

# NEWS BRIEFS

● **GULF, MOBILE & OHIO** has received ICC approval to install a traffic control system on one main track replacing automatic block signaling on two main tracks between Plainview and Godfrey, Ill. Certain portions of second main track will be removed and other portions will be retained as sidings.

● **NATIONAL CAPITOL COMMISSION OF CANADA** has ordered traffic control equipment from General Railway Signal Co., for installation in the new Ottawa terminal area. A Traffic Master console in the new passenger depot will provide terminal control for both

Canadian National and Canadian Pacific railways. Type J and type K2 code control systems will be used.

● **CHICAGO & WESTERN INDIANA** has ordered equipment from General Railway Signal Co., to expand and modify interlocking controls at the mainline Torrence avenue lift bridge in Chicago.

● **PENNSYLVANIA's** spending plans for 1965 include provision for expanded use of radio communications in yard offices and on locomotives; installation of CTC at two locations; automatic highway protection for 25 grade crossings; and in-

stallation of switch heaters at more than a score of points to improve train movements under snow conditions.

## Railroad Personnel

● **CLINCHFIELD:** James W. Hager, engineer signals and communications, was born in Johnson City, Tenn., on June 28, 1924. He graduated from the University of Tennessee in 1949 with a bachelor of science degree in electrical engineering. Joining the Clinchfield in 1950, Mr. Hager started in signal construction work. Later he was promoted to signal maintainer and was circuit engineer in 1953, when he resigned to join Union Switch & Signal in the project engineering department. He advanced through various positions, attaining that of senior engineer, when he resigned to return to the Clinchfield as engineer signals and communications (RS&C Feb. 1965, page 26).

● **LOUISVILLE & NASHVILLE:** R. A. Hicks, general communications inspector, appointed assistant to engineer communications at Louisville. L. M. Tingle, general communications inspector, appointed assistant engineer communications—radio, also at Louisville, Ky. F. R. Wix, general foreman communications, appointed assistant engineer communications—inside plant. R. L. Brown, general foreman communications—inside plant, appointed radio inspector. J. R. Bennett, chief telephone installer, appointed general foreman communications—inside plant. L. B. Nipper, draftsman, appointed general foreman communications—inside plant. H. L. Hood, supervisor communications and signals, at Nashville, Tenn., transferred to Atlanta, Ga., succeeding J. E. Bruce, retired. C. P. Richardson, assistant signal supervisor, Jackson, Tenn., promoted to supervisor communications and signals at Nashville. D. L. Nordhoff, communications draftsman, appointed assistant supervisor communications at Nashville. D. L. Webb, assistant signal supervisor, appointed supervisor communications and signals at Louisville, succeeding R. L. Pearce, deceased. L. A. French, signal draftsman, appointed assistant signal supervisor at

(Please turn to page 32)

## Must Reading For Signalmen

"Fundamentals of Relay Circuit Design" can be read and studied for profit by signalmen from helpers to engineers. This book, by Alan R. Knoop, former C&O circuit designer and US&S project engineer, begins with the fundamentals of magnetism and DC relay operating characteristics. Next, the book covers neutral relays and plan symbols, basic circuit concepts and additional fundamental circuits and relay concepts. Applications of relay circuit design are in four chapters: (1) motor and process machinery control; (2) conveyor controls; (3) public service (vehicular traffic) controls; and (4) railway signaling.

Without a doubt, the chapter on railway signaling will be of most interest to RS&C readers. However, the beginning chapters provide a solid foundation for the study and understanding of the applications chapters. Fundamental circuits of relay systems are shown, together with their operating descriptions. In each system, the reason for a particular design is stressed. The operation of basic circuits is explained in a logically progressive manner so that they can be easily recognized in the complex systems presented in

the application chapters.

The approach throughout assumes that the designing of relay circuits is really not as complex as it appears, if examined step by step and in clear, logical manner. The four final chapters of the book examine typical systems in different electrical control fields to show that many of the problems encountered in one field are similar to those in other fields. The systems and control circuits used in these chapters are not theoretical, but are the actual circuits used by designers in their respective fields.

Topics dealt with in the chapter on railway signaling include: operation of trains; types of signals and signal aspects; track circuits; basic signal systems—single direction running; signaling for two directions; auto-manual signal control; switch control; complete interlocking; destination routing; automatic interlocking; movable bridge interlocking; highway crossing protection; and summary.

