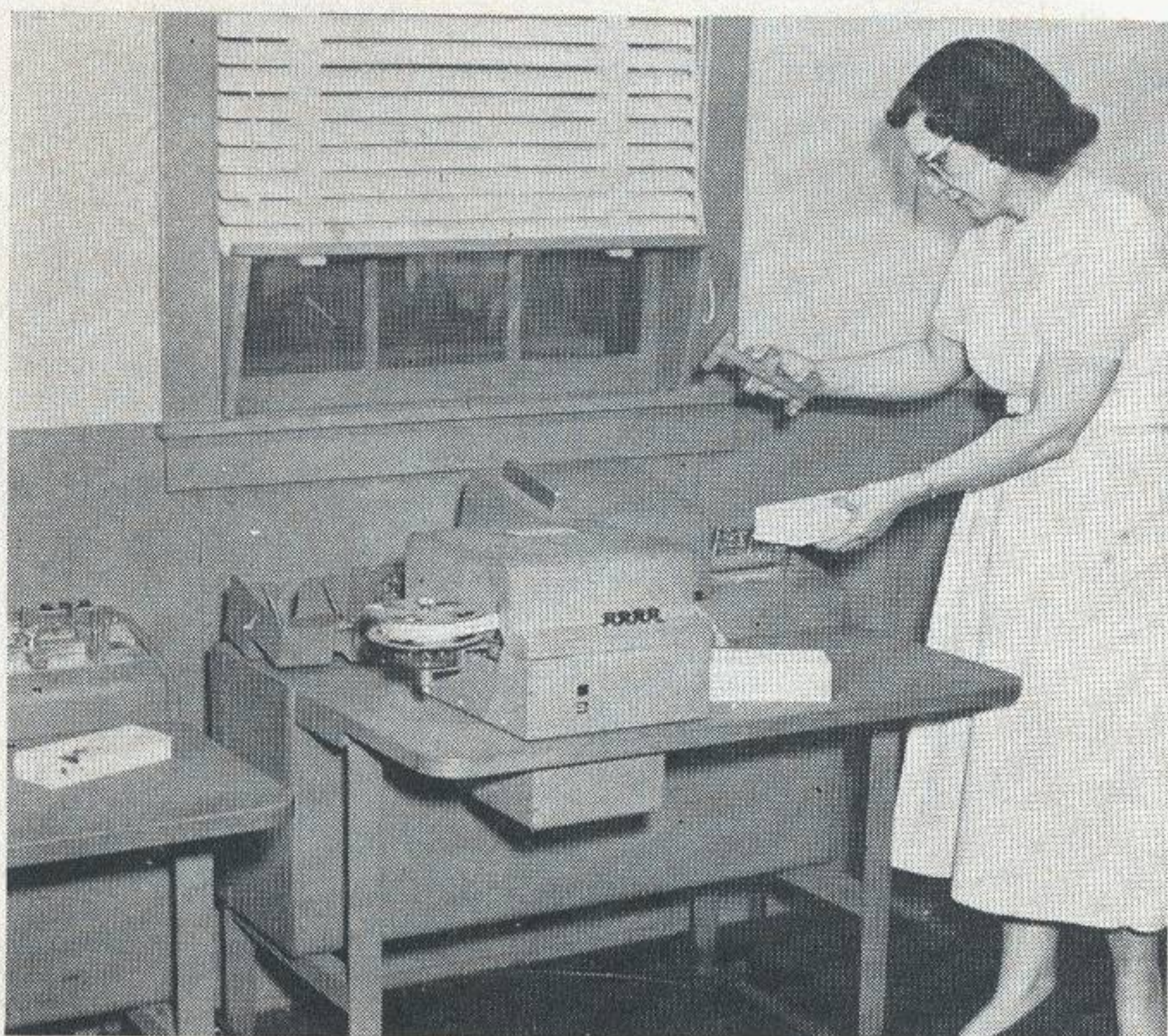
