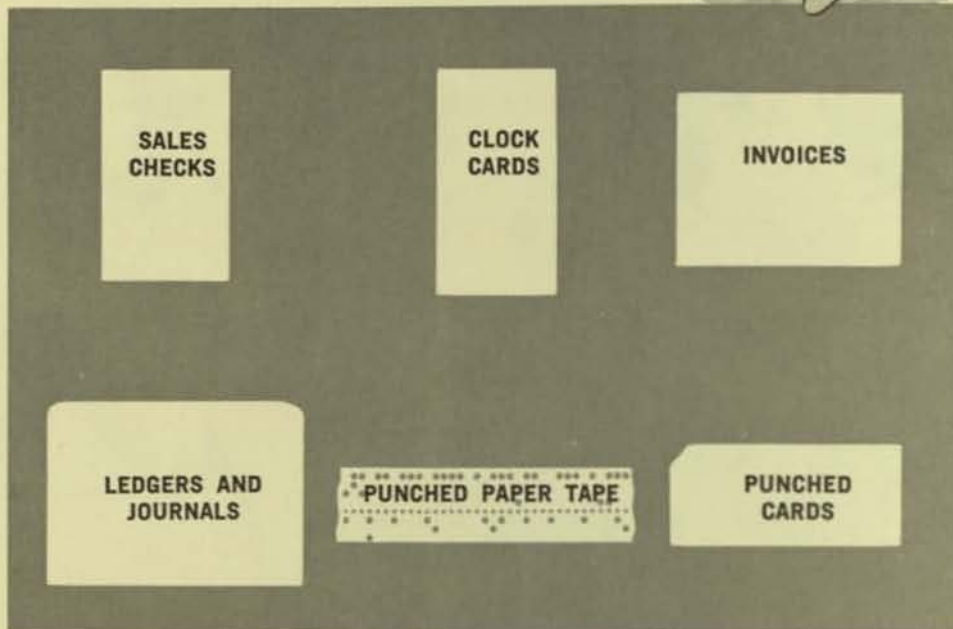
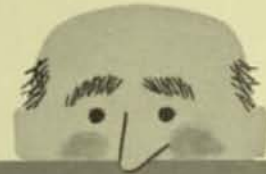
SALES REPORT	
Dept: No. 100	
Product # 1	265.10
2	85.25
3	112.15
4	300.00
5	650.00
6	15.00
7	22.50
8	112.20
9	10.00
10	45.00
Total	\$ 1,617.20



From a management point of view, it is important that reports be accurate, complete, well organized, capable of quick interpretation, and easy to use. As we move down the management chain of command, we find more detailed summaries are required. These summaries and reports can be highly skeletonized, or highly detailed, depending upon the person or persons, purpose or purposes, for which they are intended.

RECORDING

Data must be recorded on some type of media.



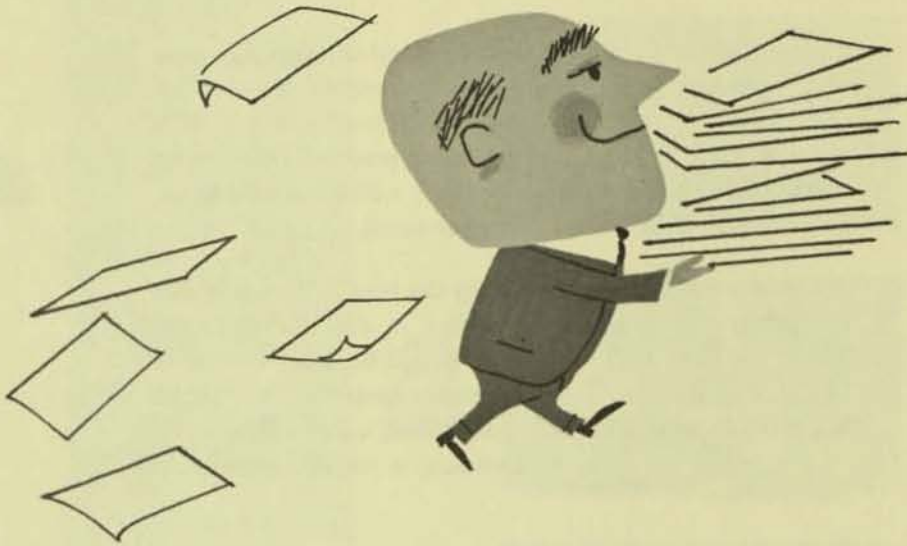
Possibly this function should have been listed first in this discussion of basic data processing operations. However, data recording can take place at almost every step in the processing routine.

It has been said that *RECORDING* is the expression of data upon a vehicle (or media) used in the processing routine. This can be the original recording of the data, the subsequent posting of the data, or the act of writing or re-writing at any stage in the processing system.

From a total systems point of view, the degree to which data is efficiently recorded will in every case affect the degree to which all subsequent processing will be efficiently accomplished. Errors in recording are usually compounded as the data flows through the system. Accuracy in recording contributes accuracy and efficiency to the other data processing operations—Coding, Sorting, Computing, Summarizing, and Communicating.

COMMUNICATING

Communication is the act of transporting data from one point to another in the processing routine.



For example, once a transaction is recorded, the media must, in most cases, flow to another location for processing. The transaction might be recorded in a warehouse, in some remote location. Of necessity, the media must get to the accounting department at another location . . . or in the same building. This can be accomplished in many different ways—messenger, mail, telephone, telegraph, pneumatic tubes, special conveyer belts . . .