Bob McKnight

"Fundamentals of Relay Circuit Design" by Alan R. Knoop, Reinhold Publishing Corp., 312 pages, \$15.

Write today for complete FREE details of all Sinclair antennas, duplexers, multiplexers and other fine communications equipment.

**SINCLAIR RADIO LABORATORIES, INC.**  
523 Fillmore Avenue  
Dept. 106  
Tonawanda, New York

**DUPLEXER WITH ONLY 0.5 MC SEPARATION**

Now... dual simplex or full duplex operation is possible with high isolation between transmitter and receiver in the crowded VHF band. Sinclair's F-150-4ER duplexer combines low initial cost with high quality construction for years of trouble-free base station or locomotive use.



This new low-cost, low-silhouette, Model 221A train antenna is engineered for trouble-free, two-way transmission and reception even in locations where buildings, bridges and tunnels generally cause interference. It is designed for the 158-164 Mc range with a power rating of 200 watts... is made from rust-resistant anodized aluminum... and meets all AAR specifications. Easily bolted to any flat surface, the Sinclair Train Antenna is rugged enough for use as a mechanic's "handle" when climbing on the engine. The Model 221A is furnished complete to any color specifications at no extra cost.

**LOW BRIDGES?  
SINCLAIR'S VHF TRAIN ANTENNA  
IS ONLY  
6 1/4" HIGH!**



**NEWS BRIEFS**

(Continued from page 10)

Louisville. D. L. Toohey, communications draftsman, appointed assistant supervisor communications at Evansville, Ind. A. L. Fegenbush appointed communications plant inspector at Louisville. E. W. Turner, general foreman lines, appointed general foreman communications—outside plant.

● **CHICAGO, ROCK ISLAND & PACIFIC:** W. B. Johnson, assistant signal engineer, appointed signal engineer succeeding H. Jensen, retired. D. L. Johnson, general signal inspector, appointed assistant signal engineer.

Mr. Jensen was born in Sioux Rapids, Iowa on Feb. 24, 1900. After completing high school in Joliet, Ill., he began his railway career on the CRI&P as a signal helper in 1927. A year later he was appointed signalman. In 1941, Mr. Jensen was promoted to signal foreman; one year later to signal circuit engineer; and in 1943 he was promoted to chief circuit engineer. He became general signal inspector in 1949 and



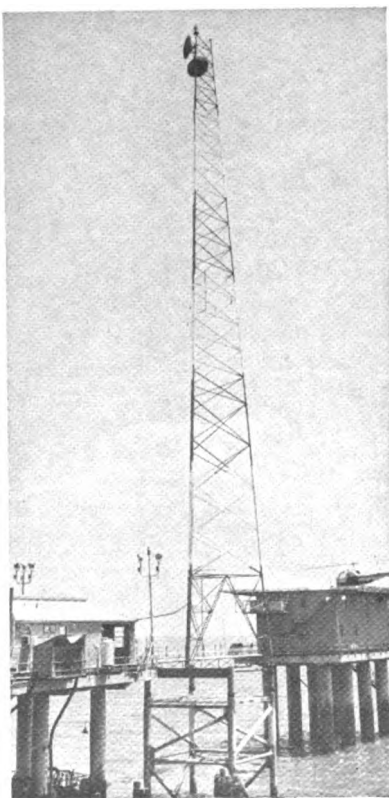
H. Jensen  
Rock Island



Harvey Alexander  
New York Central

was promoted to assistant signal engineer in 1956. One year later he was appointed signal engineer.

● **NEW YORK CENTRAL:** Harvey Alexander, district engineer communications and signals at Indianapolis, Ind., was born in Conesus, N.Y., on Sept. 11, 1919. Following graduation from the Rochester Institute of Technology in 1940, he joined NYC as a draftsman. In 1949 he was appointed assistant engineer, and a year later promoted to assistant supervisor of signal construction. In 1951, Mr. Alexander served briefly as general signal inspector, and then was appointed assistant engineer signals. Four years later he was appointed office engineer sig-



**ROHN  
TOWERS  
"STAND UP"  
to Hurricane Hilda!**

A series of ROHN micro-wave towers, used on Shell Oil Company offshore platforms near the Louisiana coast, took on the full fury of "Hurricane Hilda" and withstood the test!

