The abc's
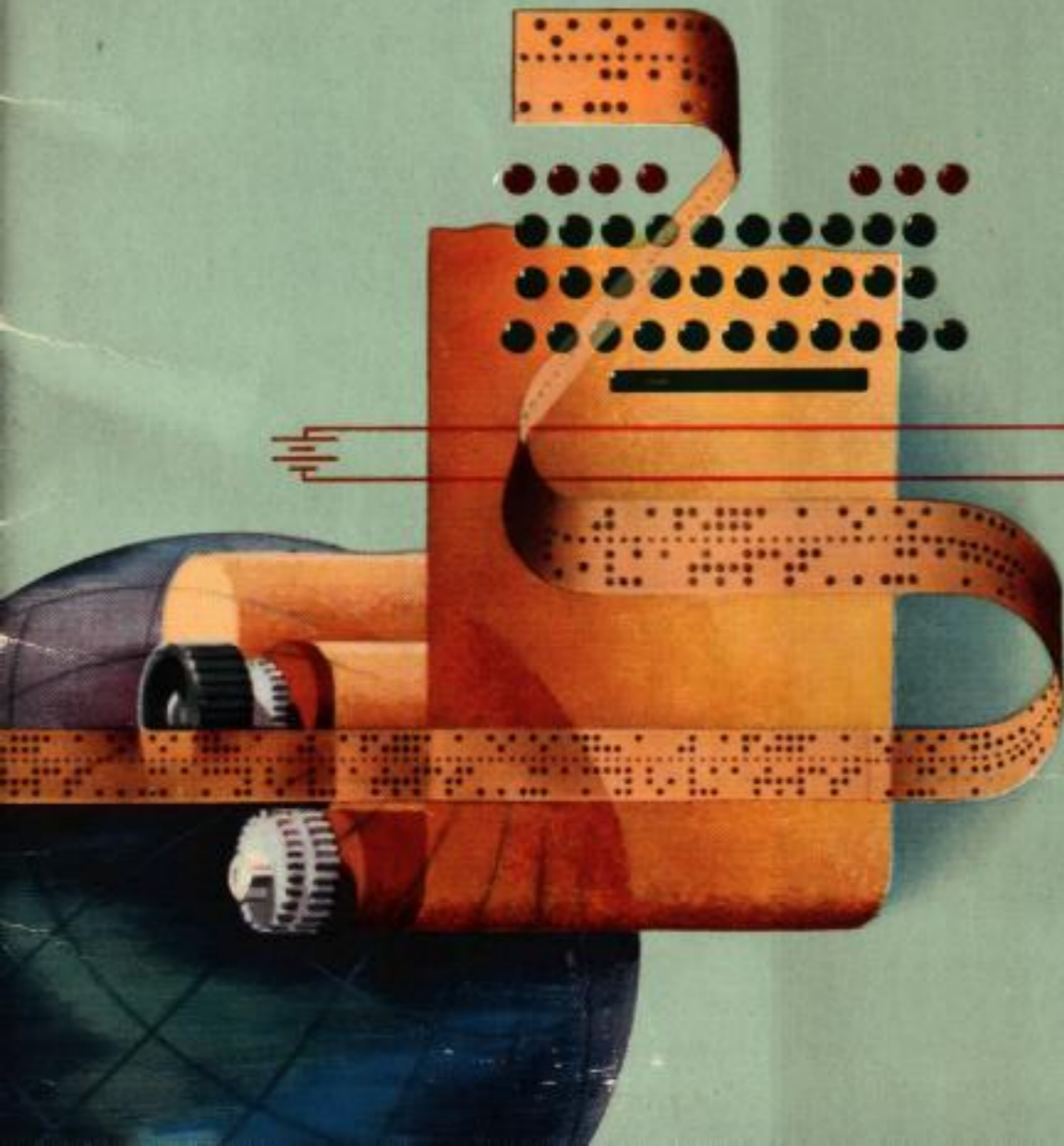
of TELETYPE Equipment

a

OVER THE CENTURIES

there have been many advances in communications...

YOUR MESSAGE IS TYPED AT 3 P.M.

12

3

... Among all these, TELETYPE EQUIPMENT is unique in that it permits the instantaneous delivery of a PRINTED message ... regardless of the distance it must travel.

12

AND IS PRINTED IN ANOTHER CITY   **3**   INSTANTANEOUSLY!

b

...ROUND THE WORLD IN A JIFFY!

This is possible because with TELETYPE EQUIPMENT messages are transmitted in the form of electrical pulses—which travel at the speed of light.

In fact, a Teletype printer in Chicago can type a character and originate corresponding electrical pulses ... transmit these pulses to a Teletype printer in New York, or San Francisco, or Montreal, or—you name it ... and the distant printer will receive the pulses and type the same character ... ALL WITHIN A FRACTION OF A SECOND.

Or, to put it another way, your message can be transmitted ... received ... read ... and possibly even answered ... in less time than it would take your secretary to address and seal the original message in an envelope, stamp it and deposit it in the corner mail box.

Not even time to powder my nose before they answer!

where's the typist?

d

But speed is only one of many advantages provided by TELETYPE EQUIPMENT.

To get a better picture of the possibilities of this versatile apparatus, let's

study it in action. Let's find out how it works...what it actually does.....

e

. . . . . . Suppose we start with a familiar object . . . a doorbell or buzzer.

When you ring a doorbell, what really happens?

Here's a play-by-play description:

WHOOZIT?

1

You push the button . . . this makes an electrical contact causing current to flow over a wire.

2

The electrical current operates a magnet . . . this causes the armature to vibrate and ring the bell.

Naturally these two steps are more complex in the operation of TELETYPE EQUIPMENT, but the fundamental idea is the same. You strike a key . . . electrical pulses speed on their way . . . and you get action. HERE ARE THE STEPS . . .

1 KEYBOARD TRANSMISSION

The operator types on a keyboard similar to that of a typewriter. This opens and closes an electrical contact, causing electrical pulses to be transmitted.

Thus the keyboard transmitter is simply a device for converting mechanical action (the depressing of a key by the operator) into electrical pulses and sending them over the signal line.

2 PRINTER RECEPTION

The incoming electrical pulses cause each receiving machine to type the message automatically, character by character, exactly as sent.

In other words, the receiving Teletype Printer is a device for converting the incoming electrical pulses to a typed character.

2...And your message is printed here!

IN THE FORM OF ELECTRICAL PULSES, INFORMATION CAN BE TRANSMITTED OVER ANY DISTANCES...

... across the room, across the street—or across the continent. What's more, pulses can be dispatched simultaneously to any number of receiving machines. The typing unit of the sending machine can respond to the same pulses, thus providing a typed copy at the transmitting point.

