ELECTRONICS *and* COMMUNICATIONS

DESIGN—MANUFACTURE—ENGINEERING—DISTRIBUTION—APPLICATION

New Ideas for Modern Management

- **If You Want Government Business It Helps To Know The Rules.**
- **Saskatoon's CKOM Remote Controlled Transmitter.**
- **Some Facts About The First Mass Produced Color Tubes.**
- **Canada's Newest TV Assembly Line Geared To Work with Latest Wrinkles.**
- **Aircraft Engine Analysis A New Vista For Tape Recorders.**

July-August 1954 ★ $5.00 a year
An AGE Publication, Toronto, Canada

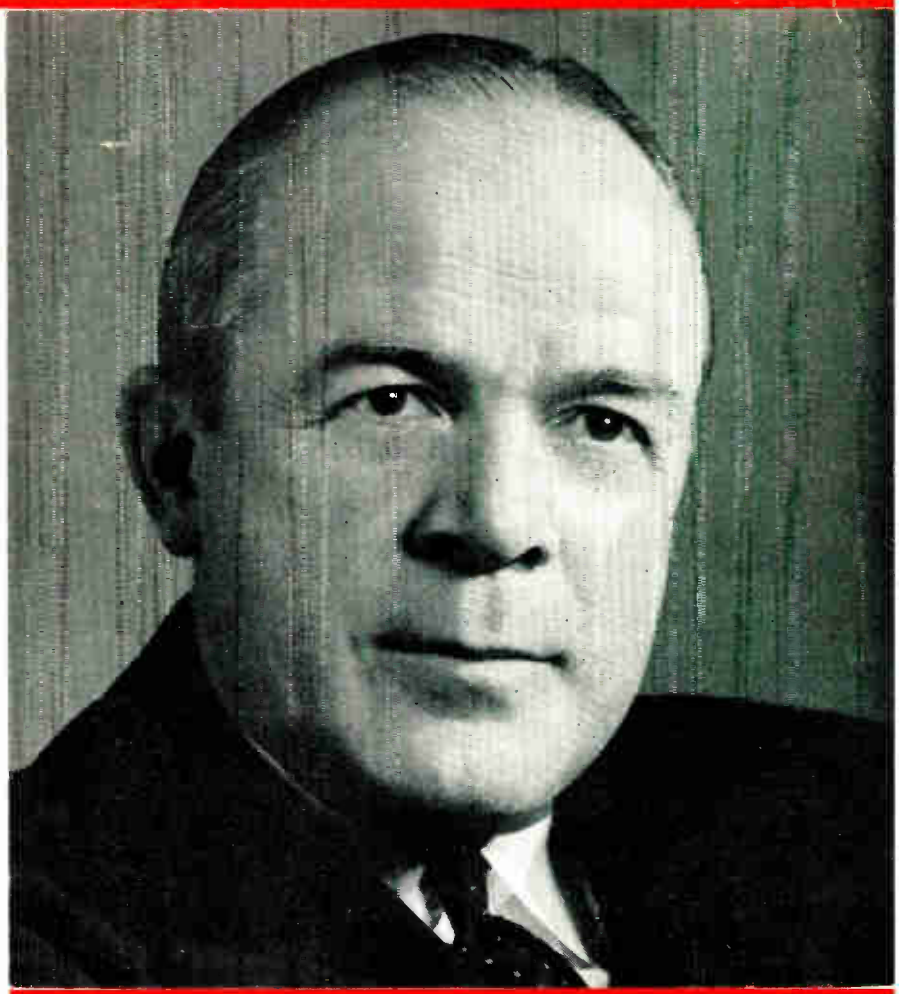
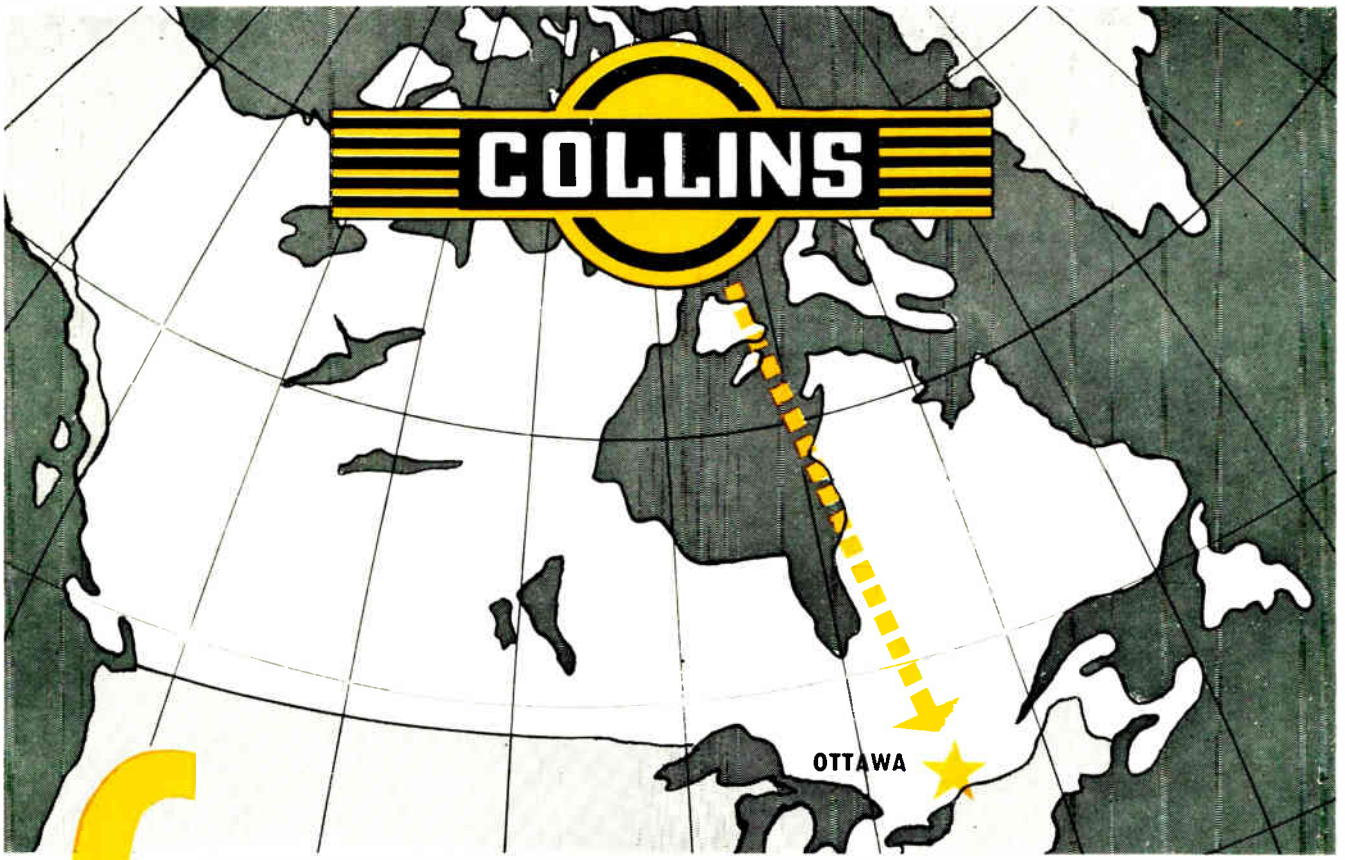


Photo by Karsh

R. M. Brophy, Deputy Minister of Defense Production who, prior to joining the Government service was associated with the electronic industry for many years, outlines in this issue through an interview with Electronics and Communications the rules for doing business with the Department of Defense Production.

Distribution Of This Issue Over 10,000 Copies



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There are so many applications of Collins products to Canada's thriving economy that establishing Collins Radio Company of Canada, Ltd., has been a logical step forward. Facilities are now available to provide you with the products and engineering service for which Collins is famous. Collins-Canada is headquartered in Ottawa.

Collins designs and manufactures radio-electronic equipment in these fields:

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Broadcast: Transmitters from 250 W to 10 KW —complete line of speech and remote control equipment.

Amateur: Transmitters and receivers, filters and oscillators.

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Industrial Components: Mechanical filters, autotunes, autopositioners, Hysteresis motors, oscillators.

Send this coupon for complete information and descriptive literature on the Collins equipment in which you are interested.

Send to: W. S. KENDALL, *Resident Manager*,
Collins Radio Company of Canada, Ltd.
74 Sparks Street, Ottawa, Ontario

Please send me information on

_____
(type of equipment)

NAME _____

ADDRESS _____

CITY _____

PROVINCE _____

COLLINS RADIO COMPANY OF CANADA, LTD.

74 Sparks Street, OTTAWA, ONTARIO

COLLINS

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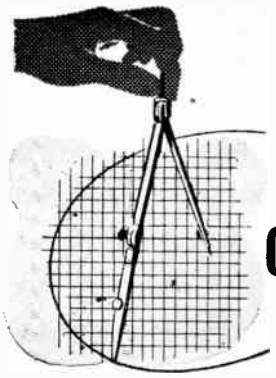

let **experts** plan your radio communications system

Marconi skilled communications specialists will analyze your particular operation, be it construction jobs, taxi service, truck transport, railways, forestry, petroleum and other industries. This is the Marconi System Planning Service.

Marconi engineers are specialists . . . experienced in planning radio communications systems. After studying your requirements, they will recommend the most efficient and economical installation for your particular type of operation.

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SYSTEM PLANNING SERVICE
saves you time and money!

Because of Marconi's extensive branch organization, you can be sure that wherever you operate in Canada, there are always repair and service experts nearby. You can be sure your equipment will be kept in top-notch operating shape at all times.

For further information write for your copy of the new booklet "Communication Systems Planning" to: Commercial Radio Communications Dept.

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MONTREAL 16

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CANADA'S LARGEST ELECTRONIC SPECIALISTS

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For over 20 years . . .

A GOOD PLACE TO GET GOOD RESISTORS

½-, 1-, and 2-watt fixed composition types in all RTMA 5%, 10%, and 20% preferred values.

Conservatively rated .5 and .6 watt variable resistors in smallest sizes consistent with real dependability. Tandem, dual-section dual-shaft, and "bushingless" types with or without line switches in 6 standard types.

SAMPLES to specifications gladly submitted to quantity users.

STACKPOLE

CANADIAN STACKPOLE LIMITED
550 Evans Avenue
Etobicoke, Toronto 14, Ontario

For further data on advertised products use page 61.

The Editor's Space

Never dreamed of fiberglass as constituting a material suitable for masts on warships but understand that the Defense Department have a development contract under way investigating the material for this purpose. Steel masts have been found to set up considerable interference with the ever increasing number and variety of transmitting and receiving aerials required to be fitted on modern naval vessels we are told.

* * *

An enjoyable reception and dinner marked the opening of the new Trenton plant of the Erie Resistor Company of Canada a few weeks back. A tour of the plant which preceeded the social program of the occasion pointed up the many intricate operations required in the manufacture of resistors. Erie's new plant, in keeping with the modern trend of industrial buildings, gives one the impression of sterile cleanliness, bright, orderly and efficient. Thanks to Ted Pfeiffer, General Manager of the company and his colleagues for an enjoyable visit to their new plant. Every success in your new location.

* * *

We've been told in hushed whispers that the first two installations of industrial television in Canada belong to the Department of National Defense. According to our informants one of the installations has been made by R.C.A. and the other by PYE. We'd like to be able to do a story on these installations but they are both classified, hush hush, top secret and all the rest. Like the news break on the McGill fence we wouldn't be surprised to read all about these installations in the American press. It would be a refreshing change if the Canadian press were afforded the opportunity of informing our friends in the U.S. of our own developments instead of the Americans informing us. Kind of makes us look like second raters in our opinion.

* * *

There are more Canadians than one would imagine interested in striking a rich lode of radio active minerals. Mr. Richardson of Sharpe Electronics tells us that there is a surprising number of north-land cottagers purchasing radiation detectors of one form or another. The demand for a suitable type of instrument for this type of person has been so great that his firm have recently developed a small gadget that weighs one and a half pounds. The instrument is four inches high, eight inches long and less than two inches deep. It's so small that it can be strapped to a person's shoe and the demand for it among cottagers, travellers and ordinary folk is so great that it is to be sold by Simpson's and Eatons. Yes sir, there's ore in them hills!

* * *

Lunched with Dr. Leslie Hill, Senior Research Physicist of the Canadian Marconi Company Limited in a quaint Hungarian restaurant in Montreal recently. Over golden-brown roast duck and the most piquant kraut I've yet encountered Dr. Hill gave me his impressions of Canada. Dr. Hill summed up his opinion with the statement that life is pleasant in Canada and it has a brighter future than any other country. We have no argument with Dr. Hill's statement.

* * *

Visited the Canadian Westinghouse Company's new television plant in Brantford a couple of weeks back and have never seen so many good looking girls and television sets concentrated in a comparable area before. Speaking of chassis design, the Westinghouse people in Brantford have lined themselves up with roughly two hundred of the town's best looking chassis between the ages of 18 and 30 who are employed on the company's assembly line turning out their fine line of television receivers. It's nice work for a fellow if he can get a job smack in the middle of one of those assembly lines. Any vacancies Mr. Rice?

For further data on advertised products use page 61.

NEW AMP

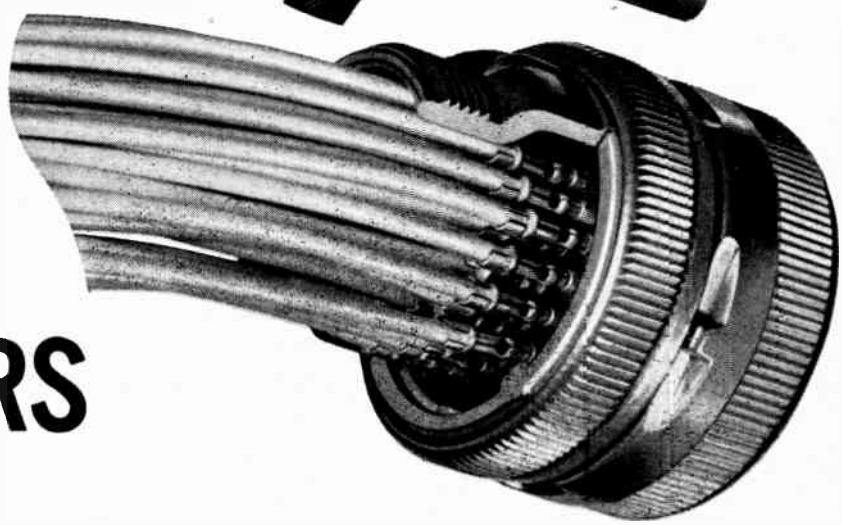
PATENTED "F" CRIMP

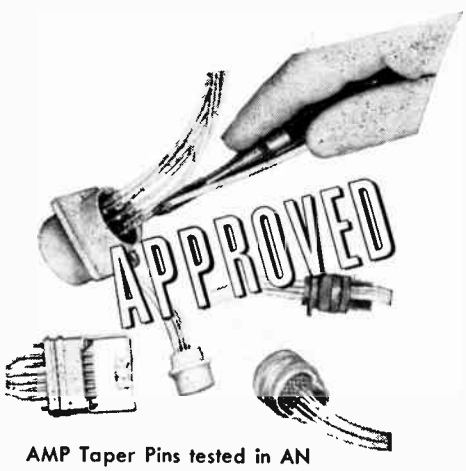
TAPER PINS

FOR WIRING

AN TYPE CONNECTORS

U. S. A. F. B-61A "MATADOR"
AMERICA'S FIRST OPERATIONAL PILOTLESS BOMBER
PHOTO COURTESY GLENN L. MARTIN CO.





AMP Taper Pins tested in AN type connectors exceed the applicable performance requirements of Military Specifications for AN connectors and solderless terminals. Taper Pin Connections are even more secure and show no change in contact resistance after vibration, temperature cycling, salt spray, and thermal shock tests. Copies of these test reports are available on request.

IMPROVE RELIABILITY SAVE TIME REDUCE COST

Now AN type connectors can be wired 5 to 10 times faster ***with even superior performance reliability.*** There are no cold solder joints, burned insulation, embrittled wire and breakage at solder cups or short circuits due to loose strands and excess solder.

For many years the Aircraft, Electronics and Communication industries have awaited this new and simpler method, since the soldering of wires to conventional AN connector contacts is a slow and painstaking process involving much skill and repeated inspection checks.

With AMP's new Taper Technique, a special AMP Patented "F" Crimp Taper Pin is attached to the wires by high speed automatic machines. This pin is then installed in the connector with one easy and positive stroke of AMP's new "measured energy" CERTI-LOK insertion tool. The result is uniformly better connections, produced in much less time with tremendous cost savings.

Tests prove that AMP Taper Pins provide a greater degree of uniformity than soldered connections. Reliability is actually increased because the possibility of human error in assembly has been greatly reduced.

Leading Connector manufacturers are now supplying AN and other types of multiple contact connectors for use with AMP Taper Pins. Write today for further information.

AMP OF CANADA, LTD.

NOW: CANADIAN SALES & SERVICE

Every customer large or small can depend on engineering assistance and excellent delivery of AMP solderless terminals and installation tools direct from

AIRCRAFT-MARINE PRODUCTS OF CANADA, LTD.
1764 Avenue Road Toronto 12, Ontario, Canada

For further data on advertised products use page 61.

About This Issue

The Department of National Defense has, without doubt, been the largest Canadian purchaser of electronic equipment during the past few years. Equipment required for the armed services is bought by the Department of Defense Production and Canadian manufacturers seeking business from the armed services will be interested in the salient facts of how the Department of Defense Production conducts its business. These facts are brought out in an exclusive interview with R. M. Brophy, Deputy Minister of Defense Production which is published in this issue of *Electronics and Communications.*

* * *

A new name has been added to the masthead of *Electronics and Communications.* It is Dr. Leslie L. Hill, Ph. D. whom *Electronics and Communications* has been fortunate enough to obtain as a contributing editor. Dr. Hill is a scientist of considerable repute and was educated in Germany, France, Austria and Britain. In Berlin he studied under the renowned physicist Dr. Max Planck. During the last war Dr. Hill served in the Royal Electrical and Mechanical Engineers. After the cessation of hostilities Dr. Hill spent four years in Egypt doing metalurgical work in aircraft materials for the British Ministry of Supply later accepting an appointment at the Fouad University and acting as liaison officer with the Egyptian Air Force. Dr. Hill came to Canada in 1951 then moved to the United States where he was director of research at Land-Air in Chicago. At the present time Dr. Hill is senior research physicist for the Canadian Marconi Company in Montreal. In addition to his many scientific achievements Dr. Hill is also a linguist of considerable ability and speaks, English, German, French, Italian, Spanish and Arabic. *Electronics and Communications* is proud indeed to announce Dr. Hill as a contributor to its columns. His first article appears on page 34 of this issue.

* * *

Unattended operation of broadcast transmitters is a subject which today looms large in the broadcasting industry. Its ability to increase efficiency and reduce operating costs makes it a subject of vital importance to the industry. William D. Forst, the 1953 recipient of the Colonel Keith Rogers Memorial Engineering Award who was honored with this distinction "in recognition of his pioneering efforts in the field of unattended operation of broadcast transmitters" describes in this issue the construction and details of Saskatoon's CKOM remote controlled transmitter which he designed and built.

* * *

Color TV has been page one news for the industry for several years. Meat of the news has concerned the color picture tube. Recently CBS in the United States announced the successful completion of the first mass-produced TV color tube. The facts about this much-talked-about component of the TV industry are contained in an article published in this issue of *Electronics and Communications.*

JULY - AUGUST, 1954

ELECTRONICS AND COMMUNICATIONS

Vol. 2 No. 4

FEATURES

DEPARTMENTS

Electronics and Communications is published bi-monthly by AGE PUBLICATIONS LIMITED, publishers of *Oil and Gas Heat, Heating, Plumbing and Air Conditioning Age, Hotel and Tavern,* and *Restaurants and Institutions.*

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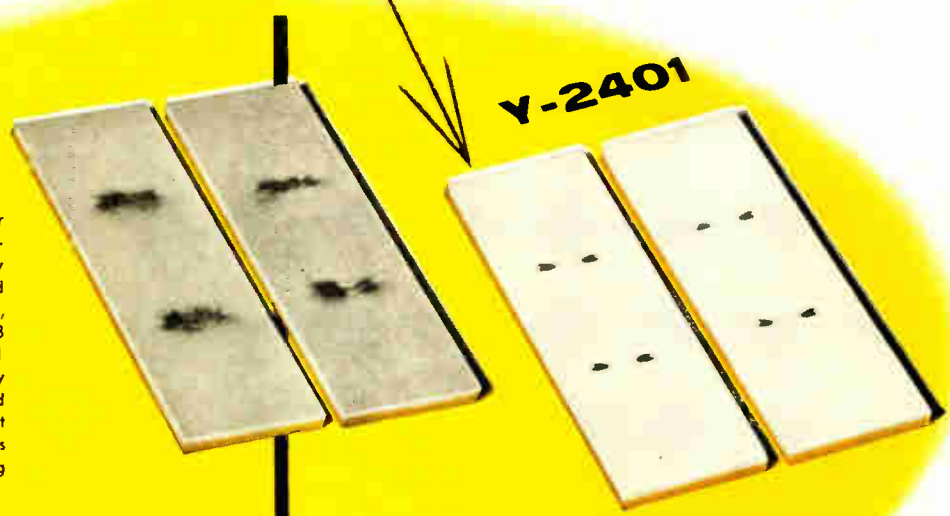
this new and significantly superior Phenolite Laminated Plastic



Here's a test showing the superior arc resistance of this new melamine-polyester material—Y-2401 by name. All samples were subjected to 5 arcs of 15 KV, 30 milliamps, through a 3/8" gap at a rate of 113 arcs per minute. Note how Y-2401 (two samples at right) showed only minor burns whereas Standard Grade XX phenolic material (at left) was deeply carbonized across the arc, resulting in conducting paths.

EXCELS IN ARC RESISTANCE ...IN MACHINABILITY ...IN ELECTRICAL PROPERTIES

With an ordinary band saw, operator saws out a Y-2401 part to be used in an oil circuit recloser.

In sections up to 3/8", Y-2401 can be shaped by shaving dies as illustrated upper left.

(Center) Y-2401 drills cleanly, without chipping or cracking. Drill tools last longer without resharpening.

Here's the circuit breaker assembly with the Y-2401 parts in place. (Note how this assembly is composed almost entirely of various grades of versatile Phenolite.)

In test after test, this new high pressure laminate actually *created* new standards of performance. The illustration above shows how this new paper base-melamine Phenolite goes beyond current grades in arc resistance.

But that's only a start! Y-2401 does away with the difficult-to-machine aspects formerly encountered with melamine laminates. It can easily be punched, sawed, drilled, turned and milled to close tolerances. And being non-brittle, it can be rough-blanked much closer to final dimensions, thus reducing waste of stock and effecting lower machining costs.

Y-2401 has excellent dielectric strength, good moisture resistance and low dissipation factor. Combine all its good points, and you have the "just-right" insulation material for use in transformers, circuit breakers, switch bases, supports for sliding contacts; in radar, television and radio; in many other critical electrical applications. Available in 39" x 47" sheets, of thicknesses ranging from 1/32" to 1".

DETAILED DATA YOURS FOR THE ASKING—Write for Technical Data Sheet on Phenolite Grade Y-2401. Contains complete listing of its properties and possibilities. Gives all other information for thorough evaluation. Address Dept. AD-7.

PHENOLITE Laminated PLASTIC

Also manufacturers of Vulcanized Fibre, Peerless Insulation, Vul-Cot Waste Baskets, Materials Handling Equipment, and Textile Bobbins

NATIONAL

FIBRE COMPANY OF CANADA, LTD.

ATLANTIC & HANNA AVES., TORONTO • 1411 CRESCENT ST., MONTREAL

business briefs & trends

★ Radio and music departments, which include television, rang up the biggest sales gain in Canadian department stores last April. Total department store sales were valued at $86,550,000, up about 8 per cent from $80,204,000 in April last year. Preliminary figures indicate that May sales were off a little more than 1 per cent from the 1953 level.

* * *

★ The growing importance of the television film market was reflected last year in Canada's motion picture output. Compiled figures show that in 1953 the movie-makers produced more films of all kinds for TV and, except for trailers, fewer for theatre presentation.

* * *

★ Westinghouse engineers in the United States are reported to be testing a completely transistorized power-line carrier intended to perform relaying and telemetering services in a telegraph system. Point contact and junction transistors are being used in the equipment which it is said will help in achieving compact design and contribute to a longer life trouble-free system.

* * *

★ The "new look" in public telephone booths features a triangular shaped unit which is being manufactured by the Burgess-Manning Corporation. Reason for the triangular shape of the new booth is to enable two of them to be placed in a corner whereas one of the old square type units required a corner all to itself.

* * *

★ Ten thousand additional stations are to be added to the San Salvador Bureau of Telecommunications in its expansion and improvement program. Open bids for the equipment is being considered by San Salvador officials.

* * *

★ Duty on the import of copper into the United States will be suspended for another year unless the price of domestic copper falls sharply according to a Senate Finance Bill that has been reported on favorably. Duties on the import of copper into the United States have been suspended for the last five years because of a shortage of the material in the country.

* * *

★ The Canadian General Electric Company last year paid out $24,548 for useful suggestions adopted under the company's suggestion award program. The largest number of suggestions per 100 employees were submitted from the company's Royce electronics plant in Toronto, where the ratio was 91 suggestions per 100 employees. Acceptance in this plant were also the highest with 20 suggestions adopted per 100 employees.

* * *

★ In hospital operating rooms, more and more electrical and electronic equipment is being used. This creates a problem of mutual interference. To reduce this interference in apparatus used for diagnosis and treatment of the heart during and after operations, a cardiac resuscitation "wagon" has been proposed. The instruments section, Division of Radio and Electrical Engineering, is studying the design and availability of equipment suitable for this project.

* * *

★ Emerson Radio and Phonograph Corp., of New York claim to be the manufacturers of the world's smallest radio. The set fits into the vest pocket or the palm of the hand and weighs 7½ ounces.

★ A new market for the electronic industry is reported to be opening up. The market is comprised of model aircraft builders who are now guiding the model craft by electronic apparatus. Though the market is yet small some American companies are devoting their entire facilities to the production of equipment for this market.