Designed for 50 pound windload per square foot, these towers stood up to winds known to have been well in excess of this. For towers proved in design, engineering and construction, specify ROHN. Complete tower, lighting kit, microwave reflector, and tower accessory catalogs and specifications available on request. Representatives world-wide.

Write—Phone—Wire for Prompt Service  
**ROHN Manufacturing Co.**  
Box 2000, Peoria, Illinois  
Phone 309-637-8416 — TWX 309-697-1488

"World's Largest EXCLUSIVE Manufacturer of Towers; designers, engineers and installers of complete communication tower systems."



Delbert E. Firestine  
New York Central



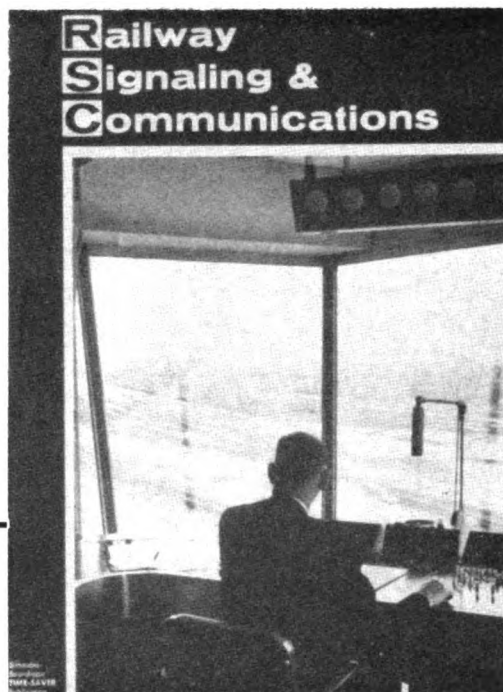
Thomas R. Gibson  
New York Central

nals, and in 1958 promoted to system chief signal inspector at Cleveland. In 1962, he was appointed district signal engineer at Indianapolis, the position held at the time of his recent promotion (RS&C Dec. 1964, page 28).

**Delbert E. Firestine**, district staff engineer communications and signals at New York, was born on Feb. 28, 1906 in Raymond, Ohio. Following elementary and high school education in Raymond, he joined the railroad as a laborer in the signal department in 1926. A year later he was promoted to signal mechanic, and made leading signal maintainer in 1929. Following three years in the Navy in World War II, Mr. Firestine was appointed circuit designer in 1945 upon his return to the railroad. In 1952, he was appointed signal supervisor at Toledo, Ohio. Two years later he was promoted to assistant engineer, signal department, at Cleveland. He was appointed field signal engineer in 1955, and two years later promoted to district signal engineer at New York, his most recent position.

**Thomas R. Gibson**, design engineer communications and signals at New York was born March 6, 1924 at St. Paul, Minn. A graduate of the University of Minnesota with a bachelor of electrical engineering degree in 1949, Mr. Gibson joined the Northern Pacific as an equipment maintainer. In 1955, he entered the employ of the Wabash as communications engineer. Two years later he was appointed engineer communications and signals. In 1961, he joined NYC as communications engineer, and a year later was appointed superintendent of communications of the New York district. This was his position until his recent promotion.

**Stanley P. Kohler**, district staff engineer communications and sig-  
*(Please turn to page 34)*



# READING TIME PER PAGE—HOW RS&C SHAPES UP

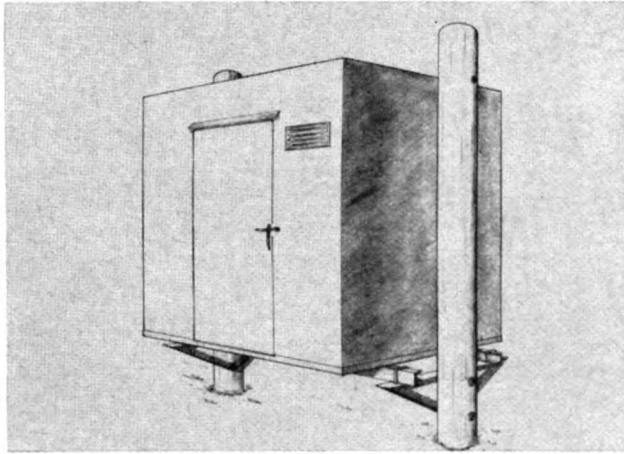
Here's the real test! Average reading time devoted to each page of advertising or editorial. The figures? One minute and 26 seconds for RAILWAY SIGNALING AND COMMUNICATIONS, compared to 24 seconds for the competitive monthly\*—readers gave 3½ times the attention per page to RS&C as to the other magazine.