*Now, let us pause for a moment to study these pulses. What are they? How are they generated?*

Let's start with a signal line. Ordinarily* there are two possible conditions of the signal line:

1 When the contact is closed, current flows and the line is said to be "marking." A MARKING PULSE is generated when the contact is held closed for a fixed length of time.

2 When the contact is opened, no current can flow and the line is said to be "spacing." A SPACING PULSE is generated when the contact is held open for a fixed length of time.
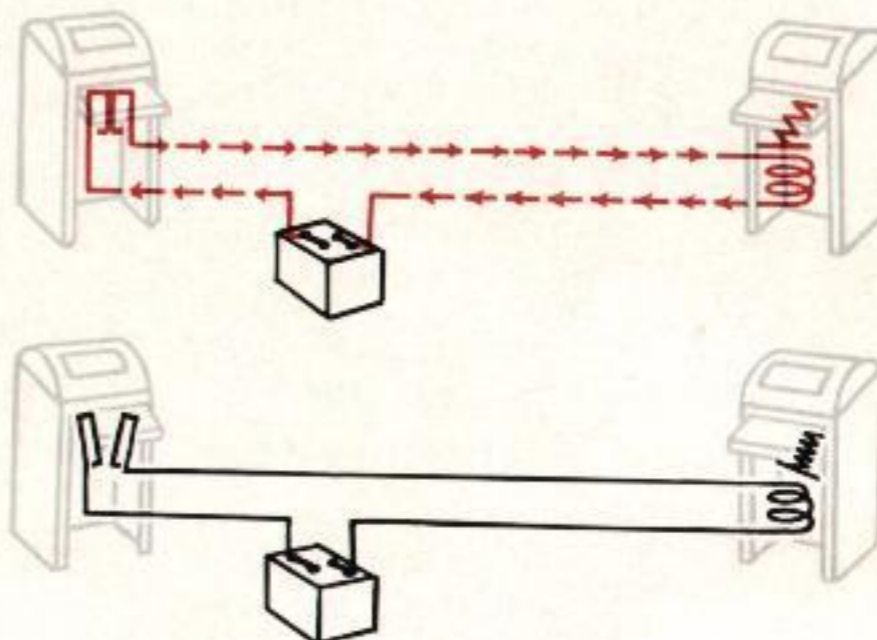
A PULSE IS SIMPLY A MEASURED INTERVAL OF SIGNAL LINE TIME DURING WHICH THE FLOW OF CURRENT IS EITHER PERMITTED TO CONTINUE—OR IS INTERRUPTED—BY THE OPERATION OF A CONTACT.

Marking Pulse (Current)

Marking Pulse (Current)

Spacing Pulse (No Current)

Spacing Pulse (No Current)

Spacing Pulse (No Current)

7
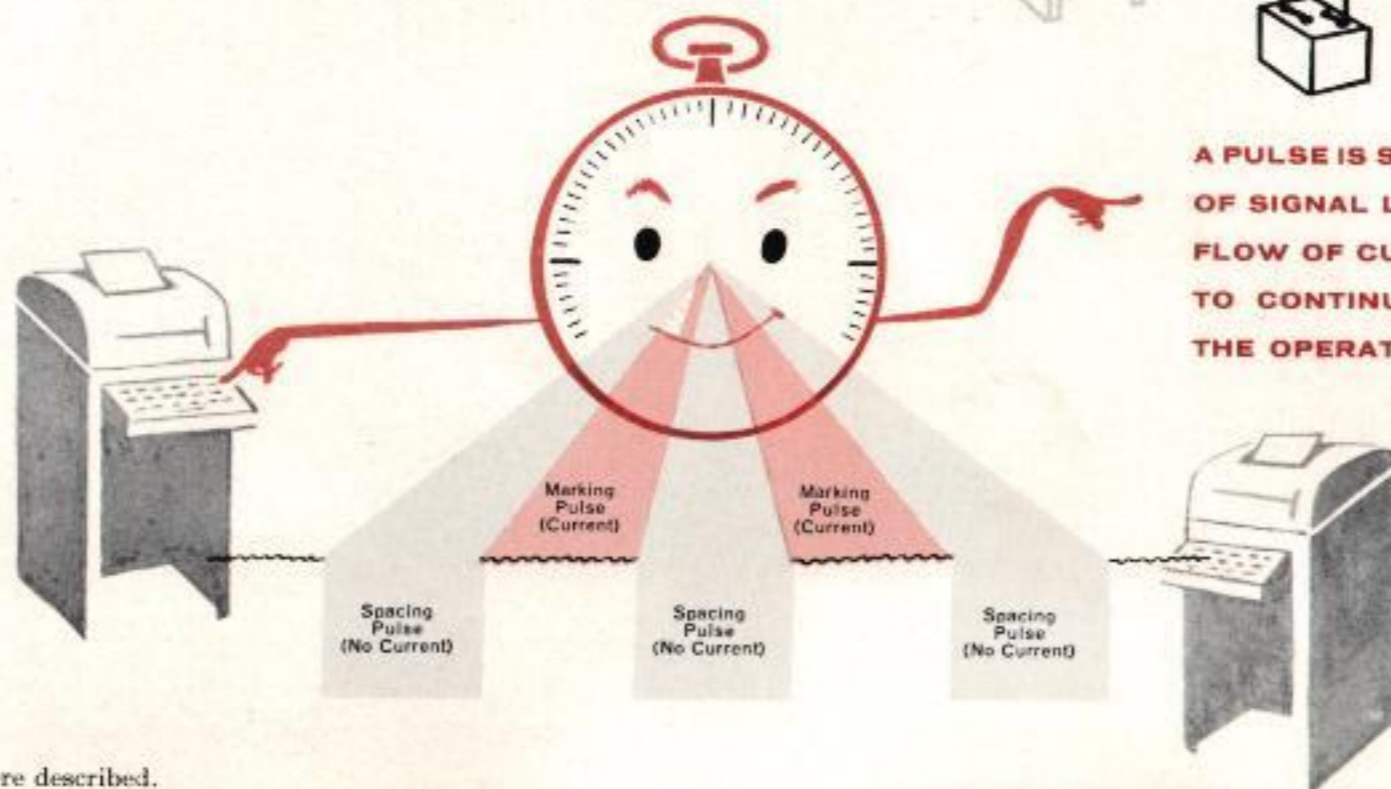
*for the neutral circuit here described.

TO TRANSMIT A CHARACTER, A COMBINATION OF PULSES CORRESPONDING TO A CODE IS SENT OVER THE SIGNAL LINE

Most Teletype units are designed to operate on a 5-unit code—that is, the code combination for each character is made up of five pulses. These pulses may be either marking or spacing. The 5-unit code is often called the COMMON LANGUAGE CODE. It was devised late in the 19th century by Jean Baudot, an officer in the French telegraph service. This code is used by various telegraph systems throughout the world and by many business machines.

