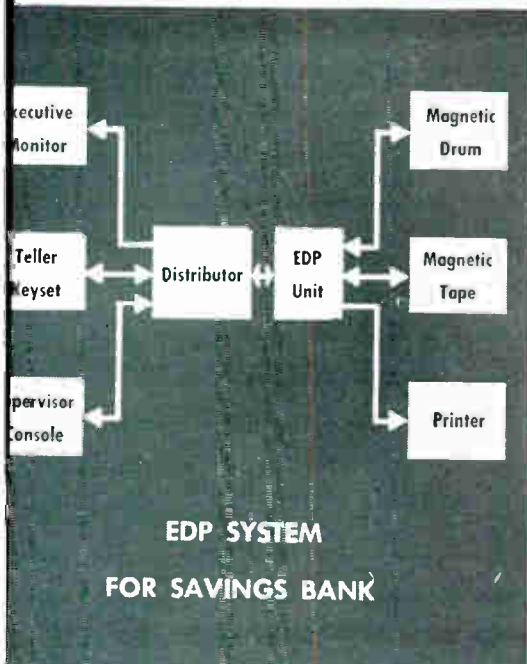


AUGUST 20, 1957

# electronics

## business edition

A MCGRAW-HILL PUBLICATION • VOL. 30, NO. 8B • PRICE FIFTY CENTS



## Bank Systems Get Nod

Savings banks may be next  
computer stamping ground . . . p 13



## Computer Line Mechanized

Card-programmed inserter helps  
make transistorized calculator . p 19

# NEW!

## LIGHT BODY SYLVANIA PHOSPHORS FOR 110° PICTURE TUBES

- More uniform color
- Good screen adherence
- Faster settling schedules
- Available immediately

Developed especially to solve the difficult screen settling problems encountered in the new wide-angle black-and-white picture tubes—these new Sylvania phosphors offer advantages for conventional tubes, as well.

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An important improvement in particle size distribution and uniformity can result in still another important advantage . . . faster settling schedules.

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Sylvania produces a wide range of phosphors for fluorescent lamps, mercury vapor lamps, and cathode ray tubes—as well as phosphors for black-and-white and color TV picture tubes. Your Sylvania sales engineer will be glad to discuss specific phosphor and settling chemical requirements with you.

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SYLVANIA ELECTRIC PRODUCTS INC.  
Tungsten and Chemical Division, Towanda, Penna.

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Lighting • Radio • Electronics • Television • Atomic Energy

# electronics business edition

A McGRAW-HILL PUBLICATION • VOL. 30, NO. 8B • AUGUST 20, 1957

## NEWS AT A GLANCE

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- Sales and Profits Up.** Thirty eight electronics companies report first half earnings up over 1956. Profit margins are wider too. . . . . p 5
- Bank Systems Get Nod.** Right now several top savings bank officials are out shopping for on-line electronic data processing systems. . . . . p 13
- New Markets Open Abroad.** Flush with U. S. aid dollars, the new nations of Asia and Africa are planning heavy communications outlays. . . . p 15
- Portrait of a Salesman.** What kind of electronics engineer makes the best salesman and how do the rewards stack up? . . . . . p 17
- Computer Line Mechanized.** Production of transistorized calculators gets a boost when card-programmed component inserter takes over. . . . . p 19
- Steelmaker Adds Computer.** Already heavy on radio and electronic instrumentation, Crucible Steel now puts in computer for inventory control. . p 20
- Tv Market Looks Good.** Setmakers expect a profitable second half to push 1957 sales six percent ahead of 1956. . . . . p 22
- Those Rocketing Automakers.** Is Detroit's interest in guided missiles phase one of a major push into the electronics business? . . . . . p 24
- Civilians Run Dew Line.** Air Force accepts 3,000-mi radar fence from builder Western Electric, then turns it over to Federal to run. . . . . p 30
- Wire Pay-Tv vs Broadcast.** Some pay-tv promoters are swinging over from the scrambled broadcast idea to cable hookup plan. . . . . p 37
- Denver Begins Rolling.** Aircraft and guided missile production is making it springtime in the Rockies for electronics. . . . . p 39
- Britain to Unwrap Missiles.** Newly revealed Red Dean and five other birds will make their debuts next month. . . . . p 42

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**INCREASE YIELDS ON  
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BARIUM TITANATE, ETC.**

These DI-MET metal bonded diamond blades are producing greater yields in all crystal cutting programs and are eliminating unnecessary waste of costly materials.

You can now obtain Type DIT blades as thin as .006" . . . ideal for delicate dicing operations.

For wafering, Type DITR is available down to .015" thick. *Both blades conserve material and provide utmost speed and blade life!*

And here's a valuable secondary advantage . . . you suffer no contamination of either blanks or cuttings when you slice and dice with DI-MET diamond blades! Make your crystal programs more successful, more economical, more profitable by specifying Felker DI-MET! Available from your Felker Distributor . . . or write direct.

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available as thin as .006"

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**FELKER MANUFACTURING CO.**  
Torrance, California

*First in Diamond Cut-Off Blades!*



Donald Klauber, Station Sales Manager of Associated Artists Productions, Inc., tells:

## “Why Popeye had to race to Texas!”

“Kids were clamoring, advertising sponsors waiting! A big TV station’s popularity — and profits — were at stake!

“As usually happens, when KDUB-TV in Lubbock, Texas, finally signed up Popeye—one of America’s hottest daytime programs—they needed those films in a real hurry!

“So we raced Popeye there — via Air Express!

“But launching a TV cartoon series is only a small part of our story. We use Air Express for 50,000 theater dates for our full-length feature films — with only 600 prints!

“We could not run this business as economically without Air Express!

“A 15-lb. shipment, New York to Lubbock, Texas, costs only \$9.47 with Air Express — \$1.36 less than any other complete air service.

“What’s more, Air Express uses radio-controlled trucks to rush many of our shipments to and from airports — and, whenever necessary, a private wire system to trace shipments instantly. It really pays to use Air Express regularly!”



# Air Express



30 YEARS OF GETTING THERE FIRST via U.S. Scheduled Airlines

CALL AIR EXPRESS ... division of RAILWAY EXPRESS AGENCY



**New,  
convenient,  
compact  
High accuracy  
expanded scale  
Ideal for  
industrial use**

**-hp- 500B FREQUENCY METER—\$285.00**

Here's a list of the many industrial and laboratory jobs the new -hp- 500B Frequency Meter can do for you quickly, easily and without elaborate setup:

Count sine waves, square waves and pulses. Indicate average frequency of random events. Measure beat frequency between rf signals. Determine oscillator stability. Measure crystal frequency deviation. Measure temperature, pressure, weight and other physical quantities which can be converted to frequency.

This versatile instrument also serves as a convenient automatic motor speed control, overspeed and underspeed control and makes possible a permanent record of frequency or speed as a function of time. And, it may be used for automatic control of quartz crystal etching.

-hp- 500B covers the range 3 cps to 100 KC and provides direct readings of high accuracy. Readings are not affected by either signal or line voltage variations. An expanded scale permits any 10% or 30% segment to be viewed over the full meter range, making possible highly accurate measurements of differential frequency. A pulse output is provided to sync a stroboscope and continuous recordings of readings may be made on an Esterline-Angus recorder.

Model 500B is extremely compact, light, easy to use and of quality construction throughout. It is also available as Model 500C, calibrated in RPM.

**BRIEF SPECIFICATIONS**

- Frequency Range:** 3 cps to 100 KC. 9 ranges.
- Input Voltage:** 0.2 v sensitivity (sine waves)  
1.0 v min. (pulses) 250 v peak max.
- Input Impedance:** Approx. 1 megohm shunted by 40  $\mu$ f.
- Accuracy:** Better than  $\pm$  2% full scale.
- Self Check:** Convenient calibration based on line voltage frequency.
- Recorder Output:** Panel jack for 1 ma, 1,400 ohm Esterline-Angus Automatic Recorder.
- Pulse Output:** Ta trigger strabe, etc., in sync. with input.
- Photocell Input:** Panel jack with bias for 1P41 phototube, 40  $\mu$ f shunt.
- Power:** 115/230 v  $\pm$  10%, 50/1,000 cps, 110 watts.
- Size:** 7 1/2" x 11 1/2" x 14 1/4". Wt. 17 lbs.
- Price:** -hp- 500B or 500C: \$285.00.

Data subject to change without notice. Prices f.a.b. factory.

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# Sales and Profits Up

**First half reports show higher sales and profits for most firms. Profit margin increases**

FIRST six months of 1957 was an excellent semiannual period for the electronics industry, according to figures of 32 firms which reported in July.

Sales and earnings increased for most. Several re-

ported record sales and earnings. Margins were higher.

First half sales increased in 1957 over 1956 for 29 firms. Typical sales increase for the group was 10.2 percent.

Twenty-seven companies enjoyed increases in net profits during the first half of this year. Typical earnings increase for the group was 27.8 percent.

Ratio of net profits to sales for the typical firm increased from 5.0 percent in first half of 1956 to 5.5 percent in 1957.

	FIRST HALF SALES (Thousands of Dollars)			FIRST HALF PROFITS (Thousands of Dollars)		
	1957	1956	% Change	1957	1956	% Change
Arvin Industries	\$35,446	\$29,828	+ 18.8	\$1,949	\$1,502	+ 30.0
Audio Devices	2,350	1,800	+ 30.6	160	104	+ 53.8
Avco Manufacturing	165,016	167,845	- 1.7	5,233	29	.....
Bell & Howell	19,329	19,244	+ 0.4	455	560	- 18.8
Century Electric	14,829	14,808	+ 0.1	450	325	+ 38.5
Clevite	39,685	36,528	+ 8.6	2,799	1,556	+ 79.9
Cutler-Hammer	38,874	40,175	- 3.2	3,100	3,743	- 17.2
Consolidated Electrodynamics	15,198	10,806	+ 40.6	911	568	+ 60.4
Cohu Electronics	2,671	1,081	+147.1	222	71	+212.3
Daystrom	19,841	16,901	+ 17.4	546	527	+ 3.6
Emhart Mfg.	17,759	16,117	+ 10.2	1,701	1,285	+ 32.4
Eaton Mfg.	121,519	122,240	- 0.7	6,586	7,450	- 11.6
General Electric	2,121,310	1,958,974	+ 8.3	127,823	112,864	+ 13.3
General Transistor	1,240	364	+240.7	127	78	+ 62.8
IBM	.....	.....	.....	40,061	31,869	+ 25.7
International Resistance	7,667	7,225	+ 6.1	256	111	+130.6
P. R. Mallory	38,690	32,663	+ 18.5	1,586	1,155	+ 37.3
Manning, Maxwell & Moore	28,868	20,661	+ 39.7	1,642	850	+ 93.2
Minneapolis-Honeywell	158,128	128,843	+ 26.7	10,304	9,560	+ 7.8
National Cash Register	182,893	155,556	+ 17.6	8,183	7,725	+ 5.9
H. K. Porter Co.	78,188	69,249	+ 12.9	3,460	3,992	- 13.3
Oxford Electric	69,546	58,957	+ 79.6	3,603	3,498	+ 3.0
Philco	182,651	166,862	+ 9.5	1,613	831	+ 94.1
RCA	564,990	526,488	- 3.2	20,311	20,037	+ 1.4
Rheem Mfg.	101,235	82,765	+ 22.3	1,473	1,127	+ 30.7
Reeves Soundcraft	2,441	1,668	+ 46.4	165	17	.....
Square D	50,697	48,447	+ 4.6	4,465	5,218	- 14.4
Standard Register	24,107	22,635	+ 6.5	1,362	1,347	+ 1.1
Sylvania	162,521	162,360	+ 0.1	4,789	7,377	- 35.1
Stewart-Warner	60,904	57,830	+ 5.3	3,374	3,178	+ 6.2
Thompson Products	196,001	142,931	+ 37.1	8,323	4,862	+ 71.2
Westinghouse Air Brake	123,974	113,064	+ 9.5	6,641	6,136	+ 8.2

## SHARES and PRICES

MICROWAVE component manufacturers are of particular current in-

terest because of the rapid rise in value of Microwave Associates com-

mon stock. Issued at \$7 in June it was recently quoted at \$14½.

Typical Microwave Component Manufacturers	Recent Price	1956 Dividends	Percent Yield	Earned per Com. Share		Traded	'57 Price Range
				1957	1956		
Microwave Associates	14½ <sup>1</sup>	.....	.....	0.19 (6 mo)	0.47 <sup>3</sup>	OTC	.....
Litton Industries	47½	.....	.....	0.72 (6 mo)	0.97 <sup>3</sup>	ASE	29½-56½
Raytheon Manufacturing	21½	.....	.....	0.63 (10 mo) <sup>2</sup>	0.45 <sup>3</sup>	NYSE	16¾-22¼
Sylvania	42	2.00	4.8	0.84 (3 mo)	4.03	NYSE	39¾-46¼
Varian Associates	18¾ <sup>1</sup>	.....	.....	0.32 (6 mo)	0.42 <sup>3</sup>	OTC	.....

<sup>1</sup> bid

<sup>2</sup> includes seven months of 1956

<sup>3</sup> fiscal year

# What Money Costs

Stock underwriting costs varied from 0.51 to 14.29 percent last year

TODAY'S tight money market lends special interest to a recent New York Stock Exchange study of the costs of raising capital.

Increasing numbers of our industry graduating to the NYSE heighten interest. Within the last two months, Litton Industries, Consolidated Electrodynamics, P. R. Mallory and Foote Mineral stocks went on the Big Board.

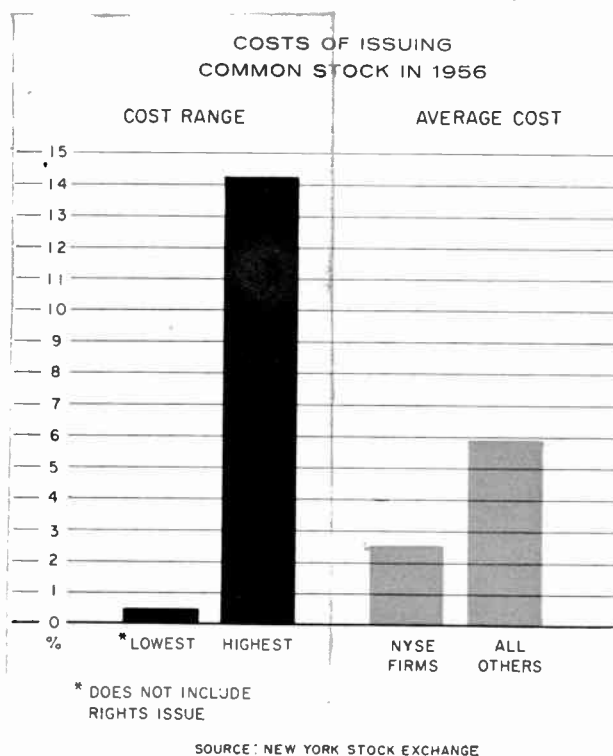
Underwriting costs of common stocks were compared for 53 NYSE firms and 51 other firms. Most firms which issued common stock last year were included, except those with less than \$7 million in assets.

Cost of issuing each hundred dollars of new common stock averaged \$2.60 for NYSE firms and \$5.97 for other firms, the study found.

Lowest individual cost found, excluding issues with subscription rights to stockholders, was 0.51 percent—to a NYSE firm. Highest cost was 14.29 percent, to a firm not listed on the NYSE.

Including rights issues, the lowest cost was 0.40 percent. Average cost of rights issues was 1.83 percent for Exchange-listed firms and 3.76 percent for others.

Financing costs decreased as the number of stockholders increased. For NYSE firms, costs ranged from 3.40 percent among those with less than 2,500 stockholders to 2.67 percent for those with 10,000-



25,000. For other firms, costs varied from 8.82 percent for the less than 2,500 group to 3.00 percent for the 10,000-25,000 group.

Costs also decreased with size of issue. NYSE firms paid 3.36 percent on issues under \$5 million and 2.31 percent on issues between \$5 and \$10 million. Non-NYSE firms paid 6.17 percent on the smaller issues and 5.06 percent on the larger ones.

Efforts to relate financing costs by quarterly periods and by size of company were inconclusive.

## MERGERS, ACQUISITIONS and FINANCE

- General Dynamics' diversification program may lead it into the soda pop industry. Last month, GD announced it was discussing merger plans with Liquid Carbonic Corp. whose products include the bubbles in carbonated beverages, and soda syrups. Its products also include oxygen, acetylene, medical gases and liquid oxygen for fuels and petrochemicals. These products are expected to tie in with activities of Electric Boat, General Atomic, Convair and Stromberg-Carlson divisions. Less dependence on defense business will be another benefit as Liquid Carbonic is largely in commercial fields.

- American Research and Development receives approval from SEC

to buy \$130,000 of the \$1 million, 15 year, 5 3/4 percent unsecured notes of affiliated Airborne Instruments Laboratory. The issue is reported over-subscribed with some 20 investment groups and individuals sharing in the purchase. It is convertible into common stock at \$48 per share and callable after one and a half years at descending premiums beginning at 105.75 percent.

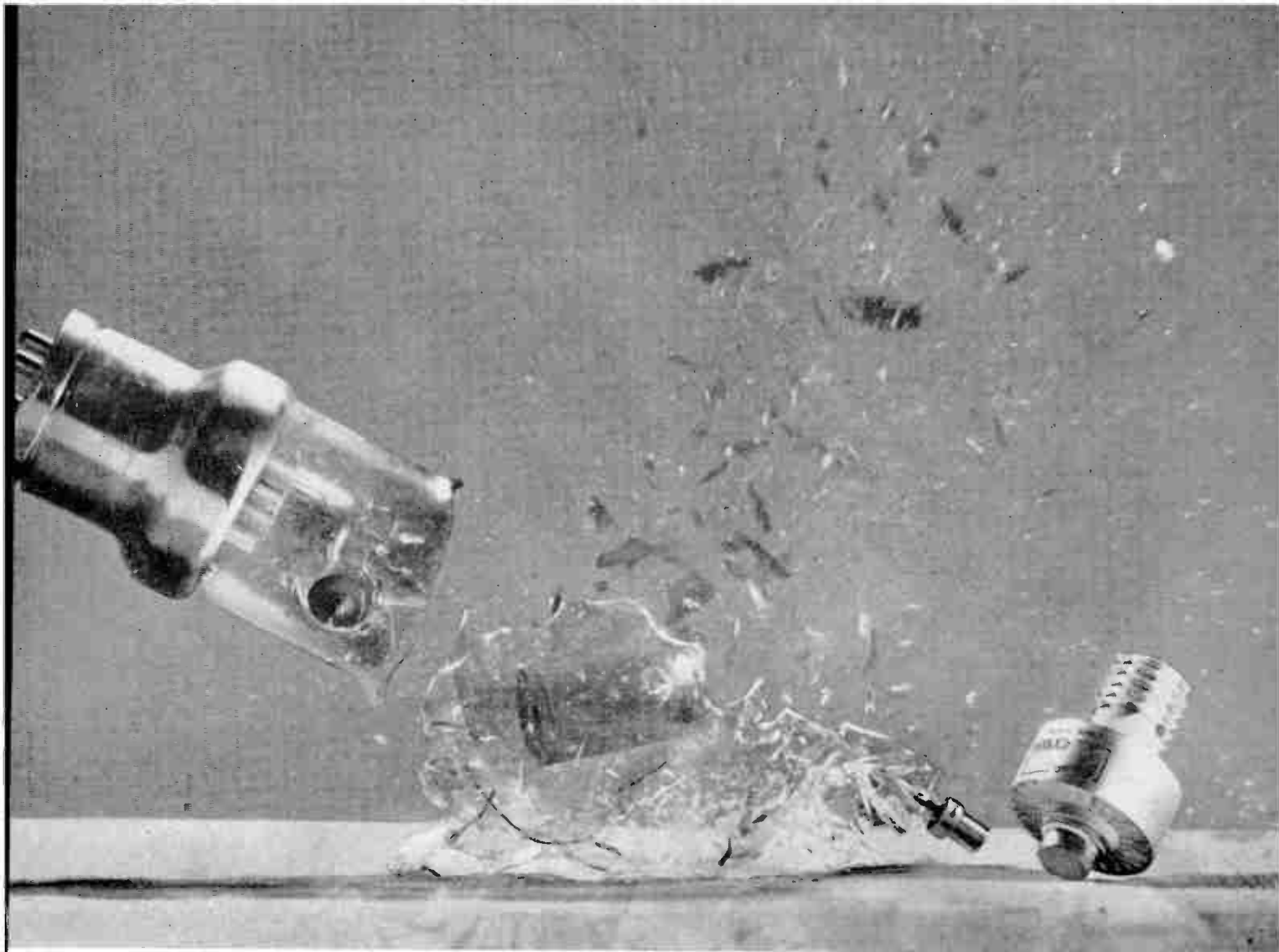
- Narda Corp., microwave component manufacturer of Mineola, N. Y., reported getting ready for its first public stock issue.