Every page is thoroughly assimilated because RS&C is the only railway technical magazine devoted exclusively to the interests and problems of men engaged in railroading's most highly technical field.

*\*Compiled from data furnished in a survey by the competitive monthly. Figures based on April-July, 1963 issues.*

Ask your Simmons-Boardman representative for detailed information—including the joint advertising rates available on space used with Railway Age, Railway Locomotives and Cars, Railway Track and Structures and Railway Purchases and Stores.

## RAILWAY SIGNALING AND COMMUNICATIONS



**ARMADILLO FIBERGLASS BUILDINGS  
ARE IDEAL FOR POLE MOUNTED USE**

- IMMEDIATE DELIVERY
- SEVERAL STOCK SIZES
- ECONOMICALLY PRICED

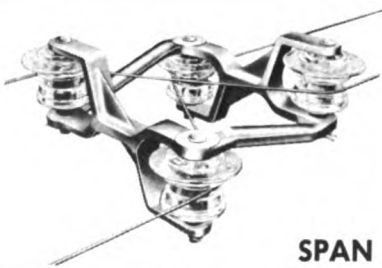
**OTHER SERVICES AVAILABLE**

- Custom design to any size
- Factory equipment installation

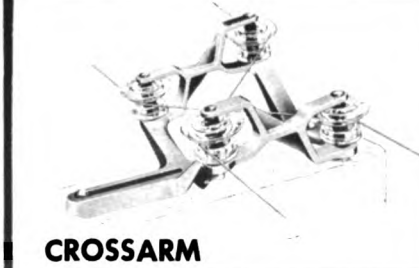
*Stationary buildings—Mobile units—Pole mounted units*

**ARMADILLO MFG. CO. ● 847 E. COLFAX AVE. ● DENVER, COLO.**

**45 of the 52 Class 1 Railroads in  
the U.S.A. & Canada Specify & Use  
CASE TRANSPOSITION BRACKETS**



**SPAN**



**CROSSARM**

**LIGHTWEIGHT ● LONG LIFE ● LOW COST**

*Especially Adapted for Carrier Circuit Construction*

**TRANSANDEAN ASSOCIATES, INC.**

**303 MAIN STREET, ORANGE, NEW JERSEY**

**Write for the name of the authorized distributor in your territory.**

**NEWS BRIEFS**

*(Continued from page 33)*



**James L. Lane**  
New York Central



**Stanley P. Kohler**  
New York Central

nals at Syracuse, N.Y., was born in Williamsport, Pa., on December 18, 1926. A graduate of the Rochester Institute of Technology, he joined the NYC as a signal helper in 1949. A year later, he was promoted to leading signal mechanic, and in 1951 he was appointed engineer draftsman in the signal department. He held subsequent positions of signal inspector, assistant general signal inspector and assistant engineer. In 1961, Mr. Kohler was appointed assistant field signal engineer, and three years later office engineer, the position he held at the time of his recent promotion.

**James L. Lane**, district field engineer communications and signals at Syracuse, N.Y., was born in West Brookfield, Mass., on Feb. 9, 1928. A graduate of DeVry Technical Institute, he joined NYC in 1947, first in the signal department. A year later he transferred to the communications department where he held a number of positions including district lineman, telephone and telegraph maintainer and installer, communications supervisor, field engineer and chief line supervisor, until his recent promotion.