With a 5-unit code, 32 combinations are mathematically possible. Of these, 26 are assigned to the letters of the alphabet and the rest to control functions such as carriage return, space, etc. A shift mechanism, controlled by the FIGURES and LETTERS combinations, extends to 64 the number of available character selections.

A TYPICAL CODING ARRANGEMENT

NUMBERS INDICATE MARKING CODE PULSES

In addition to the code pulses, each combination is preceded by a *start pulse* (always spacing) and followed by a *stop pulse* (always marking). The purpose of the start and stop pulses is to keep the sending unit and the receiving unit in synchronism.

| START | 1 | 2 | 3 | 4 | 5 | STOP |
| SPACING | MARKING | SPACING | SPACING | MARKING | SPACING | MARKING |
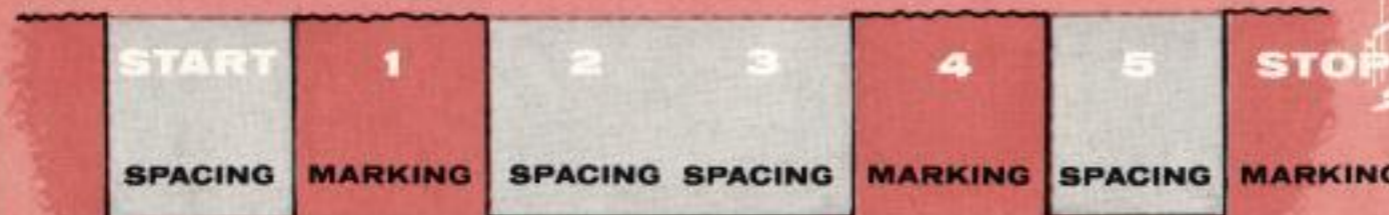
Transmitting the Letter "D"

TELETYPE PAGE PRINTER
Send-Receive Model

FOR 2-WAY TRAFFIC

TELETYPE PAGE PRINTER
Receive-Only Model

FOR 1-WAY TRAFFIC

THE PAGE PRINTER IS THE MOST FAMILIAR TELETYPE PRODUCT

This is the machine you see in TV newscasts...and which has become the "messenger" of the printed word all over the globe.

the page printer records
information on a
continuous paper roll...

THIS IS A SAMPLE OF TELETYPE PAGE PRINTER COPY. THE

WIDTH OF THE PAPER IS USUALLY 8 1/2 INCHES AND THE

CHARACTERS ARE SPACED TEN TO THE INCH ACROSS THE PAGE.

LINES MAY BE EITHER SINGLE OR DOUBLE SPACED.

(Shown ½ actual size)

...or on multi-copy business forms

The Page Printer may be equipped with a sprocket feed platen having projecting pins which engage perforations in continuous multi-copy business forms to keep them in accurate register.

In direct keyboard transmission, as we have seen, the sending of code pulses over the signal line is manually controlled. The operator strikes a key . . . code pulses travel over a signal line . . . and the character is typed at one or more distant points. This is *manual transmission*.

k

There is another method of dispatching code pulses over a signal line—AUTOMATIC TRANSMISSION. Here, keyboarding and transmission are separated so each can be controlled individually.

The keyboarding is done on a Tape Perforator (Page 15), which punches holes corresponding to the signaling code in a paper tape.

The coded tape is then fed into a Transmitter Distributor (Page 17). This unit senses the code holes in the tape, makes electrical contacts, and automatically sends the pulses over the line.

punched

tape...
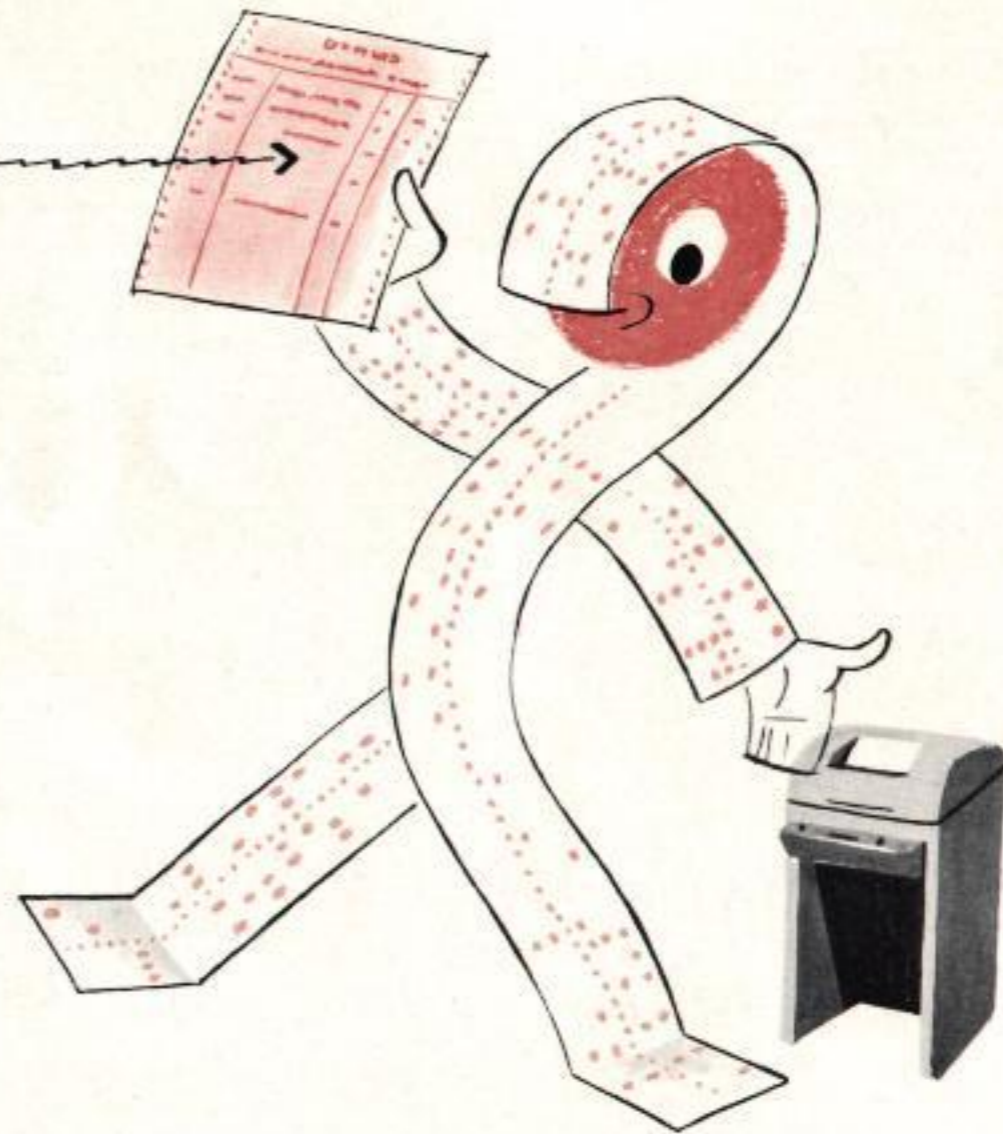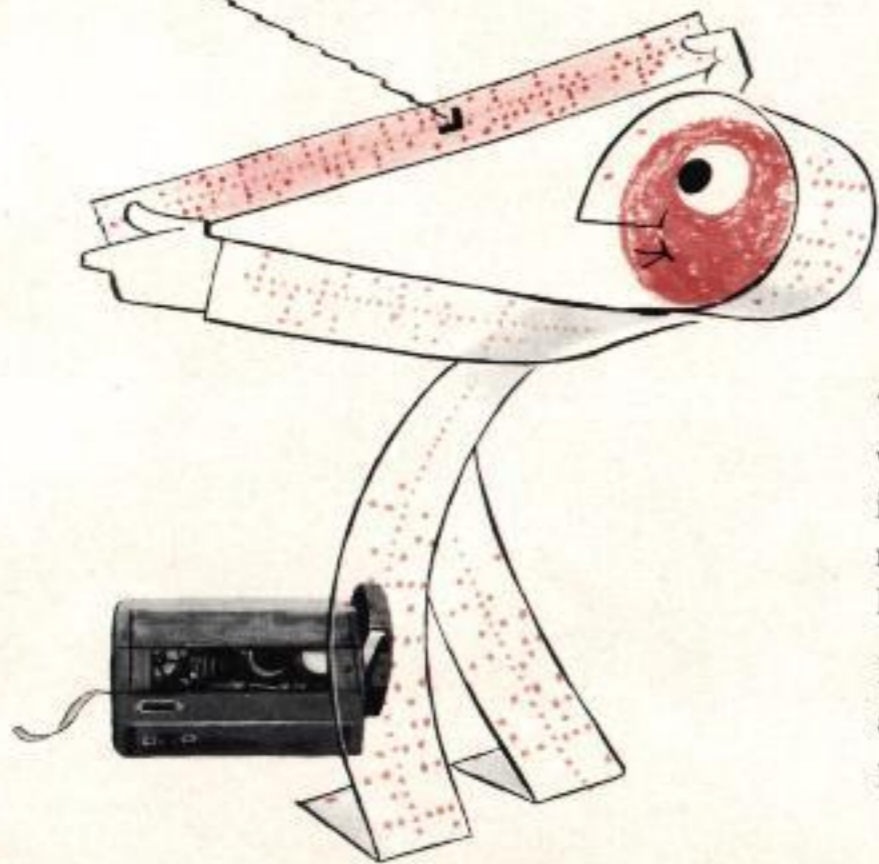
What happens at the receiving point? The code signals are the same, whether dispatched manually or automatically. They can be translated into either page copy or punched tape, depending on the receiving apparatus employed. Or, if both page and tape copy are wanted, the two kinds of units may receive the signals simultaneously.