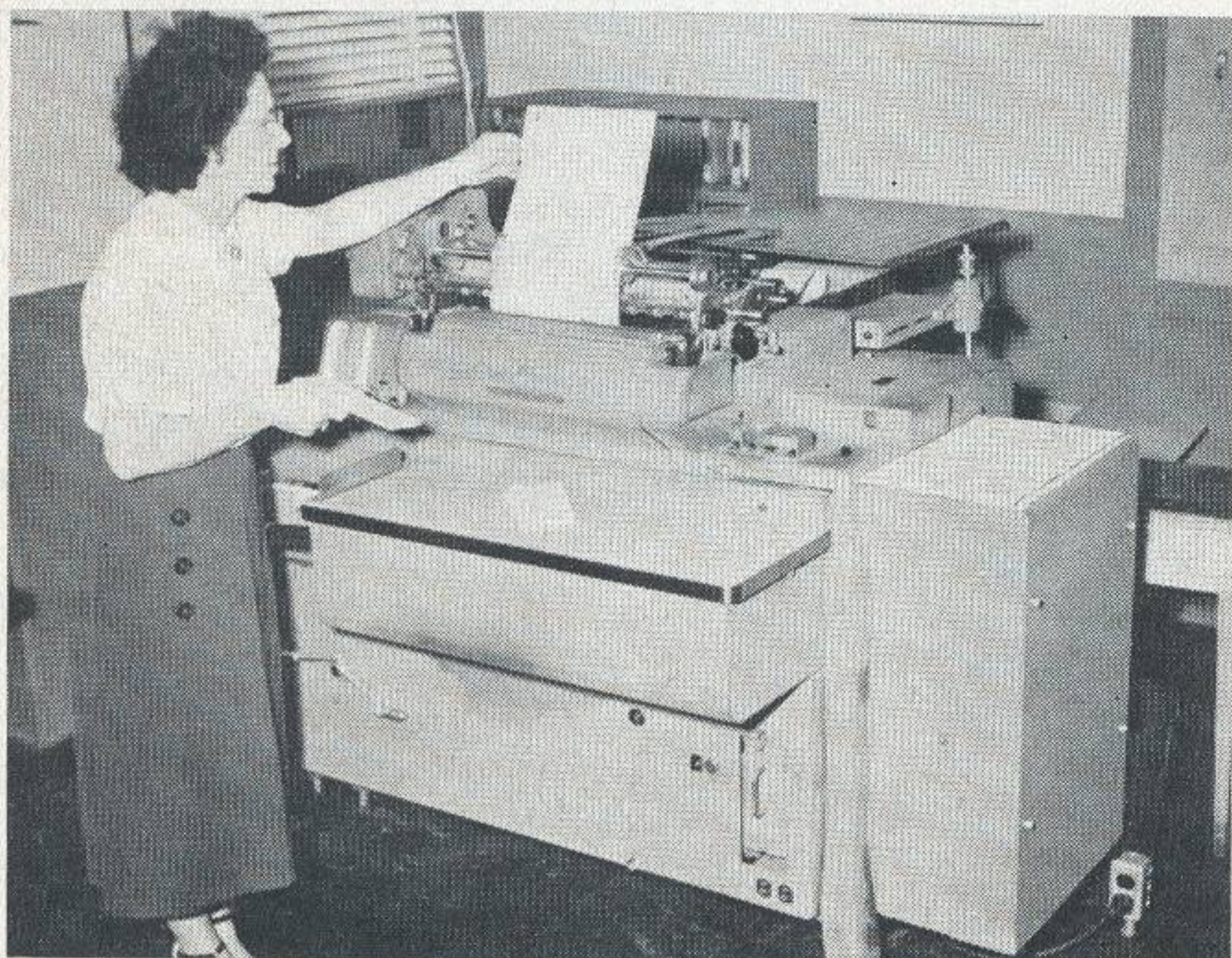