- Chemicals - Electronics - Metallurgy Group (CEM), formed by Emerson Radio & Phonograph, General Aniline & Film and Revere

Copper & Brass, submits proposal to Atomic Energy Commission for joint AEC-CEM nuclear reactor project. The proposal is designed to accelerate industrial progress in the radiation field. The CEM group has been studying problems in finding ways to bridge the gap between lab experiments and commercial applications.

- Ling Electronics, Los Angeles, Calif., acquires American Microwave Corp., also of LA. The acquired firm produces microwave systems used for transmitting and receiving tv station programming, multichannel tv circuits, military data and closed-circuit tv installations. Ling makes guided missile components.





## Surviving Impact is an Eimac Ceramic Tube Extra

Aeronautical electronics demands extras from vacuum tubes. Among them is the ability to withstand heavy impact without impairing electrical characteristics. The photograph dramatically shows what happens to a 250 watt glass envelope tube and an Eimac 300 watt ceramic tube when both are dropped from a height of seven feet. The ceramic tube "took it."

Other advantages of Eimac ceramic tubes are: resistance to damage by vibration and temperature; smaller size without sacrificing power; ability to undergo optimum processing techniques that lead to tube reliability and longevity.

See Eimac Tubes that can take it at Wescon Aug. 20-23,  
Booths Number 1706 and 1727-28

**EITEL-McCULLOUGH, INC.**  
SAN BRUNO · CALIFORNIA

*Eimac First with Ceramic Tubes that can take it*



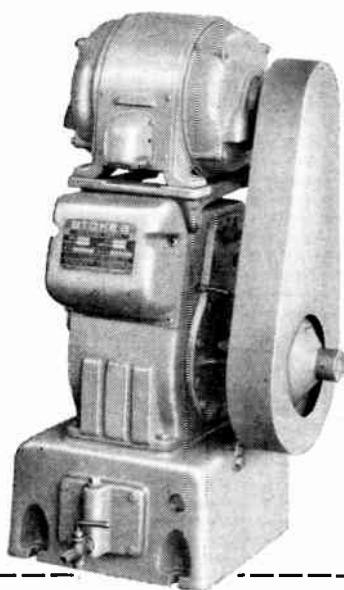
The small Eimac ceramic 4CX300A, shown above, will withstand 50G shocks of 11 millisecond duration. It will operate in airborne or ground station service at full ratings up to 500mc.

In its new line of ceramic tubes, Eimac has the answer for the aeronautical engineer who needs a tube that will deliver full output under extreme environment.

### 4CX300A MAXIMUM RATINGS TO 500MC

	FM	AM	SSB		FM	AM	SSB
D-C Plate Voltage	2000	1500	2000	Plate Dissipation, watts	300	200	300
D-C Screen Voltage	300	300	400	Screen Dissipation, watts	12	12	12
D-C Grid Voltage	-250	-250	—	Grid Dissipation, watts	2	2	2
D-C Plate Amperes	.250	.200	.250				

# need high vacuum components?



The Stokes Model 149 Microvac Pump has displacement of 70 cu. ft./min. . . . is a water-cooled unit. This pump cuts floor space requirements . . . measures less than 2 feet on a side. This model and all pumps in the Stokes Microvac line, 17-500 cfm capacity, are tested to produce vacuums of 10 microns or better on blank suction.

**S**TOKES makes a complete line of vacuum components . . . advance-designed and engineered to help make your vacuum systems more productive. Each unit reflects Stokes' unparalleled experience, pioneering leadership and wealth of basic vacuum technology.

The product list includes: Diffusion Pumps, Vapor Booster Pumps, Mechanical Pumps, Mechanical Booster Pumps, Vacuum Gages, and Valves.

Send for technical data on any or all . . . without obligation.

High Vacuum Division  
F. J. STOKES CORP.  
5500 Tabor Road, Phila. 20, Pa.

## STOKES

Circle 5 Readers Service Card

## WASHINGTON REPORT

THE DEFENSE DEPT. has finished a preliminary review of fiscal year 1958 military procurement plans, and the outlook for electronics producers is optimistic. This is in the face of a series of decisions to cut back, stretch out and postpone weapon production and development projects under the administration's new hold-down on defense spending.

Commenting on the review for *ELECTRONICS Magazine*, a top-level Pentagon budget official says: "Electronics won't be hurt by the new ceilings on defense expenditures. On the whole, the industry is on the upswing in military sales, and has a fairly good future. There won't necessarily be an increase in electronics spending, but the industry won't lose ground either."

Because so much electronics procurement is tied up in budget sums for planes, missiles and other weapons, it's tough to pin down total military electronics buying with any precision. But the general outlook is for contract awards of about \$4 billion over the next 12 months—roughly the same level as in fiscal year 1957—and deliveries of about \$3.7 billion, a 20-percent hike over fiscal 1957.

These overall estimates are particularly significant in view of the Air Force's plan to reduce the \$7.5-billion fiscal year 1957 volume of aircraft and related expenditures—under which much of electronics is covered—by about \$500-million in the next 12 months.

The current military budget squeeze comes from two fronts:

Congress' \$2.3-billion cut in the administration's Defense Dept. appropriation request. The Air Force finally received \$5.8 billion for aircraft and related procurement—\$3.4 million less than was sought; the Navy was voted \$1.8 billion for aircraft and related buying—\$95 million under the original request.

The administration's drive to reduce fiscal 1958 military expenditures by about \$2.2 billion—mostly in hardware procurement. This is the difference between the \$38 billion earmarked for defense spending in the administration's initial budget estimate and the Defense Dept.'s actual level of cash outlays in recent months.

The recent Air Force Association convention in Washington—held, ironically enough, to celebrate the Air Force's 50th anniversary and to play up air-power achievements—provided top Air Force officials with the loudest sounding board to date for spelling out officially and in some detail the bad news in store for airframe makers, engine builders, and others under this squeeze.

Said Dudley C. Sharp, Assistant Air Force Secretary for Material: Air Force suppliers are in for "an era of increasing competition between weapon systems for survival and competition (in industry) for the privilege of manufacturing" the systems that survive.

- The Army Adjutant General's personnel research division has started work to develop better psychological measures to test aptitudes of soldiers for training as electronics technicians. Objectives: (1) to find out in advance what men are most likely to survive electronics training courses; (2) to determine what level of aptitudes are needed for specific types of electronics jobs. The Army is becoming increasingly dependent on electronic equipment and is up against a serious problem of finding and training men to operate and maintain it. The new project is expected to run at least three years.

**ALONG THE WAY... OF *TWA***

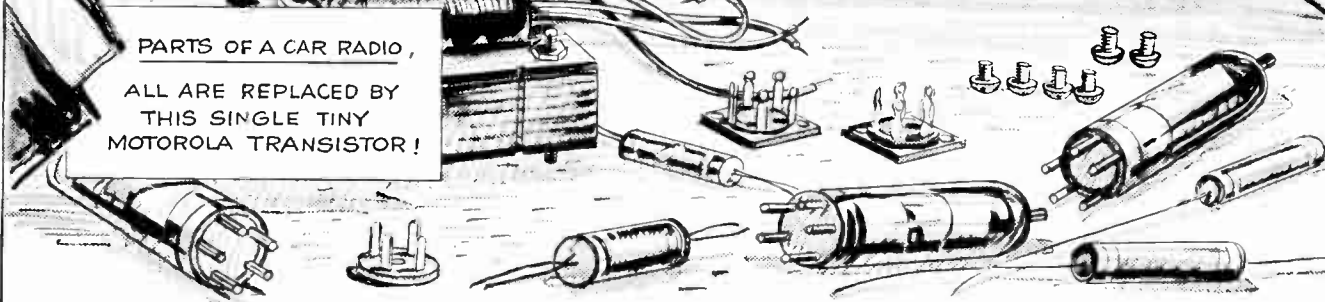
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SPEED NEW-RADIO PRODUCTION!**

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PARTS OF A CAR RADIO,  
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MOTOROLA TRANSISTOR!



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*TWA* IS THE ONLY AIRLINE OFFERING SINGLE-CARRIER AIR FREIGHT SERVICE BETWEEN 65 KEY U.S. AND 21 MAJOR MARKETS IN EUROPE, AFRICA AND ASIA!



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REGULAR *TWA* AIR FREIGHT SHIPMENT CAN REDUCE OR ELIMINATE COSTLY STORAGE... GIVES GREATER CONTROL OVER LOWERED INVENTORIES... LOWERS WAREHOUSE INSURANCE PREMIUM!

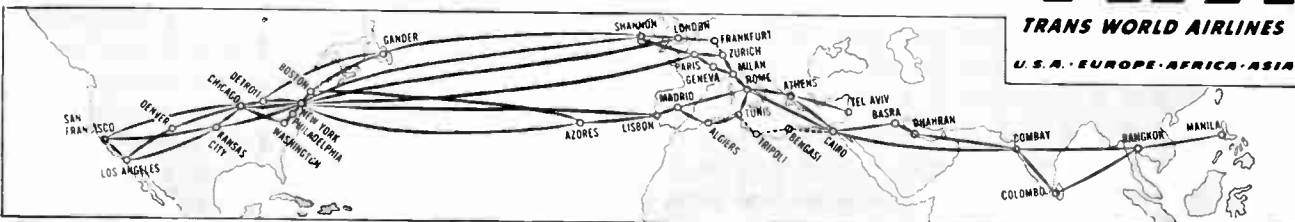


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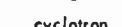
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## EXECUTIVES IN THE NEWS



### Roberts of MBS: ideas, with commercials

Just two weeks ago, a brash, energetic brainstormer from Philadelphia took over the Mutual Broadcasting System and the Don Lee and Yankee Networks. Paul Roberts, who will be 45 next month, brings a peculiar talent to his new job as president of the all-radio Mutual system—a talent for getting ideas and promoting them into successful enterprises.

MBS is the fourth largest revenue producer in the field that will ring up \$2 billion in electronics' till this year. The network was spun off from General Tire's RKO Telradio subsidiary, now comes under oil-operator control. Roberts' financial backing comes from West Coast oil interests, including Occidental Oil chief Armand Hammer, who is also president of New York's Hammer Galleries.

Roberts is a former journalist (Temple '32 and the now-defunct *Philadelphia Record*), publisher and promoter. He started and ran the first U. S. International Trade Fair at Chicago's Navy Pier and Coliseum, a project that everyone thought impossible. The night the fair was first opened to the public, "the whole end of Chicago was blocked with traffic." He ran a ship-refitting enterprise during the war, still likes to sail when he can although he "goes broke from buying big sailboats."

Roberts says he likes music: "hi-fi and f-m music, with commercials." He meets the world with good-humored acceptance, insists that the best day to do business is Sunday—"no lawyers, no telephones or other interruptions."

### STRICTLY PERSONAL

#### Research Teams: Rx or Fallacy

Your article "Organization: Rx for R&D" (July 20, p. 17) repeats the fallacy that "the day of the lone wolf in research and engineering has long passed." With this, I and many others have long and strongly disagreed.

The project team may be fine for investigative or design problems, but it rarely if ever actually creates

anything. Two or five or ten heads may be better than one in engineering design, but the history of creative endeavor shows it to be a process of individual minds. The greatest milestones of our creative achievements in all fields bear full witness to this fact.

A collaborator may sometimes strike a spark in another, but once the idea is thus individually conceived, others can only suggest

changes . . . or . . . polish up design details.

The great industrial laboratories which spend billions annually on group projects have been propounding this "death of the lone wolf" theme so long that many have come to accept this fallacy as truth. Great creations are born of something more than mere proficiency in basic science or engineering skills.

Whatever its essence, creativity is not to be bought by a salary nor instigated by a bull session. It must be nurtured in a friendly hospitable climate. It cannot be forced.

B. F. MIESSNER

VAN BEUREN ROAD, RFD 2  
MORRISTOWN, N. J.

### Timely Help

We have received many fine comments on the Business Editions of *ELECTRONICS*.

The business notes are timely and helpful in conducting the affairs of our office.

We keep copies of the publication in our library for handy reference as we are often called on to disseminate current business information on the electronics industry.

RICHARD L. PAULLUS

WEST COAST ELECTRONICS MANUFACTURERS ASSOCIATION  
LOS ANGELES 36, CALIF.

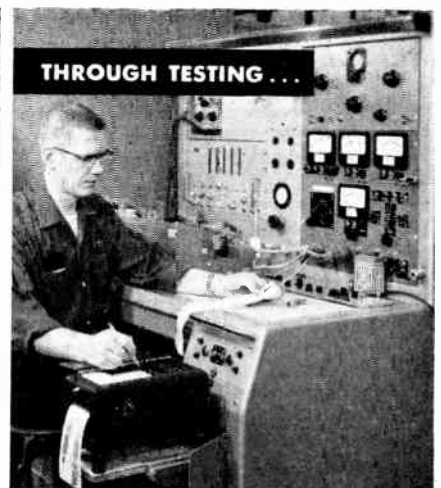
### Optimist

The cutbacks in defense spending will undoubtedly cause some economic backing and filling in our industry. But ultimately it should be a healthy thing. We shouldn't go on being subsidized by government money anyway.

Maybe if some of this tax money is returned to the people we'll begin to see more investment in consumer products. Certainly our engineers will be able to get down to business solving some of the problems of industrial and commercial controls.

Personally, I feel very optimistic about the whole thing.

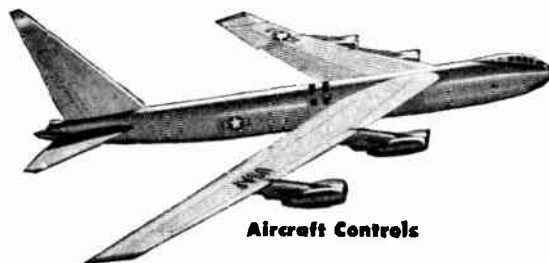
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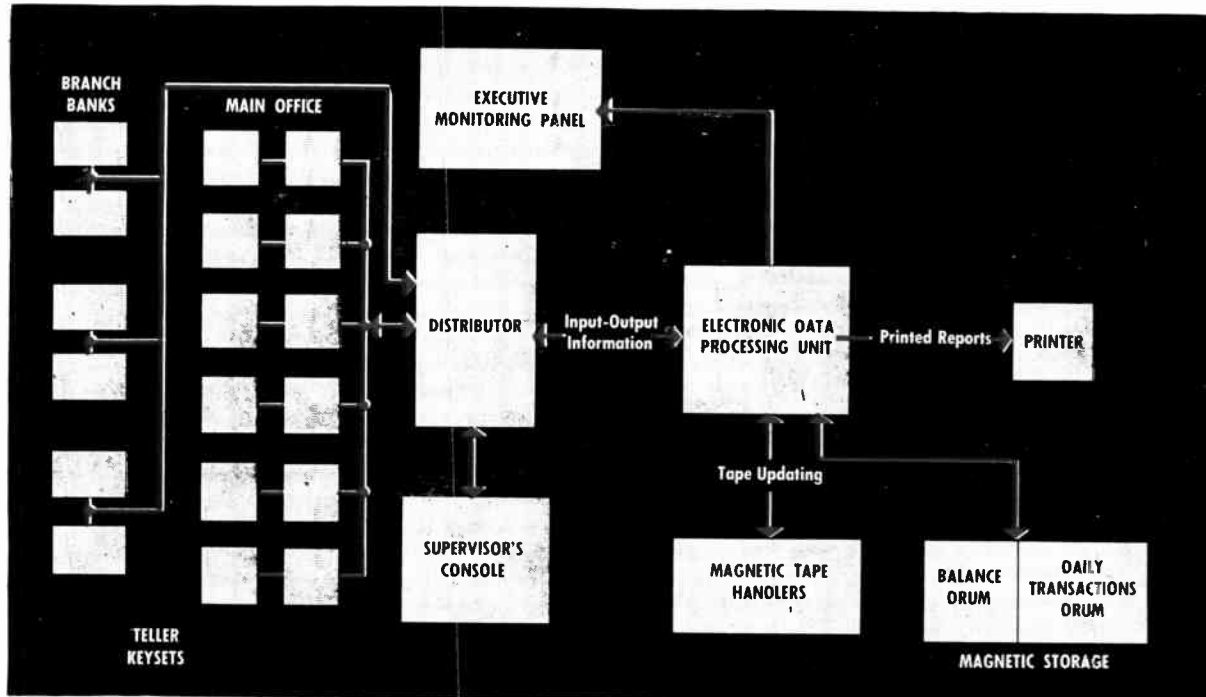
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Computer will keep savings accounts straight when . . .

## Bank Systems Get Nod

Savings bank leaders say on-line electronic data processing is an answer to saving automation problems. High equipment costs limit use today. But bankers look towards lower costs in the future and cooperative use of equipment by small banks

ON-LINE electronic data processing systems are the only real answer to automating savings operations, bank leaders said last week.

Savings banks, faced with problems of rising wages and difficulties in finding qualified clerical help, have been intensively studying methods of automating their operations by electronics.

The Savings Bank Research Group, comprising 36 savings banks, in July issued a report on electronic data processing systems. The report is based on engineering and economic studies by Arthur D. Little and Price, Waterhouse.

On-line systems appear to be the primary goal for

savings banks and there is no compelling reason to adopt off-line systems except on an interim basis, the report said.

On-line systems process deposit and withdrawal transactions as they are handled at the bank. Off-line systems accumulate deposit data on tapes or cards for processing at a later date.

When a teller enters a deposit or withdrawal in a customer's passbook an on-line computer will simultaneously update the account and compute interest.

"Ultimately most savings banks will obtain electronic data processing systems," says Arthur F. Ken-

dall, spokesman for the Savings Bank Research Group and comptroller of the New York Savings Bank.

"There is no question that on-line data processing systems are practical or that they will come into widespread use, eventually, says Everett J. Livesey, chairman of the Committee on Electronics of the American Bankers Association and vice-president of the Dime Savings Bank of Brooklyn.

Last month, Livesey wrote to 500 savings bank executives, urging them to get started on an electronic data processing feasibility study. If they don't they may get left behind in a revolution of savings bank operations, Livesey says.

The market for savings bank automation systems is to be found among America's 500 savings banks, 12,000 commercial banks with savings accounts and 6,000 savings and loans associations. Their respective deposits are: \$30, \$50 and \$30 billion.

Market estimates vary all over the lot. One firm estimates the market at 400 large banks, plus several thousand small banks which could economically use EDP systems through cooperative purchase. Another manufacturer estimates the top market at only 100 systems.

One big advantage of on-line systems is that they help hold down a bank's labor costs. Bankers estimate they can increase their volume of transactions 40 percent without increasing their labor expense with on-line systems. Also, the banks don't have to give the computer periodic raises and fringe benefits.

Increased flexibility of operation is another important advantage. Like supermarket cash register the number of depositor windows in service can be varied with business volume. Other systems require one teller for each group of accounts at all times.

The major problem of on-line systems is initial cost. At present prices, the equipment ranges from \$1-\$2 million. Only the larger savings banks with deposits of \$100-\$200 million can afford to purchase them individually, says Kendall. However, bankers look for lower costs in the future.

Livesey sees a need for a window machine that can be operated mechanically as well as electronically, in case of breakdown. He also sees the need for an economical automatic signature verification system. However, one bank claims it already has discovered such a system but cannot discuss it until patents are cleared.

Teleregister Corp. of Stamford, Conn. and Boston's Laboratory for Electronics are two manufacturers presently working on meeting savings bank needs, says Kendall.

Teleregister has three contracts in its pocket. One of its Magnetronic Savings Account systems will be ready for test by July of next year and for delivery to the Howard Savings Institution of Newark, N. J. in September. Two others are being built. One for Union Dime Savings Bank of New York City and another for the Society for Savings in Hartford.

Laboratory for Electronics is scheduled to install its Diana computer at the Chase-Manhattan Bank in December of this year. At Chase-Manhattan Diana will be used for off-line payroll and expense analysis work. But, an on-line system designed by LFE uses a Diana computer with Burroughs or National Cash Register window machines.