* * *

★ Authorization has been given by the Foreign Operations Administration for the purchase of signals and communications equipment valued at $2,460,000 as part of the United States program of relief, rehabilitation and defense support in Korea. The purchase will include step-by-step central office Strowger dial equipment to be used in the Seoul central telephone exchange.

* * *

★ A five-day clinic on the latest techniques in planning microwave radio relay system installations — sponsored by the Radio Corp. of America Engineering Products Division — attracted approximately 60 railroad communications engineers and officials from all parts of the United States and Canada recently. The clinic was held May 3-7 at Camden, N.J. Lecturers were RCA microwave specialists engaged in equipment design and systems planning.

* * *

★ David Bronstein, of Toronto, last week received FCC registration to operate mobile radio facilities in the United States, using base station facilities of the Bell Telephone Co. of Canada.

* * *

★ A contract for the construction of 14 radio relay towers a part of the Bell Telephone Company's Toronto-to-Winnipeg microwave relay network extending from Pearl, Ontario, to the Manitoba border has been awarded to the M. F. Mills Construction Co., of Fort William and Port Arthur. Estimated cost of construction of the 14 towers is between $150,000 and $175,000.

* * *

★ Members of the International Union which represents charwomen, janitors and elevator operators have been urged to press representations for restrictions on the use of electronically controlled elevators which operate without attendants.

* * *

★ Dr. Oliver H. Strauss of the National Company of Malden, Mass., says that the electronic recording equipment being produced in Europe is on a par with that being used in the United States. Dr. Strauss did not note any startling new electronic developments in Europe during a recent visit, but was impressed with the fact that the policies of the large electronic firms are determined and formed by executives who are engineers, rather than businessmen "which is not always the case in this country".

* * *

★ By the end of 1953 there were 590,200 TV sets in use in Canada. For 1954 the Canadian television industry forecasts sales in the amount of 450,000 sets which will bring the figure of total sales in Canada to well over 1,000,000 sets.

* * *

★ The projected opening of TV stations in Canada during 1954 will enable a satisfactory signal to be received by an additional 762,000 homes opening up a possible market for greater sales.

(Turn to page 60)

For Greater Television Development and Service

The Simpson 303 is a versatile instrument — use it as an electronic DC voltmeter, an ohmmeter, an AC voltmeter, an AF voltmeter, an RF voltmeter (with accessory probe), an output-meter, or a FM indicator.

Painstaking research by Simpson engineers in the laboratory, working closely with TV set manufacturers produced the model 303. Compact for greater portability, the 303 is also accurate and functional. Its large 4¼" meter is easy to read and its wide voltage and resistance ranges, as well as low current consumption, justify its claim to versatility.

Simpson model 303

Vacuum tube Voltmeter

SPECIFICATIONS:

DC input Resistance 10 megohms
AC input approximately 200 mmf shunted by 275K.
Flat Frequency Response
AC-25 cycle to 100 KC
RF-20KC to 100 MC
5 DC Voltage Ranges 1.2V to 1200V
5 AC Voltage Ranges 1.2V to 1200V
5 Ohm Ranges — to 1000 megohms.
High Frequency and High Voltage Probe available as accessories.
Available in 60 cycle or universal 25-60 cycle.
Also available with roll top case, Model 303RT.

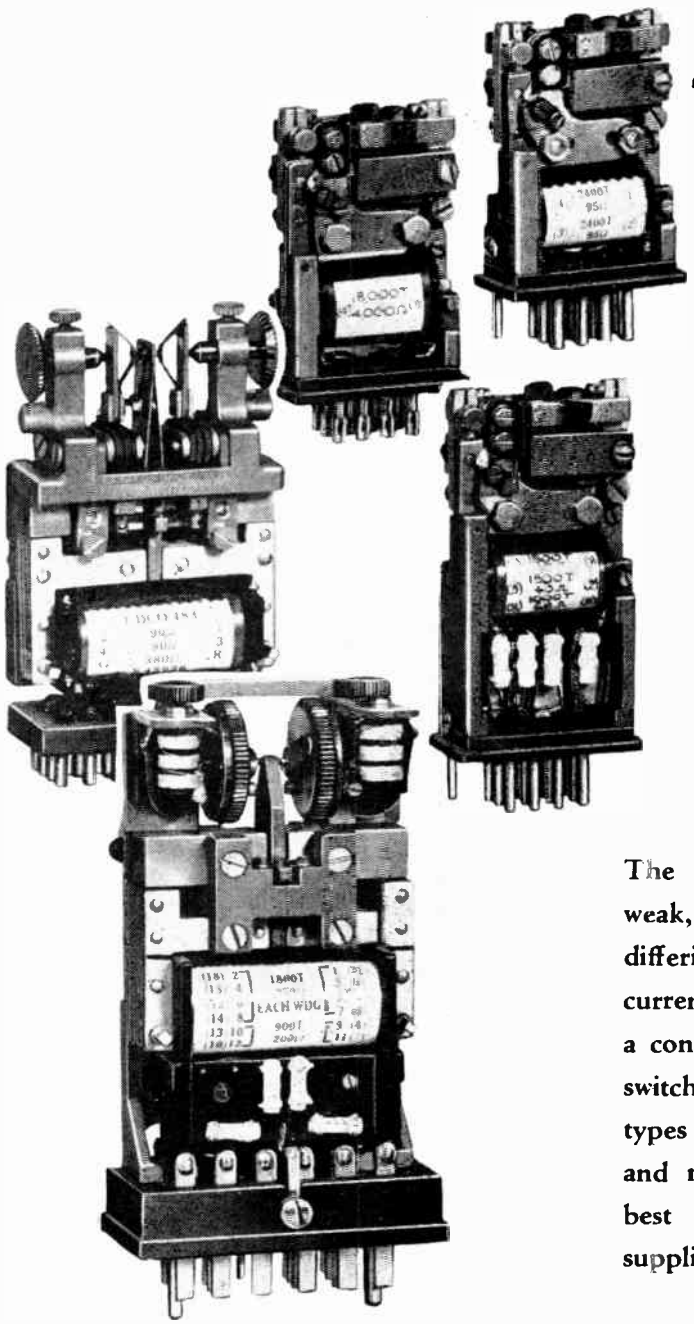
In U.S.A.
Simpson Electric Company
5200 W. Kinzie Street
Chicago 44, Ill.

Bach-Simpson LIMITED

1255 BRYDGES ST. LONDON, CANADA

For further data on advertised products use page 61.

TMC CARPENTER POLARIZED RELAYS



-have these outstanding features

- High operational speed
- High sensitivity
- Freedom from contact rebound
- No positional error
- High contact pressures
- Accuracy of signal repetition
- Exceptional thermal stability
- Ease of adjustment

The Carpenter Polarized Relay will respond to weak, ill-defined or short-duration impulses of differing polarity, or it will follow weak alternating current inputs of high frequencies and so provide a continuously operating symmetrical change-over switch between two different sources. Four basic types are available with a wide range of single and multiple windings. Particulars of the type best suited to your purpose will be gladly supplied if you will send us your circuit details.

Manufactured by the sole licensees.

TELEPHONE MANUFACTURING CO. LTD.

CANADIAN BRANCH

SAXONY BUILDING - 26 DUNCAN STREET - TORONTO

Telephone EM. 6 - 5314

Contractors to Governments of the British Commonwealth and other Nations

Head Office & Main Works: Hollingsworth Works - London S.E. 21, England

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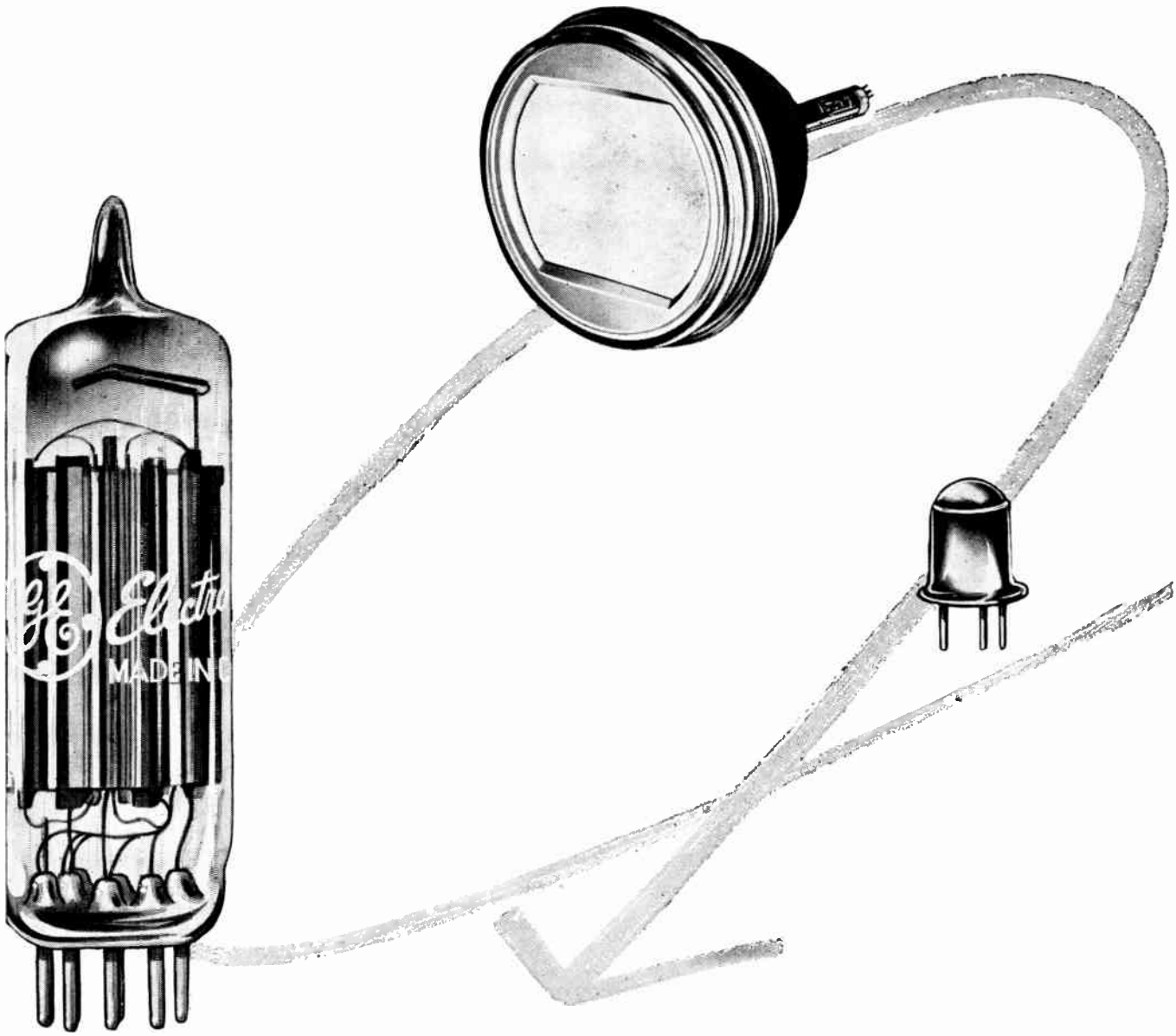

Always a step ahead...

Leaders in the industry, Canadian General Electric is always a step ahead in tube research and development. New, improved manufacturing methods and quality control, are your further assurance that G.E. Electronic Tubes will give longer life and maximum performance in radio, television and electronic equipment.

GE Electronic TUBES

The Finest Any Set Can Have

77-576W-154

CANADIAN GENERAL ELECTRIC COMPANY LIMITED

Head Office — Toronto

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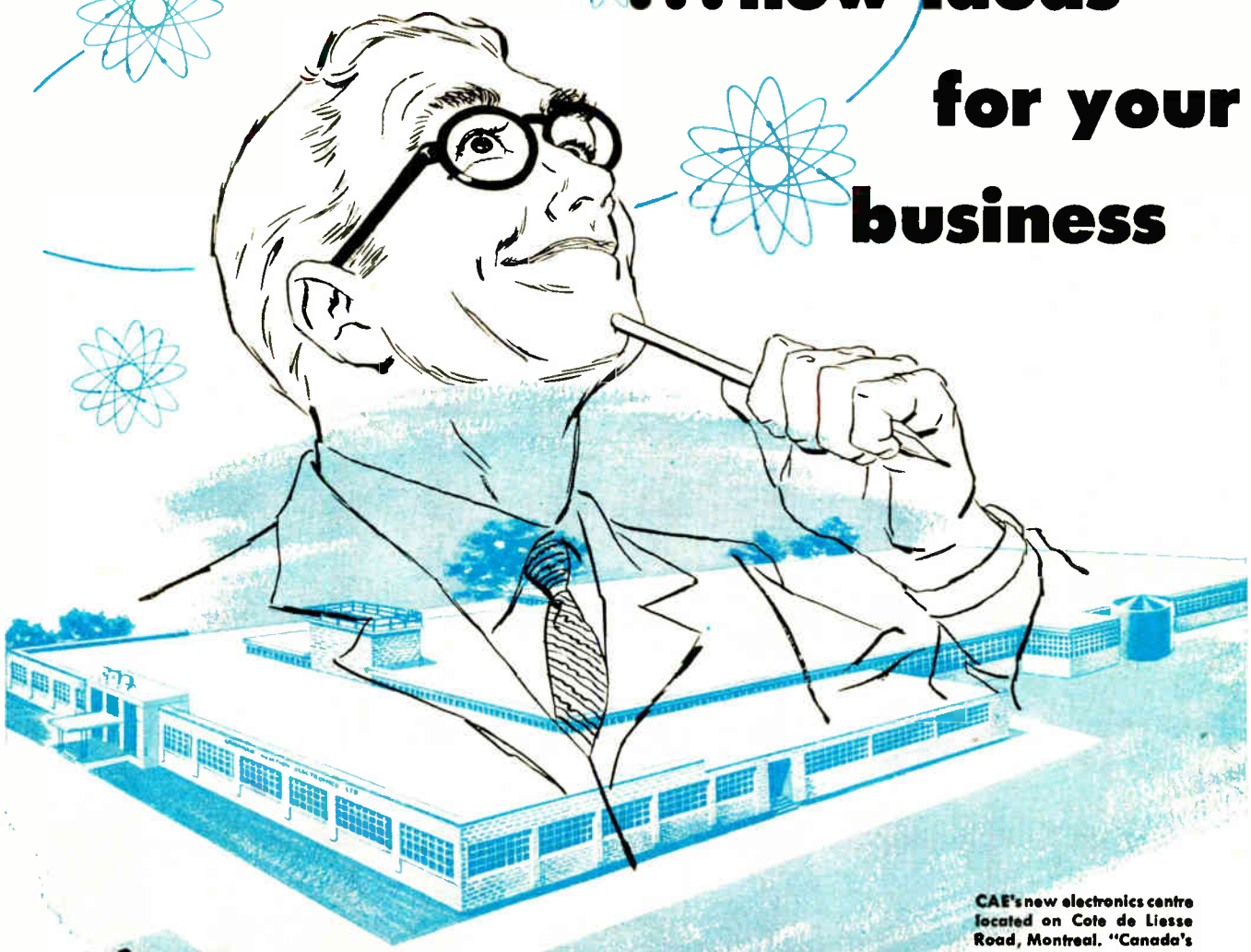
...new ideas for your business



CAE's new electronics centre located on Cote de Liesse Road, Montreal. "Canada's Most Modern Electronics Plant"

from cae's great new electronics centre

Industrial applications for electronics are being discovered almost daily . . . bringing higher quality, more efficient production.

The combined experience of **cae's** 400 engineers and technicians—more than 4,000 man-years—places **cae** at the genius level on the electronics I.Q. scale.

In the hands of this versatile team, **cae's** great *new* electronics centre, fitted with the most modern instruments and equipment, provides Canadian Industry with the most advanced electronics know-how.

Make it *your* business to take advantage of **cae's** engineering research, design and manufacturing facilities!

CAE manufactures Du Mont Television Sets, designs and manufactures radar, communications and industrial electronics equipment, and high fidelity audio systems.

cae **Canadian Aviation Electronics, Ltd.**

Montreal • Ottawa • Toronto • Winnipeg • Vancouver

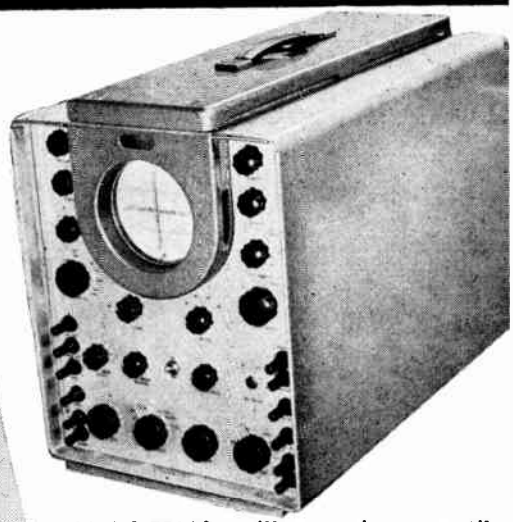
THE LARGEST CANADIAN-OWNED ELECTRONICS COMPANY

2405

For further data on advertised products use page 61.

OSCILLOSCOPES

designed to solve industry's measurement problems



The Cossor Model 7514C oscilloscope is a versatile high gain wide band instrument for general laboratory and industrial applications. The model 7514C brings to this price range the accurate quantitative measurement found heretofore only in more elaborate and expensive equipment.

The Amplifier handles signals from 5 cycles to 10 Mc.

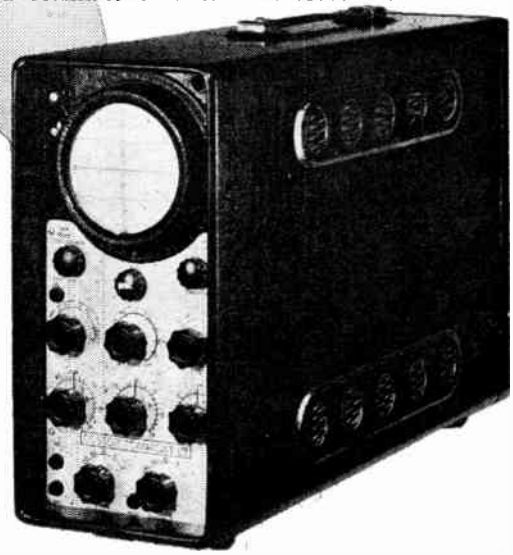
Time Base speed from .01 sec. to 0.1 microseconds per cm., plus expanded and delayed sweeps.

Built-in voltage and time marker generators giving 0.1 to 100 V square waves and a range of locked oscillations to 0.2 microseconds.

The Cossor Model 1037C provides the basic facilities required for radio, television, radar and industrial electronics servicing and testing Its small dimensions and universal power supply operation make it an instrument of universal application.

No. 1 Vertical Amplifier. D C. coupled, 0-100 Kc., 1 volt sensitivity.

No. 2 Vertical Amplifier. A C coupled, 20-300 Kc., 2 volt sensitivity Time Bases 2-50 Kc., 25 or 60 cycle versions.



The Cossor Model 7511C is a portable oscilloscope for Television monitors, outside broadcast apparatus, aircraft maintenance, industrial electronics servicing, general laboratory applications and TV receiver service. Double beam system. Wideband Pulse performance. Voltage and Time Calibration. Recurrent and Triggered sweeps. Operation on supplies from 80 to 230 volts 25 to 2400 cycles.

Twin amplifier channels and double beam tube for simultaneous comparison of any voltages. Each channel handles signals from 5 cycles to 3 Mc. Time base speed to 5 microseconds per inch, recurrent or triggered. Complete time and voltage calibration on each channel.

Further information and literature may be obtained from:—

COSSOR (CANADA) LIMITED

301 Windsor St. Halifax, N.S.
758 Victoria Sq. Montreal, Que.
648A Yonge St. Toronto, Ont.

For further data on advertised products use page 61.

E&C EDITORIAL

Competition Isn't New To The Engineer - -!

According to the prognostications of the financial pages and economists we are now entering what is known as a "buyers' market". The implications are that times are going to be a little harder and that competition will stiffen up considerably. Such prophecies, if true, will make little difference to the normal operations of any well managed business and particularly to their engineering departments.

As far as engineering is concerned competition is always tough and there is never any other kind of market except a "buyers' market". The engineer is continually faced with the problem of keeping abreast of the latest materials, techniques and equipment using such to solve the ever-present equation of producing better quality goods for his firm at less cost

Back in the days when five dollars bought enough groceries for a week — and these were certainly days of the "buyers' market" — the engineer's prime task was to beat competition not only from a monetary point of view but from a physical standpoint too. Performance, weight, size and appearance, in addition to cost, were objectives he continually strived to improve to simplify the task of the sales department in selling his firm's products.

Buyers' market or sellers' market competition from where the engineer deals with it on his drawing board runs at a constant level. Irrespective of what the future holds with respect to whose market it is, the engineer will, by the nature of his place in the industrial economy, be faced with competition — good stiff competition — stemming from the discerning nature of the buying public.

Are We Selling Electronics Hard Enough?

The Canadian electronic industry as represented at the 1954 Canadian International Trade Fair provided a reasonable indication of this country's interest in electronics — the newest of the industries. The scattered disposition of the electronic exhibits at the Trade Fair was also ironically representative, in our opinion at least, of this country's yet undecided acceptance of the fact that the electronic industry is an industry unto itself and should, if it is to be permitted recognition as such, be treated accordingly and given every assistance to be so identified. No better opportunity of lending prominence to this fact affords itself than the Canadian International Trade Fair. Here the exhibits of the industry could be grouped together as are the machinery displays, much of the impressiveness of which is due to their collective grouping.

Basically, electronics is an off-shoot of the electrical industry but because electronics is generally regarded as that part of the electrical art based upon the science and application of the electron tube, it has become recognized in the United States and the United Kingdom as an industry unto itself. Similar recognition has been slower of development in Canada but present signs indicate that the inevitable recognition of the industry as a self-contained unit of our economy is slowly taking shape. The formation of electronic divisions within some of our larger electrical industries is sufficient cause to believe that responsible industrialists are thinking along the right lines by establishing separate electronic divisions within their companies. This, in essence, is an act of differentiation between the science of electronics and electricity.

The establishment of specific manufacturing facilities for electronic equipment, however, constitutes the development of only one half of the industry, the producing half. The remaining half of the industry, that of the consumer market, is also of prime importance and must be developed with equal vigor. Although manufacturers have a considerable stake in the matter of informing their potential customers about the merits of their products and more generally about the benefits to be obtained by business and industry through the use of electronic equipment, it would be unfair to expect them to assume this responsibility wholly unto themselves. This function properly lies in the field of public relations and the best public relations for the electronic industry is that which, like the industry itself, is concerned solely with the development of the electronic industry and devotes itself specifically to this one field and objective.

Electronics and Communications magazine has been serving the Canadian electronics industry for the past year and a half. During this period of time our conviction has been steadily strengthened that business and industrial management is anxious to learn more about this thing called electronics. With a belief based on the voluminous size of our correspondence files, made up of letters from all sections of business and industry, letters seeking further information on electronic equipment which has been dealt with in our editorial columns, we are of the steadfast opinion that the development and identity of the consumer's half of the electronic industry will grow proportionate to the vigor and effort with which the manufacturer informs his potential customers. This is particularly so in the case of industrial electronics as applied to manufacturing, a field which, in our opinion, seems to have been somewhat neglected in Canada.

When the Government buys it does so in accordance with well established procedure. The following interview with R. M. Brophy, Deputy Minister of Defense Production outlines the rules followed when - - - -

THE GOVERNMENT PAYS THE CHEQUE!

***Question:* What is the function of the Department of Defense Production and what is its relationship to the Department of National Defense and Canadian industry?**

Mr. Brophy: The primary function of the Department of Defense Production is procurement on behalf of the armed services. The inter relation of this department, the Department of National Defense and Canadian industry in fulfilling this function may be illustrated as follows.

Once a requirement has received internal approval within the Department of National Defense, purchasing action is negotiated by raising a requisition or contract demand on the Department of Defense Production. Contract demands describe the item to be purchased and must bear a certification that a sufficient sum of money has been set aside or encumbered to pay for the purchase. This means that preliminary discussions between D.N.D. and D.D.P. are often necessary in order to determine how large the financial encumbrance should be. It may also involve, in some cases, preliminary formal or informal enquiries to industry. Once the contract demand has been submitted to the Department of Defense Production, purchase negotiations can be started with prospective suppliers.

***Question:* Are there any particular features of departmental contracts which would be of interest to industry?**

Mr. Brophy: I believe that industry would be interested in knowing that, in general, there are six types of contract, in so far as basis of payment is concerned, normally entered into by the department.

***Question:* What are the conditions necessitating the use of these six types of contract?**

Mr. Brophy: I think that this can be explained more clearly through a brief description of each of the six types.

The first, and most frequently used, is the fixed price contract, awarded on the basis of competitive tenders. Approximately three quarters of all contracts are awarded on this basis. Unless other considerations prevent it, the lowest tenderer is awarded the contract.

***Question:* What factors in addition to price are considered by the department in evaluating tenders for awarding contracts on the fixed price basis?**

Mr. Brophy: Factors which are considered and which may justify a departure from the practice of awarding contracts to the lowest tenderers are delivery dates, satisfaction on previous contracts, the stability of the contractor's financial position and the capacity of the contractor to produce the goods in question.

***Question:* What are the remaining five types of contract?**

Mr. Brophy: The second type, the negotiated fixed price contract, provides for those cases where an item can be obtained from only one source of supply. This situation would occur where spare parts for items already in use are required; where tests on certain specialized equipment are to be conducted; where previous experience might have proved one type of patented equipment or technical equipment to be superior; or where only one firm has facilities for producing the required product. This type of contract is also employed where it is desired to give experience in manufacturing a certain class of military equipment to firms capable of such production or where tooling up for military production is to be accomplished. There are a good many cases where this procedure has to be followed but careful scrutiny ensures that tenders are called wherever possible. In both the above types of contract, the price can be fixed in advance.