WAYBILLS go to operator who prepares punched cards from them containing pertinent information. Cards then go to . . .



CARD-TO-TAPE machine which prepares a Teletype tape of the consist in train order. Cards are next sent to . . .



PRINTING TABULATOR which prepares conductor's wheel report.

Up-to-the-Minute

Mechanized car reporting system, used at Hammond, Marion and Meadville, provides headquarters with timely information

Within 50 minutes after an eastbound freight train leaves the Erie's yard at Hammond, Ind. (just east of Chicago), the train consist is transmitted to major yards on the route of the train as well as to traffic offices and the general offices in Cleveland. Shortly thereafter, the consist is transmitted to off-line traffic offices.

To accomplish these results, the Erie has installed IBM card-processing machines in yard offices at Hammond, Marion, Ohio, and Meadville, Pa., and in the office of the car accountant in Cleveland. Additional Teletype equipment was installed at these and other offices, and three new carrier circuits were added: Hammond-Marion, Marion-Youngstown and Youngstown-Meadville. Elsewhere, existing railroad-owned circuits and printing telegraph equipment are handling car reporting traffic. Additions to the system will include the installation of card-processing machines at yard offices in Buffalo, Hornell, N. Y., and Jersey City.

How the System Operates

Hammond is the originating assembly yard for eastbound trains, and the final break-up point for westbound trains on the Erie. Six types of IBM card processing machines were installed in the Hammond yard offices: (1) alphabetical key punch unit (makes punched cards); (2) interpreter unit; (3) card-to-tape unit; (4) tape-to-card unit; (5) sorting unit; and (6) tabulating unit.

When a train or a transfer cut arrives at Hammond from Chicago, the conductor brings his waybills to the yard office. The first step is to prepare a punched card containing all pertinent waybill information for each car. This is done by an operator, using the alphabetical key punch machines. Information punched on the card includes: car initial and number, whether loaded or empty, kind of car, net tons, gross tons, contents, destination, state, consignee, junction to and road, freight charges, origin station, shipper, waybill date and number, route, and special instructions. Sometimes this information is contained on two or three cards for the particular car.

Card Interpreter

The data on the cards at this stage is in the form of small rectangular holes. The cards are next passed through an interpreter machine which "reads" the holes, and prints the information on the cards. The interpreted cards are checked against the waybills, then inserted in the waybills and passed along to the yardmaster who

Car Reporting

... AS THE ERIE DOES IT

ng IBM-Teletype equipment at Ham-
es advance yard offices and Cleveland
concerning car movements

will use them to classify cars and make up eastbound trains. The yardmaster arranges the waybills and cards in train order from head end to rear. Then the waybills and cards are separated, keeping each group in order.

Next the conductor's wheel report is prepared. A heading card is placed in the machine to print the train number, engine number, conductor's name, departing station, time of day and date. Then the punched cards, stacked in train order, are automatically fed into the accounting machine to print the required train information. The wheel report is automatically totaled to show the net and gross tons, as well as empty and loaded cars in the train. This wheel report is prepared in advance of train time, so that there is no delay in departure. The conductor picks up his wheel report and waybills, and is soon on his way.

Multiple Sending of Consists

But the car reporting job has just begun. As soon as the wheel report is made, the cards are released and run through a card-to-tape machine which prepares a Teletype tape ready for transmission. Next the Hammond operator positions several key switches on an electronic line multiplier, thus setting up circuit connections for the Teletype transmitter-distributor to Chicago, Huntington, Marion and Youngstown. He then feeds the consist tape into the transmitter-distributor, and presses its start button.

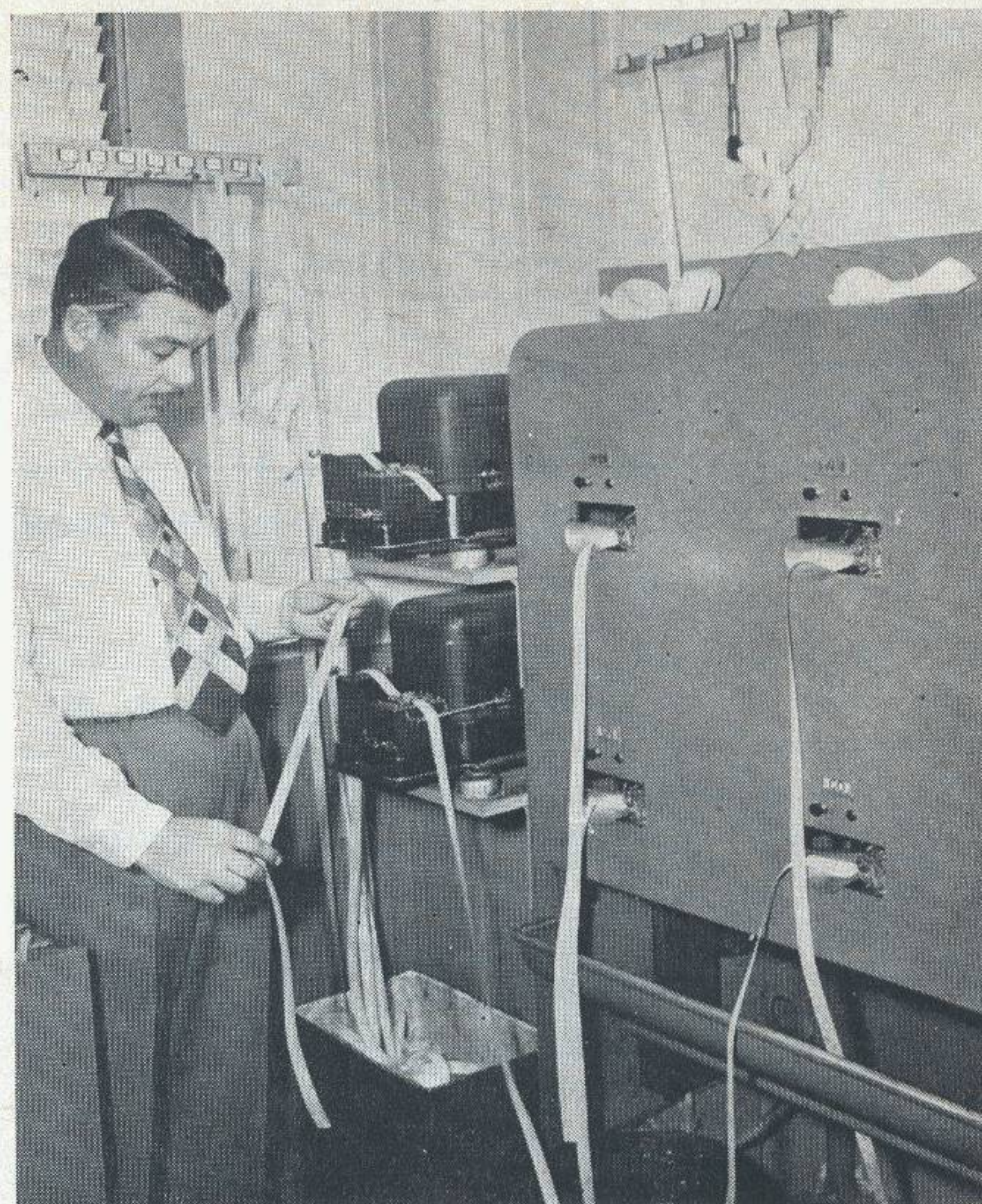
At the Chicago traffic office and Huntington (Ind.) telegraph office, the consist is received on a page printer.