IBM is shooting for an on-line system capable of operating at a reasonable cost. But, realization of this aim is more than a few months away, says IBM banking representative, W. J. Kenney.

Burroughs is concentrating on improving off-line systems. It is developing a new system which it hopes to announce shortly.

RCA may be the dark horse in the race. It is known to be developing a new on-line system but is keeping details secret. The secret may be out in October when it has an on-line demonstration appointment with the Savings Bank Research Group.

RCA's previous demonstration to the bankers was based on its Bizmac computer and point-of-sale recorder, both now being tested in Higbee's department store in Cleveland.

Remington-Rand has submitted proposals for an on-line system using its Model O computer with 10 key window machines. The unit was developed for use in commercial banks.

Though not a manufacturer, Buhl & Sons of Detroit is preparing an EDP system for cooperative use by smaller banks. Buhl's representative, J. R. De Hart reports the firm is placing an order for an IBM Rmac to be used about two years hence.

**Manufacturers may find the savings bank market a source of new business through subcontracting.**

- Both Teleregister and LFE count on subcontracting to carry the production load if orders start to come in fast. Teleregister is quoting two-year delivery on orders. If savings bank business increases, the company will have to rely on contractors to meet delivery schedules.

- Savings bankers are interested in hearing from other data processing manufacturers who would like to bid for savings-bank business. The American Bankers Association in New York has a pamphlet, "Automation of Bank Operating Procedure," that provides guides for interested manufacturers.



# New Markets Open Abroad

- U. S. foreign aid promotes telecommunications and broadcasting in underdeveloped areas; \$25 million already allocated
- Prospect: contracts for microwave and other gear worth tens of millions of dollars for Southeast Asia alone

TELECOMMUNICATIONS and medium-wave radio broadcast gear are playing an increasingly significant role in U. S. foreign aid in the fiscal year 1958.

More than \$25 million has already been earmarked or spent for both survey work and equipment installation.

Emphasis on communications will probably continue for some years as President Eisenhower's Middle East Doctrine and other policies are implemented. It will mean:

- Engineering survey contracts for U. S. communications consulting firms.
- Equipment and installation contracts totaling tens of millions of dollars, with both U. S. and foreign firms eligible.

Latest foreign aid item is \$8,370,000 that has just

been obligated for a telecommunications system for the Baghdad Pact countries—Iran, Iraq, Turkey and Pakistan. Additional funds will probably be contributed by the countries concerned.

The International Cooperation Administration, which administers the foreign aid program, is expected to ask soon for proposals for the survey job. That may mean a contract worth anywhere from \$200,000 to \$700,000.

Southeast Asia Communications, a joint venture firm set up by Hycon Eastern Inc. and Page Communications Engineers, is now engaged in a \$2.5 million survey program for Thailand, Laos and South Vietnam.

Contract includes: survey of telecommunications needs; engineering of systems, including toll, local

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## TECHNICAL DIGEST

- **What height reliability?** After a test firing, a Lockheed X-17 ballistic missile fell from a height of five miles, burrowing a hole 12-ft deep in the desert floor. Workers hack-sawing through the accordion-pleated missile nose discovered the transistor sun-position indicator intact. The two-ounce device continued to operate on its own power for several weeks, having survived an impact greater than 1,000 g.

- **Stereo disk-recording is emerging from the laboratory in Britain.** The method of putting two channels in one groove is the often-discussed combination of lateral and vertical recording tried by Bell Labs over 25 years ago. Both motions are mechanically transmitted to the same stylus during playback.

- **Multi-electrode transistors developed by R. Rutz of IBM effect economies in computer circuitry.**

A single two-collector unit in a simple circuit performs a complete binary addition or a variety of other logical operations. Two models have been developed; a point-contact design with high current multiplication, and a junction unit using p-n hook collectors to yield higher values of intrinsic alpha.

- **Gated-beam tubes, originally designed as limiter-discriminators for f-m receivers, are used by the National Bureau of Standards in a relaxation oscillator circuit.** With a 6BN6, pulse widths ranging from 0.5 to 400 microsecond may be obtained at frequencies greater than 1 mc. The oscillator requires only 3 or 4 resistors and 1 capacitor in addition to the tube.

- **Triglycine sulphate has ferroelectric properties that make it a promising material for switching circuits and memory devices.** Under development at Bell Labs, the material has a lower coercive force than barium titanate, permitting switching with lower voltages.

Rapid switching does not cause fatigue, and the material will hold a given polarization indefinitely. About 20 volts at low current is required for switching, suiting the device for use with transistor circuits.

- **From dinnerware to ceramic printed-circuit wiring boards was a logical step for the Gladding McBean Co.** The techniques of crockery production were of direct value in the development of a rolling production method for the wiring boards. The result is uniform ceramic boards which resist 2,000 F°, do not warp or absorb moisture and are mechanically strong.

- **Ultrasonic brain surgery, now leaving the developmental stage, takes advantage of the fact that high intensity sound waves passed through the brain destroy nerve tissue only at the focal point.** Technique does not affect blood vessels, precluding hemorrhage, the great danger in other surgical methods.

and auxiliary equipment such as telegraph and facsimile gear; operation of a training program in management, crafts and operations; inspection of construction progress and rehabilitation of existing telephone equipment.

First equipment contracts may be let some time in 1958 before the survey contract ends. These will involve telephone exchange equipment for 80-90 cities and towns, and toll links between them.

Most of the network will require vhf or uhf multiplex equipment. Total will run into tens of millions of dollars, with one guess as high as \$100 million. About 20 percent of the cost of the telephone equipment may go for tropospheric scatter gear.

In Libya, work is going forward on both a telecommunications system and a medium-wave radio network. Estimates on these projects range from \$10-\$15 million. Libyan-American Reconstruction Commission, known as LARC, supervises these and all other foreign aid projects in Libya.

Carrying out the Libyan communications work is another joint venture company, Hycon Page LARC,

set up by Hycon Eastern, Cambridge, Mass. and Page Communications Engineers, Washington, D. C.

Telecommunications part of the Libyan program is scheduled to go into operation next year. About 30-40 percent of the system will be tropospheric scatter.

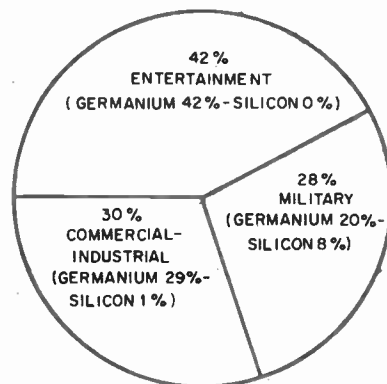
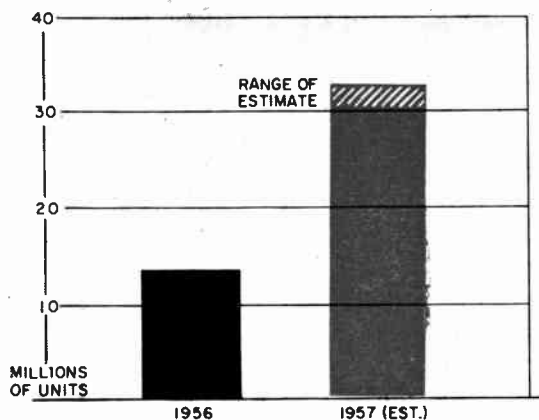
A number of 5 kw radio transmitters have been completed as a temporary broadcast facility.

Within 18 months new facilities will be completed at Tripoli and Benghazi, including a 50 kw transmitter.

Tunisia may follow Libya's example. In Southeast Asia it's considered likely that Burma, Cambodia, Indonesia and other Asian countries will get surveys and telecommunications systems.

Other ICA communications projects are: Ethiopia—about \$1 million for two medium-wave radio stations; South Vietnam—two medium-wave radio projects totaling about \$1.5 million; Indonesia—about \$300,000 for rehabilitation of medium-wave facilities; Cambodia—about \$10-\$15,000 for broadcast equipment; Laos—a \$10-\$15,000 shortwave radio project.

## PRODUCTION and SALES



COMPOSITION OF 1957 TRANSISTOR SALES

## Transistors to Top Thirty Million

TRANSISTOR sales appear to be headed for a total of 30,000,000-32,000,000 units in 1957.

Last month, Herman Fialkov, president of General Transistor, told the New York Society of Security Analysts that 1957 sales would be over 30,000,000 units.

Projection of transistor sales for the first five months of this year yields an estimate of over 32,000,000 units.

EIA reported sales of 8,954,000 transistors in the first five months of 1957, about two and a half times the 3,628,000 units sold in the same period last year. Total transistor sales in 1956 were nearly 13,000,000 units.

Dollar sales for 1957 should total between \$83 and \$88 million. However, if average prices for the year fall below the current average of \$2.75, a smaller dollar total can

be expected. Dollar sales totaled \$37 million in 1956.

According to a recent survey by Stanford Research Institute, the 1957 transistor market is divided as follows: entertainment use, 42 percent (almost all germanium); commercial-industrial use, 30 percent (29 percent germanium and one percent silicon); military use, 28 percent (20 percent germanium and eight percent silicon)

# Portrait of a Salesman

**Good electronics salesmen are even harder to find than engineers. Added to technical know-how they need a big shot of applied psychology. Selling is a tough life—it means spending up to half a year on the road. But salaries can climb to \$17,000 a year or more**

"GOOD SALESMEN are hard to come by. They are probably harder to find than engineers." Last week a sales vice president of a medium-sized electronics company used those words to sum up an interview on electronics salesmen.

The type of salesman he was talking about: the men who sell apparatus, (computers, broadcast station gear, industrial controls) to industry or systems to the military.

Industrial and military salesmen should have an electrical engineering degree or its equal in electronics experience.

With that as the cornerstone of his background what else does he have to be?

According to one sales director, "He's an introverted extrovert. He has to like people; at least not dislike them. There's a little bit of his heart that belongs to the laboratory, but the big part drives him out to meet people.

"He mustn't dislike traveling. He has to have lots of physical fortitude. And most important, he's got to behave like a vice president of the company; the customer will think of the company in terms of the impression he makes."

One firm estimates that 75 percent of its salesmen come from inside the company. Some come out of the labs. Greater number, however, are engineers who have been close to the customer either through service or applications engineering.

Motivation for the technical man to move into sales is partially negative. He doesn't feel completely at home in the laboratory.

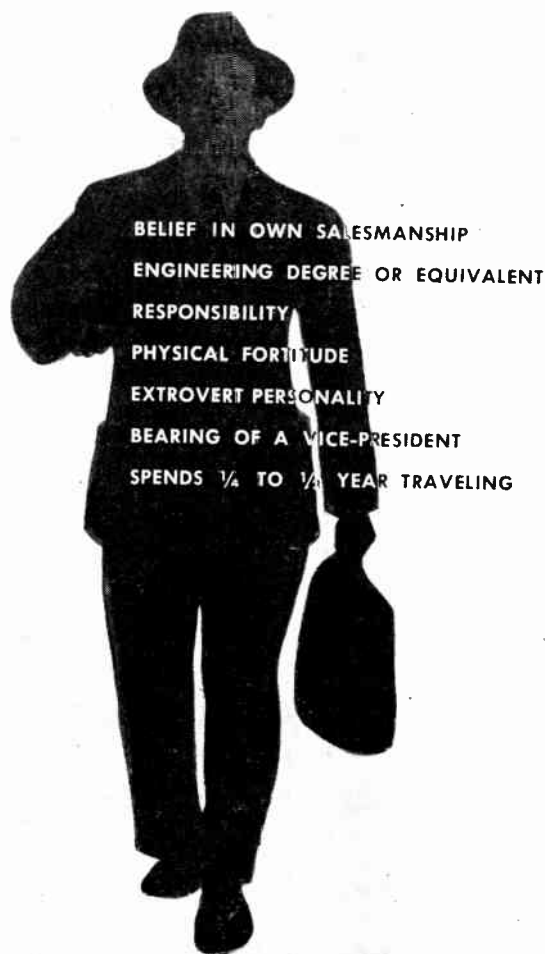
One positive motive is money.

In electronics the salesman begins somewhere in the neighborhood of \$7,500 to \$8,000 a year. He can in a short time, depending on his salesmanship and breaks, climb up to \$10,000 level. He can continue up to \$17,000. Some few go even higher.

Average take runs around \$10-11,000.

Most electronics companies pay straight salary plus bonuses or commissions for sales above and beyond quotas. Next most popular method of payment is the set yearly salary. Uncommon technique is the straight commission.

Majority of electronics salesmen are modest in



Makings of an electronics salesman

making out their expense accounts. Says a sales v-p, "We don't think we're being unrealistic in thinking that a heavy expense account is a sign that the salesman is substituting hoopla for faith in his product."

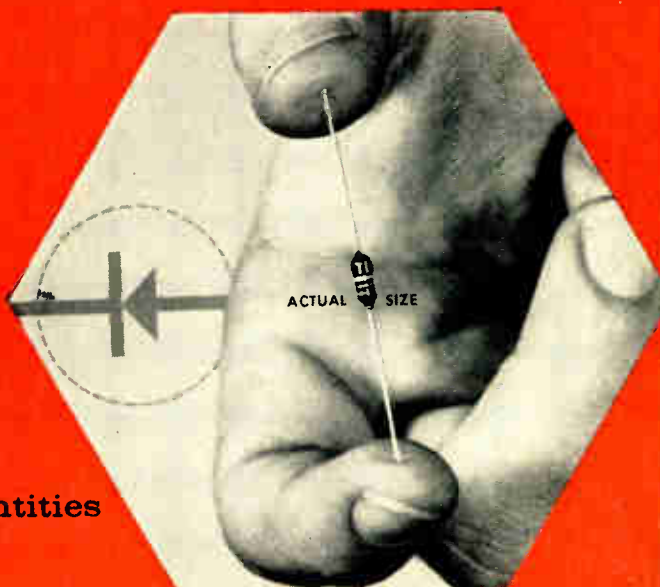
Amount of travel an electronics salesman can expect ranges from three months a year up to six months. Excessive travel is the main reason men give up selling.

Most common age for men beginning to sell electronics gear is between 28 and 32. They apparently hit their stride after their 35th birthday.

Average age for electronics salesmen, according to a consensus of five firms, is around 38.

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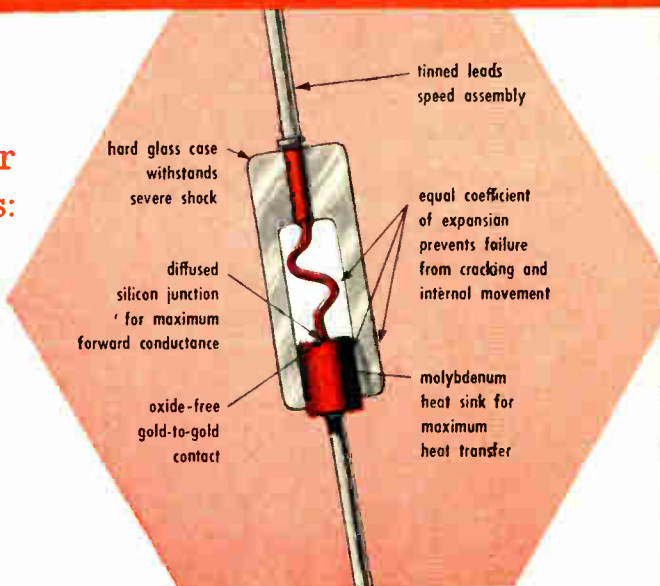
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Recurrent Peak Forward Current at +25°C	1.25	1.25	1.25	1.25	1.25	amp
Surge Current, 1 Second DC at +25 to +150°C	3	3	3	3	3	Amp
Power Dissipation at +25°C	600	600	600	600	600	mW

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	275	360	480	600	720	V
Minimum Breakdown Voltage at +100°C	275	360	480	600	720	V
Maximum Reverse Current at PIV at +25°C	0.2	0.2	0.2	0.2	0.2	μA
Maximum Reverse Current at PIV at +100°C	15	15	20	20	25	μA
Maximum Voltage Drop at I <sub>0</sub> = 400 mA; at +25°C	1.0	1.0	1.0	1.0	1.0	V

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# Computer Line Mechanized

**Card-programmed automatic inserter puts the components in circuit boards for IBM's transistorized 608 calculator. Machine uses lead-taped components, can select from variety of sources. Company might sell inserters for "about \$100,000"**

This month, in the sprawling Poughkeepsie, N. Y., plant where IBM's electronic data-processing machinery is built, an automatic inserting machine (cover) began putting together circuit boards for the transistorized Model 608 calculator.

The inserting machine—designed and built by IBM for its own use—is punched-card controlled. It can use several component feed sources, fixes large and small components in the board with separate insertion heads.

Eighteen months of investigation and evaluation preceded the design of the inserter, and resulted in a complete overhaul of purchasing standards. Example: the company now intends to buy all diodes in one size, irrespective of electrical characteristics.

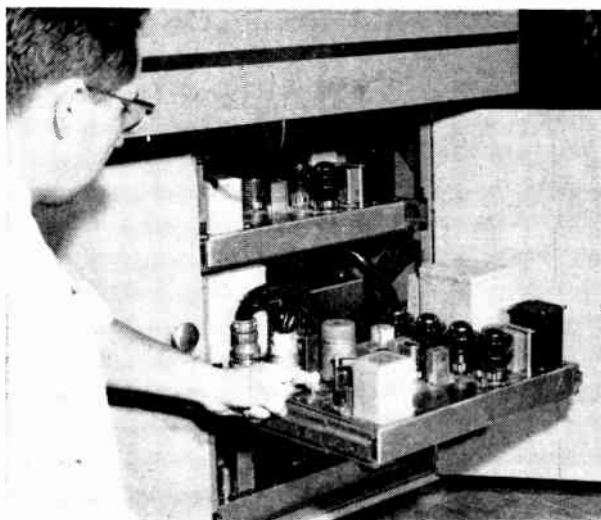
Standardization of components and of circuit-board characteristics was the first big step. As program coordinator Samuel B. Korin told *ELECTRONICS*: "It's the critical step, too. You've got to get straight exactly what you want to do before you build a machine to do it."

Evaluation produced standards comparable to those being threshed out in component subgroups of the Electronics Industries Association. IBM's machine will accept axially-leaded components, mount them in holes spaced 0.7, 1.0 or 1.4 in. apart. Minimum spacing between the ends of adjacent components is 0.2 in., between parallel components is 0.14 in. (to allow the inserting head to clear).

The automatic inserter has four subsystems: one selects the components, another positions the pallet that holds the circuit board, a third forms and inserts the component, and the fourth clinches the part to the board.

Two columns of an 80-column card contain the three pieces of data needed to insert one component. First instruction selects one of 20 component types. Second and third tell the two-directional servo system how far to move forward or back, and left or right. One punched-card control unit can run six insertion stations.

To work into the machine, parts must be lead-taped and put on reels. IBM currently uses a United



Adjusting servo control or programmed component assembly system

Shoe Machinery Corp. lead-taper which also straightens out any bent leads.

The reels of taped components are mounted on a big rack. Each reel position on the rack is referred to as a cut-off unit. On command, these units cut one component loose just inboard of the two strips of tape. The tape holds onto the clipped-off lead-pieces, keeps the working area clear of scrap wire.

Cut component drops into a V-shaped trough, down which it is propelled by air pressure. As it scoots under the insertion head, a photocell detects its arrival and tells the machine to go ahead and clinch.

Servo system simultaneously positions the board. The machine can handle any printed-circuit board up to 10 by 10 in., positions it in both axes in increments of 0.05 in., to accuracies of better than 0.002 in. The insertion head is interlocked that it will not move until the board is in place and the part has broken the photocell circuit.

Although IBM built the original machine for its own use, the company may decide to produce and market inserters for the industry. Machine now at Poughkeepsie inserts one component every second and a half. A proposed one-a-second machine is tentatively priced at "about \$100,000."