**John E. Schmitt**, district field engineer comms. and signals at Cleveland, Ohio, was born on Oct. 8, 1923 at Quincy, Ill. After graduation from the University of Illinois in 1948 with a bachelor of science degree in electrical engineering, he joined the Rural Electrification Administration as a field construction engineer. Five years later he left REA to become assistant general manager and chief engineer of the Eastern Illinois Telephone Co. In 1957, he was appointed communications engineer for NYC at Cleveland. In 1963, Mr. Schmitt was

*(Please turn to page 40)*

# LET'S TALK ANTENNAS or RAILROAD COMMUNICATIONS



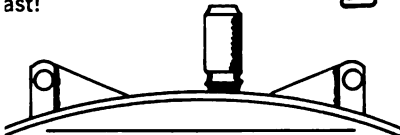
Specialists in railroad communications  
Exclusive railroad distributor for  
Mark Products

*Griffith M. Morgan & Co.*

Griffith M. Morgan Area Code 312 282-2903  
7516 N. Sheridan Road Chicago, Illinois 60626

We've been doing it ever since radio communications augmented the swinging lantern, and I'll have to admit that our Mark Antennas are well worth talking about. Traintop antennas from six inches to three feet . . . base station, mobile, parabola, and special two-way antennas . . . the best in the field. From engine to caboose or all down the line, we can solve your problems with products of extreme adaptability and lasting quality.

Our talk has led to mighty line antenna systems for some great railroads. If we don't have it, we'll design it for you—and fast!



## LET'S HAVE ANTENNA TALK

(check your requirements)

- |  |   |
|--|---|
| <input type="checkbox"/> Traintop        | <input type="checkbox"/> Base Station   |
| <input type="checkbox"/> Mobile          | <input type="checkbox"/> Microwave      |
| <input type="checkbox"/> Special Two-Way | <input type="checkbox"/> Coaxial Cables |

Name \_\_\_\_\_

Title \_\_\_\_\_

Railroad \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Mail to MORGAN

7516 N. Sheridan Rd., Chicago, Ill. 60626

## NEWS BRIEFS

(Continued from page 34)

promoted to superintendent of communications at Cleveland, his most recent position.

### Supply Trade News

● **GENERAL RAILWAY SIGNAL CO.:** John K. Records, director NASA support for the Apollo support department, General Electric Co., has been elected president, succeeding Percy W. Smith, retired. William R. Goodwin, sales representative in the Chicago office, has been appointed chief engineer—applications engineering department with headquarters at Rochester, N.Y.

Mr. Records, 43, graduated from the University of Cincinnati in 1948 with a BS degree in electrical engineering. He received an MS degree from the University of Illinois in 1949. While at UI he was a research associate and assistant director of the antenna laboratory. In 1950 he joined GE as a project engineer on microwave and radar projects. In 1957, Mr. Records was appointed

manager of engineering operations for missile guidance of GE's heavy military electronics department. Subsequently he was appointed manager of the defense system's instrumentation and guidance product section, following which he was named director of GE's NASA support for the Apollo project.

Mr. Smith was born in Springville, N.Y., on Feb. 2, 1900. A graduate of the Rochester Institute of Technology, he worked as a foreman for the Buffalo, Rochester & Pittsburgh during school vacations. Upon graduation he joined American Locomotive Co., as a draftsman, later transferring to the B&O in the same capacity. He joined GRS in 1923 as



John E. Schmitt  
New York Central



William R. Goodwin  
Gen. Ry. Signal

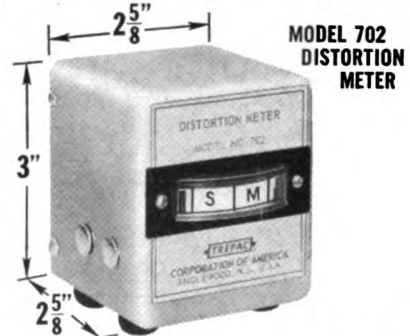
## SWATTING FLIES WITH PILEDRIVERS?

OF COURSE NOT, YOU USE TASK ENGINEERED TOOLS!

HOWEVER, EXPENSIVE AND CUMBERSOME LABORATORY TYPE INSTRUMENTS REQUIRING HIGHLY TRAINED PERSONNEL ARE OFTEN ASSIGNED BASIC DISTORTION ANALYZING JOBS.

NEW **TREPAC**

MODEL 701  
REVERSAL  
GENERATOR



MODEL 702  
DISTORTION  
METER

**FEATURES:** • USE ONLY LOOP POWER • SOLID STATE CIRCUITRY • SMALL SIZE  
• LIGHT WEIGHT • INEXPENSIVE • DIRECT READING • EFFORTLESS TESTING

These units combine to form an inexpensive, easy to operate line and system distortion test set. (Only \$50.00 for either unit or \$95.00 for the pair).