At Marion, the consist is relayed through the depot telegraph office to the yard office where it is received on a page printer and reperforator.

Relay Reporting

The Youngstown operator in turn takes the tape from the reperforator and feeds it into a transmitter-distributor, keys his electronic line multiplier for Cleveland, Akron, Meadville, Buffalo and Jersey City, and begins transmission. The transmitter-distributor is adjacent to the reperforator so he can begin relaying after a couple of feet of tape have issued from the reperforator. The incoming consist makes a tape and page copies at Cleveland, Meadville, Buffalo and Jersey City. At Akron the consist is received on a page printer.

At Jersey City, an operator takes the incoming tape, feeds it into a transmitter-distributor, keys an electronic



CONSIST TAPE is sent on transmitter-distributor (left) and incoming train consists received on console reperforator (right).

line multiplier, and transmits the consist to the New York traffic office at 50 Church street and to the Duane Street office (Piers 20 and 21). These offices obtain the consist on a receiving page printer.

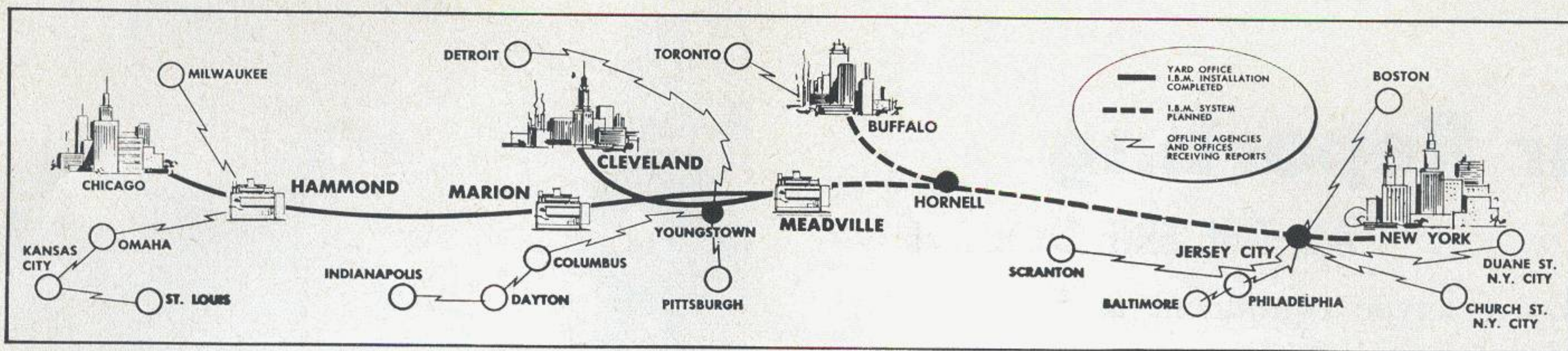
Thus, within 10 min after Hammond starts sending a train consist, that consist is being received on a reperforator and/or page printer at yards and major offices on-line including the general office in Cleveland. Within 50 min of the starting time at Hammond, all offices mentioned in the preceding discussion have received the complete consist.