Computer tackles inventory control problems, may take on production control later

# Steelmaker Adds Computer

**Magnetic-drum machine handles Crucible Steel's inventory control now, will schedule production later. Other electronic equipment used includes magnetic and ultrasonic inspection instruments, beta-ray gages, x-ray and emission spectrometers, two-way radio and radar**

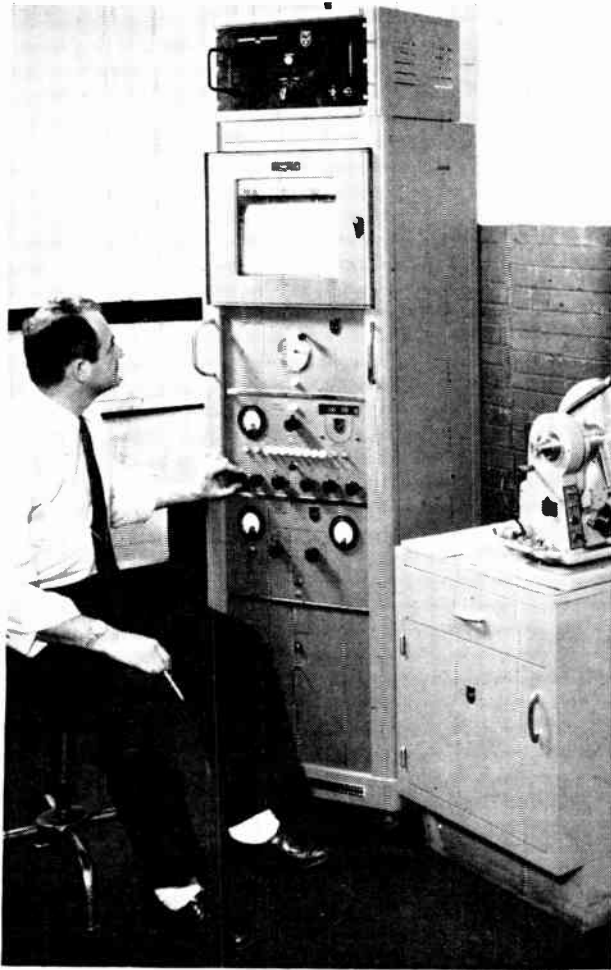


Magnetic analyzer checks bar stock for surface flaws

CRUCIBLE Steel is now fitting a computer center into its office routine. But even before the computer arrived, electronics was active in the company's laboratory and five plants.

In quality control, an emission spectrograph analyzes tool and alloy steels during their fleeting melt stage. Ultrasonic equipment probes the interior of steel shapes for flaws and magnetic equipment searches for surface defects. X-rays inspect casting densities and x-ray spectrographs analyze high-alloy stainless steels.

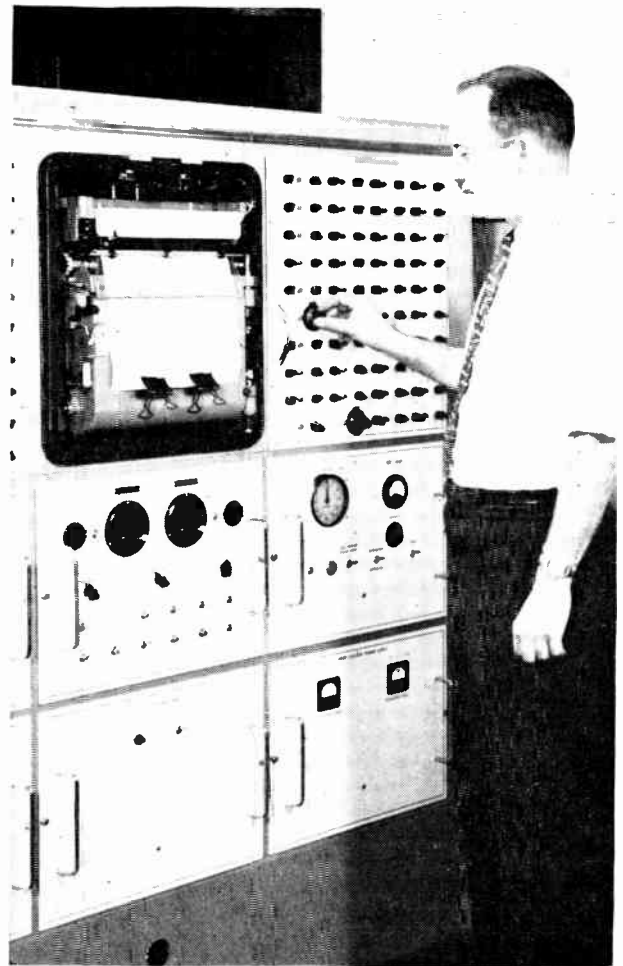
In production control duplicate beta-ray gaging systems monitor thickness as sheet steel is worked on reversing cold rollers. Roll grinders are electronically controlled to get the uniform speeds which help impart mirror finishes.



X-rays analyze high-alloy stainless steels

In materials handling, plant vehicles use two-way radio. Radio for works locomotives and other mobile equipment is planned. A 100-ke carrier-current system communicates with cranes and ore bridges. Radar keeps coal barges moving on 108-mile river trip to coke ovens even during periods of poor visibility.

And now in the office, the computer is centralizing



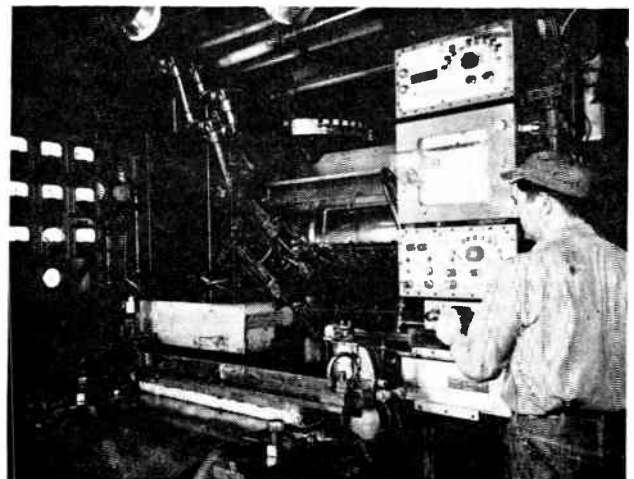
Tubes give quick spectrographs

inventory control of 16,000 specialty steel items. Next, it will expedite customer service, production scheduling, research and engineering study and routine accounting.

L. L. Ferrall, Crucibles' v-p of operations, sums up: "Electronics facilitates uniformity and precision . . . it will have a role of increased importance in future production."



Ultrasonics inspects steel rounds for internal defects



Beta rays monitor sheet steel thickness in cold mill

# Tv Market Looks Good

- Set makers predict that second half sales will be strong, see first half as time spent putting inventories in order
- Makers expect retail dollar volume for 1957 to be six percent ahead of 1956 but predict only a small gain in unit sales

INTRODUCING their 1958 lines, tv setmakers are bristling with optimism. But only RCA is bullish about color tv.

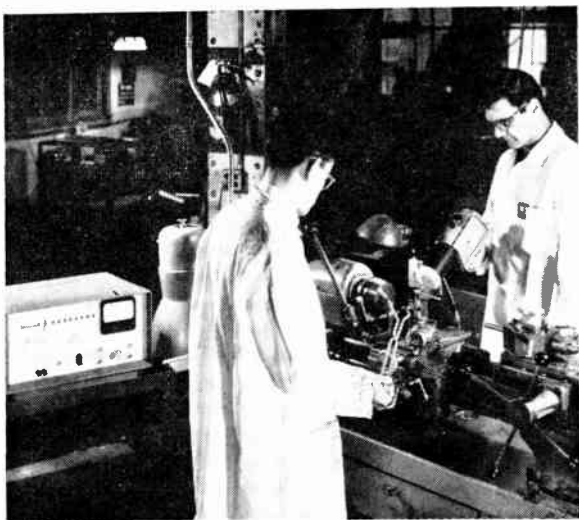
Last week one manufacturer summed it up this way: "The industry has played it smart this year. Last year was plain lousy. Now that we've cleaned up that mess, we're ready to start rolling."

Admiral president Ross D. Siragusa last month predicted total tv set sales for '57 to be "somewhere around 7 million." Production, in his opinion, will be about the same. "Production at Admiral," he says, "is now running only two or three days ahead of sales."

The setmakers see a "strong second half" for monochrome tv sales.

They base their optimism on these factors:

- Emphasis on "thin" sets with extensive use of the 110-degree and 90-degree short-neck tubes.
- The "furniture look" of thinner consoles, calculated to increase the number of higher price units being placed in living rooms.



## Counting Bit Chips

Finding out why and where machine parts wear is one use for radioactive tracers. Tool bit's wear is measured with Nuclear-Chicago scintillation counter and binary scaler

- Increased emphasis on hi-fi sound in tv sets, with two and three matched speakers and amplifier units in more of the high-end-of-the-line products.

- Relatively low inventories held by both the manufacturer and retailer at mid-year, caused by carefully controlled and budgeted production of 2,165,000 units, some 25 percent less than in the first five months of 1956.

- 25 to 20-percent increase in advertising budgets.

- Few "dumps" of existing stock, such as occurred in 1956 when a number of old-line manufacturers closed down their tv production. Upcoming production will be "watched like a hawk" and in large part based on distributor and retailer sales.

Allen DuMont, chairman of DuMont Labs, has this to say on color tv: "You can buy a top quality 21-in. console, a first-class 17-in. or 21-in. portable, a good packaged hi-fi console with a-m and f-m radio and several three-way table radios for the price of a color console. No wonder the mass market doesn't want it now."

Zenith's President E. F. McDonald still feels "the time is not right for color." Other opinion in the industry is not quite as negative. It boils down to "we'll wait and see." RCA continues to be the sole firm with a belief in color-tv as an immediate market item.

Portable tv, now taking some 30 percent of the market, is expected to hit 40 percent of the total tv sales in 1957, with 60 percent of those sales in 17-in. screen size.

Manufacturers note a new trend regarding tv purchases by retailers. Dealers buy at shorter time intervals, avoiding previous long-term gambles on consumer buying power.

"Absorption point at the dealer level is greater this year than ever before," says T. B. Kalbfus, general sales manager, Westinghouse. "For the full year 1957, retail dollar value of tv will be 6 percent ahead of last year and unitwise it will be about the same, roughly 7 million."

Set prices have gone up. They are climbing by 5 to 15 percent. But manufacturing officials do not worry about any negative effects of the price boosts.



# PTFE

## *for hot spots!*

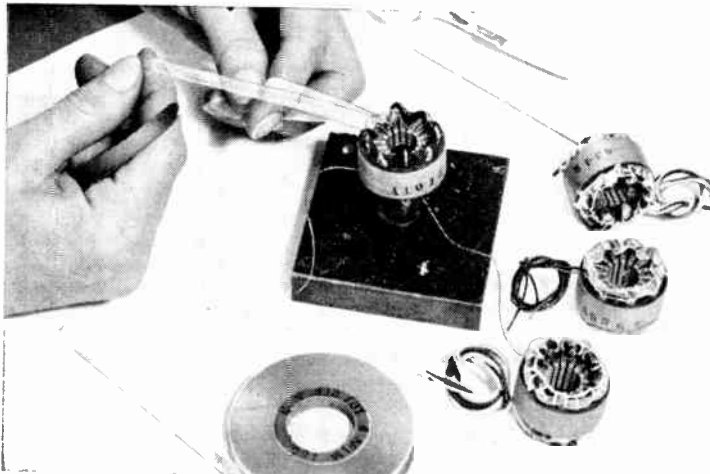
PTFE is 3M's own brand of polytetrafluoroethylene films and tapes—developed specially to give equipment makers three big advantages over ordinary materials of this type:

(1) PTFE is an extremely constant high voltage barrier . . . gives you more insulation with fewer layers. (2) Tensile strength is unusually high; caliper is carefully controlled. (3) It has the highest uniform quality of any polytetrafluoroethylene.

PTFE Insulating Films and Tapes give Class H temperature performance, yet remain flexible at very low temperatures; physical strength and electrical properties remain uniformly excellent over a wide temperature range. In addition, PTFE Films and Tapes

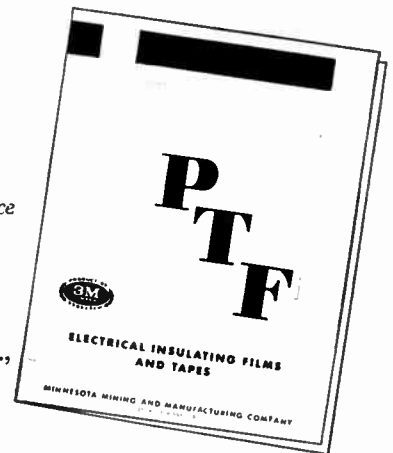
offer these advantages: extremely low shrinkage at high temperatures; unusual freedom from moisture absorption; resistance to most chemicals; high insulation resistance; low dissipation factor and low dielectric constant which remain uniform over a wide range of frequencies and temperatures; and excellent arc resistance without formation of carbonized path.

PTFE Electrical Insulating Products are made in a variety of versatile, easy-to-use forms to fit a wide range of needs. Fully fused, unfused, treated and pressure-sensitive forms; wide range of calipers. If your products can use the advantages of a superior quality Class H insulation with high dielectric strength and chemical resistance, it will pay you to investigate PTFE products.



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# Those Rocketing Automakers

**Each of the Big Three automobile manufacturers has taken on a major role in guided missiles and other military equipment. This work puts Detroit's foot in the door of electronics. At least one auto man sees going all the way in within 10 years**

LAST MONTH'S announcement by the Ford Motor Company's Aeronutronic Systems division that it is about to launch a Far Side rocket several thousand miles into space for the Air Force gave pause to some electronics firms. One executive of a large electronics company last week put voice to a widely held industry opinion: "Thinking about expanding into electronics is becoming a national fad. If the automobile companies are as serious about electronics as I think they are, we are going to have some stiff competition in the future."

Ford Motor is indeed serious about the electronics defense business. It had made some of the electronic controls for its missile; for example, a subminiature telemetry transmitter. It is also prime contractor for the Far Side rocket project.

Other integrated automobile companies that have made a move toward electronics include General Motors and Chrysler. Another, American Motors, has made a pass at obtaining some electronics defense contracts, one of its executives admits. Studebaker-Packard had a finger in defense electronics with its Aero-Physics Development Corp., but Aero-Physics was swallowed into Curtiss-Wright by agreements made a year ago.

The prospect of the Big Three auto firms stepping into electronics is responsible for some sober consideration by many electronics firms. General Motors had total sales in 1956 of more than \$10.7 billion, Ford had sales of \$4.6 billion, Chrysler \$2.6 billion.

General Motors has been in electronics for a score of years with Delco Radio division turning out radios for GM cars. AC Sparkplug division is heavy in military electronics.

Delco this month begins production of its second million high-power transistors. Its first million took a little less than a year to produce. Delco sees the second million mark reached in less than nine months. It is also involved in research and development in semiconductors and in their applications.

Delco has been using and selling transistors for auto radios, electronic control gear, and guided missiles. It claims to have "little defense business," but has a military contract for mobile radio.

AC Sparkplug, calling itself unofficially "the electronics division of General Motors," has just racked up a \$38-million order for inertial guidance systems for the Air Force intermediate range ballistic missile Thor.

In 1956 it announced an inertial guidance system for "an advanced missile," built a new plant, announced another guidance system (unidentified as to type), and began production of guidance for the Matador.

This summer it is doing the guidance systems for the Navy missile Regulus and, of course, Thor.

"The two areas we're interested in right now," says an AC Sparkplug spokesman, "are automobiles and missiles. We're not interested in going into something like production for television or radio sets."

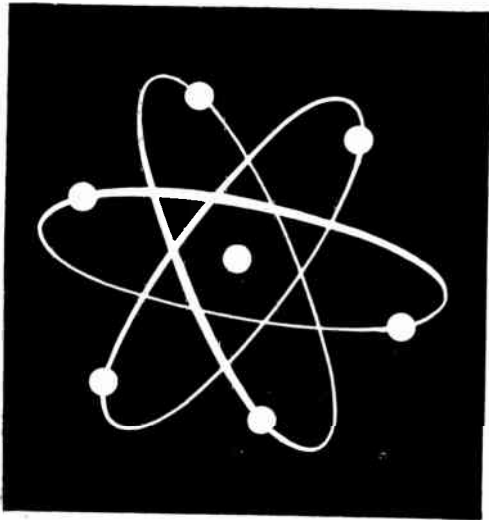
AC Sparkplug has somewhere in the neighborhood of 1,200 electronics engineers and technicians. About 500 devote themselves entirely to the automotive field.

Ford Motor division Aeronutronic Systems is only a year old, but has staked out an ambitious program of interest in the military field. It is investigating four areas, ballistic missiles, anti-ballistic-missile missiles (AICBM), surveillance systems, atmospheric and space research systems.

As to the future of Aeronutronics, Ford's chairman of the board, Ernest Breech says that the "new company can make an important contribution not only to the defense of our country, but to the development for peacetime uses . . . in the fields of electronics, physics and nucleonics."

Chrysler has 3,900 people working on missiles. It has been a prime contractor for the Army's Redstone since 1951. Last year it picked up the engineering and production contract for the Jupiter. Chrysler will not disclose the number of its electronics personnel, but admits "it's a good number."

Chrysler's missile work is under its Missiles Operations branch of Defense and Special Products division. This division's future: "We'll have to see. Right now, we're in missiles."



# **sunny sites for electronics!**



For manufacturers of electronic equipment, Tampa provides all of these plus factors for efficient operation — *and profit!*

- “Vacation” climate, the year ’round, attracts — and holds — engineers and skilled personnel; assures minimum of employee turnover, and less absenteeism due to winter ills.

- Recreational living builds employee morale, results in higher human efficiency and increased production. Employees live better, feel better, work better.

- Uncrowded sites with “clean air” . . . the Tampa Planned Industrial Park, largest in Florida, is located on former airport site. High, level ground effects economies in construction.

- Accelerated development of aircraft industry in Florida is creating growing market for electronic equipment — and Tampa is the State’s most centrally located industrial community.

- Excellent air freight, motor freight and rail facilities are supplemented by water shipment through Tampa’s deep-water port.

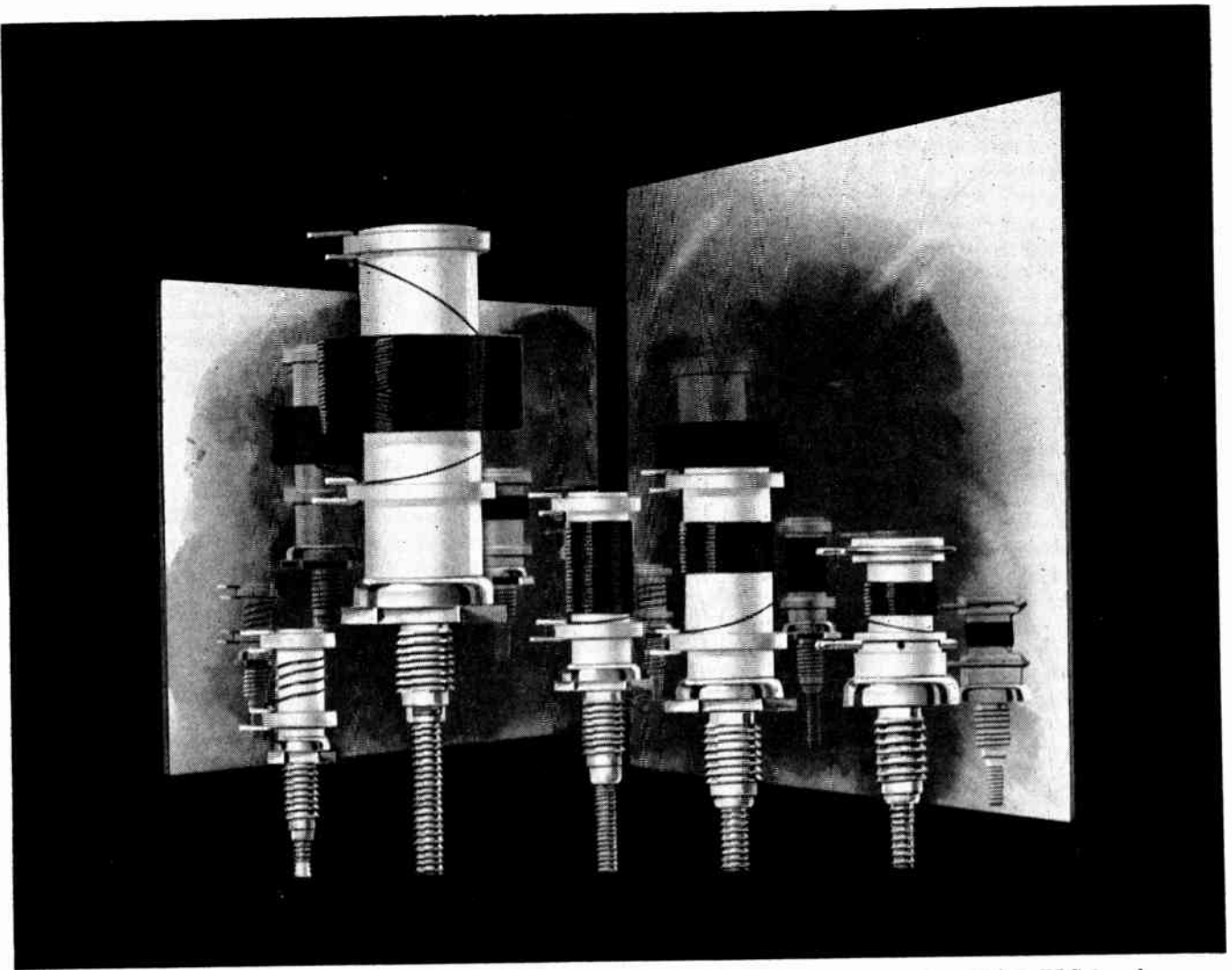
*Get the facts on Tampa — first hand!* Plan a pleasure-business trip to Tampa soon. Between wonderful fishing, golf and other recreation, check up on Tampa’s special advantages for the production of electronic equipment.