For page copy, the receiving machine is a Page Printer, as we have already seen. For punched tape, the receiving machine is a Tape Reperforator (Page 16).

FULLY PERFORATED TAPE...The confetti is called "chad."

Here is just a glimpse of some of the uses of punched tape:

Maximum Utilization of Signal Lines. Transmission from tape is automatic, evenly paced. Lines are used to capacity, peak loads handled more easily.

Maximum Production in large volume telegraph operations (Page 15).

Mechanization of Message Relaying (Page 19).

Reusable Labor. Tape can be used over and over again.

Stored Labor. Keyboarding can be done when convenient and stored in tape for use later; for example, transmission at the end of the day or at night.

Automatic Reproduction of tape, page, or form copy.

Integrated Data Processing. An application of the concepts of reusable and stored labor (Page 21).

Editing. Typing errors can be deleted before transmission.

Data Input and Output for certain types of computers.

Control Medium for Automation. Certain types of machines can be operated automatically with punched tape.

PUNCHED TAPE...

We'll talk more fully on the pages that follow about the applications of punched tape and about tape-operated Teletype equipment.

Punched tape introduces speed, flexibility, and versatility not always possible with direct keyboard transmission. Once information is cut into tape, the tape becomes a willing servant—a time and work saver of the first magnitude.
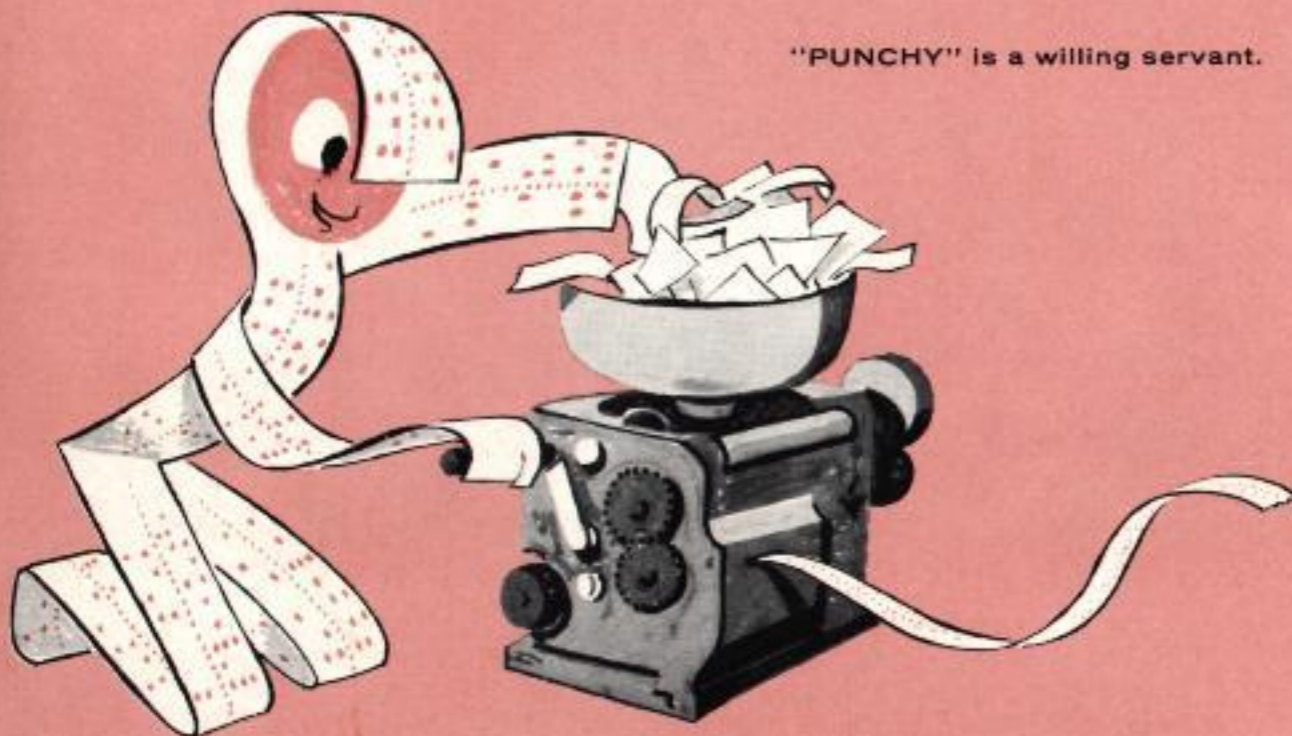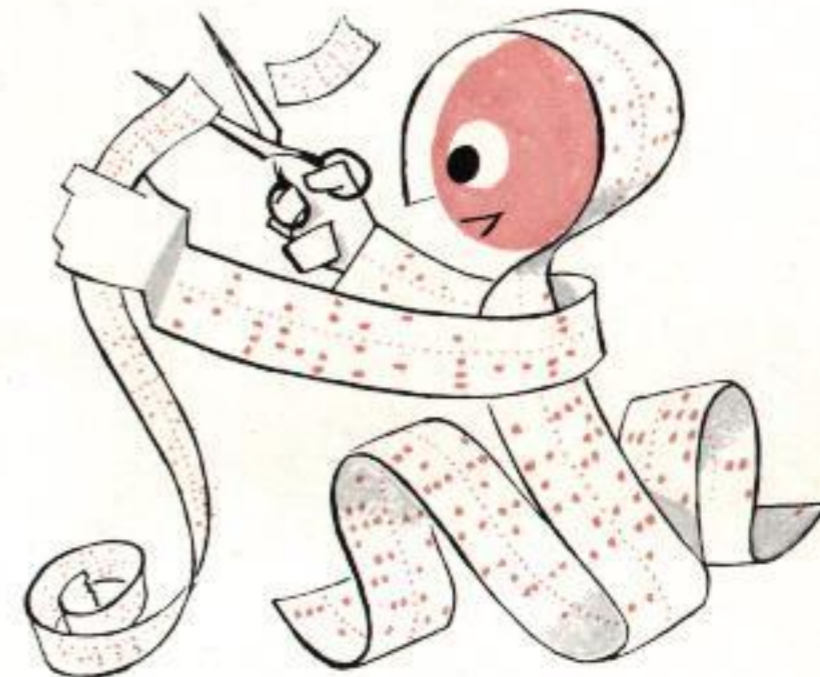

n

THIS IS CHADLESS TAPE   THIS IS CHADLESS TAPE   THIS IS CHADLESS TAPE

PRINTED CHADLESS TAPE...The perforations remain hinged to provide printing surface.

"PUNCHY" is a willing servant.

TAPE PERFORATOR

Teletype Tape Perforators are used by press associations, railroads, commercial telegraph companies, the military—and, increasingly, by business and industry as their communication loads grow.

THE TAPE PERFORATOR

In large volume communications, it is customary to punch tape for transmitting the bulk of the traffic. The machine generally used is the TELETYPE TAPE PERFORATOR, a high speed instrument producing fully punched tape.

This method of operation offers two advantages:

1

Improved Operator Output

In direct keyboard transmission the operator's speed is limited to the standard speed of equipment and lines (usually 60, 75 or 100 words per minute). The Perforator, however, is an "off-line" machine—that is, it is disassociated from the signal line. It is equipped with a "free speed" keyboard, and trained operators attain extremely high speeds. They learn the code and can read the tape as easily as a newspaper.

2

