# NEWS

## Dr. Fisk to Serve on Guggenheim Foundation And M.I.T. Corporation

Dr. J. B. Fisk was recently elected a member and trustee of the John Simon Guggenheim Memorial Foundation. Established in 1925 to improve quality of education, foster research, and enhance better international understanding, the Foundation offers fellowships to further the development of scholars and artists by assisting them in their research in any field of knowledge.

Dr. Fisk has also been elected an alumni member of the Massachusetts Institute of Technology Corporation. The term of the election is five years.

## Experimental Set Using Push Buttons Placed on Trial

One of the important links in telephone communications is the connection between the customer's telephone set and his central office. Over this connection, the customer not only talks but also sends the digits of the number he is calling. With automatic equipment, he does so with successive turns of his rotary dial; the dial mechanism sends trains of d.c. electrical pulses representing the digits.

Another way to send called-number digits is to generate tone pulses with push buttons. To find out whether customers would like to have this type of service, and whether they would benefit from faster calling, the Laboratories has designed an experimental push-button telephone. Some 400 preliminary models were recently placed on trial in Hamden, Connecticut, and in Elgin, Illinois. Installed temporarily in offices and homes at these locations, the sets are being used to obtain field data as a valuable addition to the preliminary results of laboratory tests.

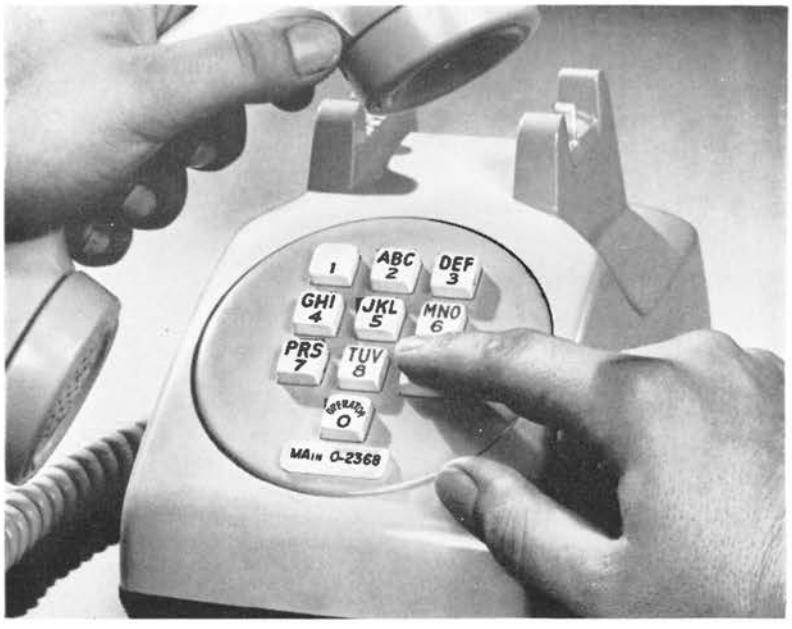
### Transistor Oscillator

The push-button unit was designed to fit into the same shell that now houses the standard instrument. It contains a transistor oscillator that, when a push button is depressed, produces two simultaneous tones. These are coded so that a different combination of tones identifies each of the digits. Users hear the tones at a reduced level in the receiver of the telephone set.

The use of tones creates, in effect, a new electrical "language" to be interpreted by the central office. Thus, special translators have been designed to adapt existing offices for receiving numbers from push-button telephones.

Tests at Bell Laboratories have indicated that with push buttons, some people can key a seven-digit number in less than two seconds, although the average time is about five seconds. The corresponding average time for rotary dialing is about nine seconds. After the number has been keyed, the time for a push-button call to go through would depend on the type of switching equipment in the local office. With crossbar switching, the time is reduced nearly in proportion to the faster keying by the customer. When the office has step-by-step switching equipment, the call would go through at a slightly better speed than with rotary dialing.

Considerable attention is being given to the design of the push-button unit so that new models will incorporate improvements. Among the studies are investigations of the size, shape and arrangement of the push buttons, and also of their action or "feel." It has been found, for example,




*Laboratories experimental push-button set (also see cover). Push-button unit here includes changes made subsequent to trial model.*

that a "snap" action did not produce any greater accuracy than other types. In human-factors tests at the Laboratories, most people preferred a smooth button action with a definite stop, but slightly cushioned.

Laboratory human-factors tests also indicated that there is an optimum size and spacing for the push buttons. When they are closely spaced, the individual buttons are difficult to strike without depressing others at the same time. With large buttons, the entire group cannot easily be taken in at one glance. The tests indicate that the buttons should be about one-half inch square, separated about one-quarter inch.

Many different arrangements of buttons have been tried — various rectangular arrays, circles, triangles, and a "cross." Among the many resulting possibilities, several gave approximately equal performance, and four were about equally well liked — two circular arrays, a rectangular array of two horizontal rows, and a three-by-three array with the "zero-operator" button centered in a fourth row. This last arrangement was selected since it uses the available space efficiently and permits a simplified design in the initial application.

Laboratory tests indicated that most users are enthusiastic about push-button operation, and preliminary data from the Connecticut and Illinois field trials support the laboratory findings. The encouraging results obtained so far indicate that the push-button set could be an important new convenience to telephone customers.

## W. C. Tinus Appointed to Scientific Advisory Board

At the invitation of General Thomas D. White, Chief of Staff of the Department of the Air Force, W. C. Tinus, Vice President — Military Development Programs, has become a member of the Scientific Advisory Board of the Air Force for the year 1959.

# FIELD TEST OF NEW DATAPHONE

*Western Electric Co. engineer prepares to send business items through the compact card reader of the new Dataphone system.*

A new experimental form of Dataphone service for sending the supply orders of an Operating Company to a Western Electric distributing house is being tried out by the New York Telephone Co. and the Illinois Bell Telephone Co. The new service is designed to convert Operating Company "shopping lists" into electronic form so they may be transmitted at high speed over regular telephone circuits.

Developed by a team of Western Electric Co. and Bell Laboratories Engineers, the system is expected to reduce greatly the amount of paperwork and time now required in manual processing of supply orders — more than 20,000 of which pour into Western Electric's distributing houses daily. Orders will be transmitted to the distributing house within minutes after they are compiled, and clerical work at both ends will be speeded and simplified by data processing machines.

Made up of card-reading, transmitting, and receiving units, the new device converts punched-card information into electrical impulses that are transmitted over a regular telephone line. Supplies are requisitioned by establishing a telephone connection and fitting pre-punched cards, representing items wanted, into the card reader. The receiving unit at the distributing house activates a key-punch to produce a duplicate set of cards bearing the Operating Company's order. These cards are transferred to a computer that automatically tells the warehouse which items to send.

This low-cost, easy-to-operate form of Dataphone service should yield substantial savings for the Bell System.