- For information on the Tampa Planned Industrial Park and other excellent sites, write Henry L. Toland, Chairman, Committee of 100, Greater Tampa Chamber of Commerce. Location map, copy of booklet “Tampa Facts” and other details will be sent you promptly. All inquiries strictly confidential.

# **Tampa**

**HILLSBOROUGH COUNTY, FLORIDA**



CTC coil forms with Perma-Torq\* Tensioning Device are designated PLST, PLS-6, PLS-5, PLS-7, PLS-8 and are factory assembled to mounting studs. The units are completely interchangeable with CTC's LST, LS-5, LS-6, LS-7 and LS-8.

## Reliability is their family resemblance

Here's a reliable family of coil forms ready to meet your specifications. These Perma-Torq Tensioning Devices on CTC coil forms allow locking of tuning cores while still tunable — and you can depend upon them to do their job well.

This built-in dependability is a result of CTC's unique design plus quality control — that meets or betters government specifications.

Perma-Torq is a compression spring of heat treated beryllium copper, that has a very high resistance to fatigue and keeps coils tuned as set — even under extreme vibration and shock. The device also allows for immediate readjustment — without removal or loosening of any mounting nut or locking spring.

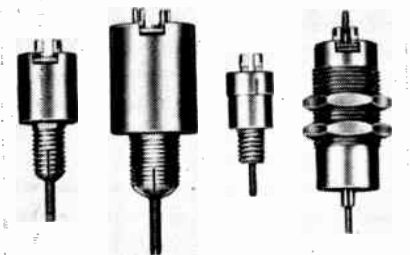
Quality control and features like the above are just two of the reasons why CTC can offer you guaranteed standard or custom electronic components — whose performance you can rely upon.

CTC researchers and practical experts are always available to help you solve your component problems. For

all specifications and prices, write Cambridge Thermionic Corporation, 437 Concord Ave., Cambridge 38, Mass. West Coast stocks maintained by E. V. Roberts and Associates, Inc., 5068 West Washington Blvd., Los Angeles 16, and 61 Renato Court, Redwood City, California.

CTC miniature shielded coil forms are rugged and perfect for "tight spots." The LS-9 is  $\frac{1}{16}$ " diameter  $\frac{1}{2}$ " high. LS-10 is  $\frac{3}{8}$ " diameter  $\times$   $\frac{1}{16}$ " high. The LS-11 is  $\frac{1}{16}$ "  $\times$  17/22. The LS-14 is double ended and is  $\frac{1}{2}$ " OD, 1 and  $\frac{1}{4}$ " overall in length. All are highly shock resistant with mechanically enclosed protected coil windings. The units are ideal for use with IF strips or as RF coils, oscillator coils, etc. Available as coil form assemblies or wound to your specifications.

\*Patent pending.

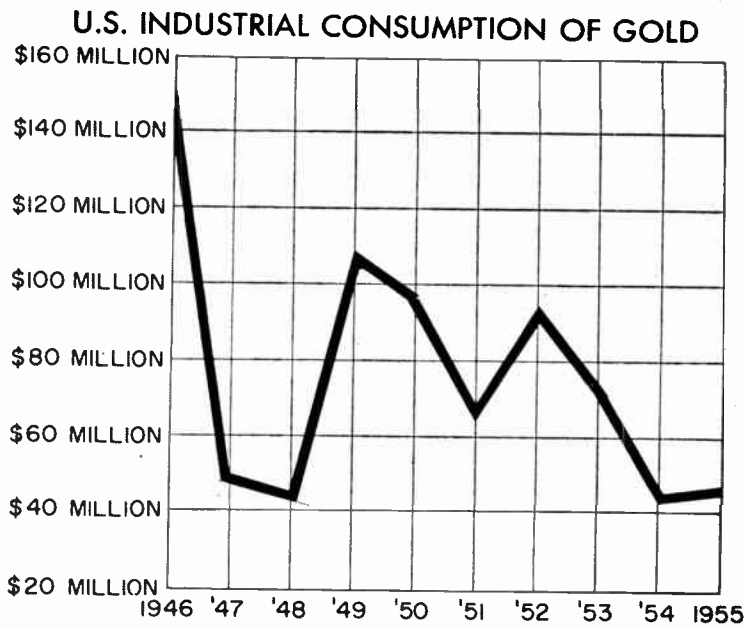


# CTC

## CAMBRIDGE THERMIONIC CORPORATION

*makers of guaranteed electronic components  
custom or standard*





SOURCE: U. S. TREASURY DEPT.

# Gold Saves Work Worry

**Grows no whiskers, needs no cleaning, Gold gives shine to increasing list of military equipment, has a place in transistor manufacture**

GOLD is becoming a substitute for work and worry in electronics production. Its uses, while not yet commonplace, are increasing, particularly in military equipment. Appearance is only one reason.

Whisker growths can ruin close-tolerance parts, according to Anthony Finocchi, reliability manager of Federal Telecommunications Laboratories' guided-missile section. Gold doesn't grow whiskers, so FTL uses it for plating new high-frequency waveguides.

FTL also puts a film of gold on some if chassis to avoid the usual precautions and cleaning required to keep the basic silver plate free of tarnish. It is often cheaper, says Finocchi, and the chassis continue to shine in use.

Whittaker Gyro gold plates its gyros. Tin platings or fusings, the firm explains, are difficult to solder and sometimes grow whiskers.

Other firms, for similar reasons, gold plate hermetically sealed relays—a favorite breeding ground

of whiskers—contacts, connectors, grids of miniature tubes and printed circuits.

Gold is sometimes used in transistor manufacture. Transistor caps may be gold plated. Gold alloyed with antimony or indium may be placed on a Kovar disk and heat-fused to the germanium wafer. The process is an alternative to the contaminated-melt method of introducing impurities to the wafer.

Sci-Rex Corp claims it has developed a reliable doped gold electroplating process for semiconductors.

Annual industrial consumption of gold fluctuates widely, some sources believe the number of wedding rings sold is the cause. However, there are no supply and price problems. The Treasury stabilizes price at \$35 an ounce. Fort Knox is ready to fill all licensed orders and world production is rising. Electronics manufacturers can buy plating solutions for short production runs or have the work done in job plating shops.

# Computer Controls Merchandising

EVER since last October, Hartfield Stores, 41-link chain of women's apparel shops, has been successfully controlling its merchandising operations and inventory with an IBM-650 data-processing system. Late last month, the chain's managers felt chipper enough about the way the system was working to break the news to the trade.

With headquarters in Los Angeles and buying offices in the heart of New York's garment district, Hartfield's has a problem maintaining control over the 465 inventory groupings which each of its stores carries. Principal advantage of the electronic system—which costs the chain \$97,000 in annual rental—is that it cuts time lag between sales and price-line analysis.

Within two or three days, merchandising managers and buyers can find out precisely how well a dress or bra is selling, in what price lines, styles or colors. Before they put the system in, it took them a couple of weeks to get the same kind of data.

Seven major merchandise reports on which buyers rely heavily, Hartfield said, "formerly required 60 hours to complete, now require only four." He added that the store saves \$50,000 annually in personnel and machinery costs alone, realizes at least 8 percent decrease in inventory. With the new system, the chain turns stock over 11 times a year, compared with an industry average of 6 to 8 times.



Data-processing system controls inventory for women's wear chain

# Atomic Electronics

Eleven-channel monitoring system in atomic power plant is another example of electronic markets created by nuclear energy



SOMETIME this year a nuclear power plant will go into operation near Shippingport, Pa. It is being built by the Duquesne Light Co. and the AEC.

An 11-channel electronic monitoring system will warn personnel of radiation hazards. The system, designed and built by Westinghouse, is another example of the markets being created for our industry by atomic energy. The system will:

- Check for leakage in the reactor's water cooling system.
- Check the radiation accumulation in the boiler compartments, to make sure that the areas are safe to enter for maintenance during shutdowns.
- Check for contamination in the ventilating and cooling air.
- Keep a continuous chart record of radiation in the various areas of the plant.

If contamination is detected in the air system being monitored, meter-relays supplied by Assembly Products actuate solenoids. These, in turn, operate butterfly valves

to stop the circulation of air.

To insure precise monitoring of radiation at lower levels, and at the same time provide for a wide range, the dials of the meter-relays have three-decade logarithmic scales, instead of linear ones. Detectors used include GM tubes, ionization chambers and air-particle detectors.

The radiation monitoring system will be housed in the auxiliary control room of the power plant. The electronic circuitry for each of the eleven channels is mounted in equipment racks on roll-out type slides that allow immediate access. In the rear of each rack are large removable doors.

Each channel in the system has a radiation detector that produces an electrical signal proportional to the activity present. An interconnecting cable feeds the signal to a computer-indicator. The computer-indicator then converts the signal into an intelligible meter indication. With only one exception, each channel has a background flasher to indicate channel operation when the radiation level is insufficient to cause a meter deflection. A d-c signal is provided to drive a strip chart recorder.

Other features of the system include etched wiring and plug-in circuits wherever practical, uniformity of circuits to the greatest degree possible, tubeless power supplies, ruggedized tubes, and two low-voltage and filament power supplies in each equipment rack, with either unit capable of supplying the rack in an emergency.

## Reactor Checks Intermetallics

BASIC EXPERIMENTAL and theoretical research to explain effects of radiation damage on semiconducting materials is now in progress at

Battelle Institute, Columbus, Ohio, under a contract with the Air Research and Development Commands, Wright Air Development Center, Dayton, Ohio.

Advances in design of weapons and weapon systems have created a need for a more detailed knowledge of the properties of all kinds of materials particularly solid-state electronic devices. Semiconductor diodes, rectifiers, transistors and transducers may be called on to operate at high ambient temperatures and in strong fields of radiation. Such conditions exist in the vicinity of nuclear blasts or near nuclear power plants, in aircraft, guided missiles, ships or submarines.

Some of the semiconducting materials to be studied in this program at Battelle's one-megawatt research reactor are aluminum antimonide, gallium arsenide, indium phosphide, cadmium sulfide, and cadmium telluride.

In the course of their research, Battelle's scientists under the direction of R. K. Willardson will study the effects of neutron and gamma radiation on the semiconductors. The effects of fast neutrons will be investigated because of the profound disruptions they produce in crystal lattices. Slow neutrons lead to atomic transmutations. Gamma radiation can also induce chemical and electrical effects that might interfere with device operation.



Removing irradiated semiconductor specimens from one of the six-inch beam tubes of the 1,000,000-watt Battelle reactor

# Music Sells Tubes

Electronic organ production of \$50 million is expected in 1957. Figure includes about \$30 million for parts and assembly of electronic circuits

AN ELECTRONIC organ with an accordion keyboard was introduced in June by Thomas Organ division of Mercury TV. It is intended to add some of the nation's 2-million accordionists to an already fat prospect list.

About \$50 million worth (at factory values) of electronic organs will be sold this year. Over half the production value represents cost of electronic components and assembly of electronic tone-generating systems.

Five years ago, there were six manufacturers. Now, there are some 18. From 1947 to 1954, production increased from \$10 million to \$31 million. Still, a Hammond Organ Company executive says: "It is practically a new industry," and a Kinsman Company spokesman asserts: "The potential is fascinating."

One system, developed in 1935, uses motor driven wheels to generate tones, which are then amplified electronically. Other products use electron-tube oscillators. In lower-priced organs, a single oscillator may produce a range of tones.

Prices vary from \$700 to over \$3,000. Average sale price is less than \$1,000. Popularity at these prices is partly explained by the fact that almost any keyboard style sounds good on an electronic organ.

While organs are by far the biggest selling electronic musical instrument, there are others.

The theremin, for example, is a hand capacitance device dating back to 1920.

Carillons which simulate bells with tuned rods and amplifiers have built a \$5-million-a-year market. Guitars using amplifiers have found a modest market for years. Wurlitzer built a new plant last year to handle production of its two-year-old amplified percussion piano.

New in May, but not yet commercialized, is a piano-like instrument that sounds like people singing. Its inventor, orchestra leader Raymond Scott, uses it for special effects.

RCA labs in 1955 built a tone synthesizer which can sound like any known instrument. A new one is now being built for RCA Victor Records.

# Magnetics Walk The Boards

NEW YORK City's school designers this year will specify magnetic-amplifier stage lighting controls in the city's new high schools. Most school stage lighting control is handled by auto transformers.

Several of the city's schools are already using thyratron tube systems. A Bureau of Construction official says the switch to magnetic amplifiers will be made to avoid maintenance and tube-heat problems.

Stage lighting control is about a \$3-million a year market. Electronic systems are gaining. Thyratron systems are firmly established and magnetic systems are coming

on fast, particularly in television studios.

Lumi-Tron division of Metropolitan Electric has installed 13 magnetic-amplifier systems, beginning with NBC Brooklyn Studio One in 1954. The systems cost \$50,000 to \$170,000 each and use from 30 to 135 circuits at a per-circuit cost of \$900 to \$1,350.

Tv studios bankrolled development of electronic dimmers, says Steve Skirpan, Lumi-Tron manager. Next market to open up was university playhouses. As prices drop, markets in legitimate theater, churches and nightclubs will mature, he believes.



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# Civilians Run DEW Line

## Federal Electric begins operation and maintenance of 3,000-mile electronic fence in Arctic

BRINGING in civilian technicians to operate and maintain the DEW Line, a 3,000-mile-long electronic system for detecting a possible attack from across the northern polar region, is part of a growing trend in military operations.

This chain of events took place recently: Prime contractor Western Electric, which has been responsible for design development, engineering, construction, procurement and administrative services, turned over the radar chain to Electronic Defense Systems Division of Air Materiel Command. AMC simultaneously assigned responsibility for operation and maintenance to IT&T under USAF supervision.

Federal Electric, field service organization of IT&T, which has been recruiting, training and preparing for the job since April, 1956, then manned the electronic fence that extends from Alaska to Baffin Island.

Working on a cost-plus basis, estimated cost of operation and maintenance is not being divulged. Also classified: number and location of civilians Federal Electric will use.

Good continued business for the electronics industry, however, is indicated by the figures known about the cost of DEW Line to date.

Spare parts already stock-piled for the project amount to \$34 million. Overall procurement of hardware to date: \$340 million. About 4,400 sub-contractors and suppliers have been involved and over 108,000 purchase orders made.

Although specific details concerning radar equipment being used are classified, both rotating radar and stationary gap filler types have been installed. Important parts of the communications system are tropospheric and vhf ionospheric scatter. Automatic audible alarm signals are in use to warn personnel that aircraft have appeared on radarscope. These were designed by Lincoln Labs.

Besides operating and maintaining the radar chain, Federal Electric will report weather and maintain the elaborate communications system.

## MILITARY ELECTRONICS

- New electronic altimeter, accurate to within 40 feet at 60,000 feet altitude, will replace USAF's current electronic altimeter.

Developed by ARDC and manufactured by RCA, the new APN/42 presents altitude in digital form on as many as three dials at once. It also feeds information to recorders, potentiometers and other devices. Now usable from 300 to 60,000 feet, production models are expected to operate at even higher altitudes.

- Generating and control systems for B-58 Hustler will be built by Westinghouse. Silicon rectifiers that rotate with an a-c exciter to provide d-c excitation will be used in place of conventional carbon brushes.

- Army will have mobilization cognizant, that is, responsibility for scheduling all mobilization defense production, over a guided missile and small weapons facility to be completed in the fall by Martin near Orlando, Fla. Martin is al-

ready turning out Lacrosse missiles for Army in rented buildings in Orlando.

- New military tv camera developed by Admiral for BuAer operates under water. Admiral's John F. Gilbarte says, "Light from an ordinary match reveals as much to this tv camera as a man with 20/20 vision sees in the light of a 150-watt electric bulb."

- USAF is studying feasibility of providing reserve units with Boeing Bomares for operational training with guided missiles.

- Instrument package weighing 3.5 lb will be carried 4,000 miles into outer space next month by four-stage rocket to be launched from a balloon. Unit will use a 5-volt telemetering transmitter. Receiving equipment on the ground is standard 108 mc, same as used by Vanguard. Known as Operation Farside, prime contractor of project is Aeronutronic Systems division of Ford Motor Co.

## CONTRACTS AWARDED

Stromberg-Carlson wins two AMC contracts: \$17,528,850 for passive electronic equipment and \$1,259,399 for AN/APN-69 radio beacons (used in air refueling operations) and spare parts.

Northrop gets USAF \$73 million order for undisclosed number of operational Snarks to be turned over to SAC. Inertial guidance system of the 5,000-mile-range, air-breathing, pilotless bomber was developed by Northrop.

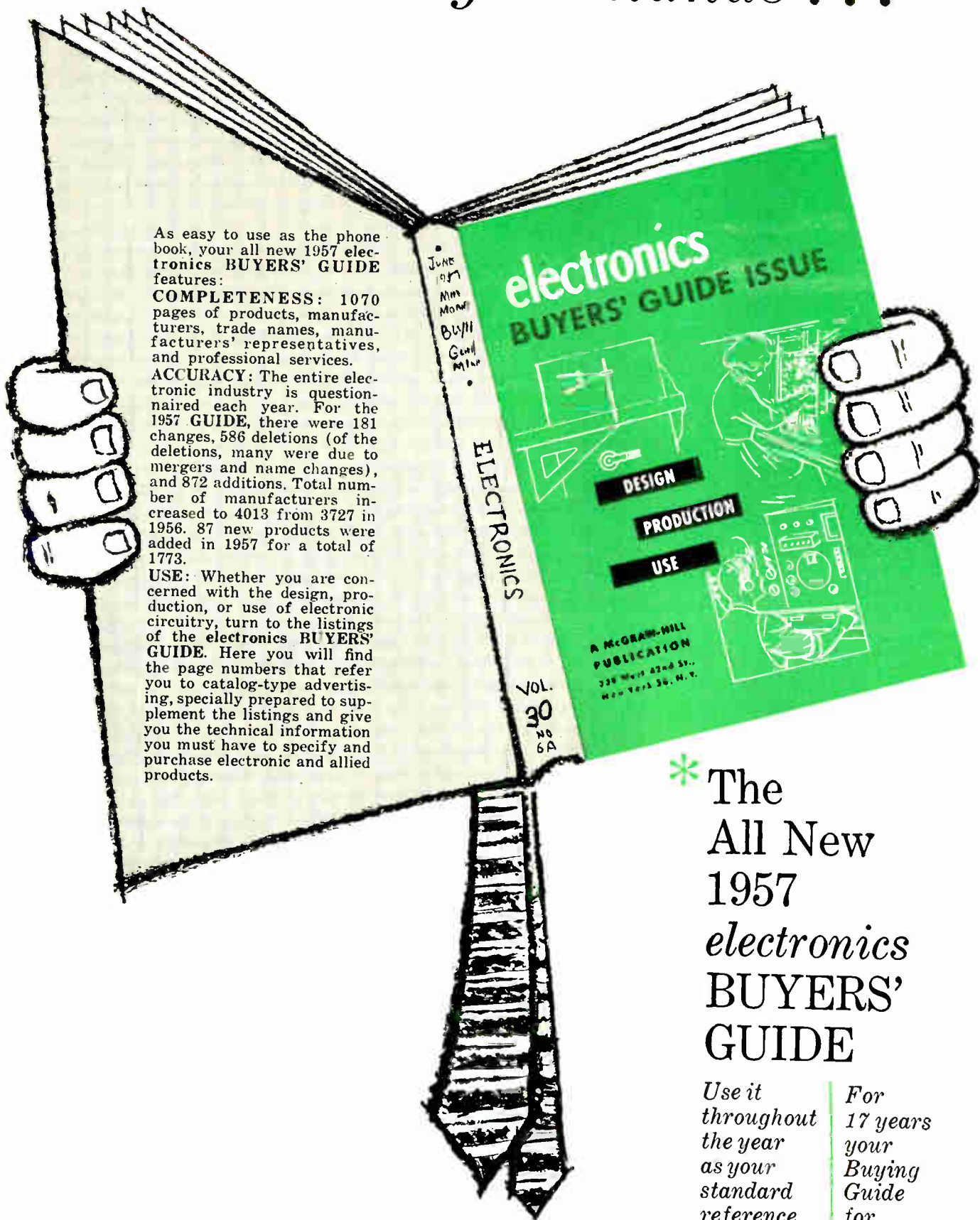
Western Electric will provide AMC a systems responsibility program for radar sets under \$290,234 contract.