For those contracts where the price cannot be fixed, four procedures are provided. All four involve determination of the contractor's costs and are subject to audit by the Cost Inspection and Audit Division of the office of the Comptroller of the Treasury, Department of Finance. The first of these is the ceiling price contract subject to reduction to cost plus a fixed percentage, which is employed where benefits of volume production occasioned by military requirements cannot be determined accurately in advance; where, for example, the contract price can be calculated only on the basis of commercial experience and the economies of large-scale production are not known. The ceiling price represents a maximum and is not subject to adjustment up for an increase in costs.

The second of this type is the target price plus incentive bonus contract. A target price is set on the basis of such criteria as are available. A valid criterion of the item being produced in Canada for the first time might, for example, be the current laid-down import price. On completion, the contractor is paid his actual costs, and a fee which is calculated as an agreed percentage of the target price plus a bonus if the contractor reduces costs below the target price. This type of contract can only be employed where a target can be estimated with some accuracy.

A third variation where costs cannot be estimated in advance sufficiently well for a contract to be placed in accordance with any of the previously mentioned bases but where some estimate is available, is the contract based on cost plus a fixed fee to the contractor. In this case, increased costs do not result in increased profits or fees to the contractor.

Finally, there is the contract where costs plus a fixed percentage of costs are awarded to the contractor. This type of contract is avoided wherever possible, but it is inevitable in those cases where a lack of previous experience makes an approximation of cost impossible. As soon as experience permits this type of contract is converted to one of the other bases, usually target in the first instance.

These are the principle types of contract used, although sometimes two or more types may be combined — for example, a target price contract may also have a ceiling price.

***Question:* Has your department established any regulations governing the physical aspect of regulating government contracts?**

Mr. Brophy: The department has developed a series of general conditions which are published and are incorporated into all contracts. The main set of conditions which are applicable to all contracts irrespective of their nature is known as Form D.D.P. 26 and covers matters such as arrangements for subletting any part of the contract, inspection, acceptance and delivery, warranty, scrap, insurance, security, patent claims and royalties and other similar matters. In addition to this form there are special conditions relating to aircraft overhaul, shipbuilding, ship repairs, capital expenditures, firm price contracts, cost plus contracts, construction contracts and various others.

***Question:* May a prime contractor sublet a portion of his contract on his own terms and without the prior approval of the department?**

Mr. Brophy: Form D.D.P. 26 — General Conditions, which is applicable to all contracts of the department, sets out the conditions under which a prime contractor may sublet. Briefly the prime contractor may select his own sub-contractor but where the expenditure under the sub-contract will be in excess of $10,000 he must obtain prior approval of his selected sub-contractor from the department. Terms of such sub-contracts must be generally similar to those under which the original contract was let.

Question: **What does the department consider to be a fair margin of profit for contractors?**

Mr. Brophy: The general yard stick which is followed is a profit rate of between five and ten per cent of costs. The actual rate varies depending upon the nature of the industry, the size of the contract and the type of contract. These rates, it should be noted, are not net profit to the contractor because of disallowed expenses but even without regard to these disallowed expenses, they are lower than the rates of profit being earned by manufacturing concerns on general commercial work, as evidenced by statistics published by the Taxation Division of the Department of National Revenue.

Question: **Does the department exercise any means of keeping profits down or investigating them when contracts are let on a fixed price basis?**

Mr. Brophy: Where the department is successful in obtaining tenders from a number of suppliers, it is generally assumed that the margin of profit of the successful contractor need not be a matter of special investigation since competitive factors should ensure that the best value is being obtained for the taxpayer's dollar. However, costs and profits may be investigated at any time by the Cost Inspection and Audit Division at the direction of the Minister.

Question: **Under what circumstances and subject to what conditions is capital assistance provided to manufacturers?**

Mr. Brophy: Because the production of some defense items requires special use facilities not ordinarily applicable to normal commercial production, it was realized that commercial firms could not be expected in some cases to make the financial investment necessary to provide these facilities. Capital assistance has been adopted by the department as one means of assisting in the establishment of essential defense facilities where it has been determined that for practical business reasons industry could not finance such establishment.

For the most part, capital assistance is extended to provide specialized machine tools and equipment to enable firms who are already established to adapt their facilities to defense production.

It has in very rare cases been utilized for the setting up of entire facilities in order to bring certain knowledge and skills essential to the defense program into the country. Assets acquired through capital assistance is placed at the disposal of applicants by formal contract but title vests in the Crown. The machine tools and equipment can be allocated and reallocated to industry in order to meet the varying requirements of the defense program.

Question: **Are there any restrictions on the type of equipment which may be provided through capital assistance?**

Mr. Brophy: Yes. Capital assistance is not granted to purchase cutting tools, hand tools, jigs, fixtures, dies, patterns, molds or gauges.

Question: **May a manufacturer who has equipment which he obtained through capital assistance, installed in his plant use it for other than defense work?**

Mr. Brophy: Under certain conditions a rental agreement may be negotiated with prime or sub-contractors for the use of such facilities for commercial as well as defense work. Rental of complete production facilities is established in accordance with a departmental directive. In some instances, rental of individual machine tools for non-defense work may be arranged.

Question: **I understand that your department sometimes employs private firms to carry out development work. What are the conditions covering such a contract?**

Mr. Brophy: When a firm receives a development contract, they are paid for the development work and the government receives the know-how which may be made available to any firm in Canada when we go out to tender on the item in question. To compensate the company for the know-how, we usually allow up to ten per cent profit on these contracts.

Question: **What is the present organization of the Department of Defense Production?**

Mr. Brophy: At present the department is organized into seven main procurement Branches — General Purchasing Branch, which deals mainly with purchases of off-the-shelf items, and six Production Branches — Aircraft, Electronics, Guns, Ammunition, Shipbuilding and Machine Tools — responsible for the major programs that require specialized production.

In addition to the procurement Branches, there are the following service units: Financial Adviser's, which includes Contracts Authorization Division, Legal, Administration, Secretary's, Economics and Statistics, Comptroller and Industrial Security Branches.

At the end of the last calendar year, because of the improvement in the material supply situation, it was possible for the department to abolish all controls on materials and the Materials Branch itself. Problems of material shortages are now handled by personnel under the Deputy Minister's Office.

The construction portion of the department's function is handled by Defense Construction (1951) Limited, a Crown company responsible for defense construction projects such as barracks, radar stations and repair and maintenance of military buildings. Other Crown companies associated with the department are Canadian Commercial Corporation, which handles U.S. Government defense contracts placed in Canada, as well as those of other countries; Canadian Arsenals Limited, which is one of the major prime contractors in the gun and ammunition programs; Crown Assets Disposal Corporation, which handles disposal of all government supplies, including those of National Defense; and Polymer Corporation, which produces a large part of Canada's synthetic rubber requirements.

EXCERPTS FROM THE ADDRESS OF C. D. HOWE AT THE OPENING OF CAE PLANT, MONTREAL

C. D. HOWE

As you know, the electronics industry was greatly expanded during the last war, and has continued to grow since that time. The Canadian consumer sees the expansion of the industry in the form of television sets. Industry sees it in the form of complicated computers and production control systems. The Armed Forces see it in the form of military equipment ranging from radar sets to flight simulators. The increase in the number and variety of items now being manufactured in Canada is the really significant feature of the growth of the electronics industry. Canadian firms are now producing more and more of the component parts rather than having to import and assemble most of them here . . . ."

". . . . New modern plants like this one are giving Canada the capacity to manufacture more and more types of complicated electronic equipment. I think it goes without saying that we are merely at the beginning of a tremendous development in this field of electronics. The requirements of the Armed Services call for electronics in almost all types of defense equipment. Private industry will be demanding ever more intricate types of electronic equipment as it aims for a higher degree of automatic control of production processes. And the Canadian consumer can be expected to want an increasing number and variety of electronic items.

The Canadian Aviation Electronics Limited plant I am opening today is a further example of the imagination and initiative of private industry in this country. It is encouraging to me as Minister of Defence Production to see private industry creating the facilities which can meet Canada's defense needs as well as those of its civilian economy . . . ."

Broadcasting Via - - -

UNATTENDED OPERATION

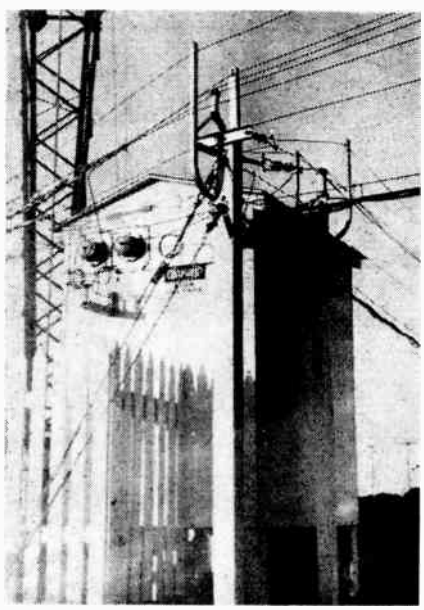
By WILLIAM D. FORST

With the advent of TV and continued expansion of the electronics industry in Canada, more and more Canadian broadcasters are contemplating unattended operation. The question of reliability, economy, and feasability of operation etc., often come up. After operating broadcast stations unattended for years, the author is completely convinced that most reliable and trouble-free operation may be had if the installing engineer chooses the proper supervisory remote control equipment and has it installed and the transmitter modified in accordance with the highest standards of engineering practice.

Reliability and efficiency of unattended and automatic operation can also be evidenced by the fact that factories and industries in general are converting to automatic controls and stations with TV licenses have found that remote control releases trained transmitter men for the stations' television work. Speaking of other industries as well it has even been proclaimed that we are now evidencing "the second industrial revolution" . . . . the industries' sweeping acceptance of automatic controls.

CANADA, for years a leader in field of unattended operation of broadcast transmitters, added to its list another remote controlled unattended transmitter when Radio Station CKOM, Saskatoon, went on the air with its new, modern 5000 watt transmitter on March 12th this year. The transmitter located nine miles from the studios is completely remote controlled. All switching of transmitter circuits and pattern change is performed from the studios, and all major circuits and meter readings can likewise be checked.

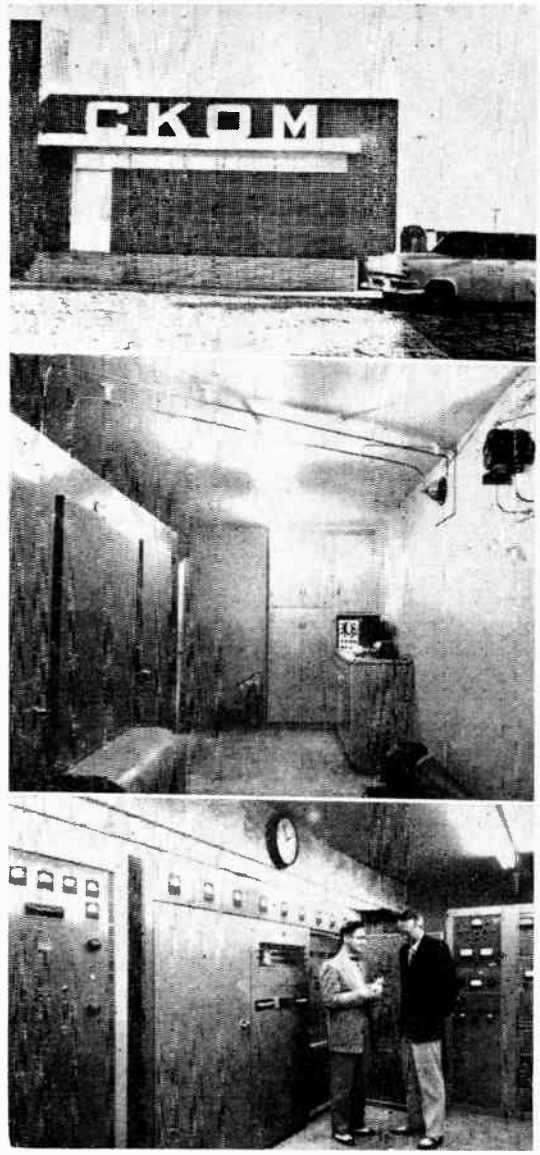
Since going on the air the new transmitter has proved economical and reliable in operation and stable under varying climatic and temperature changes . . . . a valuable asset in unattended operation. The antenna system and the overall tuning remain stable with all meter readings unchanged in weather changes from 40 degrees below zero through wet snow, dust storms, heavy rains, to extremely hot summer temperatures.



● Rear view of No. 1 tuning hut.

CKOM's 5000 watt transmitter was designed specifically for unattended operation by remote control and incorporates several unique features. Its designed installation brought about numerous new problems. Although the transmitter is and has been operated by remote control, additional remote control features are being installed. When installation is complete on the additional self-supervisory remote control equipment, the complete transmitter will be fully automatic in operation. When the transmitter is switched on in the morning, the self-supervisory equipment supervises the entire transmitter with no other attention being required from the studio operator for the broadcast day. Should trouble develop in the transmitter, the studio operator is signalled and if the trouble is of a serious nature then the standby transmitter is automatically turned on and the defective transmitter completely shut down until trouble is remedied, at which time the original transmitter takes over. Should a break in power service occur, the standby power plant along with the standby transmitter will automatically take over. The entire equipment is so designed that manual operation of the transmitter is possible should lines between studio and transmitter fail.

The heating and ventilating system is also automatic and maintains constant temperatures in the transmitter, transmitter air intake, and transmitter building. No flame-fired heating equipment is used as it is considered hazardous in unattended station operation. In its place the heat from the transmitter is circulated throughout the building and when it is insufficient, thermostatically controlled electric space heaters, spaced throughout the building, provides additional heat as required.



● *Top:* CKOM's new building. *Center:* Rear view of transmitter showing "dead-back" construction. *Bottom:* Mr. Forst, and R. A. (Bob) Hosie right, examine the tube that delivers the stations 5000 watts.

Air intake into the transmitter is from the basement. Over 2000 cubic feet of air per minute is required to cool the tubes. To minimize the danger of getting a cold blast of air on the tubes in winter, a specially designed mixing chamber was built. This chamber, with thermostatically controlled motorized vanes, keeps the air temperature constant by mixing basement air with air from the transmitter building providing outside air as required. Provision has also been included for filtering outside intake air and "de-sanding" it during spring dust storms by forced rotation or circulation of the dust laden air. It has been found from experience that constant air intake temperature will definitely minimize tube and circuit breakdowns. In designing the building it was decided to make it large enough to house the transmitter and its associated equipment and allow ample room both front

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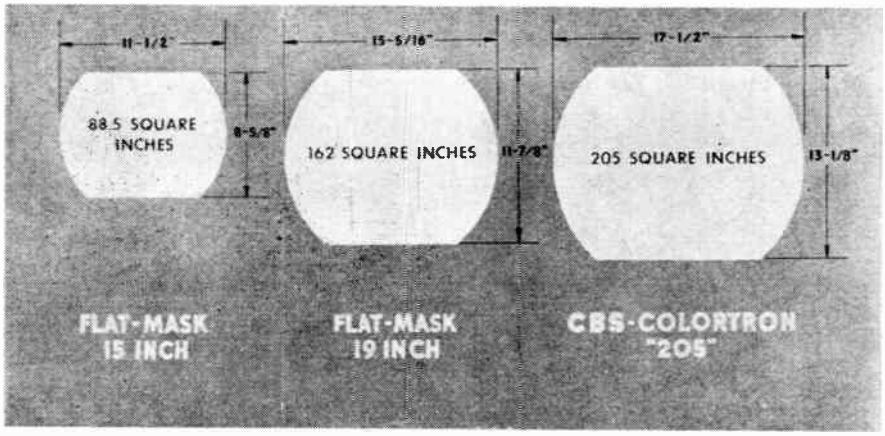

● Flat-mask color tubes and the "205" are compared to show the large increase in useful picture area attained by CBS-Hytron's original curved-mask design.

Engineering - - - -

Mass Produced Color Tubes

THE first successfully mass produced color tube is known as the "205". It is a 19 inch tube and is the closest in size to the popular 21-inch black-and-white tube. Its curved mask-screen gives 43 square inches more picture surface than the flat-mask type of 19 inch tube. The company is set up to produce 10,000 of these tubes each month. The price of the new tube to television set manufacturers is $175.

Company officials state that the absence of "pincushioning", distortion, easier circuit adjustments, and the sharper pictures obtainable with its electromagnetically converged electron gun and its curved mask screen have contributed to its success.

Inventions used in the production of the new tube are covered by patent applications which have already been allowed broad claims covering the basic concepts.

Unlike color tubes of the flat-mask type, the new tube is simpler to mass produce. The heavy screen-mask assembly of the flat-mask design is eliminated. The tube weighs 12½ pounds less than a flat-mask type, even with both types using the same 19-inch round glass bulb. A larger picture for the same bulb size is possible with the new unit, because it produces the picture on the face of the tube directly, instead of on an internal screen mounted on a flat glass plate behind the face.

The new color tube is a large-screen, direct-viewing, all-glass, tricolor television picture tube. It employs the curved shadow mask and tricolor screen along with a three-beam electron gun designed for electromagnetic convergence. The tube provides a choice of full-color or black-and-white pictures on a screen having an area of 205 square inches.

How Color-Tube Designs Differ

In black-and-white tubes, the entire inside of the face is available for the picture screen. This is not necessarily true in shadow-mask color tubes. In one style, the face of the bulb is used as a window and the phosphor plate is mounted behind it. In another, unnecessary screen area is sacrificed by the manner in which the mask is mounted. This means that a color tube's size is better evaluated on the basis of its useful picture screen area, rather than on the diameter of its face.

A 19-inch, flat-mask type of color tube, for example, has a viewing area of only 162 square inches. Another recently announced 19-inch tube, which is not yet commercially available, uses the curved screen-mask construction. This tube has a viewing area of 185 square inches. The new "205" uses the same size bulb as the other two tubes, but achieves the largest screen area: 205 square inches. It accomplishes this by the maker's method of printing the screen directly on the inside of the face and also by constructing its curved shadow mask so as to achieve maximum utilization of the area on the face.

Maximum Picture Area Achieved

Additional screen area has been gained in the "205" tube by positioning the three supports for the shadow mask above and below the desired screen area . . . where the screen is masked off anyway to obtain the desired 4 x 3 aspect ratio. The sides of the mask and screen are thus left free of interference. This technique permits almost as complete use of the lateral space for the screen as in black-and-white tubes.

Outstanding features claimed for the tricolor tube are: Simpler design, lower cost, improved performance, and readier adaptability to mass production in large sizes.

Development of a photographic technique, similar to photoengraving, makes it possible to deposit the "205's" picture screen-composed of approximately 300,000 triangularly arranged

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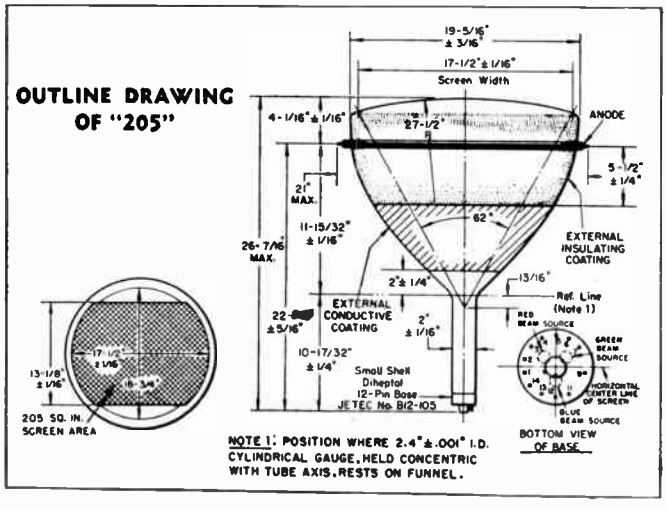
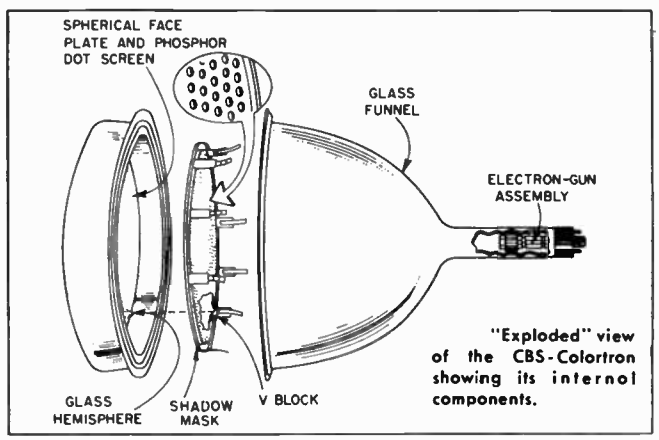
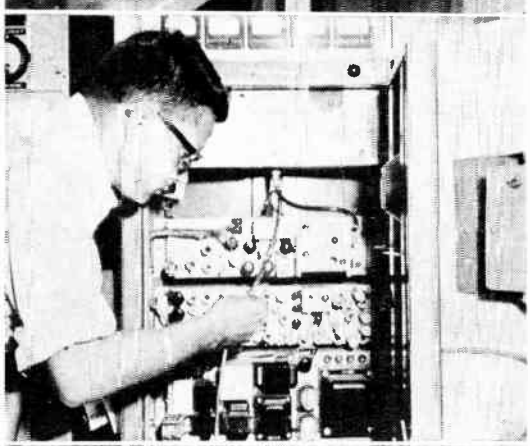
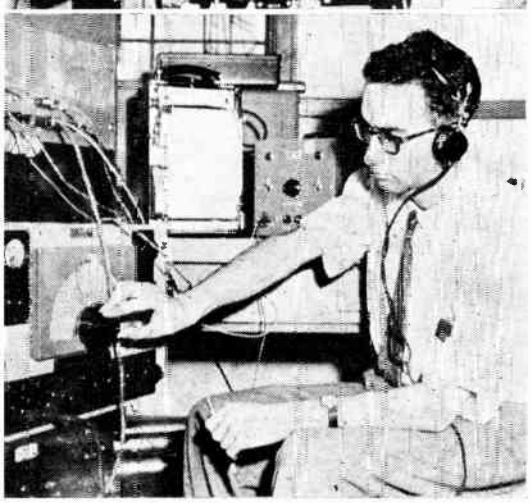




● Outline drawing and perspective drawing of the new color tube.





● *Top:* Collecting data in microwave section. *Second from top:* Measuring microwave power by heating water. *Third from top:* High frequency transmitter in RPL mobile lab. *Bottom:* Equipment used by the laboratory for ionosphere investigations.

Communications Research - - - -

They're Finding The Answers At (D.R.T.E.)

IN the two widely-separated Ottawa area laboratories which together comprise the Defense Research Telecommunications Establishment (DRTE), scientists are probing a variety of defense telecommunications problems. Their contributions to forecasts on world-wide radio propagation variety of defense telecommunications conditions alone affect practically every living Canadian.

The Radio Physics Laboratory (RPL), 12 miles west of downtown Ottawa at Shirley Bay, serves as the center of a comprehensive system of ionospheric recording stations scattered across northern Canada and operated for the Defense Research Board by the Department of Transport.

The raw scientific data obtained on the behavior of the ionosphere as it is influenced by polar phenomena is developed into factual information. This is passed to Washington's Central Radio Propagation Laboratory where, with similar submissions from other locations, it is used to forecast radio propagation conditions on an international basis.

As at the Electronics Laboratory (EL), east of Ottawa on the Montreal Road, RPL research stresses problems peculiar to Canada. One of the laboratory's main considerations is basic research in the field of telecommunications. Hence its interest in the ionosphere and projects concerning the aurora borealis which affects adversely, and particularly when it is most active, northern telecommunications.

McGill Fence Development

Additional research fields include radar and control systems for the guided missile being developed by the Defense Research Board. Much of the testing and development work on the so-called McGill Fence, an early warning device designed to supplement radar chains in northern Canada, was directed at the Shirley Bay laboratory.

A self-contained unit, RPL comprises six main research sections and includes as well as scientific library, a photographic section and other services. Nearby is a 200-acre area which contains almost two dozen research huts and a bewildering array of antennae of all types, necessary research equipment for the problems under consideration. The laboratory provides also a consulting service for the Armed Forces and other government and civilian agencies.

The main building is unique in Canada because it rests on a huge copper screen buried beneath the foundation. This ensures the complete grounding of the structure.

Mountings for a variety of masts and antenna systems dot the roof and parapet of the three-storey, buff-brick building. Electrical interference, both from external and internal causes likely to prejudice the results of experiments, is minimized by every known method.

A two-deck, white stucco structure, EL is U-shaped and immediately adjacent to the Canadian Signals Research and Development Establishment building. The site was chosen to facilitate continuation of the past close association with the Army signals unit.

Much of the research carried out at EL is applied in nature and relates to Service telecommunications' requirements. The characteristics of transistors are currently under study and increasing interest is being devoted to the miniaturization of electronic equipment.

Large laboratory bays line the outside of each floor with smaller units along the inside. A spacious interior court separates the building's inside walls and serves to provide the maximum amount of air and natural light possible to the interior of the structure.

● Comparison of transistor and conventional tube circuit.

The floors contain ducts which permit the installation of a variety of power and signal lines. Four transportable screen rooms, built in double, copper-mesh sections, shield sensitive electronic equipment from external

(Turn to page 55)

For further data on advertised products use page 61.

NEWS

Canadian Westinghouse Open New Brantford TV Plant

The necessity for more space at the Canadian Westinghouse Company's Hamilton plant to cope with the increasing volume of commercial and defense electronic equipment and the desire for more spacious and suitable facilities for television production are the reasons behind the establishment of the Canadian Westinghouse Company's new television and radio plant at Brantford.

The building formerly occupied by the Behr-Manning Company is a single storey structure with a floor area of 130,000 square feet, an area 50 per cent larger than the company's former television production area in Hamilton.

At the present time between 250 and 275 employees are engaged in producing television sets at the new plant and this number will be increased in the near future when the company starts radio production in the new plant.

The move to the new location provided company engineers with the opportunity to devise newer and more improved methods of production and despite the attendant disruptions occasioned by the move production is steadily increasing. This is indicated by the fact that a full range of 1955 TV models will be in full scale production at the time the new models are being displayed at the Canadian National Exhibition.