Maximum Utilization of Transmission Lines

In direct keyboard transmission the standard speed of equipment and lines is not fully realized because of limiting factors, such as operator interruptions and fatigue. With tape, transmission is automatic and lines are utilized to capacity.

In essence, this is a production line technique: a job is split into two steps so each can be handled more effectively.

THE TYPING TAPE REPERFORATOR

As its name implies, this unit is a "receiving perforator." It receives code pulses and records them by punching tape. This unit also types the characters on the tape, so the tape can be read by anyone and handled easily. To accommodate the printing, the tape produced is the partially punched, chadless variety.

The Typing Reperforator is important in both communications and data processing. Among the many tasks this machine is called upon to perform are the following:

Message Relaying. At central points, for interchange of traffic between locations not connected by direct wire.

Monitoring. Providing a record in storable form of all traffic transmitted from a station.

Integrating Data. Combining information from several sources into a single tape.

Reproducing Tapes. For multiple address messages and wherever duplicate tapes are needed.

By-Product Tapes. By teaming a Reperforator with a Page Printer, tapes can be made of incoming and outgoing traffic automatically, as a by-product.

TYPING REPERFORATOR
Tape Reproducer

THE TAPE TRANSMITTER DISTRIBUTOR

This unit, sometimes called a "tape reader," reads code combinations in punched tape and transmits the corresponding code pulses to one or more receiving points.

The operator inserts the tape . . . flips the switch to "ON" . . . and transmission is under way. Once started, the tape feeds automatically. The unit even shuts itself off automatically.

The Transmitter Distributor is the basic tool for moving information which has been coded into punched tape. It delivers the data automatically and instantaneously— across the room, across the city, or across the country to branch plants or offices located thousands of miles away.

THE MULTIPLE TRANSMITTER DISTRIBUTOR

This is a variation of the basic Transmitter Distributor, designed to save space where a number of machines are required. Three or six units are compactly packaged with a single motor. An automatic start feature permits successive transmission from the various tape gates, if desired.

MULTIPLE TRANSMITTER DISTRIBUTOR

17
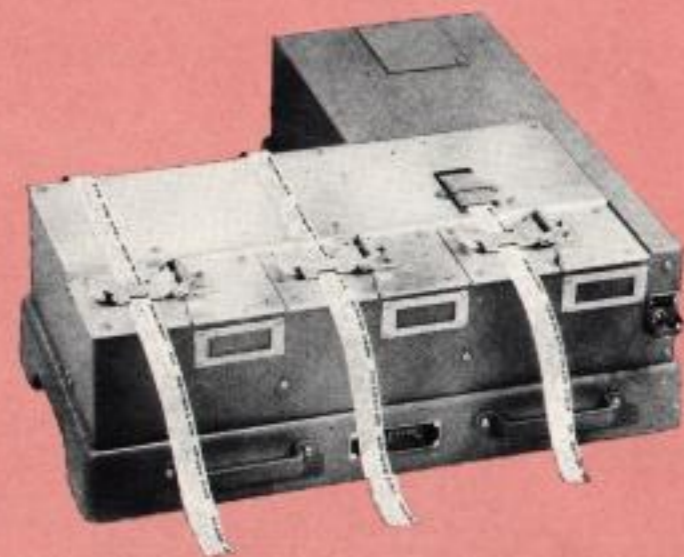
A popular set for office installation—for both communications and data processing. For all its versatility, a typist can learn to operate it with just a day's instruction.