Northeastern Engineering wins \$1,071,951 order from Aviation Supply Office for frequency meters.

Sylvania gets seven orders totaling \$785,435 from Electronics Supply Office for various types of tubes.



\* now in your hands . . .



As easy to use as the phone book, your all new 1957 electronics BUYERS' GUIDE features:

**COMPLETENESS:** 1070 pages of products, manufacturers, trade names, manufacturers' representatives, and professional services.

**ACCURACY:** The entire electronic industry is questioned each year. For the 1957 GUIDE, there were 181 changes, 586 deletions (of the deletions, many were due to mergers and name changes), and 872 additions. Total number of manufacturers increased to 4013 from 3727 in 1956. 87 new products were added in 1957 for a total of 1773.

**USE:** Whether you are concerned with the design, production, or use of electronic circuitry, turn to the listings of the electronics BUYERS' GUIDE. Here you will find the page numbers that refer you to catalog-type advertising, specially prepared to supplement the listings and give you the technical information you must have to specify and purchase electronic and allied products.

\* The All New 1957 electronics BUYERS' GUIDE

Use it throughout the year as your standard reference source

For 17 years your Buying Guide for electronics

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ELECTRONICS business edition — August 20, 1957



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**GENERAL  ELECTRIC**

Tabet Mfg. will sell radio transmitter switchboards to Electronics Supply Office under \$290,639 contract.

Aveco gets three contracts: \$6,632,000 from AMC for building three Air Traffic Control Systems; \$3,600,000 from IBM and \$1,169,000 from Hazeltine Electronics, both for SAGE components.

Warwick Mfg. will sell recorder-reproducers to Rome AF Depot under \$760,619 contract.

Gilfillan Bros. gets \$400,614 contract with Rome AF Depot for modification kits to make siting more versatile in radar sets AN/CPN-4 and AN/MPN-11B.

GE will sell triode amplifiers to Dayton AF Depot amounting to \$399,600.

Gruen gets \$611,960 contract with Dayton AF Depot for radar test sets, AN/UPM-68.

Eitel-McCullough will sell Dayton AF Depot transmitting triodes amounting to \$510,000.

Westinghouse gets \$1,399,968 contract with Dayton AF Depot for magnetrons.

U. S. Army Signal Supply Agency, Philadelphia, has contracted:

Wilcox Electric for 232 radio transmitters, \$625,897.

Presto Recording from 257 recorder-reproducers, AN/TNH-5, \$180,094.

Philco for radio sets, AN/GRC-81, components of AN/TRC-24 antenna group and power accessories kit. Totals: \$8,534,366.

Hallcrafters for frequency-shift converters and radio teletype-writer controls, \$195,628.

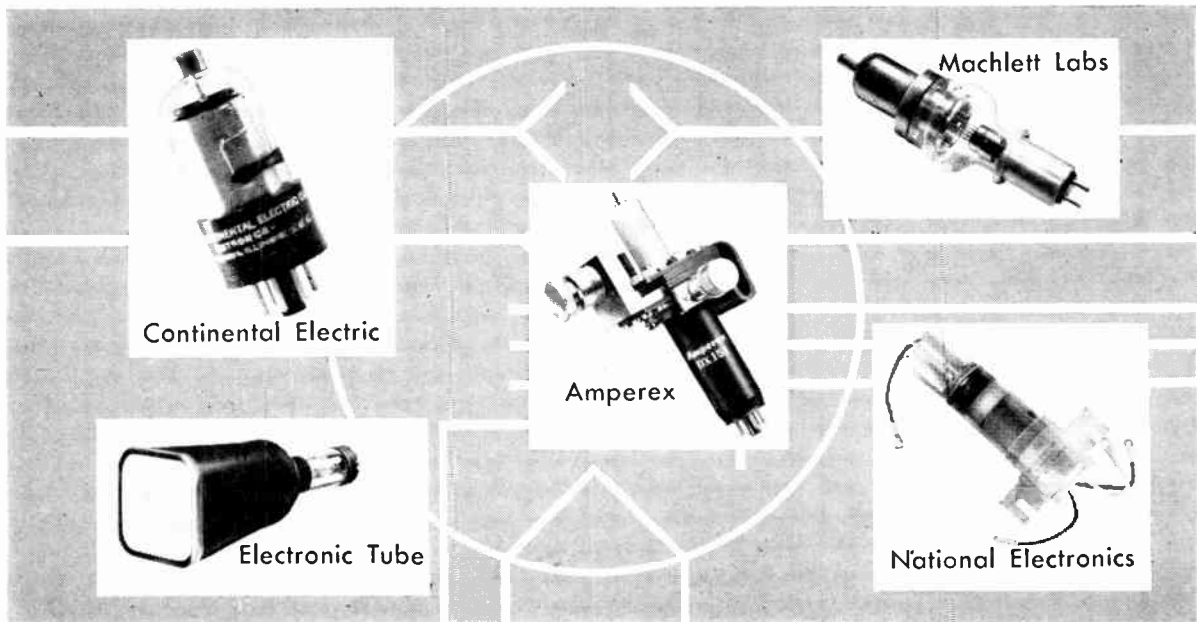
Dubrow Development for single sideband converters, \$191,073.

Admiral for radio sets, AN/ARM-44, \$2,952,288.

Automatic Mfg. for radio set controls, \$1,277,760.

Motorola for radio sets, AN/FRC-27, \$1,082,686.

# New Tubes Head List



## Special Types Offered

PERFORMING new functions and doing old ones better is the purpose of tubes added to the ever-growing list available to electronics. An 18-ampere thyratron developed by **National Electronics** (41) uses xenon for quick starting and wide temperature limits. A thyratron with a one-ampere rating is announced by **Continental Electric** (42) for such applications as a relay, inverter or exciter regulator.

**Electronic Tube** (43) announces a 3½-inch, square-face, cathode-ray tube with electrostatic focus and deflection. Klystrons are announced by **Amperex** (44) that are tunable over 6,000 mc in the range of 65,500 to 77,500 mc. An oil-immersed, high-vacuum rectifier tube capable of passing 10 amperes peak anode current is announced by **Machlett Labs** (45).

The ratio of peak magnitudes of two signals regardless of phase or frequency up to 1,000 cps is displayed directly on **Cal-Tronics** (46) peak voltage comparator. . . . **Techniques, Inc.** (47) announces a screen resist formulation called Supracote Blacktop #3, for printed circuits said to withstand alkaline cleaning and plating baths.

Four silicon rectifiers (1N253, 1N254, 1N255 and 1N256) have been developed by **General Instrument** (48) in accordance with mili-

tary specifications and are available for quantity delivery. . . . Recording potentiometers with two pens and completely transistorized amplifiers are offered by **Westronics** (49). . . . Viscous-damped, high-output linear accelerometers have been designed by **Physical Measurements** (50) for use in rugged environments.

Wide-band differential amplifiers by **Epsco** (51) are said to have the high gain and stability necessary for strain-gage and thermocouple applications. . . . Environ-

mental Equipment (52) offers a test chamber that provides temperatures from zero to 200 F and relative humidities from 5 to 98 percent.

Corona-type voltage regulators with current ratings up to 4 ma have been developed by **Vietreen Instrument** (53) for use in klystron power supplies, oscilloscopes, radar display units. . . . Subminiature snap-lock coaxial cable connectors are available from **Automation-Engineering** (54) in 50, 75 and 95-ohm sizes. . . . Type WVA encapsulated precision wirewound resistors by **Dale Products** (55) have tolerances as close as 0.05 percent.

Four GE (56) triode transistors for guided-missile computers, autopilots, nuclear reactors are rated at an alpha cutoff frequency of 25 mc. . . . Coaxial detector mounts for bolometers and thermistors of the mica-disk type are offered by **Narda** (57). . . . Feed-through r-f power monitors by **Electro Impulse** (58) measure incident power between 2 and 500 mc, reflected power and vswr between 10 and 500 mc.

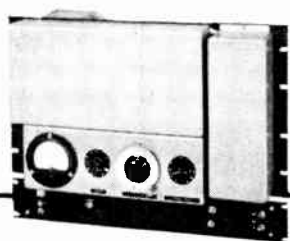
Floating input is featured in a d-c amplifier produced by **Neff**

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Instrument (59) for use with thermocouples, strain-gage bridges. . . . Specific Products (60) introduces an adjustable d-c power source for bench experiments which delivers zero to 300 volts in two ranges.

Telephone plugs and jacks available from Kings Electronics (61) are made in accordance with MIL-P-642A and MIL-J-641A. . . . Drift errors are said to be virtually eliminated in a Daytronic (62) indicating system for position, size, tension, thickness. . . . Capacitor-discharge type magnet chargers developed by Radio Frequency Laboratories (63) can charge a magnet every four seconds.

A combined frequency standard and pulse source for harmonic measurements is announced by Manson Labs (64). . . . Called a servo-ratio multimeter, an instrument by Union Switch and Signal (65) measures voltage ratios, absolute voltages and resistances. . . . Federal Telephone and Radio's (66) uhf millivolt meter is said to be ideal for calibrating signal generators and determining exact signal levels.

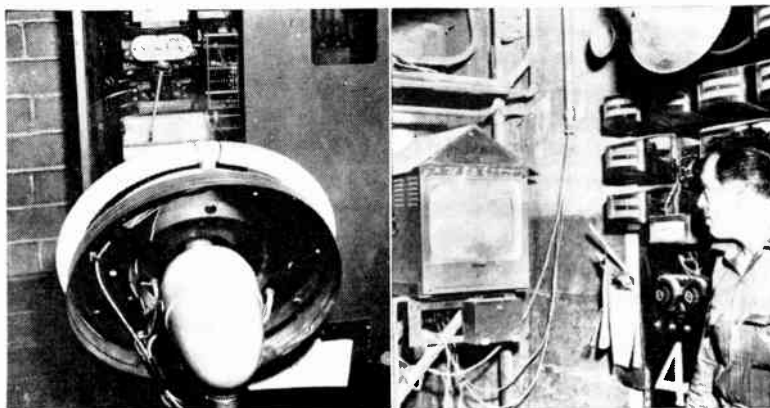
Strain-gage power supplies for operating strain gages and telemetering equipment in aircraft systems are announced by Perkin Engineering (67). . . . Oscilloscopes

in kit or wired form available from Precise Development (68) go beyond 9 mc for color tv testing. . . . Single-stage magnetic amplifier, selenium rectifiers and wire-wound resistors are used in Vickers' (69) regulator for 60-cycle alternators.

Columbia Research (70) announces cathode followers for coupling barium titanate accelerometers to standard test equipment. . . . Miniature multiplier phototube power supplies by NJE Corp. (71) furnish 800 to 2,000 volts, zero to 5 ma. . . . Studies of load, torque, shock, displacement are said to be possible with Allegany Instruments (72) cathode-ray recording system.

Large a-c outputs are provided by linear accelerometers introduced by Pacific Scientific (73). . . . Motorola (74) announces a two-way radio for the 450-470-mc band, the receiver of which cuts off until the transmitter supplies an inaudible tone which triggers the receiver. . . . Transistor power supplies introduced by Model Rectifier (75) for laboratory use feature maximum ripple of 0.05 percent of full output, which is 60 volts.

Linear accelerometers announced by Minneapolis-Honeywell (76) feature essentially constant damping throughout the temperature



## He's Cutting His Electric Bill

FIV installation by GPL saves a chemical firm \$10,000 a year by reducing peak power demand billings. Camera monitors meter. Engineer adjusts power consumption

range of -65 to 175 F. . . . Called the type 49-A Verni-Pot, Research Instruments' (77) vernier potentiometer is said to have resolution equivalent to a 10-turn potentiometer. . . . A machine for marking resistors, capacitors, tubes announced by **Popper & Sons** (78) handles up to 9,000 pieces an hour.

Television monitors by **GPL** (79) are said to have horizontal resolution in excess of 600 lines and bandwidth flat to 8 mc  $\pm$  2 db. . . . Low-cost satellite-tracking antennas are announced by **Technical Appliance** (80) for universities, laboratories and individuals interested in tracking the IGY earth satellite.

**GE** (81) is producing a recorder which measures and records d-c signals as small as one millivolt full scale. . . . Operating from 28 volts d-c, **Magnetic Research's** (82) d-c amplifier is designed to amplify transducer signals in aircraft or missile systems. . . . Self-contained transistorized engine exhaust temperature indicators are available from **Ford Instrument** (83) for the range of 200 to 1,000 C.

**Communication Accessories** (84) announces mechanical filters  $2\frac{3}{8}$  inches long and  $\frac{3}{8}$  inch in diameter for a center frequency of 455 kc. . . . A rack-mounted balance unit offered by **Consolidated Avionics** (85) permits individual or simultaneous calibration of ten 4-arm strain bridges or resistive type pickups.

Stabilized oscillators for the frequency range 9,000 to 10,500 mc are being produced by **Laboratory for Electronics** (86). . . . Accurate operation in vibration to 20 g is claimed for **Servonic Instruments** (87) rectilinear potentiometer for airborne service.

A 200-volt, 3-phase, 400-cycle induction motor is announced by **American Bosch Arma** (88) for intermittent duty applications requiring a maximum of  $\frac{1}{4}$  horsepower. . . . **Mucon's** (89) line of six capacitors is said to fulfill many bypass and coupling requirements in

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transistor circuits. . . . A line of accelerometers has been developed by Fairchild Controls (90) to cover a wide range of static and uniformly varying types of acceleration.

Designed for airborne, ship-board or ground support electronic equipment, Hallicrafters (91) cooling units dissipate up to 7,000 watts. . . . Motor-tachometer generators are available from John Oster Mfg. (92) for use in temperatures from -55 to 125 C. . . . High-speed insulation testers for production use are said by the maker, Peschel Electronics (93), to detect pinholes invisible to the naked eye at rates of 4,000 ft per minute.

### New Product Makers

- 41: National Electronics, Geneva, Ill.
- 42: Continental Electric, 5 N. Michigan Ave., Chicago 2, Ill.
- 43: Electronic Tube, 1200 E. Mermaid Lane, Philadelphia 18, Pa.
- 44: Amperex, 230 Duffy Ave., Hicksville, N. Y.
- 45: Machlett Labs, Springdale, Conn.
- 46: Cal-Tronics, 11307 Hindry Ave., Los Angeles 45, Calif.
- 47: Techniques, Inc., 52 Jackson Ave., Hackensack, N. J.
- 48: General Instrument, 65 Gouverneur St., Newark, N. J.
- 49: Westronics, 3605 McCart St., Fort Worth, Tex.
- 50: Physical Measurements, 1650 19 St., Santa Monica, Calif.
- 51: Episco, 588 Commonwealth Ave., Boston 15, Mass.
- 52: Environmental Equipment, 369 Linden St., Brooklyn 27, N. Y.
- 53: Victoreen Instrument, 5806 Hough Ave., Cleveland 3, Ohio
- 54: Automation-Engineering, 723 Sonora Ave., Glendale 1, Calif.
- 55: Dale Products, Columbus, Neb.
- 56: GE Semiconductor Products, Syracuse, N. Y.
- 57: Narda, Mineola, N. Y.
- 58: Electro Impulse, 208 River St., Red Bank, N. J.
- 59: Saff Instrument, 2211 E. Foothill Blvd., Pasadena, Calif.
- 60: Specific Products, 21051 Costanzo, Woodland Hills, Calif.
- 61: Kings Electronics, 40 Marbledale Rd., Tuckahoe, N. Y.
- 62: Daytonie, 216 S. Main St., Dayton 2, Ohio
- 63: Radio Frequency Labs, Powerville Rd., Boonton, N. J.
- 64: Manson Labs, 207 Greenwich Ave., Stamford, Conn.
- 65: Union Switch & Signal, Swissvale, Pa.
- 66: Federal Telephone and Radio, 100 Kingsland Rd., Clifton, N. J.
- 67: Perkin Engineering, El Segundo, Calif.
- 68: Precise Development, 2 Nell Court, Oceanside, N. Y.
- 69: Vickers Electric, 1815 Locust St., St. Louis 3, Mo.
- 70: Columbia Research, McDade Blvd. and Bullens Lane, Woodlyn, Pa.
- 71: NJE Corp., 315 Carnegie Ave., Kenilworth, N. J.
- 72: Allegany Instrument, 1091 Wilks Mt., Cumberland, Md.
- 73: Pacific Scientific, P.O. Box 22019, Los Angeles, Calif.
- 74: Motorola, 4501 W. Augusta Blvd., Chicago, Ill.
- 75: Model Rectifier, 1065 Utica Ave., Brooklyn 3, N. Y.
- 76: Minneapolis-Honeywell, 1100 Soldiers Field Rd., Boston 35, Mass.
- 77: Research Instrument, P.O. Box 9168, Montavilla Station, Portland 16, Ore.
- 78: Popper & Sons, Inc., 300 Fourth Ave., New York, N. Y.
- 79: General Precision Lab, Pleasantville, N. Y.
- 80: Technical Appliance, Sherburne, N. Y.
- 81: GE, Schenectady 5, N. Y.
- 82: Magnetic Research, 3160 W. El Segundo Blvd., Hawthorne, Calif.
- 83: Ford Instrument, 31-10 Thompson Ave., Long Island City 1, N. Y.
- 84: Communication Accessories, Lee's Summit, Mo.
- 85: Consolidated Avionics, 66 Brooklyn Ave., Westbury, N. Y.
- 86: Laboratory for Electronics, 75 Pitts St., Boston 11, Mass.
- 87: Servconic Instruments, 1145 S. Fair Oaks Ave., Pasadena, Calif.
- 88: American Bosch Arma, Springfield 7, Mass.
- 89: Alcon Corp., 9 St. Francis St., Newark 3, N. J.
- 90: Fairchild Controls, 225 Park Ave., Hicksville, N. Y.
- 91: Hallicrafters, 4401 W. 5 Ave., Chicago 24, Ill.
- 92: John Oster Mfg., 1 Main St., Racine, Wis.
- 93: Peschel Electronics, 13 Garden St., New Rochelle, N. Y.

# Wire Pay-Tv vs Broadcast

**Pay-tv's two concepts, wire and broadcast, are pitted. Some pay-broadcast backers move to wire**

LAST MONTH Jerrold Electronics reiterated its opposition to broadcast pay-tv to the FCC. Jerrold's position has been on the record for more than three years. But this time it offered an alternate which has been getting considerable attention, even from some proponents of broadcast pay-tv.

The concept of Jerrold's substitute system, called Cable Theater tv, is not technically novel. It calls for wiring homes to a tv studio. Closed-circuit pay-tv is believed to have some basic advantages:

- There is no change required in present telecasting patterns.
- There is no need for scrambling picture and sound.
- Monthly collections can be made without coin boxes or other equipment.
- FCC permission is not needed.

The main source of Jerrold's new found strength is publicity from an experiment about to get started in Bartlesville, Okla. (ELECTRONICS, June 10). Here, a movie exhibitor is using Jerrold and GPL equipment to show first-run movies.

Other developments are combining with the experiment to cause FCC members, reputedly prepared to okay a test of broadcast pay-tv, to go on their annual August vacations with the words "wire tv" ringing in their collective ear. Two of broadcast pay-tv's main proponents, Skiatron and Telemeter, are putting some of their eggs in the wire basket.