Included among the key personnel located at the new plant are Harry Rice, Divisional Manager; Ricardo Muniz, Manager of Operations; Julien Tuteur, Sales Manager; Elof Olson, Manager of Engineering; George Beaumont, Engineering Superintendent; and Leslie Johnson, Chief Designer.

Electro Sonic Supply To Represent Arco Electronics Inc.

Howard L. Rothenstein, General Sales Manager of Arco Electronics Inc., New York city, announces the appointment of Electro Sonic Supply Co. Ltd. of Toronto, Canada as the authorized distributor of Elmenco Capacitors in the Toronto area.

Arrangements for the distributorship were made during a recent visit of Mr. Rothenstein to Toronto at which time details were worked out with Mr. Len Finkler, Sales Manager for Electro Sonic Supply Company Limited.

Research Council Personnel Honored By Appointments And Elections

Recent honors and distinctions awarded to personnel of the National Research Council in Ottawa included Dr. D. W. R. McKinley who has been appointed Assistant Director of the Division of Radio and Electrical Engineering; Mr. W. J. Purvis of the Division of Radio and Electrical Engineering who has been named Chairman of the Ottawa Section, American Institute of Electrical Engineers and Mr. W. A. Cumming, Division of Radio and Electrical Engineering who has been elected Chairman of the Ottawa Section of Institute of Radio Engineers.

● Mr. Arthur Levin, M.I.E.E., Director and Chief Engineer of Cossor (Canada) Limited will take up a temporary appointment with the Canadian government to assist the armed services in special development work it has been announced by officials of his company's office in Halifax.

Lab-O-Ring Selected To Represent Norma Meters

Lab-O-Ring Enterprises Limited, 17 Collier Street, Toronto, has been selected as the Canadian representative for Norma Meters. In making the announcement Mr. F. Ring, Vice-President, of Lab-O-Ring stated that Norma Meters, manufacturers of high quality electrical measuring instruments will shortly set up manufacturing facilities in the Toronto area.

RTMA Acquire New Head Office Facilities

S. D. Brownlee, General Manager of the Radio-Television Manufacturers Association of Canada has announced that the Association's offices are now located at 200 St. Clair Avenue West, Toronto 7. The Association's business has been conducted from the new premises since July 1st.

Plant Tour And Dinner Mark Opening Of Erie's Trenton Plant

Highlights of the official program marking the opening of the new Trenton plant of the Erie Resistor Company of Canada Limited last June 25th, were a conducted tour of the company's manufacturing facilities, a reception at the Trenton Golf Club and dinner for more than fifty representatives of the electronic industry.

Manufacturing techniques used by the company in the fabrication of Erie resistors proved of great interest to the company's many guests who were shown the various stages of assembly and the many tests and processes involved in resistor manufacture.

Head table guests at the dinner were Wilfred Shenk, Director, Erie Resistor Company; Roly Whitley, Roley Whitley and Sons, Trenton; Allen Shenk, Vice-President Sales, Erie Resistor, Trenton; Senator W. A. Fraser; J. T. Pfeiffer, General Manager, Erie Resistor, Trenton; G. R. Fryling, President, Erie Resistor, Trenton; O. W. Larry, Clerk Treasurer, Trenton; W. H. Fryling, 1st Vice-President, Erie Resistor, Trenton; K. J. Couch, Industrial Committee of Trenton; B. Minnium, Vice-President and General Manager Erie Resistor Parent Company; Ross Burtt, Mayor of Trenton; J. D. Heibel, Vice-President Engineering, Erie Resistor, Trenton; W. Steenburg, Steenburg Construction Company, Trenton and Group Captain J. B. Millard, Commanding Officer, R.C.A.F., Trenton.

RCA Service Branches For London, Ottawa and Quebec

The opening of new Sales and Service Sub-Branches in London, Ottawa and Quebec City has been announced by the RCA Victor Company, Ltd., Montreal. The establishment of these three new offices, company officials state, is part of a nation-wide expansion program which has also seen the recent opening of new RCA Victor Sales and Service Buildings in Toronto, Winnipeg, and Vancouver. The purpose is to provide faster on-the-spot service to television, radio and appliance dealers, and to support the RCA Victor dealer organization with a factory-trained service organization for the handling of service on RCA Victor products in the home.

Industrial Assemblies Locate In Agincourt, Ontario

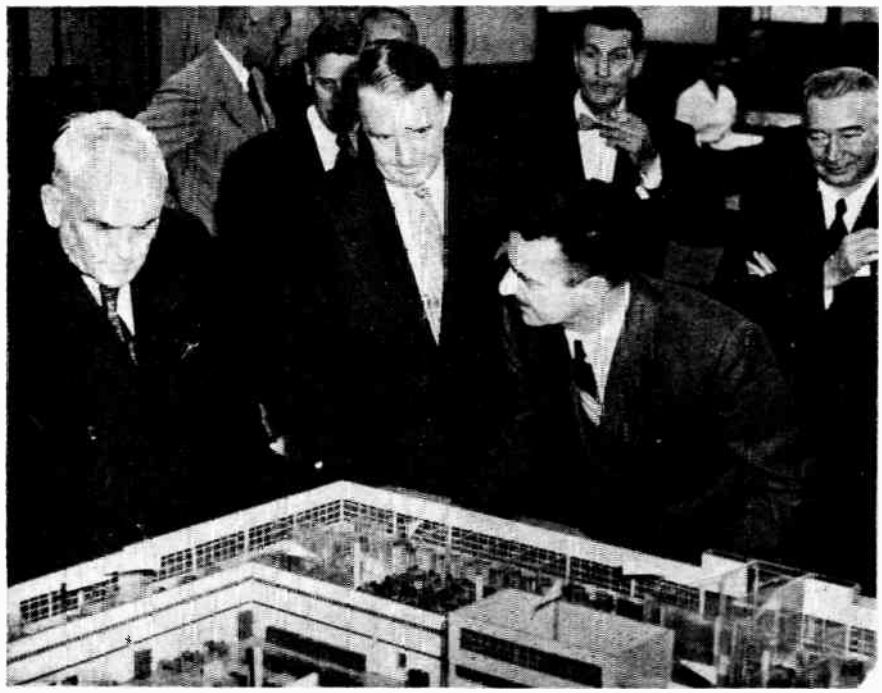
Agincourt, Ontario, is the site of a new firm named Industrial Assemblies. In announcing formation of the new firm company officials state that they are equipped to handle large and small runs of electrical, electronic and mechanical assemblies for manufacturing concerns in need of this type of service.

Rt. Hon. C. D. Howe Opens CAE's New Montreal Plant

From an unpretentious, three-employee operation in the corner of an unused hangar at St. Hubert Airport near Montreal to a nation-wide organization with 1,300 employees and over 200,000 sq. ft. of floor space in just seven years is the story behind the recent opening of Canadian Aviation Electronics new plant on Cote de Liesse Road, Montreal. The new plant was officially opened by C. D. Howe, Minister of Trade and Commerce and Defense Production last June 11th.

Now with its operations reaching into practically every phase of electronics — including engineering research and development, manufacturing intricate instruments and devices, complicated installation projects in many parts of the world, and the maintenance, repair and modification of many types of electronic equipment— CAE moves into its vast new $3 million electronics center on Cote de Liesse Road, Montreal, one of the most modern electronics plants in Canada.

In opening the new plant Mr. Howe said: "The Canadian Aviation Electronics Limited plant I am opening today is a further example of the imagination and initiative of private industry in this country. It is encouraging to me as Minister of Defense Production to see private industry creating the facilities which can meet Canada's defense needs as well as those of its civilian economy."



● Rt. Hon. C. D. Howe, Minister of Trade and Commerce and Defense Production, Hon. D. C. Abbott, Minister of Finance and K. R. Patrick, President and Managing Director of Canadian Aviation Electronics discuss the scale model of the plant at the official opening of CAE's new plant on Cote de Liesse Road, Montreal, June 16th. The model was used for designing the plant layout for maximum efficiency while the CAE million dollar electronics center was under construction.

Pye Limited Opens U.S. Office

Mr. C. O. Stanley, Chairman of the Board of Directors of Pye Limited, Cambridge, England, has announced the appointment of William M. Cagney as Regional Supervisor for the activities of the Pye group of companies in the United States of America.

R.C.A. To Open Western Forwarding Depots

The establishment of two new forwarding warehouses in the near future has been announced by the RCA Victor Company, Ltd., Montreal. The first, in Regina, Saskatchewan, will operate through the facilities of Tremaine Cartage Company Limited and will open on September 1st. The second, located at MacCoshan Storage Company in Saskatoon, will open on October 1st.

The purpose of the new warehouses will be to provide rapid, "on-the-spot" distribution of Radio, Television and Home Appliances in the Province of Saskatchewan.

Opening dates have been chosen to coincide with the dates when TV Stations begin operations in these cities.

Pitt Distributing Co., To Stock D & M Products

The Pitt Distributing Company, 71 Front Street East, Toronto, has been named as the Canadian warehousing agency for D and M Products of Detroit, Michigan, according to a statement by the Detroit office of D and M Products.

Wareheouse stocks of the company's products will be maintained in Toronto, Montreal and Winnipeg in order to expedite deliveries to Canadian jobbers and manufacturers.

Bayly Engineering To Represent Boesch Manufacturing Company

F. D. Schatzle of the Boesch Manufacturing Company Inc., of Danbury, Conn., has announced the completion of an agreement naming Bayly Engineering Limited of Ajax, Ontario as their Canadian representatives. As a result of the agreement Bayly Engineering will carry the Boesch line of coiled winding machinery and equipment including toroidal coil winding machinery and toroidal tape winding machines.

Magnecord Canada Limited Move Toronto Office

Magnecord Canada Limited have announced the move of their office to 3745 Bloor Street West, Toronto. The move, according to a company statement, was necessary to provide larger quarters for the company's operations.

Electro Sonic Supply Named Toronto Area Distributor

Howard L. Rothenstein, General Sales Manager of Arco Electronics Inc., New York City, has announced the appointment of Electro Sonic Supply Co., Ltd., of Toronto as the authorized distributor of Elmenco capacitors in the Toronto area. Details of the distributorship were finalized during a recent visit of Mr. Rothenstein to New York.

CSA Issues Specification For Insulated Conductors

The fourth edition of an electrical Approvals Specification has been issued by the Canadian Standards Association under Part II of the Canadian Electrical Code. This Specification replaces the third edition issued in 1947 and applies to insulated conductors intended for use in power-operated radio devices, but does not apply to the supply cords. The specification details includes general requirements, construction, insulation, braids, tests, voltage rating, marking and Appendix A, covering the Physical Test Requirements for Performance and Heat-Resisting Grades of Synthetic-rubber Insulation Compounds, Types VSR and VHR Wires.

Copies are available from the Canadian Standards Association, National Research Building, Ottawa at $1.50 each.

(Turn to page 24)

NEWS

(Continued from page 23)

John Herring Company Limited Named Agents For American Firms

The appointment of John Herring and Company Limited, Toronto, as representatives in Canada for Stevens-Arnold Inc., of South Boston and Messrs. George Rattray and Company Inc., of New York has been announced.

Stevens-Arnold Inc., are manufacturers of ultra-high speed relays, frequency sensitive relays and DC-AC choppers and George Rattray are manufacturers of precision potentiometers of the linear and non-linear types.

U of T Engineering Alumni 1954 Triennial Re-Union

The 1954 Triennial Re-Union of the Engineering Alumni, University of Toronto is to be held in Toronto on October 29th, 30th, and 31st.

The 1954 Triennial Gathering will be the largest ever and the program will include an industrial tour, class luncheons, business meetings, stag dinner and evening, dinner party and dance, Saturday afternoon football game (Varsity and McGill), and special entertainment for the ladies.

Every University of Toronto Engineering Alumni member will receive complete details with an advance registration card, toward the end of the summer.

RCA Victor Opens New Studios In Montreal And Toronto

RCA Victor's Toronto Radio and Television Programme Division have transferred their operations from the old studios in the Royal York Hotel to their new address at 225 Mutual Street.

The new studios, under the management of L. D. "Len" Headley, have been designed to provide all the necessary recording services required by the rapidly growing television and radio industry, the company states.

Other new studios, under the direction of Ed Traynor, have been opened at 1551 Bishop Street in Montreal.

Dawe Instruments Ltd. Open Canadian Office

In order to provide better facilities for their Canadian customers, Dawe Instruments Limited have announced the formation of a Canadian Division located at 59 Crown Crescent, Ottawa, Ontario, and they have announced that plans have now been finalized for the Sales and Service of Dawe Precision Electronic Instruments to be handled by MJS Electronic Sales Limited, 2028 Avenue Road, Toronto.

Phillips Electrical Company To Issue Extensive Catalog

Phillips Electrical Company (1953) Limited are now going to press with a complete 500-page catalog of all their wires and cables. This volume is made of ten different sections, dealing with:

1. Bare Wires and Conductors.
2. Magnet Wires.
3. Weatherproof Wires and Cables.
4. Building Wires and Cables.
5. Fixture and Appliance Wires and Cables.
6. Control and Signal Cables.
7. Communications Wires and Cables.
8. Transportation Wires and Cables.
9. Mining and Portable Wires and Cables.
10. Power Cables.

Each of these sections will also be published individually for use of those who do not require a full catalog.

Helipot Corporation Establishes Canadian Subsidiary

Helipot Corporation, precision potentiometer manufacturer of South Pasadena, California, U.S.A., has established a subsidiary company which will produce a full line of Helipot products in Canada, it was announcel by D. C. Duncan, Vice-President and General Manager of the parent corporation.

R. L. Smart has been appointed Plant Manager of the Canadian firm, which occupies a large new building at No. 3 Six Point Road, Toronto, Ont. Mr. Smart recently returned to Toronto after an extended visit to California to arrange for tooling and equipping the Canadian plant.

J. S. Root, of 290 Lawrence Avenue West, Toronto, continues as Helipot's exclusive Sales Representative in Canada.

W. Edwards And Company Open Canadian Plant

F. J. Pearce has announced the opening of the Canadian plant of W. Edwards and Company of Crawley, Sussex, England. The Canadian plant which will be known as W. Edwards and Company (Canada) Limited is located at 17 Jutland Road, Islington, Toronto. Heading the sales and service department is Mr. F. J. Pearce who is Director and General Manager of the Canadian operation. Technical Manager is Mr. Albert Dunkley, B.Sc., (Eng.). Both Mr. Pearce and Mr. Dunkley have been associated with the parent company for several years.

F. J. PEARCE

Mr. I. Wahn and Mr. Norman S. Jarvis, well known residents of Toronto are also directors.

K. R. Patrick CAE President Awarded Rensselaer Honor

Kenneth R. Patrick, O.B.E., C.D., President and Managing Director, Canadian Aviation Electronics Ltd., was awarded the honorary degree of Doctor of Engineering from Rensselaer Polytechnic Institute, Troy, N.Y., June 11th.

Well-known in the field of electronics, Mr. Patrick was born in St. John, N.B., June 12th, 1915. He served with the RCAF during the war and is closely associated with the RCAF Reserve Radar organization. Author of several technical publications for the RCAF, Mr. Patrick was awarded the O.B.E. for radar work. He also received the United States Legion of Merit from the U.S. Government. He founded CAE Ltd. in 1947 and has been President and Director since 1951.

K. R. PATRICK

Among other positions, Mr. Patrick is past Chairman and a senior member of the Institute of Radio Engineers and a member of the Board of Governors, Sir George Williams College.

This month his company — first housed in a corner of an unused hangar — moved into a multi-million dollar plant on Cote de Liesse Road near Montreal.

Delhi Metal Products Get Exclusive Patent Rights

Ralph Ercolino, Sales Manager of Telrex, Inc., Asbury Park, N.J. announces that Delhi Metal Products, Ltd., Delhi, Ontario, Canada, has been granted an exclusive license for the manufacture in Canada of "Conical-V-Beams", which are protected under Canadian Patent No. 500,436 issued to Telrex, Inc.

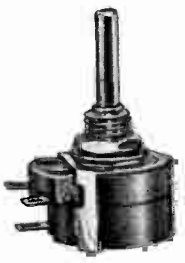
Delhi Metal Products, Ltd., have also been appointed as the Sales Representatives in Canada for Telrex "Beamed Power — Perfect Match" "Balanced Pattern" Rotary Communications Antennas, for both amateur and commercial, as well as governmental services.

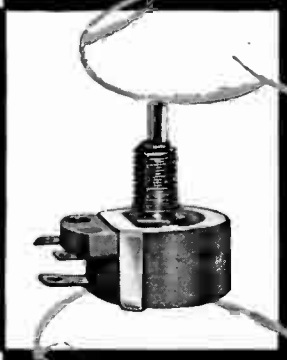
Canadian Marconi Sponsors TV Study Sessions

Canadian Marconi Company recently sponsored meetings and study sessions at the Chateau Frontenac hotel, Quebec City, to prepare dealers and service men for public demands for service on television receivers. This was part of a continuing company program to assist dealers as television stations are established in their districts.

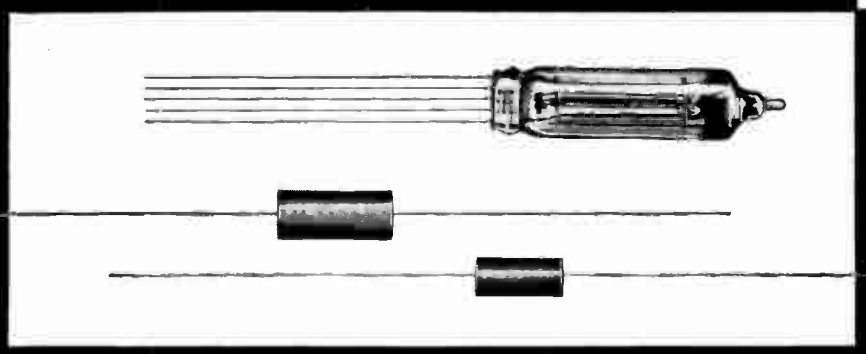
Approximately 175 from the Quebec area took advantage of the sessions.

(Turn to page 45)





Marconi... authority on subminiatures



In the fast expanding world of electronics specialization grows more intense. And in few fields has the specialist taken over more completely than in the manufacture and application of subminiature components. Marconi's long experience in the industry makes possible a *complete* technical service available to you in solving *all* your miniaturization problems, with the ability to supply the subminiature components you may require.

Canada's leading electronics specialists

ELECTRONIC TUBE AND COMPONENTS DIVISION

CANADIAN MARCONI COMPANY

VANCOUVER, WINNIPEG, TORONTO, MONTREAL, HALIFAX, ST. JOHN'S, NFLD

Printed Circuits Speed Television Production

THE first major improvement in television assembly technique since Canada's TV industry began, is claimed by Canadian Westinghouse Company officials for their new plant in Brantford.

A new "printed wiring" method of simplified assembly which replaces much of the maze of wires and soldered connections in a television chassis is now being used by the company's engineers. Instead of the complex wiring that forms part of the electrical circuit in a TV set, a plastic plate is used to do the same job. The plate, about the size of a business envelope, carries the copper circuit pattern on one side, and the components such as tubes, resistors and capacitors on the other, Simple, easily assembled, yet adapted for long service, the new printed wiring will eliminate human error from a major assembly stage without sacrificing a single essential component.

The new assembly technique had a modest beginning about a year ago when Canadian Westinghouse engineers designed it for small radios. Since then, continuous research has resulted in its development to the point where today it is in full scale production for the company's 1955 line of TV receivers.

Simple Assembly Process

The actual assembly process is relatively simple with a copper foil circuit, bonded to plastic, forming the base of the printed wiring plates. Photographic negatives are used to print the desired circuit pattern onto the copper, and an acid etching solution removes the excess metal. Holes are then punched in the plates to receive the leads from components to be mounted on the reverse side. These leads are pre-cut to length and shaped on special automatic machines.

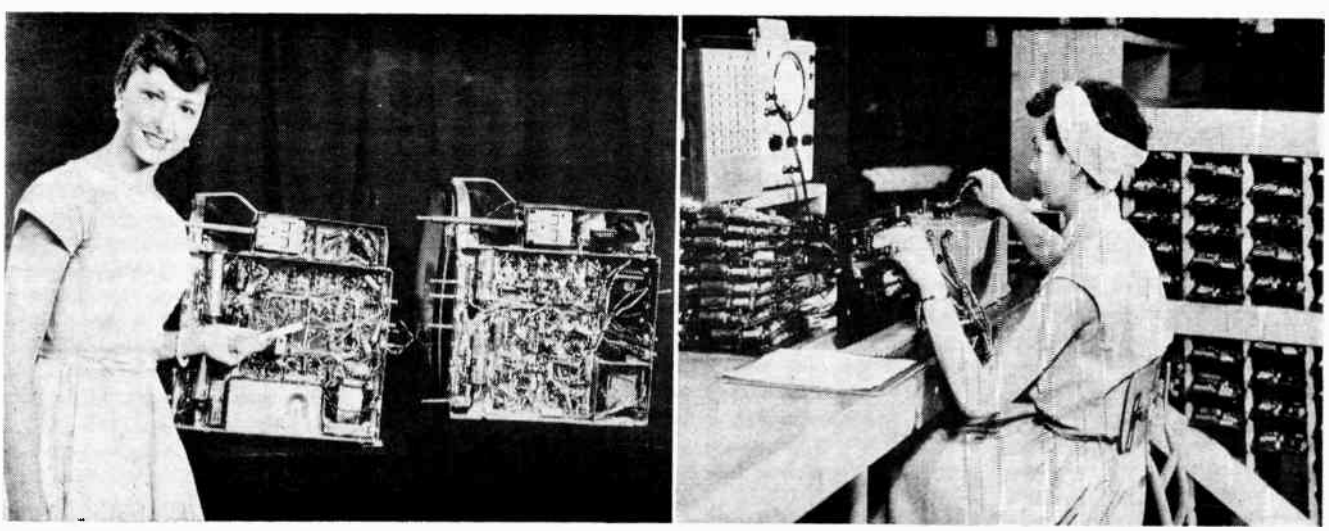
With the assembly of components, the printed circuit plate is virtually complete but it is still necessary to join the leads to the printed pattern on the reverse side. Previous conventional methods called for each lead to be individually hand-soldered into place — a technique that consumed considerable time and posed some hazard to top quality through the ever present margin for error in such manual operations.

Engineers have remedied this situation by developing another new assembly technique named "dip soldering". With this method 200 lead connections to the printed circuit are completed in a matter of seconds. The assembled plates are removed from the production line and placed — printed side down — in carrying trays on a moving belt. The belt then carries them through to a bath of molten solder which connects all the leads firmly to the printed pattern in one quick operation. Apart from the obvious advantages of greatly reduced assembly time, the new dip soldering method results in a uniformly dependable product and the virtual elimination of loose or improper manual connections.

● *Top:* Close to 200 soldered connections in one quick operation. *Bottom:* Completing the printed circuit assembly.

Final testing of the printed wiring plate follows on another specially-developed device which carefully checks each of the many individual components. Rows of tiny signal lights in a cabinet located at eye level provide immediate indication should a single part be overlooked during testing. The printed wiring plates are then ready to move to the main production line where they are assembled to the rest of the chassis.

The two new techniques were representative of the many manufacturing advances revealed at the new plant, all indicative of this country's ability to fit into the pattern of modern industry and keep pace with the demanding requirements of greater production.



● *Left:* A new method of assembling television sets using "printed wiring" results in the much simpler assembly of the chassis at left as compared with the old type. *Right:* Testing of the many individual components constituting a complete printed wiring circuit is simplified with this special comparator.

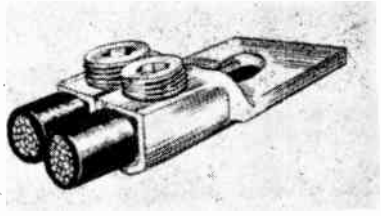
NEW PRODUCTS

New Product specifications published in Electronics and Communications have been briefed for your convenience. If you require further information on any of the items published you may readily obtain such by using our Readers' Service, Page 61. Just mark the products you are interested in on the coupon on page 61 and the information will be in your hands within a few days.

● *Twin Connector*

Item 547

Production of a new rugged, never-failing twin connector MU has been announced. This connector is extremely compact, low in height and as narrow as two maximum conductors. It is designed to replace a larger single connector. MU accommodates two wires and is available in three sizes: MU 250 for 250MCM-6 wire range, MU 350 for 350-4 wire range and MU 600 for 600 MCM to 4/0 wire range.



MU is produced from heavy, extra hard drawn seamless copper tubing by the Ilsco process. The copper is of 100 per cent electrical conductivity assuring low heat rise. MU has been tested by Underwriters Laboratories and the Canadian Standards Association.

● *Portable Hand Tachometer*

Item 548

A new portable hand tachometer, featuring, a scale-changing device which reduces misreading of its various ranges, is available.

Three different models, each having three ranges, are capable of measuring rotational speeds from 2 to 100,000 rpm and linear speeds from 2 to 10,000 fpm with accessories. Accuracy is plus or minus one per cent of full scale under all conditions, according to company engineers.

Applications of the tachometer include speed measurement of motors, generators, turbines, lathes, milling machines, planer beds, shapers, band saws, conveyor belts, and all continuous webs. The indicating unit incorporates a reactance circuit, a multi-scaled milliammeter, and a flashlight-cell power supply. Battery life is about two to three years, and changes in voltage may be compensated by a self-contained calibration circuit which assures consistent, accurate performance, the engineers said.

Accessories include two external cone tips, an internal cone tip, a 0.1 foot disk, a one-foot disk, a low-speed adaptor, a high-speed adapter, and an extension arm, all stored in a compact carrying case along with the tachometer.

● *Broadcast Recorder BR-1*

Item 549

This radical improvement in design of broadcast recorders brings a new standard of quality to sound recording. An integral unit, consisting of an "inside out" hysteresis synchronous motor, fly-wheel and blower provides a cooler, lighter, smoother drive than has been previously possible.

Instead of the usual three heads, the BR-1 can accommodate up to five. This permits playback of a delayed broadcast while recording an incoming program on the same tape. Single and dual track operation of one recorder is also possible.

All operations of the recorder are combined in a single, convenient error-proof lever system. Tape handling in fast forward and rewind can be at any speed from zero to full spoolng. This permits rapid location of any desired section of tape.

An exclusive method of fading from the incoming signal to playback from the tape eliminates all clicks and noises previously inherent in such A-B tests.