These compact units, use only the current of the line under test, and are ideal for testing and adjusting mechanical keying relays.

The REVERSAL GENERATOR transmits sig-

nals for all teletype, and data circuits with less than 1% distortion at speeds to 200 bits per second. Controlled amounts of either marking or spacing bias can be transmitted. One screw-driver adjustment presets calibration.

The DISTORTION METER is a go — no go gauge that allows immediate readout of line, equipment and relay conditions.

**TREPAC** CORPORATION OF AMERICA

SOLID STATE ELECTRONICS for TELECOMMUNICATIONS

30 West Hamilton Avenue, Englewood, N. J. • Phone (201) 567-3810 • TWX (201) 567-4977



John K. Records  
Gen. Ry. Signal



Percy W. Smith  
Gen. Ry. Signal

a draftsman and engineer. In 1937 Mr. Smith was appointed a sales engineer. From 1944 to 1948, he was resident manager at New York. For the next three years he was eastern manager, and in 1951 was appointed vice-president eastern U.S. and Canadian sales. Two years later, Mr. Smith was appointed vice-president sales at GRS headquarters in Rochester, N.Y. In April 1958, he was appointed executive vice-president and was elected president in October, 1958. Upon the formation of General Signal Corp., in 1962, Mr. Smith was elected president of that company. He will continue as a director of General Signal and will also serve the corporation as a management consultant.

Mr. Goodwin, a native of Greensburg, Ind., studied electrical engineering at the University of Cincinnati. He began his signal career on the New York Central in 1941 as a helper. Subsequently he was promoted to signalman, signal maintainer, and signal circuit draftsman. In 1953, he joined the Terminal Railroad Association of St. Louis as assistant signal engineer. Three years later he joined GRS as an application engineer at Rochester. A year later he was appointed sales engineer in the Chicago office, his most recent position.

● **GENERAL SIGNAL CORP.:** Harold A. Strickland, Jr., executive vice-president, has been elected president succeeding Percy W. Smith, retired.

GSC will consolidate two of its operating units: Cardion Electronics, Inc., Westbury, N.Y., and Budelman Electronics Corp., Stamford, Conn. Orville Dunning, chief executive officer of both companies, will continue in this position in the combined activities which will be

*(Please turn to page 42)*



### For every railroad use... wire & cable with the extra margin of dependability

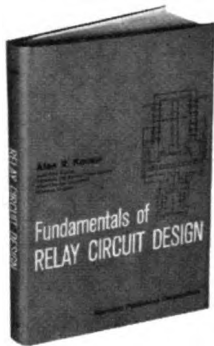
From General Cable, everything you need: Signal cable & track wire, insulated by Aquaseal® premium insulation. Qualpeth® FPA\* communications wire and cable, now with a bonded polyethylene coating on both sides of the shield to solve troublesome moisture problems. Video pair cable. Diesel and car wire. Tower and case wire. Trolley wire. All engineered for superior dependability in every railroad application. All meet or exceed AAR Signal and Electrical Section Specifications...and many are immediately available from local stocks. Special types can be quickly engineered to meet your particular specifications.

Order GCC wire and cable for all your requirements—in carload or less than carload shipments. See your nearest General Cable sales office, or write General Cable Corporation, 730 Third Avenue, New York, New York 10017.



\* patent pending

# A new book for signal engineers and circuit designers



## FUNDAMENTALS OF RELAY CIRCUIT DESIGN

By **Alan R. Knoop**

Formerly circuit designer, Chesapeake & Ohio Ry., and project engineer, Union Switch & Signal

1965 320 pages Illustrated \$15.00

The designing of relay circuits—basis of much railway signaling practice—is not as complex as it appears, according to the author of this much-needed and clarifying book. Beginning with magnetism fundamentals, he discusses DC operating characteristics, types of neutral relays, plan symbols, basic circuit concepts, motor and process machinery controls, conveyor controls, public service controls and railway signaling.

The railway signaling section covers train operation, types of signals and signal aspects, track circuits, single and two-directional systems, auto-manual signal controls, complete interlocking, automatic interlocking, destination routing, movable bridge interlocking, and highway protection.