Skiatron has a Los Angeles franchise to run cable along the streets. Telemeter has applied for a similar right in Los Angeles. Skiatron also talks of wiring San Francisco. Skiatron proposes to use baseball as the lure to get its audience. Possible moves of two National League teams, the Dodgers and the Giants, to Los Angeles and San Francisco, respectively, are spurring the move to wire tv in this area.

Zenith, another advocate of broadcast pay-tv, is holding firm. President E. F. McDonald, Jr., says that if the FCC continues to delay broadcast pay-tv, "a wire system of television will be created, and once created will preempt the field." He predicts that it would reduce broadcasting to a third rate service.

## FCC ACTIONS

- Makes rule affecting fishing and sightseeing boats of 65 feet or less in length. If they carry more than 6 passengers for hire on normal routes of less than 20 miles off shore, they must meet the radio requirements of the Communications Act.

- Amends rules allowing licenses in the Railroad Radio Service to install mobile radio equipment in vehicles of those firms who service railroads under contract.

- Brings the 8-mc coast telegraph frequency band (8,476-8,745 kc) into conformity with the Atlantic City Table of Frequency Allocations.

- Substitutes frequency 8,761.8 kc for 8,550 kc for public coast station radiotelephony at Hawaii.

Maritime mobile frequency assignments now conform with the Geneva Agreement of 1951 in the bands between 4,000 and 18,000 kc.

- Proposes to change rules to permit a gas company to use its Power Radio facilities in distribution of liquefied petroleum gas beyond existing gas distribution lines. This relaxation of rules would apply only to gas companies licensed under section 11.251 (a) (2) of the Power Radio Service.

- Appoints Warren E. Baker to be acting Liaison Representative with Congress. Commission also appoints Edgar W. Holtz to be Acting Security Officer. Baker is already commission General Counsel and Holtz is Associate General Counsel.

## STATION MOVES AND PLANS

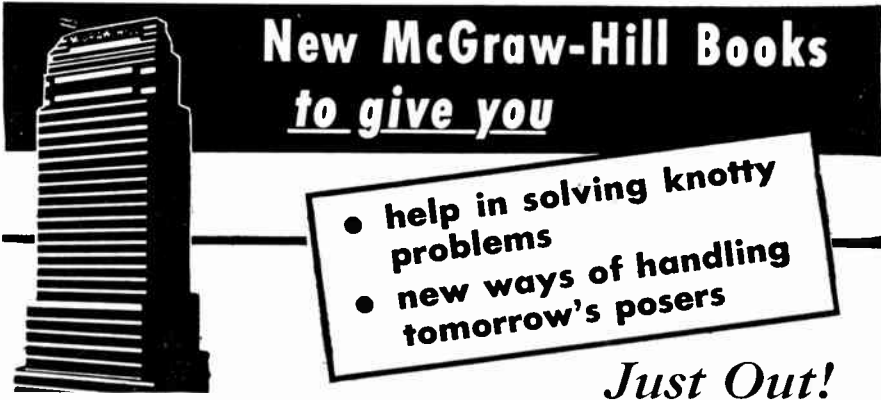
KVHC, O'Neill, Neb., is sold to Sun Broadcasting for \$25,000 by Holt County Broadcasting.

WORM, Savannah, Tenn., is sold by Florence Broadcasting to Savannah Broadcasting Service. Price is \$50,000.

WNAV and WNAV-FM, Annapolis, Md., control passes from Capital Broadcasting to Washington Broadcasting for \$91,000.

WILD, Birmingham, Ala., changes hands. Bartell Broadcasters pays \$335,000 to Gordon Alabama Broadcasting.

KREM-TV and KREM, Spokane, Wash., is linked with KING, Seattle, Wash., and KGW, Portland, Ore., by formation of KREM Broadcasting. New corporation



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### System Engineering

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### Microwave Measurements

This practical guide gives you modern methods and essential information for readily making precise microwave measurements. Full scope of the field is covered, beginning with generation and detection of microwave signals and progressing through measurement of impedance, wavelength, frequency, and other major topics. Scores of clear drawings and photos show details of modern laboratory equipment. By Edward L. Ginzton, Stanford U. 514 pp., 375 illus., \$12.00

### Electronic Components Handbook

For the designer of military and commercial electronic equipment. Furnishes data on resistors, capacitors, relays and switches as an aid in selecting and applying the best unit for a particular job so that maximum reliability of the end product results. Gives effects of heat, humidity, high altitude, low pressure, shock, and other environmental factors. Electronic Components Lab., Wright Air Devel. Ctr. Edited by Keith Henney and Craig Walsh, 224 pp., illus., \$9.00

### Handbook of Industrial Electronic Control Circuits

Here are the circuits (over 400) you need for sorting, timing, measuring, and counting; for sweep control, triggering, and hundreds of other industrial uses—each with concise description, component values, performance characteristics, etc. By John Markus and Vin Zeluff, Electronics. 352 pp., 412 diagrams, \$8.75

### Engineering Electronics

Gives you sound knowledge of electronics theory for effectively designing and working with modern electronic equipment for industry. From basic facts on vacuum tubes as circuit elements to more advanced topics such as switching circuits, computing amplifiers, power rectification, and electronic motor control, this big, 666-page book covers a broad area in a way that is clear, concise, and useful. By John D. Ryder, Dean of Engrg., Michigan State U., 666 pp., 796 illus., \$9.50

### Handbook of Industrial Electronic Circuits

A companion volume to the above. Contains 433 different industrial electronic circuits for immediate practical use. Each circuit has a clearly drawn diagram, component values brief, comprehensive description. Stroboscopic, telemetering, ultrasonic, metal-locating, are some of the circuits described. By Markus and Zeluff. 272 pp., 433 diagrams, \$7.50

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 Markus & Zeluff—Indust. Elect. Circ., \$7.50

owns physical assets of KREM. KING, which will be principal stockholder, has a major interest in Pioneer Broadcasting which operates KGAV.

Louis Wasmer, former owner of KREM, is president, and Mrs. Dorothy Bullitt, president of KING, is vice president.

WEWS, Cleveland, Ohio, builds a concrete silo to house its microwave equipment. The television station made the move from a steel tower to an enclosed one to protect servicing personnel and equipment from the weather.

KXGI, Fort Madison, Iowa, installs new transmitter.

KBAL, San Saba, Tex., installs new transmitter.

WBMS, Boston, Mass., is sold. Bartell Broadcasters pays \$200,000 to WBMS, Inc.

WWOC, Manitowoc, Wis., is sold. Business Management pays \$62,300 to Manitowoc Broadcasting.

KODY, North Platte, Neb., is sold by John Alexander, George B. Dent, Jr., and Townsend E. Dent to KODY, Inc. Price is \$210,000.

KTIX, Seattle, Wash., passes to Tele-Broadcasters of Washington from W. Gordon Allen for \$180,000.

KJBS, San Francisco, Calif., plans to increase power from 1 kw to 50 kw, change antenna-transmitter location and install directional antenna.

KPDG, Portland, Ore., plans to increase power to 5 kilowatts, install new transmitter.

KBRC, Mount Vernon, Wash., plans to increase power to 5 kilowatts, install new transmitter.

WPIK, Alexandria, Va., plans to increase power fivefold to 5 kw and install a new transmitter.

KBUN, Bemidji, Minn., installs new auxiliary transmitter at the main transmitter site.



# Denver Begins Rolling

**Aircraft and guided-missiles set the stage for growth of electronics business in the Rockies.**

**Main reason is dispersion of defense production**

ELECTRONICS industry in the Denver area is likened by some to a small snowball poised on the lip of snow-covered slope.

It's about ready to roll into "substantial proportions," says Dallas Cook, chief of industrial development for the Denver Chamber of Commerce.

Reasons: In electronics "shipping costs are not the major factor they are in heavier items."

"Company officials are beginning to weigh recreational factors in where they locate their plants. They like to be near mountains and other places of recreation when they are away from work."

"Dispersion of defense industries from more crowded industrial areas is another factor in our growth."

"We also are an airline hub—that means speedy transportation in any direction for officials of companies. This is important for those holding government contracts who need to confer with Federal officials in Washington. We're only four hours away by nonstop flights now."

Denver is also becoming a hub for missile activity.

Under construction on the southern limits of the city is a Ramo-

Wooldridge Corp. plant. This \$5-million facility, upon completion in 1958, will employ approximately 1,300 persons on a single-shift basis.

Ramo-Wooldridge's new plant is near the \$20 million-plus Glenn L. Martin plant for production of the air frame for the intercontinental ballistic missile, the Titan. Rocket engines produced on the West Coast will be tested with the air-frame at Martin's Denver plant.

Production at the new Sundstrand-Denver plant, a division of Sundstrand Machine Tool Co., Rockford, Ill., topped \$20 million last year. Originally built to produce a constant speed drive for aircraft, Sundstrand has recently established a new research laboratory at the Denver facility.

Sundstrand announced one of its prime objectives will be the research and development of auxiliary missile devices.

Colorado Research Corp., a subsidiary of Carrier Corp., Syracuse, N. Y., is setting up nearby, will engage in research on guided missile range instrumentation and develop computers and mass quantity data reduction apparatus, antenna systems and specialized television equipment.

## Maine Asks, 2,500 Reply

MAINE is conducting a drive to woo back engineers and technicians. Already some 2,500 former Maine residents say that they are willing to return.

Running the drive are the state's Department of Development of Industry and Commerce and the Employment Security Commission. Maine officials are using this skilled-manpower pool as a selling point to attract new industries and meet current needs.

Engineers and technicians made known their desires in answers

to questionnaires sent out by the state. Maine officials say replies give them a gold mine of valuable manpower.

Even engineers not questioned heard about program and asked about returning to Maine, officials say.

The list of nearly 2,500 skilled workers is being used confidentially. Authorities, as a service, are sending names from it to industrial, research or engineering firms already in the state or planning to locate there.

## British See New Reactor Markets

BRITAIN has sold or is negotiating the sale of five nuclear power plants worth about \$151 million. Electronic instrumentation for these plants amounts to some \$15.4 million.

British manufacturers expect foreign orders totaling between \$475 to \$540 million for nuclear power plants by the end of 1958. That will mean \$47-\$54 million worth of electronic controls.

Projection for 1960 is for \$840 million worth of power plant orders, and for 1965 the total is expected to exceed \$1.4 billion. If the latter figure is reached, Britain could export instrumentation worth about \$100 million.

British firms now providing control systems for nuclear power reactors include Sunvick Control, Plessey Nucleonics, Philips Electrical, Dynatron Radio Ltd., Elliot Brothers, Ferranti, Ericson Telephones Ltd. and E. K. Cole.

## Eyes On Alloy Diode

A new germanium-silicon alloy diode has been developed by Clevite Transistor Products. Both military and civilian uses are foreseen.

The company predicts that one use alone might mean a \$3-million-a-year military market. But potential market cannot be specified on security grounds, says Clevite.

Principal features of the alloy diode: better high temperature performance than germanium; higher forward conductance at lower voltages than silicon.

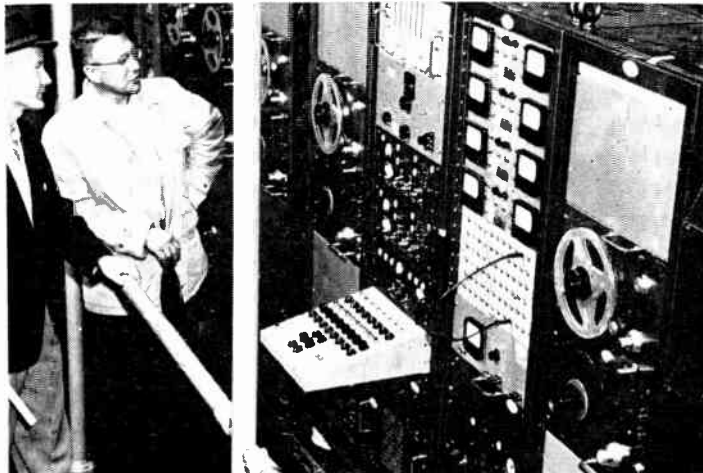
Other key advantages: increased reliability where it is applicable; it fills the gap between silicon and germanium diodes.

Manufacturing cost per unit for the new diode is slightly higher than germanium, lower than silicon. The diode has passed life, environmental and reliability tests, the firm reports.

Though primarily a fast-switching computer diode, it may be applicable in the general-use category. Production is underway.



Missile data picked up by radomed antennas . . .



is retransmitted back to control point as . . .

\$711,000. This was mostly communications equipment such as radio receiving tubes and home radio receivers and a small number of primitive fish detectors and direction finders. Japanese observers believe 1957 exports will show a moderate increase.

Extent of Red Chinese purchases of Japanese electronic gear will depend on Peiping's purchasing power. The feeling of Japanese government officials is that it is not great enough right now to permit large-scale electronics purchases.

Japanese electronic items removed from the Red China embargo list include: communications gear such as transmitters, receivers, tubes; ultrasonic detectors; sub-miniature circuit components; photoelectric cells; and radar and navigation instruments.

## Urges Review Of Contracts

A top Raytheon official this week urged the government to take a new look at its contract profit policies.

"Present policies pose a threat to future national defense," says Ernest F. Leatham, assistant to the president at Raytheon. "I am concerned over whether the current profit rate is adequate to bring future weapons systems into being."

He says government contract profits are tightening when, instead, they should be loosening. He points out that higher-powered radars and higher-frequency applications need specially designed facilities.

"These have to be built. Their high engineering requirements make such facilities very expensive. That is a prime reason government contract profits must be improved," he says.

Leatham believes the government is saving money now but hurting itself long-range. He says the rate of return being allowed is not adequate to enable firms to expand to meet future government needs.

Leatham says that on certain cost reimbursement R&D contracts the government allows an average of about 7 percent profit return, whereas Public Law 413 allows up to 15 percent.

# Missile Testing Steps Up

STEPPED-UP testing of long-range missiles by fall is indicated by ARDC's plans to close up gaps in Florida's 5,000-mile test range.

Six electronic-laden telemetry ships will become floating trackers this fall along the 3,000-mile islandless stretch between St. Lucia and Ascension Island.

Called Ocean Range Vessels, the converted Army Freight Supply ships will receive data from Army, Navy and Air missiles flying the test range. Data will be recorded

and transmitted back to Range Control Station at Cape Canaveral.

Electronic hardware, installation and conversion of ships cost approximately \$2 million. Cost of operation and replacement of electronic equipment will be substantial.

By 1958 five more floating electronic monitors will supplement the six ocean range vessels. Converted 340-ft maritime service vessels will record impact data on missile tests.

# Japan Eases China Embargo

JAPAN has taken more than 30 electronic items off her Red China trade embargo list, but it is unlikely that Peiping will buy many of them right now.

Equipment most likely to be exported to Red China this year,

in the opinion of Japanese trade observers, would be telephone exchange switchboards, radar and navigation instruments and advanced-type fish detectors.

Last year Japanese electronic exports to Peiping amounted to about

# electronics

OCTOBER 1957

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# electronics

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# Britain to Unwrap Missiles

**Newly revealed Red Dean missile and five others will be shown for first time next month.**

BRITAIN will take the wraps off six of her guided missiles next month when the Society of British Aircraft Constructors exhibits in Farnborough.

One of the missiles, the Red Dean, was revealed prematurely last month when its name appeared on the SBAC list of those to be displayed. The air-to-air missile is manufactured by Vickers-Armstrong. A company spokesman acknowledged that this was the first announcement of the missile but declined to give further details.

SBAC said security restrictions have been lifted sufficiently to enable British industry to demonstrate for the first time a sizable amount of its missile work. There will be a special missile enclosure at the exhibition, which opens the first week of September.

The five other missiles, also to be shown for the first time, are:

- De Havilland Propeller's Firestreak, an air-to-air infrared missile, which is to be fitted to the Gloster

Javelin, English Electric P. 1 and De Havilland Sea Vixen.

- Bristol Bloodhound, ground-to-air weapon ordered by the Royal Air Force.

- English Electric's Thunderbird, on order by Antiaircraft Command and under development for RAF.

- Armstrong-Whitworth Sea Slug, ship-to-air missile, ordered by the Royal Navy.

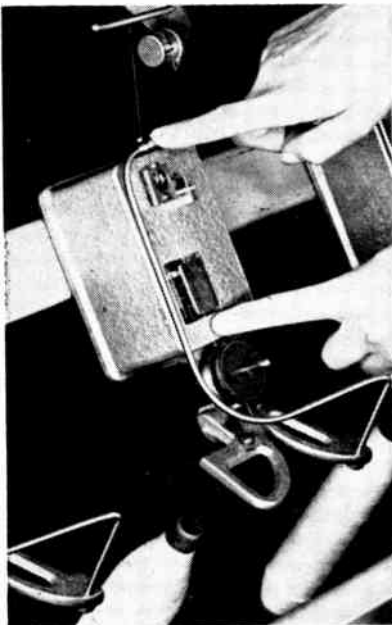
- Fairey Fireflash, RAF air-to-air training missile.

Test and target missiles will also be displayed. These include the Bristol Bobbin, Bristol Borzoi and Australian Jindivik. The majority of the missiles on display, says the SBAC, will be available for sale abroad.

Some mystery surrounds the naming of the new missile, Red Dean. But it's said in London the name is connected with the Very Rev. Hewlett Johnson, the so-called Red Dean of Canterbury.

Vickers, the missile's maker, refused to comment on the coincidence. However, the Most Rev. Geoffrey F. Fisher, Archbishop of Canterbury, told ELECTRONICS he considered it a "curious compliment."

## DEVELOPMENTS ABROAD



Dutch device catches defects in yarn being wound onto spindle. Control is said to reduce cutting losses in ready-made clothing

- In Holland, an application of electronics to yarn winding is reported to produce yarn that is completely free of defects (slubs). Device was developed at J. F. Scholten & Zonen cotton weaving mill at Enschede, and is being marketed by N. V. Qualitex, a subsidiary.

- East German state-owned (VEB) firm Ernst Abbe, Jena, (former Carl Zeiss plant), has reportedly delivered to Moscow a newly developed electromagnetic theodolite. The instrument is said to allow measurement of the earth using the original units of longitudinal scale and voltage, and giving results up to one billionth of a millimeter. An East German report says the instrument was ordered by the Soviets to calibrate their magnetic instruments and to fix a standard level for their geomagnetic observatories.

## EXPORTS and IMPORTS

British firm Wayne Kerr Laboratories and Robertshaw-Fulton Controls, Anaheim, Calif., have signed a licensing agreement. U. S. firm will use Wayne Kerr's transformer ratio-arm bridge techniques in the development of conductivity and permeability instruments for chemical measurements. Robertshaw-Fulton will act as distributor for WKI instruments in the U. S., with an initial order for more than \$100,000 for bridges covering the audio to 250-mc range, video oscillators and waveform analyzers. Marconi Instruments of New York will continue as agents for Wayne Kerr.

In Canada, Daystrom Ltd. has been established to handle sales, service assembly and manufacture of Daystrom electronic products. A factory is planned in the Toronto area employing several hundred

people and turning out instruments (including aircraft and guided missile items) for Canadian industry by 1960. Daystrom's Weston electronic products will still be handled in part by Northern Electric.

In Australia, Pope Industries Ltd. has taken over Motorola's license from Thom & Smith and plans to intensify production of Motorola tv sets and other products. The firm expects to change its name to Pope Electronics and move into a wide range of electronic equipment under different license agreements to be negotiated with U. S. companies.

In England, Mansol Ceramic Co. has opened a new 10,000 sq ft plant at Thornton Heath, Surrey, for the manufacture of glass preforms for hermetic sealing. Mansol duplicates its U. S.-made products in England for the European market and takes advantage of shorter supply lines. Technical information will be exchanged by its Belleville, N. J. plant and the new plant in Britain.

In Venezuela, more than \$800,000 worth of x-ray equipment will equip a 1,000-bed military hospital in Caracas, says Westinghouse Electric International Co. Included is the first production model of Westinghouse's new rotational cobalt 60 therapy unit, rated at 1,000 curies.

Peru's Radio America Co. has signed a contract with RCA for delivery of a two-kilowatt transmitter, two camera chains and complete tv studio. The station plans to be on the air in November, with Peru becoming the sixth South American country to introduce television.

In England, EMI Electronics Ltd. is entering the digital computer field. First EMI computer will be used at the Austin automobile factory for production control purposes. Machine is serial operated at a clock rate of 115 kc with a word length of 36 digits, has a magnetic-drum storage system, a quick access track and main storage for 24,000 words.