● *Cadmium Sulphide Crystal Photocells*

Item 550

The way to outstanding cost reductions on a wide variety of photelectric assemblies results from the recent development of a new cadmium sulphide crystal photocell.

Standard types as small as ¼ in. diameter by only ¼ in. deep exclusive of leads deliver from 2 to 5 milliamperes when exposed to light of from 50 to 100 foot-candles intensity with approximately 100 volts applied across cell and load.

Standard CdS Crystall Photocells show useable resistance change with light intensities as low as 1/10,000 foot-candles.

Speed of response — usually the deficiency of other photo-conductive devices — is on the order of 1/100th of a second at 50 foot candles . . . sufficient to operate the fastest relay in counting or activating applications.

(Turn to page 28)

For further data on advertised products use page 61.

PRODUCTS

(Continued from page 27)

Standard Piezo CdS Crystal photocells respond to visible light, ultra violet, X-rays, and nuclear radiations. This wide response, plus the extremely small size of the light-sensitive element, only 2 square millimeters, make these units well suited for X-ray detectors, densitometers, and other measuring applications where the sensitive element must be as small as possible to insure accuracy.

Resistance of the crystal photocells decreases linearly with an increase in illumination from 10-4 to 100 foot-candles. Dark resistance is approximately 10,000 megohms. Maximum resistance variation with temperature is 2 to 1 between — 50°C and + 75°C.

• *Microfriction Potentiometer*

Item 551

OHMAG Microfriction Potentiometers are constructed to combine miniature dimensions with extremely low torque and high precision. In spite of the delicate precision work that goes into them they are ruggedly built to withstand the high shock loads and vibrations encountered in aircraft and related applications.

OHMAG Microfriction Potentiometers are especially intended for use in remote controls, telemetering, precision measurement work, aircraft, guided missiles, servomechanisms, computors, and any other applications where small dimensions, low friction, and high accuracy are important factors.

OHMAG Microfriction Potentiometers are designed to keep size, weight, and tolerances down to a minimum. The microfriction shaft is mounted in miniature precision ball bearings. In addition to the four standard models A, B, C, and D, special models can be furnished, to withstand high temperatures, with dustproof protection, etc., with any specified resistance rating between 100 Ω and 100 KΩ.

• *Polymeter, Type 301*

Item 552

This new rugged dependable Polymeter, designed for laboratory and field measurements, is stabilized against errors in calibration due to normally changing line voltage, or to gas current in tubes. The unusual high input impedance (17 megohm) of the Polymeter makes it ideal for use in high impedance circuits which are encountered in electronic equipment. The patented fullwave rectifier circuit gives optimum full scale accuracy necessary on the lower AC ranges.

The flexibility of this instrument is increased by its ability to read peak to peak voltages directly. The accurate measurement of the peak to peak value of many complex waveforms makes the 301 indispensable to the TV service man in trouble-shooting Video, Sync and Deflection circuits.

The Polymeter is truly many meters consolidated into a light, compact, portable unit.

Peak to Peak meter — 6 ranges 0-2800v; AC voltmeter — 6 ranges 0-1000v; DC voltmeter — 6 ranges 0-1000v; OHM meter — 6 ranges 0-1000 megohms; DC ammeter — 6 ranges 0-10 amps.; Decible meter — 6 ranges — 20 db. to + 61.4 db.

• *Potentiometric Recording Controller*

Item 553

These instruments, designed for continuous measurement and control uninterrupted by periodic standardization, incorporate new measurement circuitry and components, according to company engineers. Foremost among the new features are a magnetic standard in the potentiometric system and a bridge-balancing unit in the a-c bridge system.

Both models are available with either electric or pneumatic control, and are equipped with a unique centerless pointer that simplifies chart changing and leaves practically all of the chart exposed to view for easy reading. Other advantages of the equipment include plug-in components, anti-backlash gearing, internal illumination, and an integral pen-inkwell assembly designed for automatic realignment.

The reinforced steel case and die-cast aluminum cover are sealed with Neoprene gasketing against dirt and moisture, and can be furnished for either wall or flush mounting.

Chart speeds are 1, 4, 8, 12, and 24 hours, and 7 days.

Net weight of the products varies from 75 to 95 pounds according to control form and measuring system. The units utilize a 120-volt, 60-cycle power supply. The potentiometer has a power consumption of 65 watts; the a-c bridge, 40 watts.

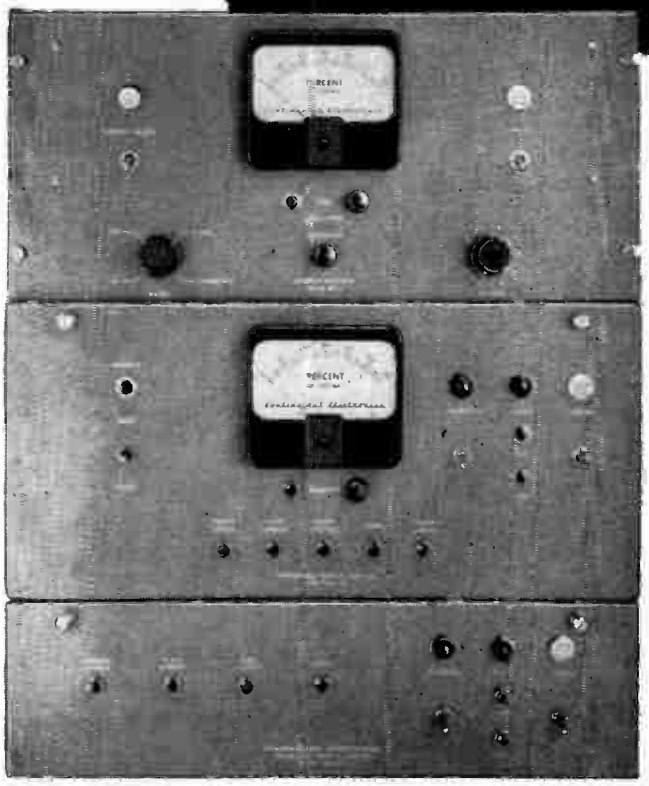
(Turn to page 32)

For further data on advertised products use page 61.

REMOTE CONTROL Pays for itself

quickly with AM and FM operating costs saved

. . . with the new Continental TRANSMITTER REMOTE CONTROL SYSTEM



Type MR-1 Monitor Receiver

Type TRC-S1 Remote Control Unit

Type TRC-S2* Remote Control Unit

Studio Assembly

You can perform all operating, metering, and monitoring functions right at the studio with this reliable, high quality equipment. Units shown at left are for installation at studio or control point . . . units below at transmitter site.

Outstanding Features

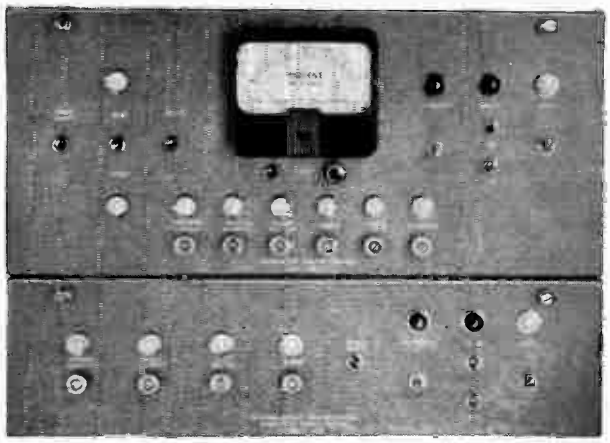
- **SIMPLIFIED OPERATION** with no telephone dials or charts.
- **FILAMENT AND PLATE CONTROL** by a toggle switch and PLATE OFF and ON buttons. Supervisory lights show transmitter condition. Time delay protects rectifier filaments.
- **OVERLOAD INDICATION** by supervisory light operated by a return signal from the transmitter.
- **MONITOR RECEIVER** feeds modulation and frequency monitors; indicates field intensity; sounds alarm if transmitter fails.

Assembly at Transmitter Location

* TRC-S2 and TRC-T2 Units provide complete, independent control of a second transmitter, either AM or FM, if required. These units can be a part of the initial installation, or may be added later.

Type TRC-T1 Transmitter Control Unit

Type TRC-T2* Transmitter Control Unit



YOU CAN BE SURE...IF IT'S Westinghouse

When planning a new station or modernization of your present facilities, for radio broadcasting at its best, specify a

WESTINGHOUSE CO-ORDINATED INSTALLATION —

of both Transmitter and Transmitter Remote Control Equipment. It will bring you greater convenience . . . realiability . . . and economy.

CANADIAN WESTINGHOUSE COMPANY LIMITED Branch Offices in All Principal Cities

For further data on advertised products use page 61,

PRODUCTS

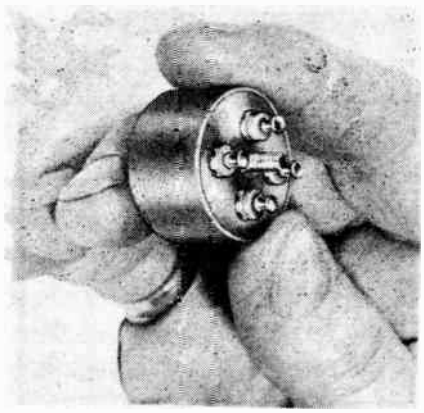
(Continued from page 28)

• *Thumb-Sized, 400 Cycle Transformer*

Item 554

The development of a new line of miniature transformers has been announced. In production are units with outputs of 3 volt amperes and 6 volt amperes.

Typical of the new series is the TW-6 unit illustrated here. This miniature transformer is only 1" O.D. x ¾" high and



weighs but 1½ oz. Electrical ratings are: Input, 115 volts, 400 cycles; Power output, 6 VA; Regulation, 10 per cent; Heat rise 40°C. Class "A". It is hermetically sealed in a metal case to MIL-T-27 requirements.

The manufacturer is prepared to supply these two units in quantity. Miniature transformers with special ratings can also be obtained.

• *Advanced Design Selenium Rectifier*

Item 555

A selenium rectifier with advanced design magnetic amplifier is the outstanding contribution to the D.C. Power Supply field in 1954. Engineers have combined known principles of magnetic amplifiers with their knowledge of the optimum results that are desired and have come up with the prototype Model H-1-200. This unit has undergone exhaustive tests to determine all possible results under any imaginable operating condition.

The rectifying elements used in the unit are of the dry plate selenium type. The arrangement of the cells consists of two three phase bridges each rated nominally at 14 volts, 100 amperes. These two bridges can be controlled for either series or parallel operation. A range potentiometer in the unit permits the voltage to be adjusted from 12 to 14½ volts in parallel or from 24 to 29 volts in series.

The Model H-1-200 unit can be operated at input voltages of either 220 volts ± 10 per cent or 440 volts ± 10 per cent. This optional feature is accomplished by changing the holding coils of the magnetic starter. In addition to which the input terminals on the transformer must also be changed. An additional safety feature in the unit is a switch which must be placed in a proper position to set the single phasing protective relay. The unit is forced air cooled by means of a fan. When the air flow of the unit is interrupted for any reason, an air-actuated switch trips the magnetic starter and the unit shuts off.

• *Deluxe Polymeter, Type 302*

Item 556

This new rugged dependable Polymeter, designed for laboratory and field measurements, is stabilized against errors in calibration due to normally changing line voltage, or to gas current in tubes. The unusual high input impedance (17 megohms) of the Polymeter makes it ideal for use in high impedance circuits which are encountered in electronic equipment. The RF probe, a Vacuum Tube probe, is an integral part of the new 302. It is designed for maximum usefulness at very high frequencies. The Sylvania patented full-wave rectifier circuit gives optimum full scale accuracy necessary on the lower AC ranges.

The flexibility of this instrument is increased by its ability to read peak to peak voltages directly. The accurate measurement of the peak to peak value of many complex waveforms makes the 302 indispensable to the TV service man in trouble-shooting Video, Sync and Deflection circuits.

(Turn to page 36)

For further data on advertised products use page 61.

For further data on advertised products use page 61.

A New Vista for Tape Recorders

The following article foresees a means of providing a constant vigil on vital electro-mechanical functions by the use of a....

Multi-Channel Tape Recorder For Aircraft Engine Analysis

By LESLIE L. HILL, Ph.D.
Contributing Editor, Electronics & Communications

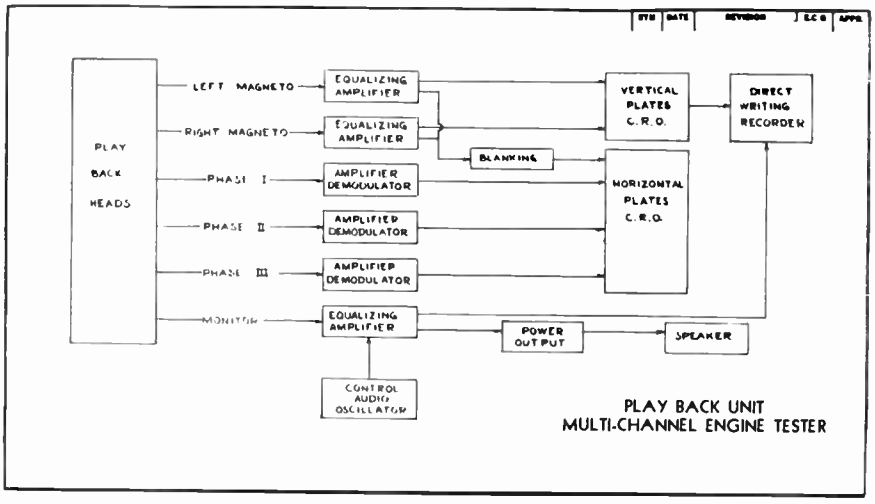


Figure 1

IN this era of audio detection and its attendant applications of wire or tape recorders in every imaginable field, it has become rather important to use audio systems also for the aircraft industry.

Wire recorders have been used in various applications in aviation and associated fields, for military purposes and also commercial use. This article describes a very important function which the tape recorder can fill in aircraft ignition systems where this device is able to save considerable time in maintenance and repair, contributing in a fundamental way to the safety of flying, especially in the case of regular airlines.

The function of the engine analyzer, at present manufactured in various forms, is based on the operator's ability to effectively employ the device in connection with the individual's knowledge of aircraft power plants, ignition systems and an ability to interpret analyzer waveforms in terms of engine condition.

Engine analysis is waveform comparison and is a matter of comparing a normal waveform (normal function of the aircraft engine) to an abnormal pattern, if abnormal pattern of waveform is created by an engine malfunction. By use of the analyzer the malfunction may be identified.

The normal pattern that is displayed on the cathode-ray screen will have an overall shape that depends upon the type of ignition system. It is a matter of practice to become experienced in the identification of a normal pattern; the operator then proceeds to increase his analyzer experience and trouble-shooting efficiency.

The tape recorder will completely replace the abovementioned engine analyzer, doing away with a bulky and spacious design, and avoiding additional weight which is very important for airborne equipment. On the other hand, it will do away with a complicated training of the operator.

The tape recorder will have the following functions:

1. Detect the electrical ignition characteristics of each spark plug of an aircraft engine in the proper order of firing and record the signal on a magnetic tape.
2. Make available a tape playback machine whereby the impressed signal may be played back in the same manner as the recording was made and where the characteristics of each spark plug may then be individually analyzed, if desired.

Since several spark plugs fire simultaneously in an aircraft engine, it is apparent that a "multi-channel" recording must be made in order to get the entire performance characteristic of the engine and, furthermore, the characteristic of the complete multi-engine setup of the aircraft.

In this way the engine tester would be divided into two major parts; the recorder and the playback machine. These two parts, would be related to each other according to the extent of the operational requirements of the tester. The most important operational requirement is the type of display. This will affect the design of the playback machine in the following fashion:

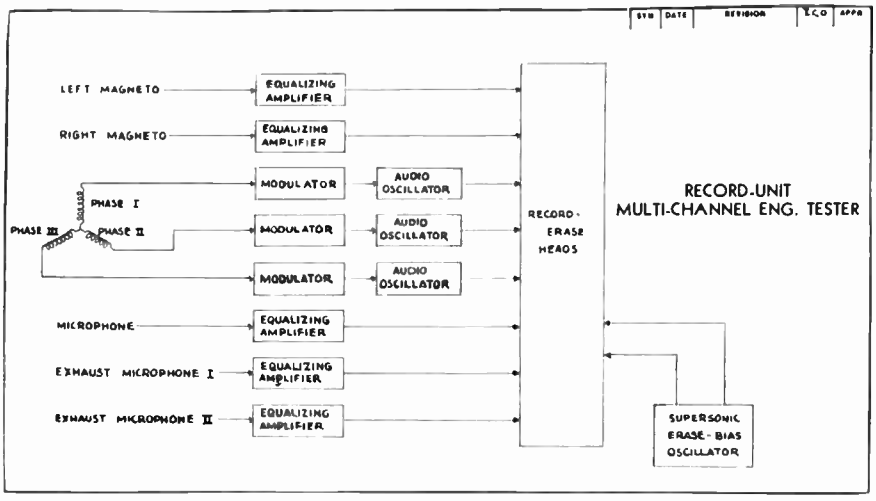


Figure 2

1. Speed Control
2. Nature of input signal
3. Type of controlling signals
4. Type of monitor signals — timing, etc.

The most common type of display is an oscilloscope. This gives a visual instantaneous display and may be attached to a camera or recording oscillograph for a permanent visual display. A meter indication does not lend itself to this operational problem unless the meter is attached to some kind of comparator circuit and, of course, works only on differences between a standard signal and the signal to be examined.

The problem can be tackled in the following way:

The magneto primaries will be attached to the cables for connection to the recording circuits. Two recording channels would be required for "left and right" magnetos. Three channels would also be required for timing purposes. The simplest way to accomplish this function would be a three phase tachometer generator attached to the engine. This would provide voltages that could be used for synchronizing and would also be available as the horizontal sweep voltage for an oscilloscope. In addition to the signal and synchronizing voltages, a monitor channel for voice could be included. Since the frequency of the synchronizing voltages is very low under certain conditions, these voltages could be used to modulate audio frequency carriers which would then be recorded. On playback this signal would have to be demodulated before entering the display circuit.

After such a system has been built one might impress the synchronizing voltages on the same channel by modulating three separate frequencies and introducing selective filters at the demodulator. A tape recorder with a minimum of six channels would be required. A tape transport mechanism for such a machine does not constitute a serious difficulty since they can be purchased from companies specialized in this field. Recording and playback heads are standard equipment of manufacturers too. Amplifiers, bias circuits, erase circuits, audio oscillators and modulators are all now standard equipment of the trade and it is not necessary to describe their relative functions. Experimentation will be made with the circuits used in equalizing the head response to determine the minimum frequency response to deliver an adequate amount of information to the relative display circuits. A block diagram of the recording circuit is shown in Fig. 1.

In this diagram a 7th and 8th channel for recording exhaust noise are attached. These two additional channels are attached to two microphones which are placed in the exhaust manifolds.

The playback machine, Fig. 2, would consist of a tape transport mechanism similar to the record mechanism, and it is believed from data available that a 15 inch/sec. mechanism would be adequate. The machine would further include the corresponding amplifiers and demodulators required to drive the display oscilloscope. Suitable "blanking" would be provided to delete any angular portion of the engine cycle, so that the display would follow the spark plug firings in the order of their firing or, alternatively, would show each plug individually. If the operator feels that he requires an ignition characteristic that is of more static nature than that which the oscilloscope gives, he could be provided with a direct writing oscillograph. This will enable the operator to make a permanent record of a small portion of the response which he can study with greater leisure than otherwise possible with a normal oscilloscope. A more elaborate technique might involve switching the oscilloscope from a medium persistence to a long persistence screen, but this has the disadvantage that a rapid change of ignition pattern will obfuscate the picture on the screen.

In conjunction with the direct writing attachment an operational attachment of greater flexibility could be attached by connecting push-button control to the monitor channel which would operate an audio oscillator. This oscillator would operate a relay which would control the motion of the direct writing machine. In this way the operator could play through the whole tape, run it back to its beginning, and have a permanent record of selected portions of the recording which the operator did not have a chance to record in the first analysis. Another factor in conjunction with the direct writing machine has to be taken into account, i.e.: the relatively low frequency response of such a machine compared to the response of the ignition characteristic. Here, the greater advantage of a tape recorder mechanism becomes apparent because the machine can be slowed down with no loss of information to the direct writing machine, since a division of frequency components concurrent with the division of tape speed may be compensated for by changing the co-ordinate system of the direct writing tape.

It is evident that the airborne tape recorder enabling the operator to record the ignition characteristic of every spark plug in every engine in flight and then examine each one on playback individually at the next stop-over of the aircraft, is of enormous value: the recording could be made on three channels:

1. Ignition voltages
2. Synchronizing voltages
3. Voice monitor

The recording would be made by switching from one spark plug and synchronizing generator to the next, at the same time recording on the voice channel which spark plug is being recorded. On playback the recording can be played into a very long persistence oscilloscope and the operator will have ample time to study the waveform, if and when necessary, at the next stop-over of the aircraft, for a longer period than with an ordinary oscilloscope.

If a small playback machine is carried in the aircraft and serious engine trouble occurs, the operator would have the opportunity to advise the next station to make required preparations in advance, which otherwise could not be planned for. Fig. 3 shows a block diagram of this airborne system.

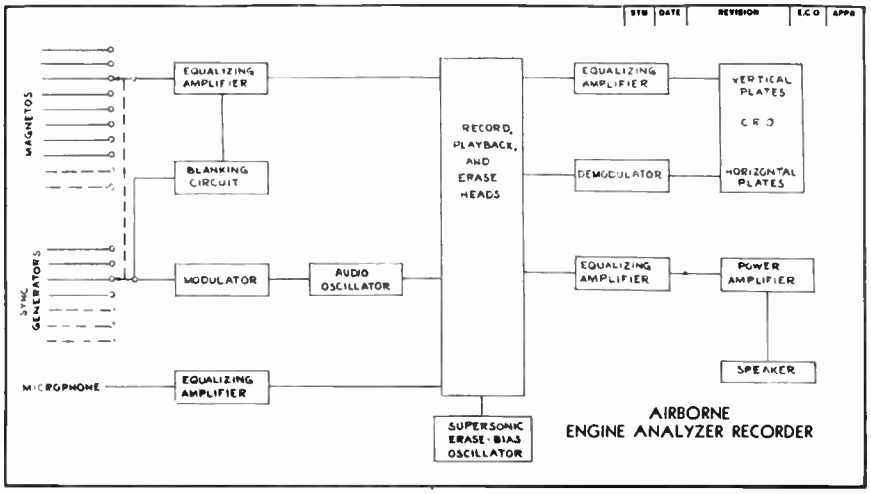


Figure 3

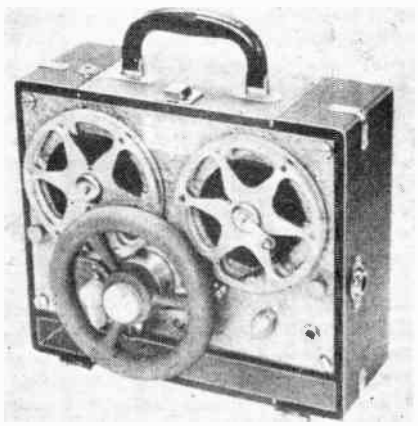
PRODUCTS

(Continued from page 32)

• *Battery-Operated Portable Tape Recorder*

Item 557

Two models of the new 4-speed Magnemite, battery-operated, spring-motor recorder are now being put into production. This recorder is designed for extreme simplicity of operation and meets the most gruelling requirements of all portable uses. Tape speeds of 15, 7½, 3¾ and 1⅞ ips. may be obtained from model 610 EM meeting primary and secondary NARTB standards, whereas model 610 DM meeting secondary NARTB standards is adaptable for tape speeds of 7½, 3¾, 1⅞ and ⅞ ips. This recorder measures 7 in. wide, 10 in. high and 11 in. long and weighs only



15 lbs. complete with flashlight-type batteries which have an operating life of 100 hours. Features include: fly-ball governor controlled motor assuring constant speed, precision-made tape transport mechanism and removable dynamically balanced flywheel for realistic recording and playback of music. Quick change of speeds is possible by simply changing capstans. Equalization for different speeds is automatic.

• *Panelboard Instruments*

Item 558

A wide range of panelboard instruments is now available from a British manufacturer.

These instruments are in various sizes including 2½, 3¼, 3½ and 6 inch either square or round for flush mounting. They are extremely handsome in appearance and all are quick and easy to read.

Moving coil instruments are available for direct current circuits. Moving iron instruments are spring controlled and are primarily for use on A.C. supplies. The latter can be used on D.C. but with slightly reduced accuracies.

Instruments are provided with back connections and are suitable for connection in circuits up to 660 volts and prior to shipment each instrument is tested at 2000 volts A.C. for one minute.

The manufacturer has a selection of bulletins covering ammeters, voltmeters, wattmeters, and various other panelboard instruments which are available upon request.

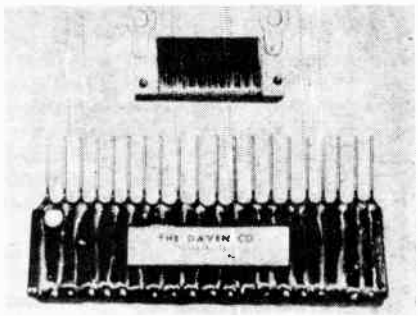
• *Card Wound Resistors*

Item 559

For many precision wire wound resistor applications, where space is at a premium, these resistor cards provide a workable, economical solution in place of the usual spool or bobbin type.

These cards are ⅛ in. thick and ⅝ in. wide. The length is determined by the number of individual resistance sections required for a particular application. Normal power rating is 0.6 watt; up to 5,000 ohms per section may be obtained. Accuracies to 0.1 per cent are available.

Card wound resistors can be Ayrton-Perry wound where frequency response is a factor and inductance must be kept to a minimum. The cards can be furnished bent into circles for mounting on a round switch and are used in many printed circuit applications. Miniature designs can be mounted on ceramic wafers such as project "Tinker-Toy".



The design is an economical way of obtaining multi-section precision resistors in the smallest size. Up to 40 sections can be furnished. Cards can be impregnated to withstand severe military or industrial environmental tests.