THE COMPOSITE SET

The Teletype Composite Set is a highly flexible and compact arrangement of equipment. It consists of:

1 Perforator Transmitter

This unit is a combination keyboard transmitter and tape perforator. The operator has a choice of:

a   Free speed tape preparation apart from the signal line.

b   Tape preparation with simultaneous direct keyboard transmission.

c   Direct keyboard transmission only.

2 Transmitter Distributor

For automatic transmission from tape produced by the set or obtained from other sources.

3 Page Printer

For receiving incoming traffic and making local copies of outgoing messages and data. The copy may be produced on continuous roll paper or multi-copy business forms.

A Typing Reperforator is often associated with the Composite Set to provide a tape on incoming traffic, so that both tape and page copy will be available.

This combination of equipment is also used for integrating information from stored tapes with data added manually.

MESSAGE RELAYING.. ..through communication centers

Many large users of Teletype equipment operate communication centers. Here, messages are received in tape for retransmission—a procedure called "message relaying."

A centralized system of this kind offers several advantages. Fewer transmission lines are required than would be the case if all stations were interconnected directly. Moreover, messages can be interchanged between stations with operating variations. And, perhaps most important of all, traffic can be controlled. A message center makes possible more orderly handling of traffic, minimizing competition for the use of signal lines and leveling out peak loads.

A simple method of relaying used in many communication centers is the TORN-TAPE SYSTEM. **HERE'S HOW IT WORKS**
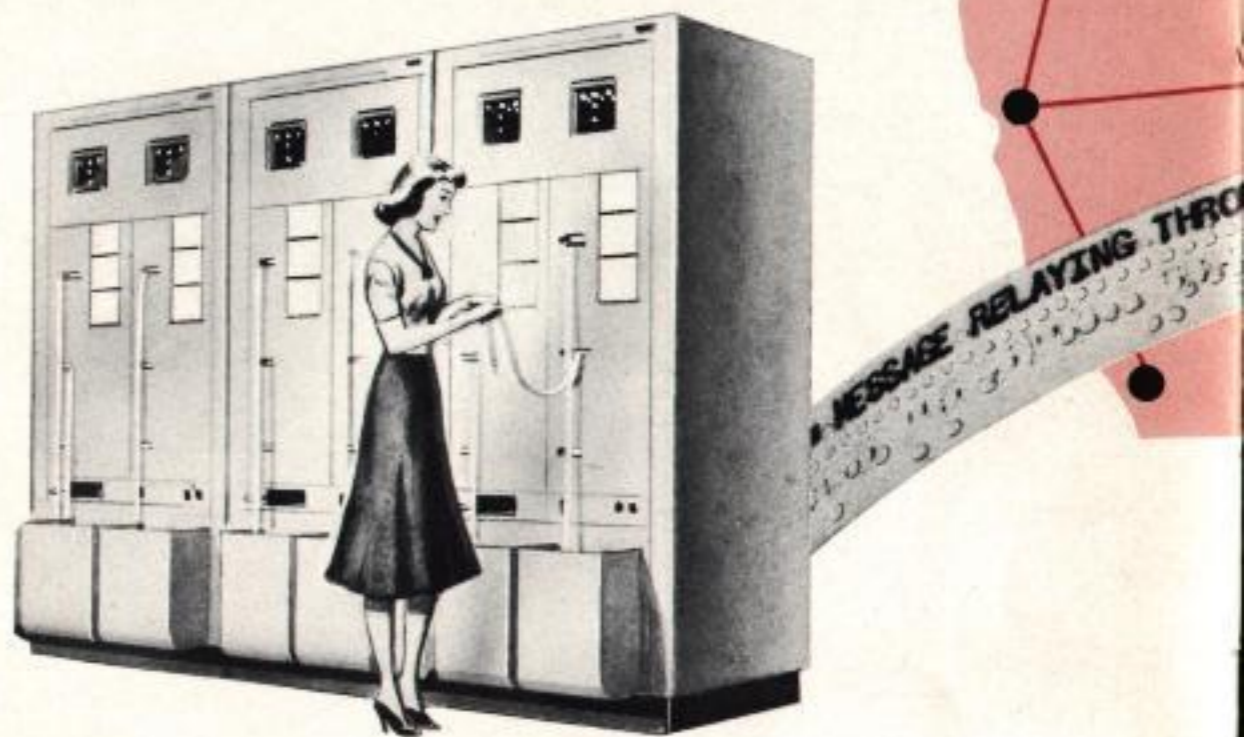
RECEIVER CABINETS...

hold Typing Reperforators (described on Page 16), which receive incoming messages in tape. The tape is printed as well as punched, to facilitate handling.