As stated earlier in this brochure, DATA PROCESSING is a method or procedure used to accomplish the accounting, statistical, and reporting functions for a business. As a result, data processing systems must be geared to the needs of the people in business. To do this, the system must provide a smooth flow of data . . . people must be able to “interrogate” (ask questions of) the system . . . and the system must provide for a clear, concise, and accurate method of communicating—that is, moving the data from one point to another in the processing routine.

In conclusion

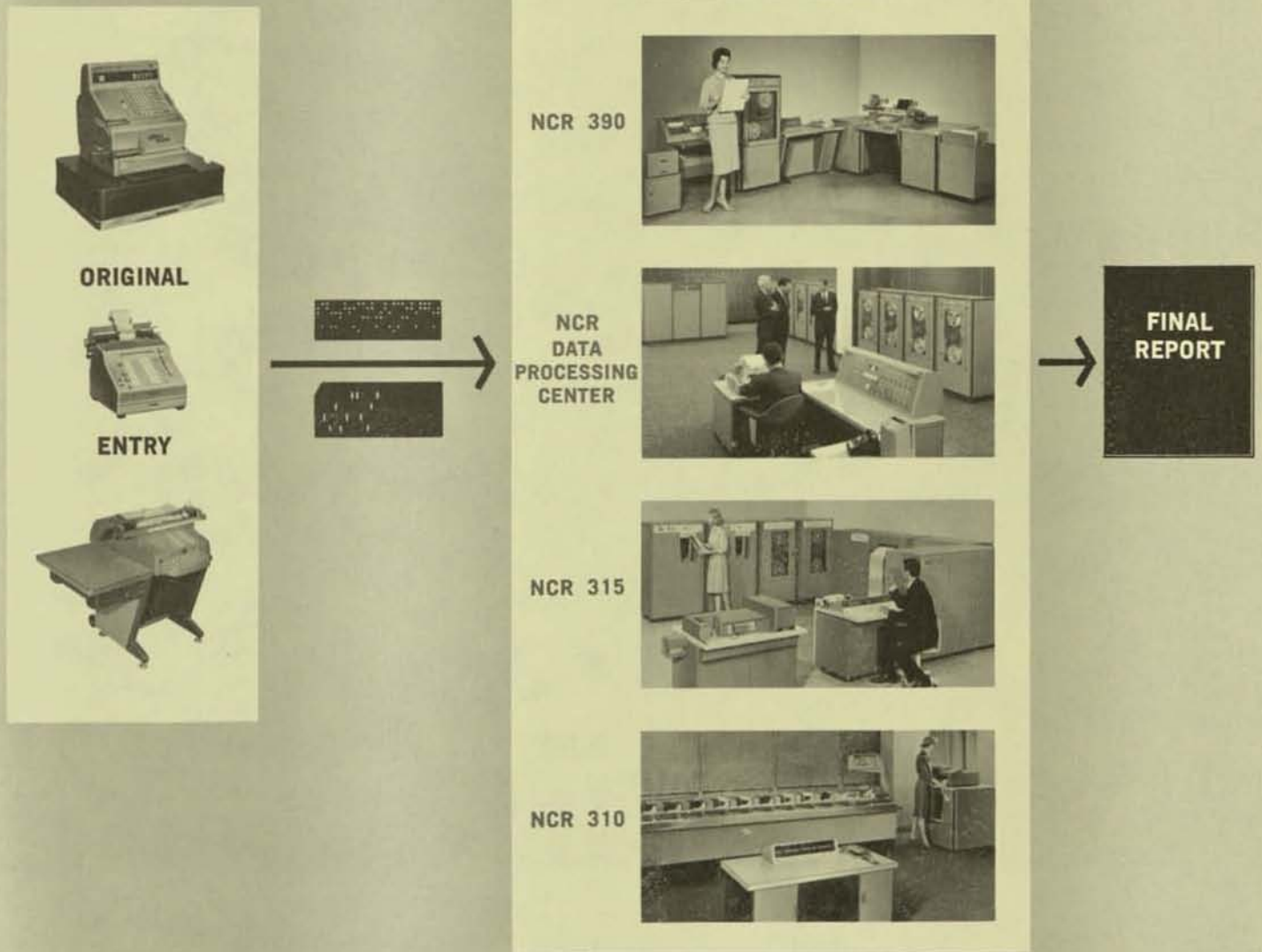
For over 75 years, NCR has pioneered and developed systems and equipment to meet the needs of business. Now, as we move ahead in the exciting age of electronics, we at NCR are dedicated to the goal of providing practical solutions to, and applications of, electronic systems which meet the needs of every line of business . . . large or small.

A recent survey concluded that by the year 1970 over 50,000 computers will have been installed in the United States. Then, too, thousands of businesses will be using the facilities of an Electronic Data Processing Center to do part, or all, of their processing. For this reason, a basic knowledge of the principles of data processing is important to every businessman.

In the final analysis, you, the men and women of business, are the ones who will reap the great benefits of EDP. The more you know about these new facilities . . . and the degree to which you put them to use . . . will determine the extent of the benefits you will enjoy.

The next book in this series—What is Binary Arithmetic?—takes up the subject of machine languages, from the layman's point of view.

NCR goes all the way from original entry to final report



NCR PROVIDES TOTAL SYSTEMS—FROM ORIGINAL ENTRY TO FINAL REPORT—
THROUGH ACCOUNTING MACHINES, CASH REGISTERS OR ADDING MACHINES, AND DATA PROCESSING
The National Cash Register Co. • 1,039 offices in 121 countries • 78 years of helping business save money