• *Cobra Jet All-Purpose Projector*

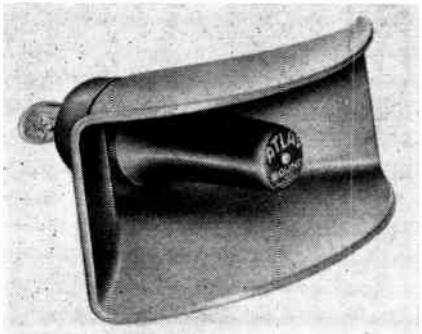
Item 560

A new, versatile, wide-angle, all-purpose projector — specially designed for penetrating coverage of wide areas and under adverse sound conditions — has just been announced.

Called the COBRA-JECTOR Model CJ-30, it features an indestructible "polyester fiberglass" projector, "ALNICO-V-PLUS" magnetic assembly, 100 per cent phenolic diaphragm and voice coil assembly, all-weather double-sealed non-resonant construction, all weather "tropicalized" and "polarized" finish on all metal parts, and universal mounting bracket.

For further data on advertised products use page 61.

It is excellent for such applications as paging and talk-back, intercommunication, and marine and industrial installations. It reproduces with a crisp, sharp, penetrating articulation characteristic — assuring intelligible coverage of wide areas and under such difficult conditions as high noise, adverse winds, etc.



Electrical and mechanical installation is quick and easy. Electrical connections can be made either to the extending plastic-covered leads or directly to the driver unit terminals. The universal mounting bracket permits adjustment in both a vertical or horizontal position without the need to change the bracket position on the wall or mounting surface.

Input Power (continuous): 15 watts.
Input Impedance: 8 ohms.
Response: 250 to 9,000 cps.
Dispersion: 120° x 60°.
Dimensions: Front Opening, 14 in. x 6 in.; overall length with bracket, 14 in.
Shipping Weight: 6 lbs.

● *New Line Consumer Tape Recorders* *Item 561*

A new complete line of consumer tape recorders has been announced. Designed for ease and accuracy in operation and with distinctive finishings to fit in the home, the office or school, the maker now offers tape recorders with a price range to correspond to any customer's budget.

There are six new different models in the 2020 series in addition to the Webcor's 2010 and 2030. The 2020's offer new antifriction brakes with split-second accuracy for perfect editing and a safety lock to prevent accidental erasing.

The Webcor 2020 series has the following features to recommend it to family use: finger-tip, touch-button control with instantaneous response; positive erase, eliminating background noises from previous recordings; ceramic microphone; special monitor control to hear recordings as they are made; input jack for recording from radio, TV or phonograph; four-pole motor for constant speeds and flutter-free, wow-free recording; tape time indicator; separate continuously variable tone control and quick easy tape-threading. The recorders are light-weight — only 25 pounds.

● *Receiver With Crystal Filter* *Item 562*

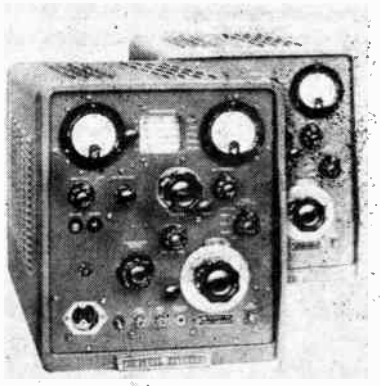
A new low-priced NC-98 receiver with crystal filter and S-meter with range of 550 kcs to 40 mcs. Making it unique in the communications field, the receiver comes with either calibrated amateur bandspread or calibrated SWL bandspread. The NC-98 offers calibrated electrical bandspread on the 10, 11, 15, 20, 40 and 80 meter ham bands. The NC-98SW has calibrated electrical bandspread on 17, 19, 25, 31 and 49 meter and electrical bandspread on all other frequencies with foreign, ship, police, aircraft and amateur frequencies clearly marked.

Both versions offer an advanced superhet circuit, using new miniature tubes throughout; and an RF stage and two IF stages, a 3-position crystal filter with heterodyne phasing control, built-in S-meter which indicates signal strength in S units from 1-9 and in db above S-9 from 0-40 db.; large, easy-to-read, edge-lighted lucite dial scales; automatic series-type noise limiter and a separate high-frequency oscillator for exceptional stability.

● *VHF Signal Generator* *Item 563*

A new VHF signal generator offering residual FM less than 1 kilocycle 1 kc. drift less than 0.005 per cent sensitivity measurements to 0.1 microvolt and a new high in stability is now being offered.

The new instrument, Model 608D VHF Signal Generator, covers the frequency range 10 to 420 megacycles. A directly set and read output of 0.1 microvolt to 0.5 volts is available through this range. A built-in crystal calibrator provides a frequency check accurate within a few kc every 5 mc through range. The instrument provides flat response from 20 cps to 1 mc, AM modulation to 80 per cent, and other forms of modulation including internal, external, external pulsed and frequency modulation. Internal impedance is 50 ohms and, VSWR a maximum of 1.2. Mechanical improvements include new,



lightweight aluminum castings, ball bearing condenser and turret drives, sealed transformers, militarized construction, and special electrically welded - hp - condensers of low temperature coefficient Invar steel plates.

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PRODUCTS

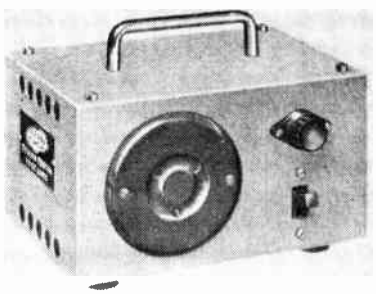
(Continued from page 37)

● *Terra-Tertia Test Unit, Type 121*

Item 564

This unit is a safety-factor device for rapidly testing the earth conductor efficiency of portable electric tools.

The T.T.T.U. is connected to A.C. mains supply, 220-250 volts, 50 c/s, and the tool to be tested is plugged into the 15 amp. three-pin socket on the front panel, and with the body of the tool pressed against the instrument's handle the panel-switch is then depressed. In this arrangement a high current at low voltage flows through the earth conductor and associate plug which, if satisfactory, withstands the current flow and lights the "PASS" lamp on the front panel. If the earthing system is faulty then the lamp will not light. Therefore, should the lamp itself fail it is impossible for the tool, faulty or otherwise, to be passed as safe.



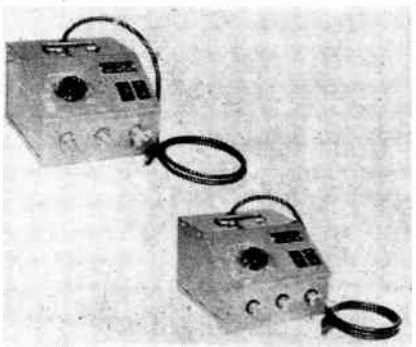
A frequent danger in portable electric tools is the partial fracture of the earth conductor due to negligence or wear and tear. In such cases the instrument's high test current at low voltage is sufficient to completely burn out the remaining strands of the partially fractured earth wire thereby anticipating the failure during work.

The T.T.T.U. is contained in a robust case with steel carrying handle; weight 12½ lb.; dimensions 8 in. x 7 in. x 6½ in.

● *Units For Resistance Soldering*

Item 565

An expanded and improved line of resistance soldering power units is announced by the manufacturer. The new units are Model 105-B2 500 watts and 105-C1 1000 watts. These units will replace the now discontinued Model 105-B1 which was rated at 450 watts.



All models are now enclosed in a ventilated cabinet of heavy gauge steel, are attractively finished in gray hammerloid enamel, and have a snap switch and pilot light. Three-way output terminals combined with a rotary switch provides 24 different controlled heats for all types of precise resistance soldering.

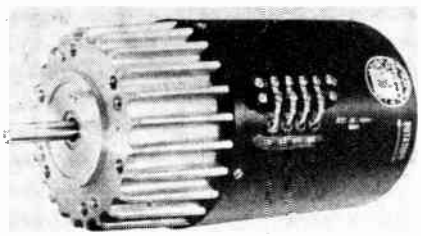
Heavy duty transformers on these models have extra iron and copper to provide long service life under severe repetitive industrial soldering usage. Both units are available for 115 and 230 volt, 50-60 cycle power supply.

● *Radar Antenna Drive Motor*

Item 566

Designed especially for radar antenna drive, a new capacitor start and run AC induction motor which conforms to U.S. Government specification MIL-M-1940 has recently been developed.

The motor is instant reversing, 115V AC, 60 cycle, single phase. Running torque is



430 inch ounces at 1475 RPM. Locked rotor torque is 500 inch ounces at zero RPM and pull-out torque is 700 inch ounces at zero RPM. Motor is fan cooled on a totally enclosed frame, shaft and hardware is of stainless steel and ball bearings are employed throughout. Weight is 22 lbs.

● *Permanent Magnets*

Item 567

A telephone instrument recently developed is setting a design pace with a model that provides inside private intercommunication for two to five stations. The heart of the new contact arrangement, it is an invisible magnet mounted in the handset. Made of the highest energy permanent magnet material commercially available, this magnet attracts a flat movable steel plate in the base of the instrument when the set is not in use. When the handset is picked up, the spring is no longer held by magnetic force and it snaps against a contact, closing the telephone circuit.

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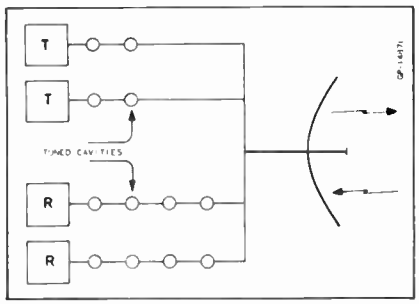
For further data on advertised products use page 61.

Radio Frequency Combining

By LENKURT ELECTRIC — VANCOUVER

RADIO circuits can be combined for transmission over a common antenna in much the same way that telephone circuits are combined for transmission over a common line. The use of a single antenna for the operation of more than one radio terminal represents a considerable saving in equipment investment. Not only are fewer antennas required for a radio route but construction costs may also be reduced.



● **Figure 1. Block diagram of two transmitters and two receivers diplexed over a common antenna by the use of tuned cavity directional filters.**

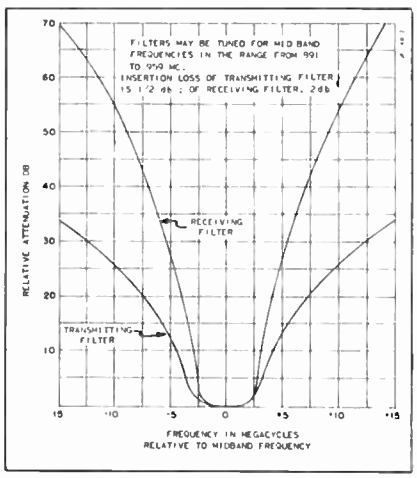
The chief limiting factor to the number of radio transmitters and receivers that can be operated over one antenna is the available frequency spectrum. However, when more than two circuits are to be operated over the same route, practical considerations usually require that the receivers be operated from one antenna and the transmitters from another. With presently available Lenkurt radio equipment for the 900 megacycle band, up to three transmitting and three receiving frequencies are used over a single multisection route at the same time.

Operation of more than one radio transmitter or receiver over one antenna is made possible by the use of tuned cavity directional filters. These filters perform the same circuit function at microwave frequencies that conventional coil-capacitor directional filters perform at carrier and voice frequencies. They prevent mutual loading between individual transmitters or receivers, reduce the output of modulation products from transmitters, and prevent overloading of the receivers by unwanted out-of-band signals.

Three combinations of transmitters and receivers are commonly used in Lenkurt microwave systems. These are a single transmitter and receiver on one antenna, two transmitters and receivers on one antenna and three transmitters on one antenna with three receivers on a separate antenna. In every case, separate frequencies are required for each transmitter and receiver. With the filters presently used, the minimum frequency separation necessary between any transmitter and receiver is normally about 12 megacycles; between any two transmitters or any two receivers, about 6.3 megacycles. This separation is dictated primarily by the directional filter characteristics shown in Figure 2.

The transmitting filter consists of two individual cavities connected in series. The receiving filter consists of four cavities connected in series. Only two cavities are required for the transmitter filters because their principal functions are to reduce the output of modulation products and prevent mutual loading. The receiving filters must also screen out out-of-band signals that may be picked up by the antenna. Figure 3 shows the use of tuned cavity directional filters to connect two transmitters and two receivers to a common antenna.

Maximum use of the 900 megacycle band for the operation of microwave communications over a common path with several repeaters is achieved with three radio circuits in parallel. For a single hop system, additional parallel



● **Figure 2. The transmitting filter consists of two tuned cavities in series. The receiving filter consists of four cavities in series.**

radio circuits can be operated between two points.

By the use of two antennas per terminal (one for transmitting and one for receiving) and presently available Lenkurt single sideband equipment, up to 168 channels can be transmitted and received over a multisection route at the same time. Lenkurt Type 45D multiplexing equipment currently under development, will substantially increase this channel capacity of a 90-megacycle route.

For further data on advertised products use page 61.

PRODUCTS

(Continued from page 38)

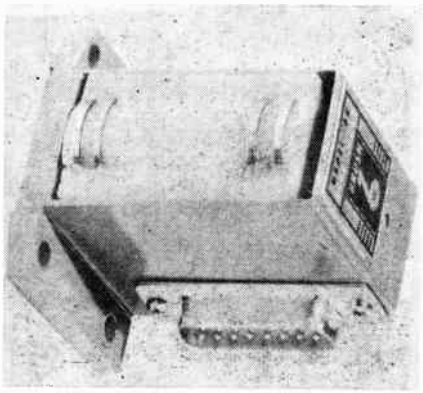
As both the steel plate and the magnet are completely enclosed, the housings are dust-free, simple and clean in both appearance and manufacture.

Return springs, activating rods, plungers and retaining springs are eliminated by this simplified design. The unit occupies a 4 x 6 inch space, may be mounted either on top or side of desk.

• *Cinemascope Magnetic Recording Heads*

Item 568

These heads were especially designed to meet the specifications of Cinemascope applications.



Outstanding features include: Balanced magnetic structure with gaps at front and back—all gaps in precise alignment—complete assembly non-microphonic and impervious to moisture — mu-metal shields between individual channels and cast in specially selected high temperature resin.

• *Mobile Transmitter Receivers*

Item 569

Now available are 2, 10, 30 and 60 watt mobile transmitter-receivers in the 25-50 Mc/s and 152-172 Mc/s frequency bands, and 10 watt mobile transmitter-receivers in the 450-470 Mc/s band. All are available in 6 or 12 volt models for trunk or dash mounting.

The makers also announce 2, 10, 30, 60 and 250 watt AC operated transmitter-receivers for fixed station use in the 25-50 Mc/s and 150-172 Mc bands, as well as 15 and 100 watt units for fixed stations in the 450-470 Mc/s band. Additional equipment now available from the makers includes a complete range of antennas, remote control units, selective calling systems and numerous specialties.

• *Power Amplifier*

Item 570

The Model AP-54 Amplifier is a medium-gain, bridging, power amplifier. It is equipped with a bridging-type input transformer providing an input impedance of 10,000 ohms center-tapped at 2500 ohms. The AP-54 has an input sensitivity of 1.2 volts (+4 dbm) which provides an ample margin of gain when using the standard +8 vu program level to drive the power amplifier.

This four-stage power amplifier provides three resistance-capacitance coupled voltage amplifier stages which in turn are direct-coupled to two power output tubes in push-pull class B. Negative feedback from a separate winding on the output transformer is carried around three stages. One power transformer supplies plate voltage for the two 811A power output tubes after full-wave rectification by the two 866A tubes. A second power transformer provides filament voltage for the 811A and 866A tubes. The third power transformer provides filament voltage and plate voltage (after full-wave rectification by the 5Y3GT tube) for the voltage amplifier

(Turn to page 46)

For further data on advertised products use page 61.

For further data on advertised products use page 61.

Ericsson Telephone Sales Limited Open First Canadian Branch Office

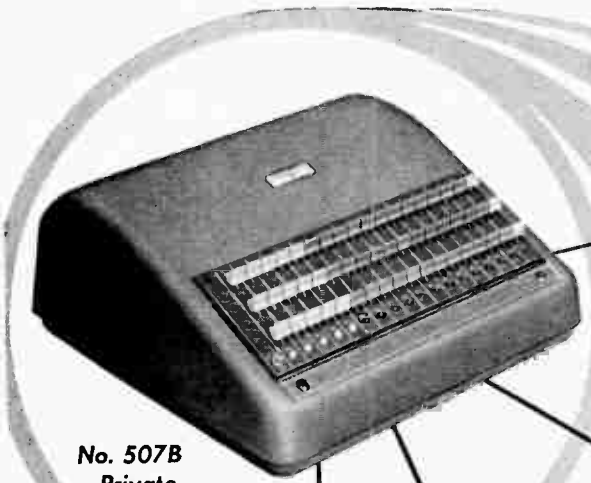
Ericsson Telephone Sales of Canada Limited, a recently established subsidiary of L. M. Ericsson, Stockholm, Sweden, have opened a Toronto office at 34 Advance Road, Etobicoke.

The establishment of a Canadian operation results from a survey of Canadian communications requirements made by firm officials just over a year ago following which the firm opened their Canadian headquarters in Montreal. The opening of the Toronto office is the first of the branch offices which are planned to be opened up in major Canadian centers later in the year. Operations in the new Toronto office call for the assembly of rural telephone equipment.

A. de Bustin who has been named to head up the Toronto office has reported that his company is one of a small group who can supply carrier equipment to permit telephone service on power transmission lines. Equipment of this nature, it is further reported, can serve many special applications in Canada.

The parent company, L. M. Ericsson, have branches in 58 countries and employ over 33,000 people. Immediate Canadian plans call for the assembly of some types of units with an early expansion into the manufacturing of a full range of equipment.

For further data on advertised products use page 61.



No. 507B
Private
Branch Exchange

Photo—courtesy of
The T. Eaton Co.

Photo—courtesy of
National Life Assurance Co. Ltd.

modern compact efficient

Photo—courtesy of
Jaeger Co. Ltd.

Photo—courtesy of
Hyde & Ahearn.

finished in neutral beige-gray colour with a fine wrinkle texture, the No. 507B P.B.X. will blend with the most modern office equipment. It is particularly adapted to operation by those who have other duties to perform in addition to switchboard attendance. The specially contoured keyhandles and smoothly working keys make this board a pleasure to operate.

Provides terminating equipment for 12 Station Lines and 5 Central Office Trunks and permits 5 Simultaneous Conversations.

Operation is from 24 or 48 volt battery with manual or dial telephone.

Northern Electric

COMPANY LIMITED

44 BRANCHES THROUGHOUT CANADA

2054-2

For further data on advertised products use page 61.

BOOK REVIEW

Transient Analysis of Alternating Current Machinery by Waldo V. Lyon is the product of more than twelve years of research and reflection and offers the first systematic application of Fortescue's method of symmetrical components to the solution of transient conditions in A-C machinery.

The method has long been an indispensable tool in the analysis of the unbalanced operation of polyphase machines and their connected networks. Its applications, however, have been confined to the steady-state behavior of machines. The resolution into symmetrical components has involved the complex representation of alternating currents and potentials and the system constants. Though Fortescue was aware that his method of resolution could also be applied to the instantaneous values of currents and potentials, there has been, until now, no systematic development of this phase of the analysis. Of great interest to all concerned with the design and operation of A-C machines and their connected circuits, his book fills an important place in the complete library of electrical technology.

Transient Analysis of Alternating Current is published by the Technological Press, Massachusetts, Institute of Technology and John Wiley and Sons, Inc., 440 Fourth Avenue, N.Y. Contains 310 pages, hard covered. Cost $7.00.

Canada's Tomorrow, edited by G. P. Gilmour.

"An attempt at sober prophecy as to what Canada may and should become in the next fifty years" was the theme on which the Canadian Westinghouse Company opened its Conference on Canada's Tomorrow in Quebec City, November, 1953. Now, the nine prophetic papers which were delivered and discussed before a representative group of 300 Canadians at the Conference are available to everyone in the newly-published book, Canada's Tomorrow (Macmillan, Toronto, $3.50).

In 324 pages, the book presents eight carefully-prepared papers by leaders in fields of Canadian endeavor: B. K. Sandwell, M. W. Mackenzie, R. K. Stratford, D. W. Ambridge, Maurice Lamontagne, Norman A. M. MacKenzie, Hilda Neatby, and Donald Creighton. Also included are sections of the floor discussion of each paper, a ninth address, titled "An Outsider Looking In", delivered by D. W. Brogan, Professor of Political Science, University of Cambridge, and nine symbolic drawings by the Canadian artist, Eric Aldwinckle.

Canada's Tomorrow is published by Macmillan, Toronto, contains 324 pages, hard cover bound. Cost $3.50.

Engineering Analysis, by D. W. Ver Planck and B. R. Teare Jr.

This book is the result of more than twenty years experience in devising and teaching courses in engineering analysis. The subject is developed by example with special stress on the whole thinking process. The authors show what must be done to translate engineering situations into mathematical language, and what is necessary after a mathematical result has been obtained. More specifically, the book deals with such matters as: defining the problem to be solved; deciding what principle to apply; choosing dimensionless variables; and the sketching of curves. These things, which constitute important elements of the professional method, are presented clearly and simply, in the effort to develop in the reader the broad patterns of thinking that are so important in the day-to-day practice of his profession.

Engineering Analysis is published by John Wiley and Sons Inc., 440 Fourth Avenue, New York, contains 344 pages, hard cover, bound. Cost $6.00.

Electronics by George F. Corcoran and Henry W. Price is a lucid guide to an understanding of electronics which strikes a logical balance between electron-tube and transistor physics on the one hand, and the associated circuitry on the other. Although emphasis has been placed on the circuitry aspect of the subject, the authors have included a comprehensive and easily grasped treatment of the basic physical principles of electronics.

After a brief introduction and a discussion of mobile charges, the book proceeds from the elementary principles of vacuum-diode operation to an up-to-date discussion of feedback circuits, transistors, and oscillators. The equivalent plate circuit theorem is introduced early, employing both the nodal and the mesh-current methods. The concept of return voltage ratio is included as an aid to understanding feedback amplifier theory, oscillator operation, and stability of electrical systems; Nyquist plots of return voltage ratio are employed as the criterion for stability of active electrical networks. Feedback amplifiers are presented in such a way that the reader learns the essential advantages and disadvantages of feedback. Included are situations in which gain X bandwidth remain fixed.

A comprehensive chapter is devoted to graphical methods. Almost all of the articles in this book are concluded with one or more examples which illustrate quantitatively the subject matter under discussion.

Electronics is published by John Wiley and Sons Inc., 440 Fourth Avenue, New York, contains 459 pages, hard cover bound. Cost $7.00.

Television Simplified by Milton S. Kiver, Few technical books have had the continuing acclaim this practical manual has received since publication of the first edition in 1946. Now in its Fourth Edition — completely reset in a larger format — Television Simplified is more than ever indispensable to all who need to understand the basic principles of television and their most recent applications.

This up-to-date revision contains many new illustrations and schematic diagrams and two complete new chapters on U.H.F. and color television. Added material includes an expanded discussion of TV tuners, an explanation of keyed A.G.C. systems and how they are utilized, D.C. video amplifiers and Casode amplifiers, and how they function. In addition to an enlarged Intercarrier receiver section, two television receivers are completely analyzed and the new 45-mc video I.F. systems as well as the older 25-mc I.F. circuits are discussed.

Television Simplified is published by D. Van Nostrand Company (Canada) Limited, 228 Bloor Street West, Toronto. It contains 533 pages, hard covered bound. Cost $8.00.

UHF TELEVISION ANTENNAS AND CONVERTERS, by Allan Lytel, explains in simple terms the function and operation of the UHF conversion systems that are appearing on the market in ever increasing numbers. Almost all of the receiver manufacturers have brought out a UHF system for use with their existing VHF receivers on the new band ranging from the simple single channel device to complete tuners that can cover the entire band. The author has grouped these according to function to assist the reader in understanding any particular unit. For example, if the reader is interested in the single channel units, these are described in detail with some commercial units being shown and their operation and circuits explained. A single channel unit not found in the book usually will follow closely the operation of the ones that are described. As would be expected, in the rapidly developing UHF field, it is not always possible to find all of the units of all the manufacturers in any single book. In UHF Television Antennas and Converters the author has taken examples which illustrate the important difference between these units, so that there is a full discussion of the various possibilities which the reader may meet.

UHF Television Antennas and Converters is published by John F. Rider, Inc., 480 Canal Street, New York 13, N.Y., contains 128 pages, price $1.80. The book is available through Electronics and Communications.

For further data on advertised products use page 61.

NEWS

(Continued from page 24)

R. T. Todd Named General Sales Manager Of Electrical Products

Mr. R. T. Todd, Sales Manager of Irvington Varnish & Insulator Company of Canada Limited, Hamilton, a subsidiary of Minnesota Mining & Manufacturing Company, has been named General Sales Manager of Electrical Products for Minnesota Mining and Manufacturing of Canada Limited. The announcement was recently made by Mr. R. W. Keeley, Director of Sales, for the "3M" Canadian Company.

R. T. TODD

Mr. Todd, a graduate of R.M.C., Kingston, joined Irvington Varnish when it was founded in 1933. He has contributed much to its development since that time. Mr. Todd will continue his present responsibilities with Irvington.

Fred Eaton Joins Erie Resistor

The appointment of G. Fred Eaton as Sales Manager of Erie Resistor of Canada Limited is announced by Allen K. Shenk, Vice-President in Charge of Sales of the parent Company, Erie Resistor Corporation, Erie, Pennsylvania, U.S.A.

Mr. Eaton is well known in the radio industry in Canada. He comes to Erie from the Canadian General Electric Company Limited where he was Manager of Mobile Radio Sales.

Prior to that period, he was with the Canadian Marconi Company Limited in the Mobile Radio and Broadcast Station Equipment Sales Department. During the early part of World War II he was with Research Enterprises Limited from where he joined the Royal Canadian Navy.

K. J. Davis Appointed Sales Manager

Mr. J. R. Longstaffe, President, has announced the appointment of K. J. Davis as Sales Manager for the Associated Companies of J. R. Longstaffe Co. Ltd., International Resistance Co. Ltd., and Copper Wire Products Ltd. Mr. Davis was previously responsible for IRC Sales and brings to his new position 10 years of selling experience both in the field and with regard to the promotion campaigns of standard and new products.