Australia's Postmaster General has invited bids for a coaxial cable and associated telecommunication,

broadcasting and television relay system between Sydney and Melbourne by way of Canberra.

## Components Rise Seen for India

QUANTITY production of electronic components in India will begin this year, states Maurice Ponte in Paris. He is managing director of The Compagnie Generale de T. S. F. (CSF).

Ponte declares that the Indian Government-owned Bharat Electronics Ltd., which was planned and set up in Bangalore with technical assistance from the French firm, will gradually take over supplying some components now imported. He says quantity production of such components as quartz crystals and transformers will start at the end of 1957, according to present plans.

The Bharat plant has a staff of 1,000 now, but will eventually employ 4,000. Ponte says that the electronics plant provides a nucleus of trained technicians and workers and gives India a new expanding industry.

Ponte declares that India's second five-year plan, now being undertaken, calls for investment in her industrial development, and "cannot fail to be of major interest to industrially advanced western countries, and particularly to France."

He cites the Bharat factory as an example of French-Indian economic cooperation. One point he stresses: understanding of India's culture and economy is required on the part of a western contractor.

India, he says, had invited tenders from several countries in 1948 in connection with establishing an electronics plant. CSF sent a special mission to India which made a study and drafted a report. Detailed recommendations were made on the proposed plant.

In 1952 four years of discussions and missions to India paid off in the contract for CSF. A year later Bharat was started by the Indian Government. First production began late in 1955. An agreement between CSF and Bharat is currently in effect.

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## PLANTS and PEOPLE



### S-C Smooths Bumps

GIRL with her back to the camera is getting some helpful advice from Patricia Hedges, who sells Rochester, N. Y., to new employees of Stromberg-Carlson. Miss Hedges, who has a master's degree in industrial and labor relations from Cornell, does a single job for this division of General Dynamics—a job of community relations.

Any technical employee changing jobs and moving into a new town travels a pretty bumpy road. So does his family. Miss Hedges tries to smooth out some of the bumps for new Stromberg-Carlson employees moving into Rochester.

The program in community relations was initiated on a trial basis

last May, aims to make employees happy by helping their wives get settled. Whatever a housewife wants or needs—from baby sitters to art dealers—Miss Hedges tries to find it in the community.

She goes to work as soon as the family moves into Rochester. Shortly after the moving van pulls away, Miss Hedges arrives armed with information on schools, churches, hospitals, banks, theaters, restaurants and amusement and recreation centers. She periodically has batches of wives in for tea and sympathy, to let them get to know each other. She hopes eventually to arrange tours to various civic institutions.

Payoff of the plan is simple. If a man and his family can find everything they need in Rochester, figures S-C, they might never feel the urge to go outside the community—either for services or for jobs.

### Collins Forms Systems Division

FIRMING up its interest in the complete spread of communications systems, Collins Radio now forms a systems division. The division, under direction of former manufacturing exec John D. Nyquist,

will integrate all of the Iowa manufacturer's activities in microwave and transhorizon systems.

Morgan Craft, Collins' operations v-p and Nyquist's boss, points out that the scope of the systems division's activities will cover design, including buildings, towers and primary power equipment; selection of the radio gear; engineering site surveys; construction of access roads and buildings, and the purchase and erection of towers and antennas. Installation, performance testing, maintenance and operation will also be the division's job.

Director of systems engineering in Dallas under the new setup will be Frank C. Dyer. Richard M. Ringoen moves up to the same slot for Cedar Rapids, Iowa.

### M-H Expands Sales Staff

DURING the last six months, Minneapolis-Honeywell added 141 sales and service engineers to the 90-odd offices of its industrial division. The division's field force now numbers more than 600.

Added sales and service staff—71 are sales engineers and 70 are service engineers—aims to probe burgeoning market in automatic control and instrumentation gear.

All the men are graduates of M-H's 22-year-old Instrumentation Education Center in Philadelphia.

### Three New Execs at Hallamore

HALLAMORE Electronics, a division of the Siegler Corp., cops three executives to fill out its management hand.

Retiring Brigadier General Alfred R. Maxwell, former commander of the Rome, N. Y., Air Force depot, becomes a Hallamore v-p. Maxwell will direct East Coast operations from headquarters in Washington.

Siegler v-p Lloyd G. Hallamore, who is president of the division, hires W. J. McGinnitty away from DuMont as his executive assistant. McGinnitty had been chief of man-

### BUSINESS MEETINGS

Sept. 9-13: 12th Annual Instruments-Automation Conference, Cleveland Auditorium, Cleveland, O.

Sept. 13-15: Sixth Annual Hi-Fi Show, Palmer House, Chicago.

Sept. 24-25: Sixth Annual Conference on Industrial Electronics, Morrison Hotel, Chicago.

ufacturing for DuMont's government division.

New director of commercial sales for Hallamore closed-circuit tv systems is Irwin E. Stange, former v-p of Muntz Tv and general manager of that firm's Los Angeles and Chicago branches.

## Lenkurt Goes to South America

LENKURT International Corp., overseas sales affiliate of Lenkurt Electric, is opening a branch office in Caracas, Venezuela. Manager of the new branch is David J. Hadley.

Lenkurt International was formed last year to handle sales among Lenkurt plants in California, Mexico and Canada. It also does business with the firm's worldwide distributors. Automatic Electric International. Caracas office will be liaison with AEI outlets in the Caribbean area, will also run some training courses for Lenkurt customers.

Meanwhile, the San Carlos, Calif., manufacturer hires retiring Major General James A. Code, former Deputy Chief Signal Officer, as consultant to the general commercial relations manager.

## Norton to Spend \$11 Million

CONSTRUCTION projects costing a total of \$11 million are under way at the Norton Company's Worcester, Mass., production center.

Newest project launched is a \$6.5-million plant to manufacture organic bonded grinding wheels. The 200,000-sq ft facility is due for completion in mid-1959.

Other construction in progress: a \$1.5-million refractories plant, \$2-million central service building, \$1-million abrasive supply building.

## Pumpmaker Goes South

PHILADELPHIA pumpmaker Milton Roy Co. opens a new plant in St. Petersburg, Fla., to house manufacturing and R&D facilities for in-

struments. Manager of the Florida plant is G. J. Wilson, former assistant to president Robert Sheen.

George W. Schneider will be manager of research and development for analytical instruments. Milton R. Sheen gets the appointment as manufacturing manager for the plant.

Application engineer John A. Mitchell Jr. moves up to Wilson's old job as presidential assistant.

## New Lineup at Systems Labs

IN Sherman Oaks, Calif., the board of directors of Systems Laboratories picks a new slate of officers. James A. Marsh moves into the president's office, with Richard H. DeLano as executive vice president. Wilbert Lloyd becomes treasurer, and A. J. F. Clement is secretary.

The West Coast corporation was formed a year ago to do R&D work on weapon systems for missiles, manned aircraft and ground supporting units. It has also made some preliminary studies in the field of space travel.

## L&N Expands Sales Setup

PHILADELPHIA instrument company Leeds & Northrup opens two new field offices and sends out a batch of resident representatives.

New Baltimore office, located in Towson, Md., serves Maryland and West Virginia, with John C. Emerline as manager. East Orange, N. J., office serves northern half of the Garden State, is managed by J. C. Latham.

Other organizational changes find new men assigned to sales offices in the South and Midwest, and in Albany, N. Y.

## Martin Pushes Electronics

PLANEMAKER Glenn L. Martin, Baltimore, is forming a "top-level planning group" to get ready for expansion in the firm's electronics activity.

Group will stress original elec-



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tronic designs for Martin's missile projects. Martin already has system design responsibility for Missile Master and Matador.

Giles J. Strickroth is manager of company's electronics department. Design program planning committee is headed by Robert J. Hender-

son, assisted by C. Edgar Thomas and John L. Mack.

Meanwhile Martin-Baltimore gets a new general manager as operations director Howard W. Merrill moves into the job. Merrill, a new Martin v-p. succeeds executive vice president William B. Bergen.



## Hoover Follows Sun

VACUUM-cleaner manufacturer the Hoover Co. of North Canton, O., is spreading out its electronics operations. Starting last year with the acquisition of a little plant in Maryland, which has since been expanded, the company is now growing in Albuquerque, N. M.

Hoover's New Mexico operations will develop gear for telemetering, guided missiles, ordnance and industrial instrumentation operations.

Head of the new Hoover Electronics operation is former White Sands Proving Grounds instrumentation service chief John D. Patrick. Patrick (center) is being welcomed by fellow manager Joseph Hegge of Sandia Corp. (left) and Albuquerque businessman Art Brown.

Following Patrick from WSPG to Albuquerque are research director Donald M. Button and chief engineer Daniel Luchter.

## RCA, Avco Build Near Boston

WITHIN fifteen-mile radius of Boston, RCA and Avco are now building laboratories worth almost \$20 million. Plans call for completing all new facilities by June, 1958. Total employment in the area by the two firms may eventually double from current 1,575.

RCA has just started work on its \$4.75-million airborne systems laboratory in Burlington, Mass. Company claims its flight simulation facility will be most modern in the East. Waltham labs of RCA will be closed when the 132,000-sq ft Burlington lab opens. New lab will employ 550, compared to 375 at Waltham; employment may ultimately hit 1,400.

Avco's \$15-million advanced research center in nearby Wilmington is going up apace. The four-building Avco center will cover 16 acres of the firm's 100-acre tract. Work force at the lab will be between 1,200 and 1,700.

## Daystrom Forms Avionics Group

AIMING at a bigger slice of the market for both missile systems and commercial air controls, Daystrom Inc. last week lumped three of its operating divisions into a new Avionics group. The group will be headed by an as yet unnamed vice



president who will report to executive v-p Dause L. Bibby.

Affected by the change are Daystrom Pacific, maker of two-axis floated gyros and other precision components; Transicoil division, with its line of synchros and servo systems; and Daystrom Instruments, which owns a 350,000-sq ft manufacturing facility in Archbald, Pa. The group will also tap the talents of the corporation's Weston Instruments subsidiary.

Daystrom Instruments division's manufacturing plant includes both electronics assembly facilities and heavy production machinery. "There's no reason," a Daystrom spokesman told ELECTRONICS, "why an electronics manufacturer shouldn't be a missile prime contractor."

The avionics group integrates both engineering and marketing activities of its component divisions. Flight control systems for commercial and military aircraft and missiles systems will be major aims.

## Plant Briefs

NEW ENGLAND scenery changes constantly. **Burndy Engineering**, Norwalk, Conn., has embarked on a \$2.5-million expansion. A \$600,000 addition at the Milford, Conn., plant will boost production space by 63,000 sq ft. . . . In New Milford, Conn., **Scovill Manufacturing** is building a new production facility on a 72-acre site. New plant will have more than 240,000 sq ft of floor space.

**Frequency Standards Inc.** just moved into new plant facilities in New Shrewsbury, N. J.

## Executive Moves

In Santa Monica, Calif., **Universal Electronics** makes production chief **James C. Arnold** an executive vice-president.

**Paul E. Twohig** is new manager of product development for **National Cash Register's** electronics division.

**Electronic Communications Inc.**, Peterboro, N. J., moves its assistant controller, **Philip L. McGovern**, up to the controller's job.

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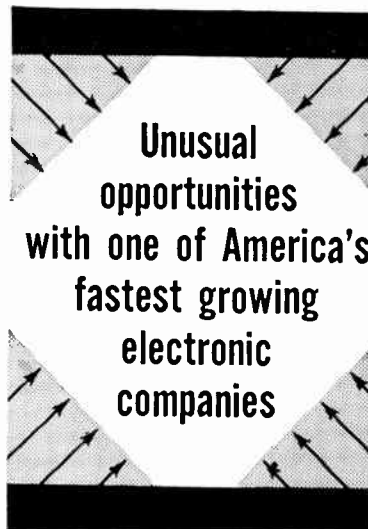
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# Can Reps Go Nationwide?

QUESTION of whether or not a manufacturer's representative can work efficiently on other than a regional basis is being raised again by an ambitious rep organization in the Pacific Northwest.

Seattle's **Howell Sales**—headed by pert brunette Vi Howell—is planning to spread out to cover the country. "Plans," says Miss Howell, "call for . . . representation . . . in the 27 major trading areas across the country."

The plan follows a three-year study of industrial and jobber sales patterns. Study apparently convinced more than Miss Howell that nationwide coverage is feasible. The program, she says, is "supported by manufacturers of some of our leading lines."

Four new reps take on the com-

ponents and instruments of Waters Mfg., Wayland, Mass. **L. A. Chambers** will serve the greater Chicago area; **H. E. Ransford** will handle the line out of Pittsburgh, Pa.; Seattle's **M. K. Widdekind** covers the Northwest, and new Ottawa, Canada rep firm **M. J. Howard** serves the provinces of Ontario and Quebec.

Boston rep **Ray Perron** takes over the New England territory for Chicago manufacturer **Industrial Condenser Corp.**

Inglewood, Calif., rep **M. B. Gilbert** now handles **Cole Electric's** line of components.

**R. W. Farris Co.**, of Kansas City, Mo., now sells the subminiature relay line of **Filtors Inc.**

## INDEX TO ADVERTISERS

Air Express, Division of Railway Express Agency . . . . .	3
Airpax Products Co. . . . .	36
Bomac Laboratories, Inc. . . . .	3rd Cover
Cambridge Thermionic Corporation . . . . .	26
Eitel-McCullough, Inc. . . . .	7
Electronics . . . . .	31, 41
Felker Manufacturing Co. . . . .	2
General Electric Company . . . . .	32
General Mills Mechanical Div. . . . .	35
Greater Tampa Chamber of Commerce, Committee of 100 . . . . .	25
Hewlett-Packard Company . . . . .	4
Knights Co., James, The . . . . .	31
McGraw-Hill Book Co. . . . .	38
Minnesota Mining and Manufacturing Company . . . . .	23
Radio Corporation of America . . . . .	4th Cover
Sprague Electric Co. . . . .	12
Stokes Corp., F. J. . . . .	8
Sylvania Electric Products Inc. . . . .	2nd Cover
Texas Instruments Incorporated . . . . .	18
Thompson Products Inc. . . . .	11
Today's Secretary . . . . .	10
Trans World Airlines . . . . .	9

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F. J. Eberle, Business Mgr.

BUSINESS OPPORTUNITIES	
WANTED . . . . .	47
EMPLOYMENT OPPORTUNITIES . . . . .	47

## Coming in Our September 1 ENGINEERING Edition . . .

- **Ferrite Ferret.** A transistorized cable tracer and fault locator for airfield and harbor lighting systems is described by Webster and Carroll of Texas Instruments. Enhanced sensitivity and reduced size of portable, watertight detector make this unit ideal for tracing underground or underwater cable systems. Instrument locates open circuits by sudden drop of 250-cps signal generated by vibrator. Ferrite core is used in the detecting element pickup coil. Signal is amplified by a three-stage, transistorized, tuned amplifier.

- **Without Popcorn.** Airborne motion-picture unit designed around conventional ppi radar indicator records video output of operating radar directly on 35-mm film, says Ralph M. Heintz of Stamford Research Institute. Intensity-modulated crt with range sweep only is continuously photographed by moving film synchronized with azimuth rotation of radar antenna. Ground-based playback consoles, with range and azimuth-mark generators, permit trainees to measure or interpret target situation.



Transistors meter jet fuel flow under wide range of temperature and pressure conditions encountered in actual flight

- **Miniature Multiplex.** Phillip G. Wray of Teletype Corp. tells how up to four channels of teletypewriter signals are combined by time-division multiplex for transmission over a single radio communication circuit. Use of transistors and germanium diodes eliminates 80 percent of the weight of older models using electron tubes. Simplified ring counter and digital synchronizer contribute to operat-

ing speed of 100 words a minute. Power needs are reduced 95 percent.

- **Tiny Tutors.** Two self-powered radio-controlled ship models, a control and a water tank, scaled 75 to 1, train naval personnel in the art of ship handling, according to Alan L. Rich of Teletronics Laboratory. Ship characteristics, such as response to helm, acceleration and deceleration, engine telegraph and have time lags similar to full-scale ships. Device also simulates wind and water currents. Control is proportional, utilizing three audio channels modulating a single carrier frequency in the 30 to 42-mc band.

- **Quick Change.** Completely automatic shift to emergency broadcast transmitter is achieved in less than 20 seconds after loss of regular carrier in system described by James H. Greenwood of WCAE. Lost air time is therefore much less than with manual control. Complete remote monitoring and control facilities are also provided at studio, with fail-safe provisions for both automatic and manual-remote modes

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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INSIDE FRONT COVER **World Radio History**

INSIDE BACK COVER \_\_\_\_\_

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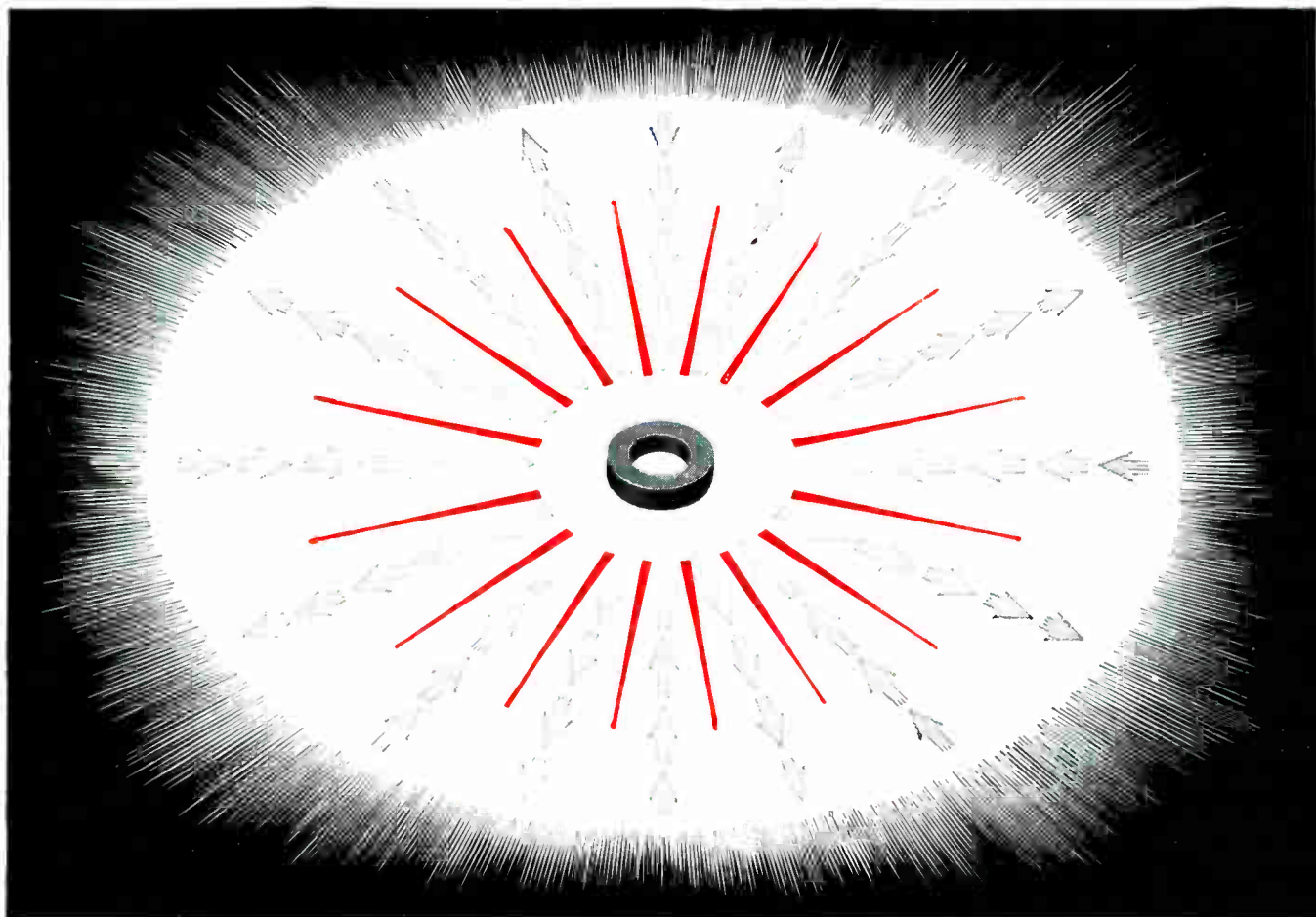
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