Tape-to-Card at Next Yard

At Marion yard office, the incoming consist tape is run through a tape-to-card machine to produce cards for each car on the eastbound train. One of the page copies is sent to the yardmaster so he can plan his work prior to the train's arrival. Upon arrival, the conductor turns in his waybills, and the cards prepared previously at Marion are put with them. New cards are made for cars picked up en route, and notations made on cards for cars set out en route. Then the cards and waybills are given to the yardmaster, whose procedure is a repeat of that at Hammond.

For westbound trains, this entire sequence of operations is reversed, with the process starting at Meadville, the farthest point east at which the card-processing-machine part of the car reporting system has been installed.

Cleveland receives the consist in the form of page printer copies and a tape. This tape is run through a tape-to-card machine to produce punched cards, one card for each car. The cards and page copies are used for



CAR REPORTING SYSTEM will be extended to include all major yards.

records, car tracing and accounting. The punched cards are used to prepare Erie's "Q.A." (Quick Action) passing reports which are sent to off-line and on-line traffic offices and freight agents daily.

A feature of the Erie's method of car reporting is that the information from the waybill is manually punched on a card at one time, and one time only. All pertinent data is included in the first punching so the additional reports required can be obtained by machine processes with no further reference to the original waybill. The transportation office in Cleveland gets everything, and from this detailed information other reports can be prepared. Hammond yard office prepares the junction passing report for the traffic and revenue departments as well as the jumbo car record book for use at Hammond, and the interchange report in lieu of typing.

The various offices which receive copies of the consist being transmitted from Hammond use this information for notifying shippers and consignees of car movements, and for various traffic and operating studies and reports. At Youngstown the western district general manager receives a copy of every train consist, as does the eastern district general manager at Jersey City. Approximately 125 train consists are handled daily by the car reporting system.

Advantages of New System

The advantages of the car reporting system, in which the operation of business machines and a system-wide railroad-owned printing telegraph network are coordinated, are many. These benefits are evident in yards and terminals as well as to the superintendent of transportation, car accountant, auditor of revenues, traffic department men, shippers and consignees. E. E. Seise, assistant to the president (Erie's man behind the system), summarized the advantages as follows:

"Printed conductor's wheel report instead of hand prepared report.

"Printed train consists and automatic card preparation for 'Q.A.' (Quick Action) Car Locator Service report for shippers and receivers.

"Machine-printed interchange reports replacing manual work.

"Machine-printed outbound train consist, providing an immediate check of classification and yard handling.

"An indexed yard car record printed automatically each day from punched cards showing daily records, and monthly to give permanent record. It shows arrivals of cars and forwardings and eliminates postings.

"An easily prepared passing report, still from the

original punched cards, for revenue settlement with other carriers and for traffic department use.

"Advance notice from other yards in form of inbound train consist transmitted from dispatching yard.

"One punching of waybill information produces cards which are used again and again. Transcribing of information from waybills is practically eliminated after the first punched cards are prepared.

"Reduction of errors in car initial and numbers, instructions, etc., which formerly resulted from numerous transcribing operations in manual set-up.

"No loss of speed or delay to train schedules at heavy car-card-punching points (receiving yards from connections) once operators are trained and new system organized to a normal routine.

"Very little dislocation of personnel. Regular yard personnel can readily be trained to take over the mechanical operation.

"When the communication equipment and business machines are coordinated, the adaptations are really tremendous," said Mr. Seise. "We are looking forward to the day when it might be possible to key punch a card from a waybill in a railroad yard on the west coast, and have that same card reproduced over and over again in each railroad yard, from the West coast to the East coast, without ever having to manually transcribe the data from the waybill. We believe the universal use of business machines in yard offices is a forward step in standardization of car reporting for all railroads, keeping shippers and receivers quickly informed about their car movements, and hence making possible more efficient operation through greater mechanization."

Carrier Circuits Added

For the past several years, the communications department has been improving circuits and installing carrier to provide system-wide printing telegraph service, the network now comprising about 4,150 circuit miles of carrier and 6,350 miles of physical circuits. Also the Erie leases Teletype circuits to off-line agents as well as TWX service to other off-line offices.

The studies for the use of improved machine methods and the development of procedures for the yard and general offices are headed by E. E. Seise, assistant to the president; F. H. Menagh, superintendent of communications; and G. F. Dunathan, car accountant. The card processing machines are leased from the International Business Machines Corporation. The printing telegraph equipment was furnished by the Teletype Corporation, and was installed by the Erie communications department, as was the carrier equipment.