K. J. DAVIS

(Turn to page 49)

For further data on advertised products use page 61.

PRODUCTS

(Continued from page 40)

stages. Grounded electrostatic shields in the power transformers minimize noise and hum from the power supply line. A swinging choke and oil filled, input-filter capacitor in the high-voltage supply reduce hum to a minimum and insure long-life, trouble-free performance.

Size: 19 in. wide, 14 in. high, 14½ in. deep, including allowance for panel mounting brackets and knobs.

Weight: 100 lbs. net; 110 lbs. packed for shipment.

Ratings: In accordance with RTMA Standard SE-101-A.

Mounting: Shelf or standard rack mounting brackets are supplied.

Audio Power Output: 250 watt at less than 5 per cent total harmonic content with 117 volts applied to 105-117 volt power transformer tap or 125 volts applied to 117-125 volt tap.

• *High Fidelity Amplifier*

Item 571

The Canadian debut of a new high-fidelity amplifier model known as PF91 and associated preamplifier PF91A is announced. Rated at 12 watts output with less than one-tenth of one per cent distortion, the PF91 is claimed to have a substantially flat response from 2 to 160,000 cycles. A combination of negative and positive feedback is employed which effectively raises the damping factor of the amplifier to infinity. The output transformer is specially designed to conform with the overall specification of the unit.

The preamplifier PF91A features cathode-follower output and can be located up to 20 feet from the main amplifier. Equalizing networks are provided for 78, LP and N.A.B. characteristics using magnetic pickups, and there are separate inputs for microphone, radio, and crystal pickup. In addition to continuously variable bass and treble boost and cut controls (giving a variation of up to 15 db. at 40 cycles and 10 kilocycles), there is a treble filter with three optional cut-off points at 4000, 7000, and 12,000 for special applications.

• *Hammer Blow Basic Switch*

Item 572

A new, exclusive Hammer-Blow Basic Switch, to fill the demand for dependable switching in any application that sets up terrific vibration is now available to the trade. The snap action is totally independent of the speed of actuation and the switch has a relatively small movement differential. Contact pressure is maintained at a high value until instant switch snap action — contacts close with hammerblow force. Contact arrangement is SPDT, 2 circuit, electrical rating 10 amps 125/250 V a-c, 30V d-c inductive; pretravel .040 in. max., overtravel .025 in. min. The switch has tested to a probable mechanical life of five million operations and probable electrical life of 750,000 operations.

• *New T Series Helipots*

Item 573

Recently introduced on the market is a greatly improved version of series T miniature HELIPOTS. Featuring low torque and small size combined with high precision, the new models incorporate a number of advantages.

All-metal housing and lids, carefully machined from aluminum alloy, blue alumilited, provide dimensional stability, ruggedness and maximum heat dissipation. Maximum operating temperature has thus been raised to 105°C ambient.

Power rating has been increased to 1.2 watts at 40°C ambient, and electrical noise reduced materially through several design improvements. Linearity has been improved; while standard linearity tolerance ±0.5%, best practical linearity tolerance is now ±0.2%.

Shaft diameter has been increased to ⅛" to provide greater rigidity and increased strength, and to permit machining of flats and slots.

Standard electrical rotation has been increased to 354°, and 360° electrical rotation or mechanical stops are available on special order.

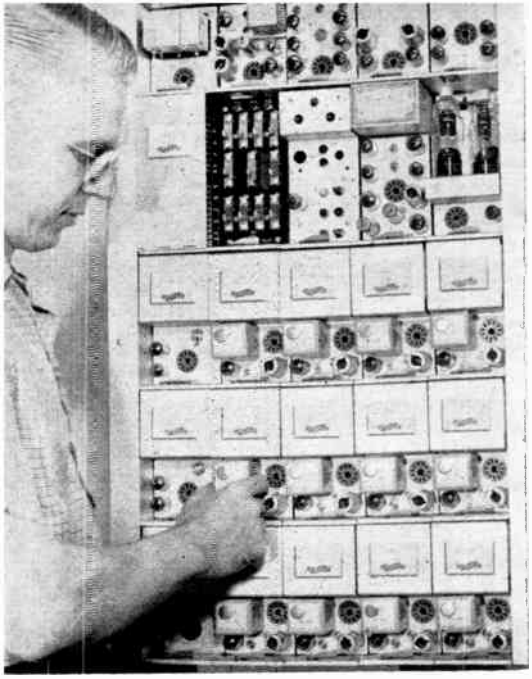
Resistance range has been increased to provide resistances as low as 10 ohms and as high as 100,000 ohms.

Series T HELIPOTS are available for bushing or servo mounting. Diameter is only ⅞", weight is but 0.6 ounces. Miniature ball bearings, carefully wound toroidal coils and precision construction throughout assure long noise-free life and high accuracy.

Up to five sections of the T series HELIPOT may be ganged on a common shaft at the factory, and as many as nine taps provided per section, each electrically welded to a selected single-turn of resistance winding — without shorting out adjacent turns.

(Turn to page 53)

For further data on advertised products use page 61.



Lenkurt Designs Versatile Unit

PROVIDING up to twelve carrier-derived voice channels on an open wire line, is the communications job performed by a new Type 45A carrier telephone system developed in the United States. The Type 45A systems co-ordinate with systems such as Western Electric J and Lenkurt 42C. They can be installed on lines already equipped with carrier systems using frequencies up to 35 kc. Four staggered frequency allocations are available to permit installation of several systems on a single pole line.

Many new electrical and mechanical features are incorporated in the Type 45A systems.

For further data on advertised products use page 61.

For further data on advertised products use page 61.

London Report

More than 150 British manufacturers of radio and electronic equipment including leading firms in every branch of the industry exhibited their products at the 1954 British Radio Show held last August 24 to September 4 in Earls Court, London. Over thirty manufacturers of television sets demonstrated their products by day-long continuous shows. Domestic radio receivers, electronic equipment of all types including components, valves and accessories were highlights of the show. . . . .

Much credit is likely to be given to the British component industry in developing valves and components that will simplify the problems of the development engineers. Much experience was gained during the war in these bands as the earlier forms of radar equipment operated in them, but both the valves and components were relatively inefficient compared with their modern counterparts. All of the valve manufacturing companies have introduced ranges of miniature valves capable of operating with high signal-to-noise ratios. . . . .

Several manufacturers in Britain are showing 12-channel television coil turrets which are being introduced to simplify the selection of the future television transmitters. The successful development of these turrets has depended on the supply of such components as fixed capacitors, resistances and inductances that do not change their electrical values at the high frequencies involved. . . . .

One manufacurer, working in conjunction with the British Ministry of Supply's Radio Research Establishment has developed a new form of high stability resistor, using a metal film deposited at high temperature on glass, the overall stability of which is far greater than that of the high stability carbon types. . . . .

A large group of new temperature compensated ceramic capacitors which are capable of operating under the most stringent Ministry specifications are produced by a number of manufacturers. Obviously such components are of great importance to companies working on projects involving wide temperature changes and climatic conditions. Guided missiles, subject to violent acceleration and speeds of up to 2,000 miles per hour, generate extremely high temperatures due to the friction of the air. Unless the telemetering components are capable of standing severe mechanical shock and violent temperature changes, the information derived from the guided missiles is worthless. . . . .

An outstanding technical development is a range of electrolytic capacitors, the insulation resistance of which is comparable to the paper dielectric types. Due to their miniature size they can be mounted in the wiring and are of particular interest to designers of high quality low-frequency amplifiers. . . . .

A number of new insulating materials have been developed during the past year, several of which now employ Terylene. In one exhibit a glass-fibre life-boat aerial mast is shown which is extremely strong and not subject to climatic conditions. . . . .

A large number of new gramophone pick-ups are being shown using ceramic cartridges as these are capable of operating over wide temperature and climatic conditions. Several new multi-speed transcription turntables have been introduced which are of particular interest to broadcasting authorities as they are capable of accommodating 16 inch records. . . . .

Several new tape recording decks and machines have been developed during the past year and these now cover speeds from $\frac{1}{16}$ of an inch to 15 inches per second. One model in particular has been in great demand by military and civil aviation operators as a means of recording conversations and control between aircraft and airfields. . . . .

(Turn to page 50)

NEWS

(Continued from page 45)

CAE To Handle Lear Automatic Pilots

Lear Inc. of Santa Monica, California and Canadian Aviation Electronics Ltd. have entered into an agreement for the production sales and maintenance of Lear automatic pilots in Canada.

The announcement of the association was made jointly in Ottawa by William P. Lear, Chairman of the Board and Director of Research and Design of Lear Inc. and Mr. K. R. Patrick, President and Managing Director of Canadian Aviation Electronics Ltd.

CAE advises that the Lear Autopilot will be produced in their new 132,000 square foot Montreal plant where Mr. Tom Dowbiggin is sales engineer in charge of automatic pilots.

D. P. CLEMES

● The appointment of D. P. Clemes as Senior Sales Representative of the Montreal District has been announced by O. W. Francoeur, Eastern District Manager, Canada Wire & Cable Company, Limited. Mr. Clemes who has been associated with the Head Office Sales Branch since 1947 has recently been a Toronto and District Sales Representative.

Speight Laboratories Chosen To Represent Winegard Company

Norman H. Speight of N. H. Speight Laboratories, Toronto, has announced that the company has been selected as factory representative for the Winegard Company of Burlington, Iowa. The Winegard Company are manufacturers of TV antennas.

For further data on advertised products use page 61.

London Report

(Continued from page 48)

Although the siting power and form of polarisation has not yet been determined for the commercial television stations, the aerial manufacturers are showing various forms of high efficiency aerials based on the experience they have gained in their sales to overseas countries, already operating on the 200 mc/s. band. . . . .

Owing to the more stringent requirements of installation of television receivers and converters operating on the 200 mcs. band, several manufacturers of test gear have introduced new equipments that will facilitate the problems of the service and installation engineer. . . . .

On the whole it can be claimed that there has been steady progress in the general design of all components which has been partly accelerated by the more stringent requirements of both the British and American Government establishments. . . . .

A new method of insulating wires which has been devised by British manufacturers is of interest. The introduction of PTFE (polytetrafluoroethylene) as a covering allows the wire to operate at temperatures up to 250 degree C. . . . .

Another development of significance is a new TV camera cable of smaller cross sectional area than previous types and is specially designed for centrimetric link equipments. . . . .

The British firm of Fine Wires has introduced a special EFA wire that is self bonding and particularly applicable to frame aerial design. . . . .

Of interest to the telephone industry is a new "HiQor" powder core with a loss factor so low that a new field of design work is opened up. . . . .

The Royal Aircraft Establishment, Farnborough has also developed a number of new components. Mica dielectric capacitors assembled in mycalex cases are treated to vary the temperature coefficient and then sealed. High linearity is claimed, with extremely low power factor. . . . .

A range of sealed variable resistors has been developed with various manufacturers. The resistors are sealed in metal cases and the seams soldered. Standard spindle and panel seals are fitted and the connections taken through sintered alumina seals. . . . .

The Radio Research Establishment have developed a method of making a connection to titanium which is a tough light metal very resistant to chemical attack. By depositing a layer of silver copper eutectic titanium can be brazed to other metals. . . . .

A method of aluminum electro-deposition for the manufacture of waveguides has been developed. . . . .

Elevated temperatures such as developed in high speed flight and in small electronic units demand resistors of great stability and a new metallic oxide resistor has been developed. Stannic oxide mixed with other oxides of antimony bismuth etc. are sprayed on a glass base at a temperature of 600°C., the film being automatically fired to the glass. One unit of 4,000 ohms that is demonstrated has a temperature coefficient of —0,0003 and after 2,000 hours life test has only changed to a negligible degree. . . . .

The demand for sub-miniature components for use with transistors has been demonstrated in several models. Due to the low heat dissipation in the circuits miniaturization can be carried further than in the case of valve operated circuits. . . . .

Much development of Ferrite components has been undertaken by the Radio Research Establishment and examples such as Ferrite gyrators are shown. In these units an axial magnetic field is maintained which rotates the plane of polarization of a wave as it travels through the specimen, and this rotation is always in the same sense about the lines of force.

For further data on advertised products use page 61.

Spectronic 20

ACCURACY and flexibility in many fields of research and quality control in which the more complex analyses involves the use of spectrophotometry will be greatly assisted by virtue of the recent development of a combination colorimeter and spectrophotometer. The instrument, it is claimed, will be of particular use in the gas industry where it can be used over a wide range of applications.

Manufacturers of the instrument have named it the Spectronic 20 because of its 20mu band pass. It produces high wavelength accuracy and spectral purity through the use of a diffraction grating and has been designed for speedy simple operation by production line operators and laboratory technicians who, with the instrument, will only be required to use two control knobs in making routine colorimetric analyses.

The new electronic instrument analyses any liquids or solids which transmit light by subjecting a sample to light of specified wavelengths. The degree of light transmittances is registered on a double scale, where readings may be taken in terms of either transmittance or optical density.

● The Spectronic 20.

The operator can adjust the diffraction grating for any wavelength in the entire range of the instrument by turning a control knob, without being limited to available filters. Effective range is from 375mmu (near ultra-violet) to 950 mmu (near infrared).

As a colorimeter, the instrument makes possible quick routine tests by subjecting the sample to fixed wavelength settings. Resulting readings can be readily interpreted as concentration values from pre-determined calibrations supplied with the instrument.

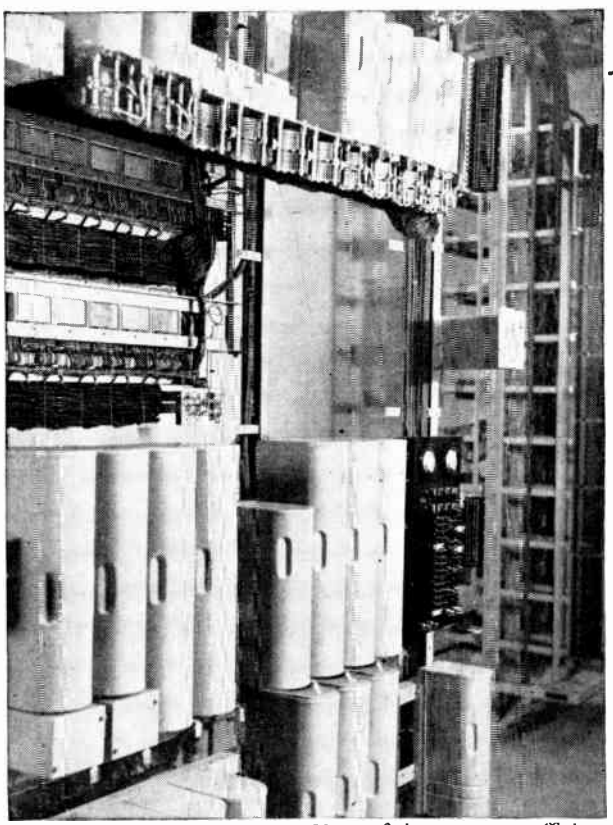
More intensive study is possible by using the instrument as a spectrophotometer. Here the sample is subjected to light of the desired wavelengths to get transmittance and density readings for interpretative analysis and the construction of transmission or absorption curves.

For further data on advertised products use page 61.

AUTOMATIC ELECTRIC—A GREAT NAME IN COMMUNICATIONS

+

EXPANSION OF PORT HOPE SYSTEM at low cost *with* STROWGER AUTOMATIC



View of the compact, efficient STROWGER *Automatic installation at Newcastle. A similar unit will be installed at Welcome.*

When the Port Hope Telephone Company installed its first automatic exchange at Newcastle, Ontario, in 1952, the company's management anticipated expansion and selected STROWGER Automatic equipment. And because STROWGER is designed to keep pace with a territory's growth, the new exchange now ordered for installation at nearby Welcome can be made both quickly and economically. Port Hope thus became the first independent telephone organization in Ontario to establish a C-A-X network.

To clients wishing to install a STROWGER Automatic system, we offer the advantages of complete advisory and engineering services. These services assure practical assistance in ironing out pre-installation problems and follow through until the system is functioning smoothly.

WRITE US ABOUT *YOUR* PROBLEM TODAY!

5446

AUTOMATIC ELECTRIC

(CANADA) 1953 LIMITED

Distributor in Canada

AUTOMATIC ELECTRIC SALES (CANADA) LIMITED

Head Office: 185 Bartley Drive, Toronto 16

MONTREAL • OTTAWA • BROCKVILLE • HAMILTON • WINNIPEG • REGINA • EDMONTON • VANCOUVER

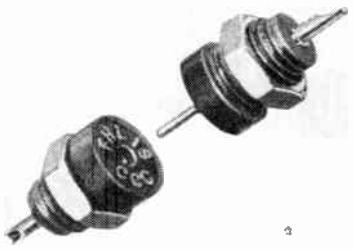
PRODUCTS

(Continued from page 46)

● *Sub-Miniature Single Pin Connector*

Item 574

A unique round-shaped sub-miniature connector providing easy means for passing a single lead through a rack and panel arrangement is now on the market. It may also be applied as a feed-thru disconnect.



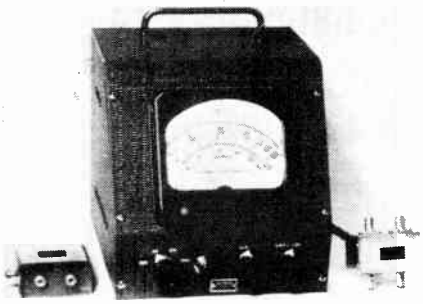
The extremely rugged "FHL" has high dielectric characteristics and features the use of one-piece moldings available in three insulating materials: Mineral (asbestos) filled Melamine for high dielectric and mechanical strength, Plaskon Reinforced (glass) Aklyd type 440A for unusually high impact strength and arc resistance, and Diallyl Phthalate (blue) with high dimensional stability plus excellent dielectric properties.

Precision-machined socket and pin contacts are of spring temper phosphor bronze and brass respectively, gold plate over silver give low contact resistance and ease of soldering.

● *H-F Phase And Vector Voltage Meter 10 KC to 1000 MC*

Item 575

This instrument, based on a new differential rectifier circuit, is extremely versatile and will be most valuable in measurement of antenna systems, filters, amplifiers and other HF transmission networks. It is characterized by high sensitivity, good stability,



light weight and convenience of operation. In particular, it will be invaluable in measurement of: Vector sum or difference of two voltages; phase angle between two voltages; voltage between two points which are both at a.c. ground potential; magnitude and phase angle of an unknown impedance. Accuracy: ± 5 per cent nominal; error increases as frequency is approaching 1000 Mc/s.

● *Vacuum Tube Electrometer*

Item 576

A greatly improved Vacuum Tube Electrometer has been announced. Designated the Model 210, the new instrument is a line-operated dc vacuum tube voltmeter with an extremely high input impedance.

Basic specifications include an input greater than 10^{14} ohms, grid current below 10^{-15} ampere, and drift within 10 mv per hour. Five voltage ranges are provided: zero to 0.8, 2, 8, 20, and 80 volts in either polarity.

The new electrometer has output terminals

(Turn to page 58)

For further data on advertised products use page 61.

Letters to the Editor

The Editor,

On reading through the May-June edition of your excellent publication, I was interested to read your editorial on Page 15 under the heading, "Are We Too Reticent . . .?", and in particular to the paragraph in the second column dealing with the I.R.E. Annual Convention in New York.

In this paragraph, you remark that —

> "Among the hundreds of exhibits in this electronic fashion parade there was also only one from Canada, that of P.S.C. Applied Research Limited. To these evangelists we extend our congratulations for their missionary work in raising the voice and prominence of Canada at the Institute of Radio Engineers convention."

May we lay claim to qualify for both the missionary and evangelistic status as we displayed our products on Stand 278 which we nominally shared with our sales agency, Beam Instruments, although most of the products shown were ours.

Notably, we displayed oscilloscopes designed and manufactured in Canada; specialized deflection coils for special radar displays, the design of which we have pioneered in both Canada and the United States and last but not least, the V.H.F. transmitter which we have supplied in quantity to the Department of Transport for use on the airways in Canada as the main ground/air V.H.F. transmitter. You will be interested to know that we received many enquiries for our products and in fact, one visitor, from C.A.A. in Washington, stated that the visit to our Stand was the highlight of the show for him as our V.H.F. transmitter also conformed to C.A.A. specifications which he had written but this was the first time he had seen a production transmitter which met his specification!!

Visitors to our Stand included people from Overseas countries quite apart from the United States and Canada.

K. A. Hovington,
COSSOR (CANADA) LIMITED

The Editor,

In the May-June, 1954, issue of your magazine Mr. Harold S. Modley-Jones complains about the lack of Canadian papers at the Annual I.R.E. Convention.

I disagree with Mr. Modley-Jones as to the reason for such a situation. In particular, I do not think that Canadian engineers are less articulate than those across the border.

It may be that the real reason lies in the system adopted in the selection of papers for presentation at the Convention. I could not deal with this rather delicate problem thoroughly in this letter, but my feeling is that people responsible for selection of papers may have some American bias and also the author's name and associations could, conceivably, carry more importance than justified at the expense of the intrinsic value of the paper.

I would expect that, on the average, the ratio of Canadian to American papers should be proportional to the ratio of Canadian to American membership in I.R.E. This would assume, of course, that in the relative figures, there are as many Canadian engineers engaged in Research and Development as there are American. I doubt, however, that this is so. Therefore, I would expect that the ratio of Canadian to American papers should be less than the ratio of corresponding memberships.

Of course, the question of convention papers is not the only one. The same situation applies to the number of Canadian papers in the I.R.E. Proceedings, which is pitifully small.

G. Glinski,
COMPUTING DEVICES OF CANADA

(Turn to page 60)

FINDING ANSWERS

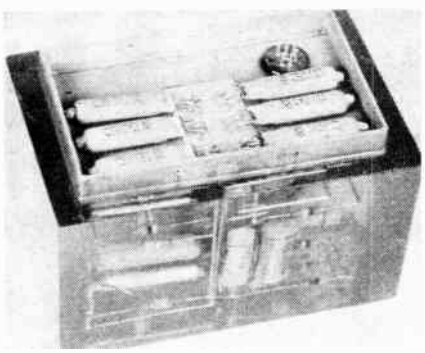
(Continued from page 20)

interference. Much of the research carried out is of a classified nature.

Top Flight Directors

Superintendent of the Defense Research Telecommunications Establishment is Mr. Frank T. Davies, an internationally known scientist who has published many papers on radio physics and geophysics. Born and educated in Wales, he lectured and took postgraduate training at Canadian universities. Two years with Admiral Byrd in the Antarctic followed and then a decade on the staff of the Department of Terrestrial Magnetism of the Carnegie Institute of Washington.

Mr. Davies spent more than two years in command of a Canadian Polar Year expedition at Chesterfield Inlet, Northwest Territories, and preparing the results of the project for publication. This was followed by three years as Director of the Geophysics Observatory of the Carnegie Institute at Huancayo, Peru.



● Resin embedded circuit.

Prior to joining the DRB staff and during the war years, Mr. Davies was in the Royal Navy's Control Service in South America, then with the National Research Council as assistant naval research liaison officer and finally, with Operational Intelligence of the Royal Canadian Navy.

Deputy Superintendent of DRTE is Mr. J. C. W. Scott, a physicist whose specialty is electrodynamics. The son of a U.K. consular official, Mr. Scott was born in France and was brought to Canada with his family as a child. He was educated in Canada and the U.S.A. and prior to joining the RCAF during the last war, was a physicist with the Bell Telephone Laboratories in New York.

Considered one of Canada's outstanding research experts on the ionosphere and radio propagation, Mr. Scott has represented Canada at international meetings on radio science and radio frequency allocation.

During the war, he organized a service radio wave propagation section and became the RCAF scientific member of a national committee created for investigations in the same field. The committee continued its work after the war and with its merger with the newly-formed Defense Research Board in 1947, Mr. Scott became a member of the Board's staff.

For further data on advertised products use page 61.

Color Tubes

(Continued from page 19)

groups of one green, blue, and red phosphor dot each — directly on the inside of the tube's curved face . . . the same location used in black-and-white picture tubes. A light, easily assembled, curved shadow mask is uniquely positioned behind this screen. This mask is perforated with approximately 300,000 tiny matching holes through which the electron beams from the three-beam gun are aimed at their related phosphor dots on the picture screen. Because each shadow mask is used as a negative to print its individual screen, the screen and mask may readily be brought into perfect registry.

Other advantages claimed for the new tube are: The simple, lightweight screen-mask assembly is less subject to electrical and mechanical damage than that of the heavy complicated flat-mask type of tube. Accurate convergence and focus of the three electron beams is easier to achieve at all points on the curved screen. The tube's design substantially eliminates "pincushioning" distortion. Specular reflections and optiial distortion due to non-uniformity of glass are minimized. A dark-glass face is employed to improve contrast and give greater color fidelity. It has the further advantage of being 12½ pounds lighter in weight than a 19-inch flat-mask type of tube.

The three-beam electron gun mounted in the neck of the "205" tube is designed for electromagnetic, rather than electrostatic, convergence. Three important advantages are gained thereby: The troublesome and expensive need for a high convergence voltage (up to 15,000 volts for electrostatic convergence) is avoided. Independent control of the three electron beams from this gun permits more accurate convergence; this gives true color fidelity over the entire screen.

For further data on advertised products use page 61.

For further data on advertised products use page 61.

PRODUCTS

(Continued from page 53)

for driving balanced or unbalanced recorders and recorder amplifiers, oscilloscopes, and galvanometers. The output amplifier drives the Esterline-Angus 0-1 milliampere recorder directly, or delivers 10 volts out on each range for full-scale input. Frequency response of the output amplifier is 0-5000 cps, making the Model 210 an ideal dc preamplifier wherever an ultra-high input impedance is needed.

All Keithley Electrometer accessories fit the new model. It can thus be used not only as a dc voltmeter, but as an extremely sensitive micromicroammeter, megohmmeter, and Kilovoltmeter. Maximum full-scale sensitivities are 8×10^{-13} ampere, 3×10^{11} ohms, and 20,000 volts.