The individual messages are separated by tearing—hence the name "Torn-Tape"—and inserted in tape grids according to destination. The tape grids are mounted on the transmitter cabinets and act as a sorting facility for outgoing traffic, usually with some provision for rush messages.
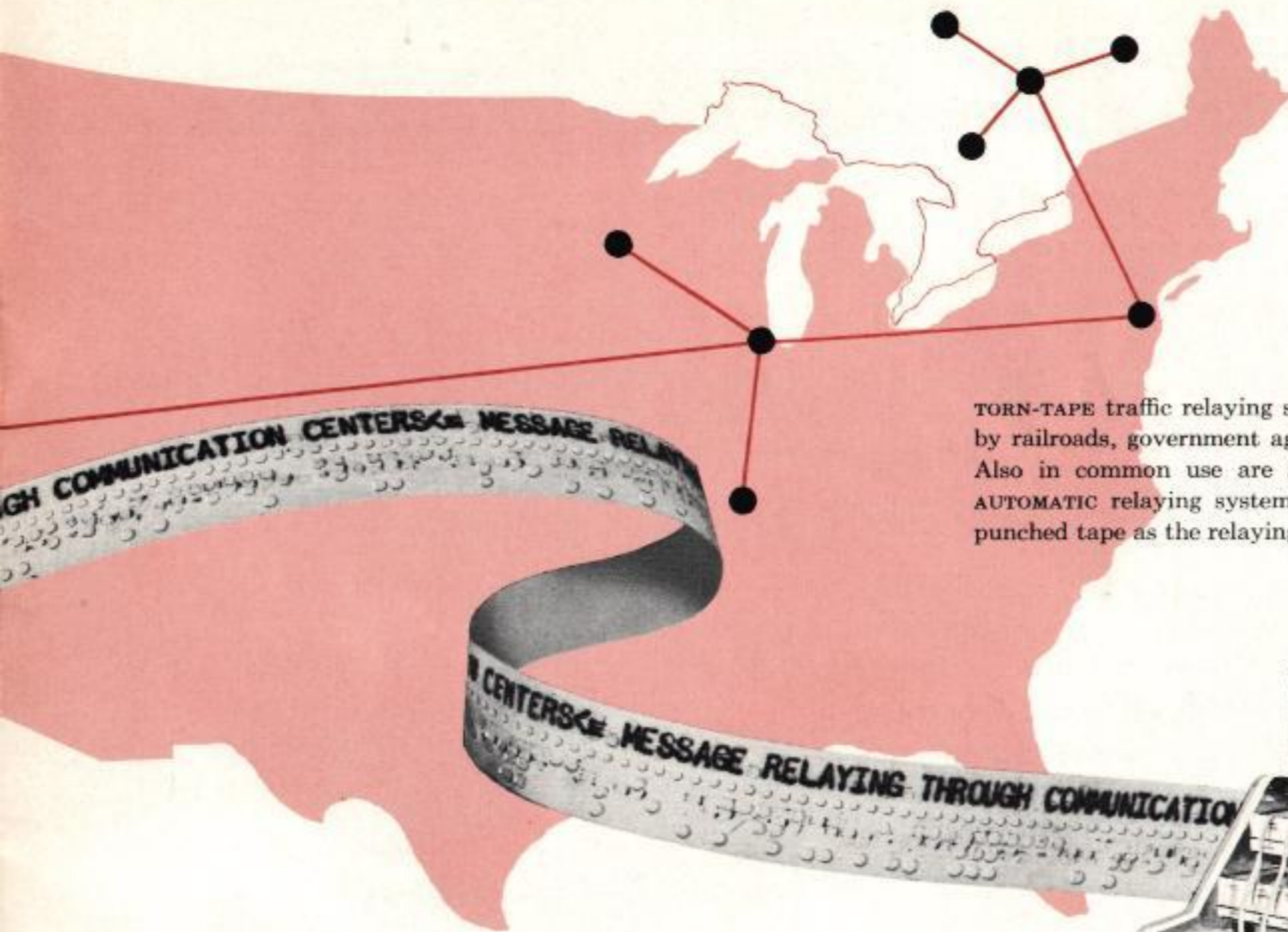
TORN-TAPE traffic relaying systems are used extensively by railroads, government agencies, and industrial firms. Also in common use are SEMI-AUTOMATIC and FULLY AUTOMATIC relaying systems. All of these systems use punched tape as the relaying medium.

TRANSMITTER CABINETS...

contain 3-gang Transmitter Distributors (described on Page 17), along with special numbering Transmitter Distributors.

The attendant pulls each tape through the slot in the tape grid and inserts it in the proper message Transmitter Distributor for its destination. No further attention is required. The numbering Transmitter Distributor cuts in automatically to transmit the message number; then transmission from the message Transmitter Distributor starts—also automatically.

INTEGRATED DATA PROCESSING...is a method of mechanizing business paper work so a single typing effort can be used over and over again

In modern business many different papers are required for even a single transaction. Much of the detail is necessarily repetitive—customer's name, description of items ordered, and so on. Likewise, certain detail is repetitive from one transaction to another involving the same customer or the same supplier.

With an IDP system, information is recorded at the point of origin in an automatically reproducible storage medium such as punched tape, often as a by-product of the first set of papers to be typed.

Thereafter, the *repetitive data* is reproduced mechanically whenever needed. Also, it can be *integrated* with *variable data* typed in by hand to produce new kinds of records—and it can be transmitted and reproduced at other locations without additional typing.

Since the 5-unit Baudot code—the so-called "common language code"—used by standard Teletype equipment is also used by an increasing number of business machines, the re-use of data is further extended to produce address plates, punched cards, computer input, etc.

Integrated Data Processing has found enthusiastic acceptance in businesses of all sizes. It simplifies paperwork, while at the same time making it easier to get information to everyone concerned. Accuracy is improved, too, since the mechanically reproduced material will always be identical.

Shop Order

Shipping Record

Billing Record

Tape Copy

Tape Transmission

Order Entry

Order Editing

Master Tape Preparation

Tape Transmission

21
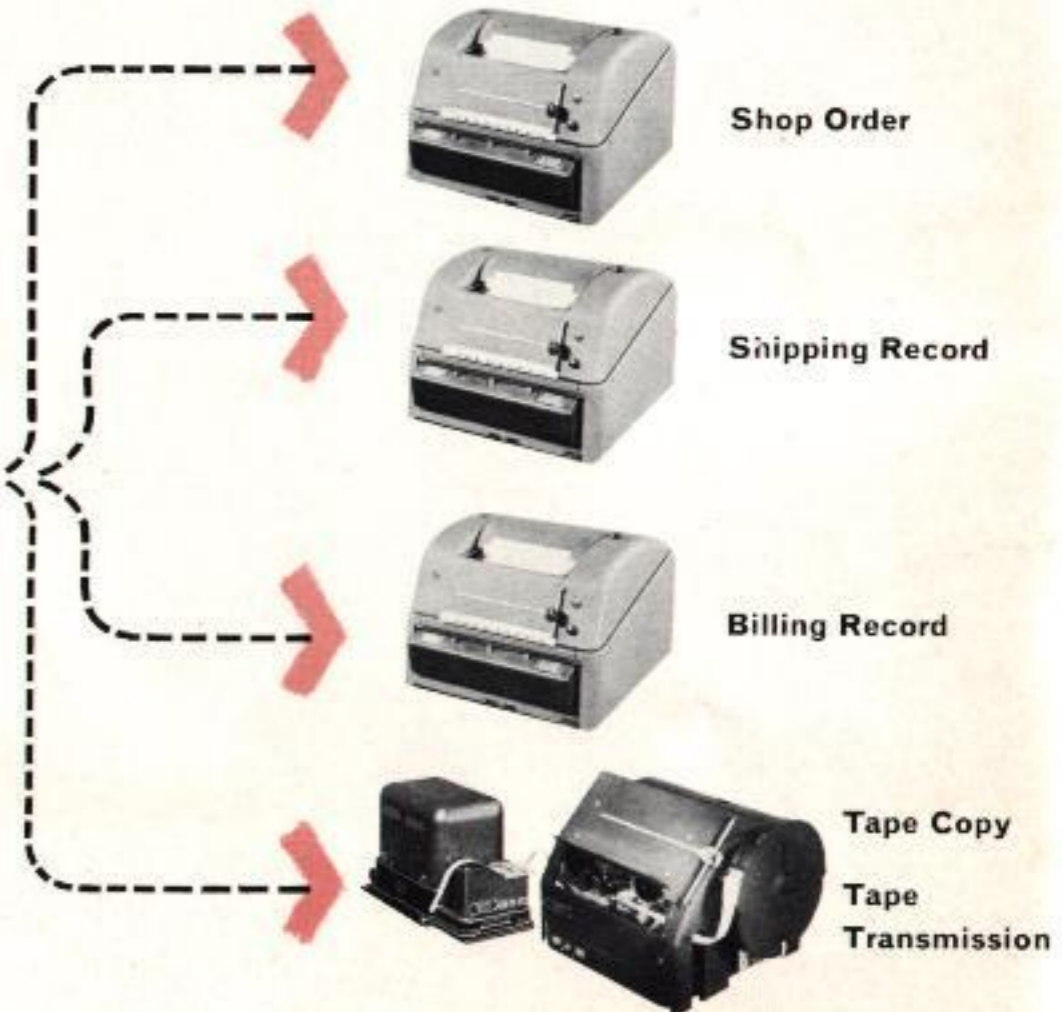
This completes our brief study of the more familiar units of Teletype equipment and the ways in which they are used. However, Teletype Corporation also manufactures various other types of equipment. For example:

ELECTRONIC MULTIPLEX EQUIPMENT

This is a time-division synchronous system for handling volume traffic. The sending unit combines signals from four start-stop channels for transmission over a single multiplex channel. The receiving unit reconverts the multiplex signals to start-stop signals.

REPERFORATOR TRANSMITTER DISTRIBUTOR

This unit is used in fully automatic switching systems. It combines the utility of the Typing Reperforator and the Transmitter Distributor in a single unit. The unique "climbing" transmitter permits sensing the last character perforated in the tape.

OTHER TELETYPE® EQUIPMENT

SIX-UNIT CODE APPARATUS

Page Printers, Transmitter Distributors, and Reperforators operating on a 6-unit code are used primarily in the news and printing fields in connection with Teletypesetter equipment, a system for setting type automatically through tape control.

HIGH SPEED TAPE PUNCH AND TAPE READER

High speed equipment provides communication at six to ten times normal printing telegraph speeds. It is of particular use as input and output means for computers and other high speed machines and can be provided for 5, 6, or 7 unit codes.

CHEMICAL COMPANIES

Teletype equipment bridges the distance between sales and shipping points, substantially reduces the paperwork of order processing, and speeds up service to customers.

AIR LINES

Extensive networks are maintained for reservations, weather data, flight manifests, etc. In Chicago, air lines are interconnected by a special circuit that enables them to book space for passengers who need reservations on more than one carrier.

HOTELS

Most large hotels use Teletype equipment for reservations, as well as handling administrative detail, providing telegraph service for guests, etc.

AUTOMOBILE MANUFACTURERS

In building some of today's sleek, custom-styled cars, Teletype equipment is used on the assembly line for split-second coordination of body style, motor, tires, upholstery, optional accessories, etc.

HOSPITALS

In Detroit, hospitals use a wire network to check incoming patients' Blue Cross insurance status. In Kansas, a circuit enables a group of small hospitals to get quick pathological and radiological reports from a central laboratory in Wichita.

BROKERAGE FIRMS

Orders for purchase or sale of securities from brokerage offices anywhere in the United States or Canada can reach the floor of the New York Stock Exchange in less than a minute via Teletype equipment.

MILITARY AND CIVILIAN GOVERNMENT AGENCIES

Teletype equipment is depended on heavily for military communications of all kinds. Networks also keep Washington civilian agencies in touch with far-flung outposts, whether in Alaska, Tokyo, or Paris. Other circuits control air traffic, collect and disseminate weather information, gather reports on money flow from federal reserve districts, and keep a constant check on agricultural conditions throughout the country.

AT WORK

NEWS MAGAZINES

Closer deadlines and better editorial control are achieved by "setting type" with Teletypesetter equipment in editorial offices, then transmitting to printing plants for automatic control of type-casting machines with punched tape.

OIL AND GAS COMPANIES

Producers use wire circuits to expedite status reports on new wells, transmit inventory and flow data, and improve contact with field offices.

POLICE

Both local and inter-state networks help police exchange information, send "alerts", and track down suspects.

PRESS ASSOCIATIONS

Teletype equipment long ago became a basic tool in press operations; it provided the means for getting news to all member and client papers simultaneously.

RAILROADS

A railroad was the scene of the first field trial of Teletype machines, and railroads were pioneer users of the equipment —for expediting car and train movements, dispatching consist and wheel reports, waybills, reservations, instructions, and a host of other uses.

RED CROSS

One of the largest networks in operation today helps Red Cross workers bring servicemen and their families together in time of emergency—as well as serving to mobilize aid for areas stricken by floods, fires, hurricanes, and other disasters.

STEEL COMPANIES

A large steel company has an extensive integrated data processing system. Another company flashes new orders to mills currently rolling the sizes and shapes required, thus avoiding costly machine setup changes. Other steel companies use Teletype equipment for a variety of production control, administrative and communication purposes.

TELEPHONE, TELEGRAPH AND CABLE COMPANIES

These companies are major users of Teletype equipment for some of the services they provide. Besides the familiar telegram and cable, there are exchange services similar to telephone connections, as well as private wire services tailored to the needs of individual customers.

Teletype Equipment

MAY BE BOUGHT...OR LEASED

The question is often asked, "Is Teletype equipment purchased outright—or is it leased?" This question has a two-part answer, and the user selects whichever method fits his own plans and needs.

PURCHASE. Teletype equipment, parts, and accessories may be bought directly from Teletype Corporation—or, outside the United States, from one of the Company's distributors. Users who do not have their own signal line facilities may lease them from communication companies. To train customers' employees in the maintenance of the apparatus. Teletype Corporation conducts a tuition-free school.

LEASED SERVICE. A user may prefer to lease Teletype equipment. Leased Service is provided by telephone and commercial telegraph companies, with installation and maintenance as part of the service. Many of the largest networks in service today are leased.

Z

WHOM TO CONTACT

	UNITED STATES	CANADA	OTHER COUNTRIES
TO PURCHASE TELETYPE EQUIPMENT	Teletype Corporation Sales & Merchandising 4100 Fullerton Avenue Chicago 39, Illinois	Northern Electric Company, Ltd.	International Standard Electric Corporation Westrex Corporation Radio Corporation of America International Division
TO LEASE TELETYPE EQUIPMENT	Your local telephone or telegraph company	Your local telephone or telegraph company	

ADDRESSES OF FOREIGN DISTRIBUTORS

Northern Electric Company, Ltd.
P. O. Box 6124, Montreal, Quebec, Canada

Radio Corporation of America, International Division
30 Rockefeller Plaza, New York 20, New York

International Standard Electric Corporation
50 Church Street, New York 7, New York

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Chicago 14, Illinois
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TWX No. CG-277
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Touhy Avenue Plant

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