Available at your bookstore or write

**REINHOLD BOOK DIVISION**  
430 Park Avenue, N.Y., N.Y. 10022

### 30-Day Approval Offer

**REINHOLD BOOK DIVISION**  
430 Park Avenue, New York, N.Y. 10022

Please send me \_\_\_\_\_ copies of (500-555) **Knoop: Fundamentals of Relay Circuit Design**, \$15.00 for 30 days' approval (U.S.A. and Canada only) under the following terms:

- Payment enclosed (Reinhold pays regular delivery charges)
- Bill me (plus delivery charges)
- Purchase order attached
- Please send me a copy of your latest catalog

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**Save Money!** Enclose full payment with order and Reinhold pays regular delivery charges. Same return privilege guaranteed. Please add sales tax on California, Ohio, Pennsylvania, and New York City orders. Do not send cash. Check or money order only. Dept. M-16†

## NEWS BRIEFS

(Continued from page 41)

located in Westbury. The marketing organizations of each unit will continue to serve their present markets, but engineering and manufacturing organizations will be merged. Budelman marketing operations will continue under the direction of its president, **William Fingerle, Jr.**

Mr. Strickland, 50, was vice-president and general manager, Industrial Electronics division, General Electric Co., when he resigned to join GSC last April as executive vice-president. Earlier in his career, he had been engineering vice-president of the Hotpoint division of GE. Mr. Strickland holds 65 patents in his name. He has degrees in electrical and mechanical engineering from the University of Michigan, and an MBA from Harvard university's graduate school of business administration.

● **NOLLER CONTROL SYSTEMS, INC.:** The following firms have been appointed sales representatives for Noller solid-state alarm and remote control equipment: Dolphin

Engineering Co., Oakland, Calif.; Waugaman Associates, Denver, Colo.; Kennedy Engineering Co., San Marino, Calif.; Wescom, Hinsdale, Ill. and Field Enterprises, Havre, Mont.

● **RAILROAD ACCESSORIES CORP.:** **Henry A. Maynard**, retired general signal supervisor, Baltimore & Ohio at Cincinnati, Ohio, has been appointed a sales and service representative. He will be headquartered at Transport Products Co., at Louisville, Ky. Mr. Maynard's photograph and biographical sketch appeared in RS&C Dec. 1964, page 40.

● **SERVO CORP. OF AMERICA:** **Henry A. Talbert** has been appointed district sales manager at Pittsburgh, Pa., for the Railroad Products division. A graduate of Carnegie Institute of Technology with a BS degree in electrical engineering, he joined Union Switch & Signal in 1930. Mr. Talbert held such positions as project engineer, sales engineer, assistant district manager at New York and district manager at Pittsburgh. In 1964, he left US&S to become district manager at Pitts-

# THIS INSPECTION TOOL

## CAN SAVE YOU NEEDLESS POLE FAILURES

The poles your linemen climb merit the most thorough Groundline Inspection and Treatment to insure their safety and uninterrupted service. And the surest way to find hidden decay is to dig for it. That's why this shovel is our most important inspection tool.

**FOR PROOF** that poles last 10 years without significant decay after each OSMOSE Treatment, write for Memorandum No. 49.



**OSMOSE**



**OSMOSE WOOD PRESERVING CO. OF AMERICA, INC., 990 Ellicott St., Buffalo, N.Y. 14209**



H. A. Strickland, Jr.  
General Signal Corp.



Henry A. Talbert  
Servo Corp.

burgh for Transcontrol Corp., the position he resigned to join Servo Corp.

● **THERMOCON CO.**, has acquired the switch heater business of White Mfg. Co., Elkhart, Ind. Thermocon will market the White G-5 gas-fired switch heater, as well as Thermocon's solid-state control system and electric switch heater.

● **UNION SWITCH & SIGNAL** division of WABCO: **C. Benjamin Ramsdell**, manager, mass transit operation, WABCO, has been appointed vice-president marketing. **L. J. Davis, Jr.**, vice-president marketing, has been appointed vice-president-general sales manager succeeding **C. W. Henricks**, deceased.

Mr. Ramsdell, a graduate of Catholic University with a BSEE degree, held various industrial marketing and management positions prior to joining WABCO as manager, mass transit operation.