Typical applications include potential measurements of charged capacitors, vacuum tube electrodes, and piezo-electric crystals. Current measurements cover photocell, mass spectrometer, and insulation leakage currents. Ultra high resistances easily measured include insulation resistance measurements, surface and volume resistivity tests.

• *FC Microwave Descriptive Bulletins*

Item 577

Of interest to public utilities, transportation companies, pipeline operators and other firms engaged in extensive operations, are new descriptive publications covering microwave radio, power line carrier and associated electronic equipment which are now available from the Canadian Westinghouse Company's Electronics Division.

The new bulletins describe type FR microwave radio, type FJ multiplexing equipment, type JZ-90 power line carrier line coupling tuners and type FD power line carrier equipment.

The type FR microwave radio equipment described is for voice communication, teletype, telemetering and supervisory and remote control. Operating in the 1700-2000 megacycle UHF band, it provides 30 voice channels with each channel capable of handling up to 15 telegraphic circuits.

Type FJ multiplexing equipment, designed for use with the FR microwave radio, is described as providing voice communication, teletype, telemetering, remote and supervisory control, protective relaying, and numerous additional indicating and operating functions.

Three additional power line carrier booklets describe applications of this equipment for voice, directional-distance relaying, phase comparison relaying and frequency shift apparatus for telegraphic or keyed-type functions. Power line carrier line coupling tuners are comprehensively covered in a sixth bulletin.

For further data on advertised products use page 61.

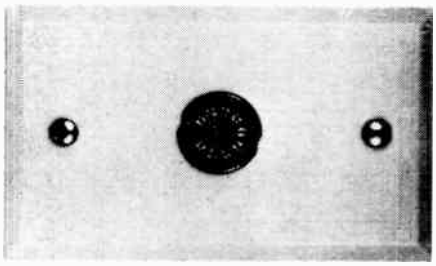
• *Rotator Wall Plate*

Item 578

Adaptability is the main feature of this new antenna rotator wall plate.

Designed to mount flush, with or without the use of the usual wall box, this new antenna wall plate accommodates control for rotators and 300 ohm antenna connections in one plate and plug.

Incorporated in this new product is a feature which absolutely eliminates cutting into a wall, or using a wall box for installation. Hence, the wall plates mount on any surface, and accept a lead-in from any direction.

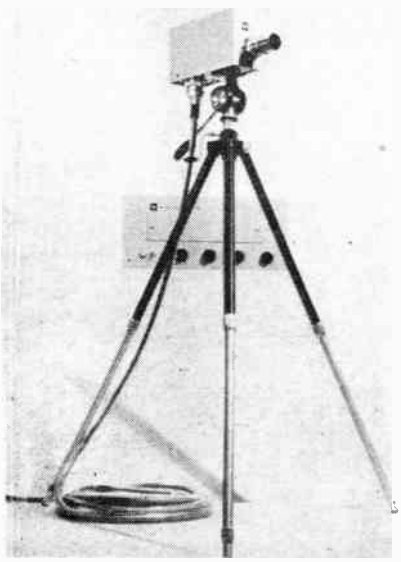


The matching XP-9 plug is moulded of JAN specification material with silver plated pins and Acrylic resin cap custom machined from bar stock. It will plug into any 9-pin miniature socket for which it has found great use and interesting application among the industry in conjunction with test equipment.

• *Broadcast Camera Chain*

Item 579

Broadcast vidicon camera chains are designed to provide the ultimate in high performance at moderate cost. The system is ideally suited for film pick-up, studio and remote operations. The use of KAY-LAB accessories allows complete remote camera control of pan and tilt and lens iris and focus. KAY-LAB Camera Chains can be added to present station facilities without requiring additional personnel. The camera is designed to use economical 16 mm. lenses.



The broadcast unit consists of a camera and camera control. The small compact camera contains a double cascode video preamplifier and vidicon pick-up tube. Electromagnetic focusing and electrical centering are incorporated. The output from the camera is fed to the camera control unit which includes the video line amplifier, deflection chassis and electronically regulated power supply. These three sections are fabricated from removable modular sub-assemblies. Keyed clamps, and adjustable black level clamps are combined in the video amplifier strip. In addition, amplitude and phase aperture correction circuits are used. This video line amplifier has an overall band width in excess of eight megacycles.

For further data on advertised products use page 61.

For further data on advertised products use page 61.

Letters To Editor

The Editor,

I have been asked by the Executive of the London Section of the Institute of Radio Engineers to comment on their behalf on a certain article appearing in the May-June issue of your publication.

I refer to "Lack of Canada's Voice at Convention Regretted" by H. S. Modley-Jones.

The general feeling of the Executive is hostile to this article, both to the general views expressed and the implied slight to the London and Hamilton Sections, Institute of Radio Engineers. From the general viewpoint, Mr. Modley-Jones' remarks concerning lack of Canadian representation at the recent I.R.E. Convention are, we feel, arrant nonsense. We think that it is fair to say that the papers presented at the annual I.R.E. Convention represent in major part the research and development output of industrial electronic laboratories. Pure or fundamental research has its place in the program but is far outweighed, and rightly, by results of applied research. As Mr. Modley-Jones point out, Canadian radio engineers and scientists have no cause to be modest, but the fact remains that, with a few outstanding exceptions, electronics *research* in industry does not exist in Canada. Most applied electronics research in this country is centered in Government agencies, and the pure electronics research divided between these agencies and the universities. The results of this type of work in Canada are continually being published, and publicized at appropriate meetings, but on the more fundamental side of electronics research, there are several North American associations other than the I.R.E. concerned, and the Canadian output is shared amongst them.

We feel that rather than being a criticism of Canadian engineers and scientists, lack of representation at the recent Convention is an implied criticism of the Canadian electronics industry which depends far too much on development work carried out in the United States and other countries. Further, if Mr. Modley-Jones were to assess the Canadian electronics contributions to such a journal as the *Review of Scientific Instruments*, he would find the quality and quantity of Canadian representation that he desires.

With regard to the second point — the implied slight to the London and Hamilton Sections contained in the suggestion that only London and Hamilton together could rank with Toronto, Ottawa and Montreal — Mr. Modley-Jones thereby betrays his ignorance of the affairs of the I.R.E. Region 8. Since almost every other I.R.E. member in Canada is aware of the relative activity of the various sections, no further comment on this point need be made.

Yours truly,
J. W. BLACKWELL,
Chairman, London Section
Institute of Radio Engineers

In suggesting that a daily symposium be given during the four days of the annual I.R.E. Convention, one by the combined London-Hamilton Sections of the I.R.E. and the remaining three by the Ottawa, Toronto, and Montreal Sections, it is unfortunate that an impression of slight has been created by the proposal of a combined effort on the part of the London and Hamilton Sections.

It is not felt that any slight was intended on the part of Mr. Modley-Jones but rather that the geographical proximity of the two sections may have entered into the author's considerations.

***Electronics and Communications*, however, regrets that such an impression has been made especially in the knowledge that the London and Hamilton Sections of the I.R.E. are quite capable of presenting individual presentations of the highest calibre.**

—The Editor.

READERS' SERVICE PAGE

We realize that our readers are busy people and may not always have time to write letters of enquiry to manufacturers regarding advertised products that are of interest to them. Therefore, to save you the time of writing a letter, we offer you the use of this Readers' Service Page. It is designed for your convenience in obtaining free and without obligation detailed information on any advertiser's product or New Product appearing in this issue of *Electronics and Communications*.

Check as many New Products or Advertisements as you like on the attached coupons and send to *Electronics and Communications*, 31 Willcocks Street, Toronto 5, Ontario. We will see that detailed information concerning your enquiries is in your hands within a few days.

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☐ Engineered Sound equipment	36
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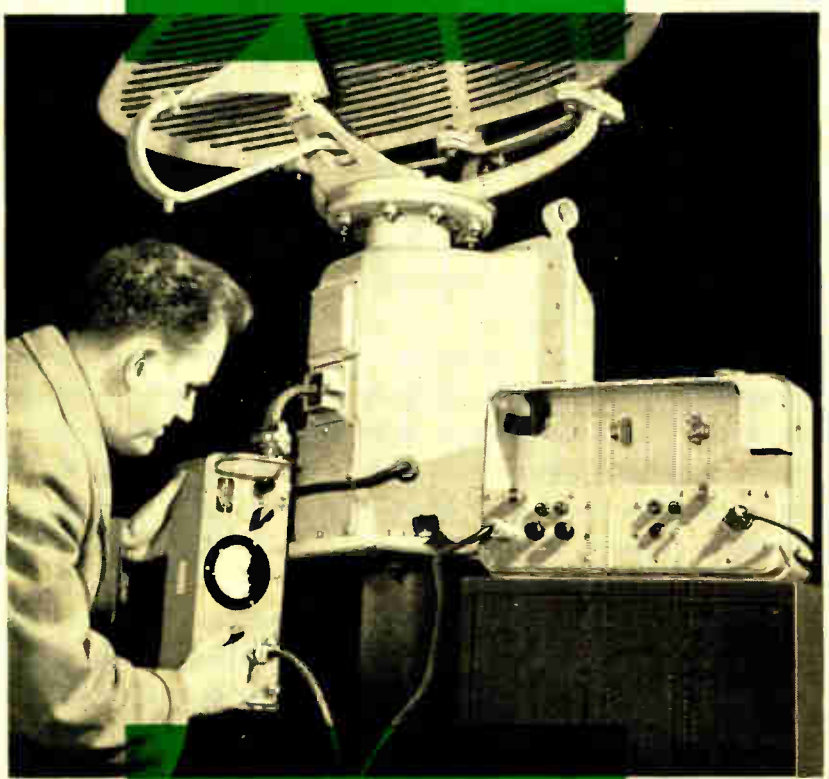
NEW VSWR TEST SET

Model 539 VSWR Test Set consists of removable indicator unit (top) and power supply (bottom) fitted in compact aluminum combination carrying case.

for rapid and accurate check of X-Band Radars



■ Now available is the Sperry Microline* Model 539, VSWR Field Test Set, designed for accurate measurement of the voltage standing-wave ratio of X-band radar equipment during installation, maintenance and repair. This compact portable test set is also ideal for use in production and laboratory testing.

■ Model 539 is a direct-reading reflectometer-type instrument which consists of a klystron oscillator, high directivity directional coupler, detector, amplifier and indicator, power supply and modulator. Calibration is accomplished with a reference mis-match.

■ The simplicity of adjustment and operation of the test set make it extremely useful for accurate measurements over the entire range. It is particularly useful in adjusting a standing-wave ratio since the meter gives a continuous indication. Indicator unit can be easily connected to the equipment to be tested with a thumbscrew-operated clamp.

■ This test set is approved by the military as the AN/UPM-12 meeting all the requirements of Specification MIL-T-945A.

*T.M. REG. U.S. PAT. OFF.

For convenience in field work, the microwave indicator unit can be easily removed from carrying case.

SPECIFICATIONS

VSWR Ranges	1.05–1.3±5% 1.3–2.0±5% 2.0–3.0±10% 3.0–10.0 uncalibrated
Freq. Range	8.5–9.6 kmc
Waveguide Connection	RG52/U (1 x ½ waveguide) or RG51/U (1¼ x ⅝ waveguide) through accessory adapter
Dimensions	Length 19¼ in. Width 12 in. Height 10¼ in.
Weight	35 lbs.
Power Requirements	105–125 volts 50–1000 cycles 75 watts

For further information write Special Electronic Sales Department

SPERRY GYROSCOPE COMPANY OF CANADA LTD.

P.O. BOX 6121 • MONTREAL, QUEBEC

SPERRY GYROSCOPE OTTAWA LTD., OTTAWA, ONT.

For further data on advertised products use page 61.

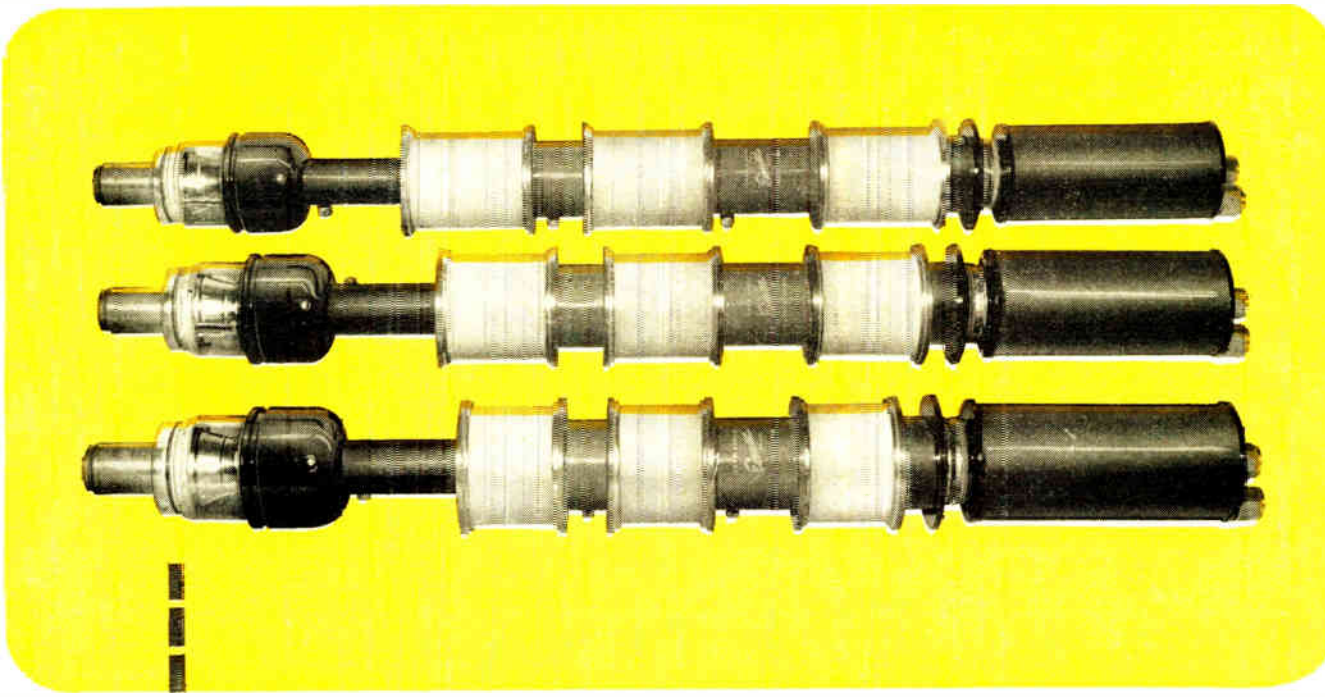
BROADCASTING

(Continued from page 18)

and back of the transmitter. Since a kitchen, bathroom, and sleeping facilities are not required in unattended operation, the resultant building is a modern brick structure measuring only 22 by 28 feet, and built of the new double-length concrete brick. The ground floor contains the main 5000 watt transmitter; 250 watt standby racks containing phase, modulation, and frequency monitors and audio and remote control equipment; and storage cabinets with maintenance bench. A full basement houses the standby power plant and the heavy high voltage power and modulation transformers encased in grounded steel cabinet.

In the design and installation of an unattended transmitter special precaution should be taken with all outside wiring. In CKOM's installation the open wire R.F. lines are built higher with all wires, including the grounded wires, out of reach. The tuning huts are also built higher for two reasons . . . to keep outside terminations out of reach and allow a safe operation factor in case of high spring waters. The complete ground system, using over 80,000 feet of copper wire, was laid in two days with the aid of a specially built plow which reeled the wire, buried and covered it at a depth of 10 inches in one operation.

For further data on advertised products use page 61.



- **HIGH GAIN — SIMPLE TRANSMITTER.** Eimac klystrons are inherently ideal for the final linear amplifier in UHF color TV transmitters. There is no need for by-pass condensers, rf chokes or feedback loops, and through low driving power and high power gain, the preceding circuits are simplified, and the smallest number of rf stages is required.
- **LOW NOISE LEVEL.** Eimac klystrons operate below the noise level specified by the NTSC color television standards. The low noise level of these klystrons is amply demonstrated in UHF television transmitters now in daily operation.
- **NO TRANSIT TIME PHASE SHIFT EFFECTS.** Regardless of amplitude level, the transit time of electrons in klystrons is substantially constant, and, having excellent linearity, a klystron will provide the amplitude and phase responses necessary for faithful transmission of color values.
- **WIDE BANDWIDTH.** The rf resonant cavities are completed external to the tube, permitting the optimum arrangement of the rf circuits for bandwidths greater than six mc — more than enough for color TV.
- **RELIABLE — ECONOMICAL.** Because of the sheer simplicity of these klystrons, they are light weight, readily mass produced, and give long, reliable life.

Eimac Klystrons for UHF-TV

TYPE	CHANNELS	SATURATION POWER
3K20,000LA	14-32	6 kw
3K20,000LF	33-55	6 kw
3K20,000LK	56-83	6 kw
3K50,000LA	14-32	15 kw
3K50,000LF	33-55	15 kw
3K50,000LK	56-83	15 kw

For further information contact our Application Engineering Department

Eimac TUBES

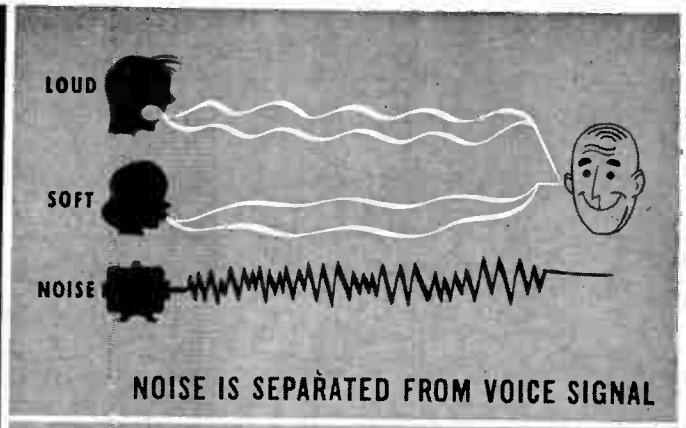
EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA
Export Agents: Frazer & Hansen, 301 Clay St., San Francisco, California

For further data on advertised products use page 61.

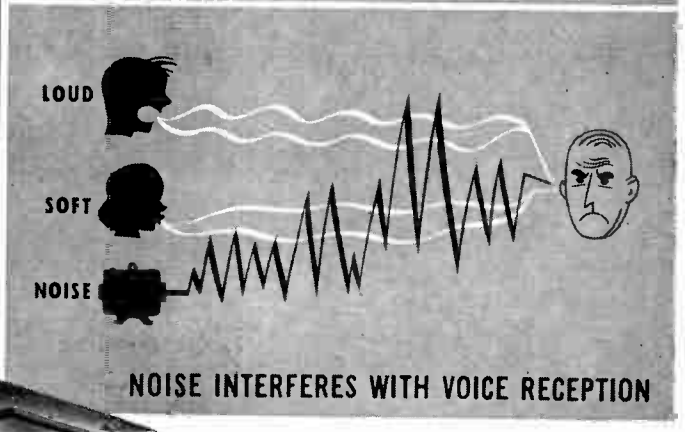
RADIO CIRCUITS can sound like this

...instead of this

with the addition of Lenkurt



NOISE IS SEPARATED FROM VOICE SIGNAL



NOISE INTERFERES WITH VOICE RECEPTION

Type 5090A COMPANDOR UNIT

Some of the economies which may be achieved by LENKURT COMPANDOR application to point-to-point radio systems include:

- Fewer repeater stations on long systems
- Smaller antennas and tower structures for short links
- Extensions of present systems by being able to add more tandem systems
- Reduced and simplified maintenance because of relaxed alignment limits

LENKURT COMPANDORS MAY ALSO BE USED TO HELP REDUCE NOISE AND CROSSTALK ON OPEN WIRE LINES

C-5448

AUTOMATIC ELECTRIC

(CANADA) 1953 LIMITED

Distributor in Canada

AUTOMATIC ELECTRIC SALES (CANADA) LIMITED

Head Office: 185 Bartley Drive, Toronto 16

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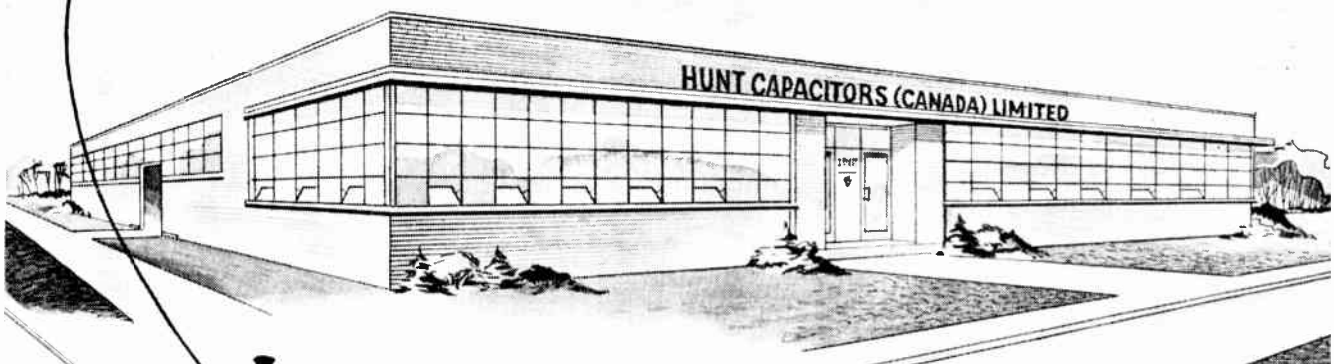
For further data on advertised products use page 61.

ADVERTISERS' INDEX

For further data on advertised products use page 61.

With the formation of Hunt Capacitors (Canada) Ltd., and the completion of the new plant and facilities at Ajax, Ontario, you will be assured of immediate service on the complete range of condensers.



Meeting Specific Canadian requirements

In the manufacture of capacitors a world-wide reputation can be built only as the maker meets the stringent requirements of one area after another. The international acceptance of Hunt has been built in this way. And in Canada now, Hunt capacitors are being designed, engineered and manufactured to conform with the climatic conditions plus the rating requirements of Canadian radio and electronic manufacturers.

In addition to manufacturing facilities, complete design and engineering service is available. If a standard item does not fit your requirements, Hunt will assist you in the development of the right condenser for your particular job.

HUNT CAPACITORS
(CANADA) LIMITED
830 BAYVIEW AVENUE, TORONTO, ONT.

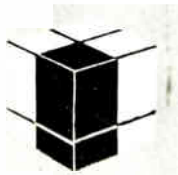
For further data on advertised products use page 61.

IN 1 Complete Telemeter PACKAGE

BY BENDIX - PACIFIC

These compact, rugged FM/FM telemetering packages are available for many types of applications. Numerous models of plug-in subcarrier oscillators and associated components are available as standard equipment to provide for maximum versatility and efficiency.

CUBICAL CONFIGURATION

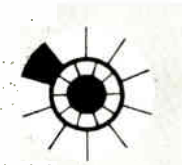


Vertical Components

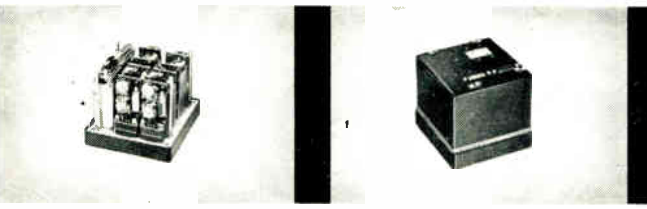
RECTANGULAR CONFIGURATION

Horizontal Components

CYLINDRICAL CONFIGURATION

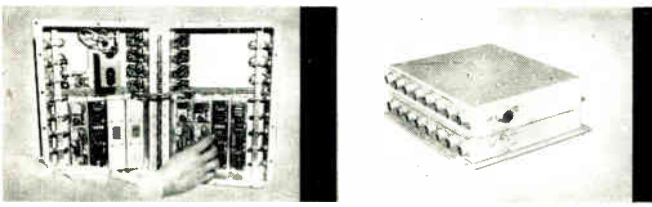


Wedge Shaped Components



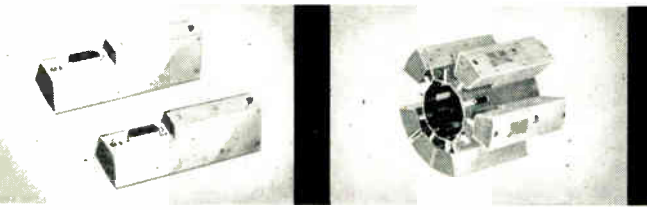
Compact Four Band Telemeter, Models TATP-3 and TATP-4

These packages, each incorporating four plug-in subcarrier oscillators, when used with a power supply and RF transmitter, form a compact, rugged system for telemetering various functions. Each package contains its own voltage regulator and calibration relays. The packages may be combined to form an 8 or 12 band system. Each package measures approximately 4.5" in each dimension and weighs approximately 3 pounds including oscillators. Standard power supplies are available for operating up to 3 packages and a 2 watt RF transmitter. The model TATP-3 operates in any 4 of the RDB bands below 22 kc; the TATP-4 in any 4 of the bands from 22 kc up.



Universal Eight Band Telemeter, Model TATP-2

Operates on any eight RDB bands from 1.7 to 70 kc permitting any combination of 8 resistance, voltage or inductance type measurements to be made by merely plugging in the proper subcarrier oscillators. The unit has provisions for mounting a model TXV-13 crystal controlled transmitter. Connectors are provided for a minimum of eight remotely located pickups. Standard power supplies are available for operation from 6, 12, 28 VDC or 115 VAC 400 cps power sources. Dimensions – 14"x 12.4"x 4.75".



Cylindrical Telemeter Configuration, Model TJW-1

These packages are built up of individual 30° wedge shaped components which plug into a cylindrical mounting assembly, Model TJW-1. As many as 10 subcarrier oscillators or other components can be installed into a 6.5" circular opening, 5.5" long. A center opening, approximately 1.5" in diameter, can be utilized for cables and pressure lines. A two-watt crystal controlled RF transmitter is also available for mounting in this configuration.

RADAR

SONAR

HYDRAULICS

TELEMETERING

ELECTRO-MECHANICAL

ULTRASONICS

PRODUCTS OF

Write for Complete Information to:

AVIATION ELECTRIC LIMITED

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