Mr. Davis, a graduate of the University of Pittsburgh, joined US&S in 1945. After holding various positions in the engineering department, he was appointed a sales engineer in New York. In 1958, he was appointed assistant manager at New York. Four years later he returned to Pittsburgh, where he held various marketing positions.



C. Benjamin Ramsdell  
Union Switch & Sig.

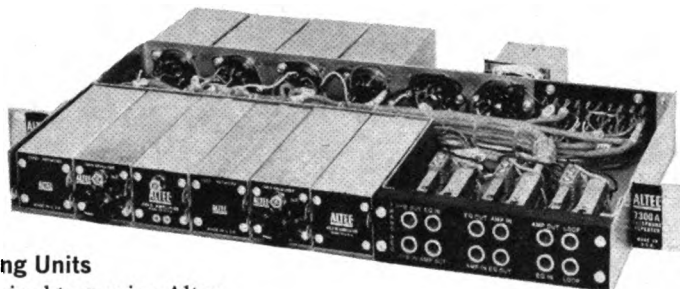


L. J. Davis, Jr.  
Union Switch & Sig.

## SOUND WAY TO RUN A RAILROAD WITH ALTEC'S COMPLETE LINE OF VF TELEPHONE PRODUCTS

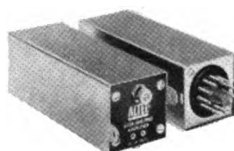
Altec offers railroad communications engineers a complete line of VF transmission products that have been proved through the years by major telephone companies. Each piece of equipment represents the most advanced features available, such as all-transistor circuitry, small size, low heat, and simple installation. Quick delivery from stock eliminates waiting and back-ordering.

### TELEPHONE REPEATER COMPONENTS



#### Terminating Units

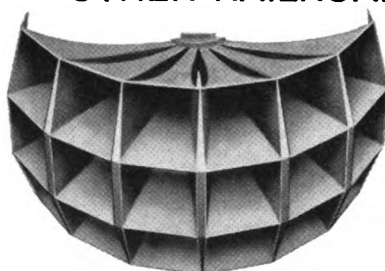
are fully wired to receive Altec plug-in components for quick establishment of repeated VF channels. 2-wire to 2-wire, 4-wire intermediate, or 2-wire to 4-wire termination. Six models.



**Plug-in Repeater Amplifiers** are all-transistor, do not require 130 v power supply. Only 1 1/8" x 1 1/16" x 5 3/16". ■ **Plug-in Transformers** include Hybrid Transformers with high trans-hybrid loss and Line Transformers with impedance matching drop side

to telephone. ■ **Plug-in Networks** include compromise and precision networks. ■ **Plug-in Line Equalizers** compensate for frequency-amplitude characteristics in cables or lines. ■ **Plug-in Auxiliary Devices** include pad adapters, pad control relays, loop-back relays, idle-circuit disabler, and filters. ■ **Plug-in Attenuators** introduce fixed loss in 4-wire paths. ■ **Power Supplies** energize up to 100 repeater amplifiers. ■ **Mounting Panels & Assemblies** mount amplifiers, networks, equalizers, or repeaters.

### OTHER RAILROAD SOUND EQUIPMENT



You'll find Altec sound systems and equipment the reliable answer to railroad communications needs: intertrain, on-train, train-to-yard, platform, shop, or station. All-transistor amplifiers give you maintenance-free reliability. Altec's unique **SEQR®** system further insures you against power amplifier failure.

For your largest areas, the **GIANT VOICE®** system provides an over-all P.A. coverage heard clearly above any noise level.

For maximum intelligence at all times, Altec has developed **NOALA®**, which automatically increases or decreases sound system output to compensate for variable high noise such as passing trains. Altec's noise-cancelling microphones, for radio or line, eliminate ambient noises which interfere with intelligibility of voice-transmission.

For specific engineering details and information about how these reliable Altec products can serve your railroad communications network, call your authorized Altec Sound Contractor. He's listed in the Yellow Pages under Sound Systems; or write Dept. RS-4.



© 1965 AL  
**ALTEC LANSING**  
A Division of **ESV Ling Altec, Inc.**  
ANAHEIM, CALIFORNIA