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CANADIAN
SCIENTIFIC
AND
PROFESSIONAL
EQUIPMENT



Chemicals Branch
Department of Industry, Trade and Commerce
Ottawa 4, Ontario
Canada

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CANADIAN SCIENTIFIC AND PROFESSIONAL EQUIPMENT

Canada, Dept of Industry, Trade, and Commerce, Chemicals
Branch.

CONTENTS

- 3 Introduction
- 4 Equipment Categories
- 6 Alden Industries Ltd.
- 7 Atomic Energy of Canada Limited
- 8 Barringer Research Limited
- 9 Building Products of Canada Limited
- 10 Canadian Research Institute
- 11 Carrol & Reed Limited
- 12 Coldstream Products of Canada Ltd.
- 13 Controlled Environments Ltd.
- 14 Conway Electronic Enterprises Limited
- 15 DBM Industries Limited
- 16 Detronics Limited
- 17 Dominion Welding Engineering Company, Limited
- 18 Ekolite Ltd.
- 19 Emoh Sales & Mfg. Limited
- 20 Engelhard Industries of Canada Ltd.
- 21 Exploranium Corporation of Canada
- 22 Foster Refrigerator of Canada Ltd.
- 23 Geonics Limited
- 24 Guildline Instruments, Ltd.
- 25 Hoplab Inc.
- 26 Hotpack (Canada) Ltd.
- 27 Hunttec ('70) Limited
- 28 O. H. Johns Scientific
and The O. H. Johns Glass Company Ltd.
- 29 Lincraft Limited
- 30 Lisle Instrument Systems Limited
- 31 Maknur Laboratories Limited
- 32 McPhar Geophysics Limited
- 33 Metrix Manufacturing Company Limited
- 34 National Electrolab Associates Ltd.
- 35 Polytronics Co.
- 36 The Robert Mitchell Co., Limited
- 37 Scintrex Limited
- 38 Sigma Instruments (Canada) Ltd.
- 39 Space Optic Limited
- 40 Spar Aerospace Products Ltd.
- 41 Stark Electronic Instruments Ltd.
- 42 Velan Engineering Companies
- 43 Canadian Trade Offices

For advanced scientific and professional equipment and supplies — consider Canada. In recent years, Canadian manufacturers have acquired an enviable reputation for contributing to the advancement of science and technology, and they have the interest and capability to share their achievements.

This booklet, published by the Canadian Department of Industry, Trade and Commerce, describes the products and services of 37 leading manufacturers experienced in serving world markets. Its purpose is to provide buyers with sources of supply and introduce distributors to successful companies seeking representation in various parts of the world.

These products are only a sampling of the excellent equipment now available from Canada's more than 250 manufacturers in the field. The list is long and at any given time there are as many products in the research and development stages. This innovative approach indicates how Canadian producers are introducing greater effectiveness, economy and convenience into the competitive technological field.

Use of reply cards at the back of the book will provide more details on these Canadian products and services.

Another source of information is your nearest Canadian government trade office, or contact:

**Tourist, Hospital and Education Division
Chemicals Branch
Department of Industry, Trade and
Commerce
112 Kent Street
Ottawa 4, Ontario, Canada**

EQUIPMENT CATEGORIES

AIR POLLUTION DETECTION	Barringer Research Limited Canadian Research Institute	
ANALYSIS	Atomic Energy of Canada Limited Canadian Research Institute Conway Electronic Enterprises Limited DBM Industries Limited	Dominion Welding Engineering Company, Limited Guildline Instruments, Ltd. Hotpack (Canada) Ltd. National Electrolab Associates Ltd.
BIOLOGICAL RESEARCH	Coldstream Products of Canada Ltd. Controlled Environments Ltd.	
GEOPHYSICS	Barringer Research Limited Exploranium Corporation of Canada Geonics Limited	Huntec ('70) Limited McPhar Geophysics Limited Scintrex Limited
LABORATORY EQUIPMENT AND SUPPLIES	Building Products of Canada Limited Canadian Research Institute Coldstream Products of Canada Ltd. Controlled Environments Ltd. Conway Electronic Enterprises Limited Dominion Welding Engineering Company, Limited Emoh Sales & Mfg. Limited Engelhard Industries of Canada Ltd. Foster Refrigerator of Canada Ltd. Guildline Instruments, Ltd.	Hoplab Inc. Hotpack (Canada) Ltd. O. H. Johns Scientific and The O. H. Johns Glass Company Ltd. Lincraft Limited Lisle Instrument Systems Limited Maknur Laboratories Limited Metrix Manufacturing Company Limited Polytronics Co. The Robert Mitchell Co., Limited Spar Aerospace Products Ltd. Stark Electronic Instruments Ltd.
MEASURING	Barringer Research Limited Canadian Research Institute Carrol & Reed Limited Conway Electronic Enterprises Limited DBM Industries Limited Guildline Instruments, Ltd. Lisle Instrument Systems Limited	Metrix Manufacturing Company Limited National Electrolab Associates Ltd. Polytronics Co. The Robert Mitchell Co., Limited Sigma Instruments (Canada) Ltd. Spar Aerospace Products Ltd. Stark Electronic Instruments Ltd.
OCEANOGRAPHIC	Barringer Research Limited Dominion Welding Engineering Company, Limited Ekolite Ltd.	Guildline Instruments, Ltd. National Electrolab Associates Ltd. Spar Aerospace Products Ltd.

PHYSICS	Alden Industries Ltd. Canadian Research Institute Conway Electronic Enterprises Limited Hotpack (Canada) Ltd.	O. H. Johns Scientific and The O. H. Johns Glass Company Ltd. Stark Electronic Instruments Ltd.
SAFETY	Canadian Research Institute Emoh Sales & Mfg. Limited Spar Aerospace Products Ltd.	
SURVEYING AND MAPPING	Carrol & Reed Limited Space Optic Limited	
TESTING	Atomic Energy of Canada Limited Canadian Research Institute Conway Electronic Enterprises Limited DBM Industries Limited Detronics Limited Dominion Welding Engineering Company, Limited Foster Refrigerator of Canada Ltd.	Guildline Instruments, Ltd. O. H. Johns Scientific and The O. H. Johns Glass Company Ltd. Polytronics Co. The Robert Mitchell Co., Limited Sigma Instruments (Canada) Ltd. Spar Aerospace Products Ltd. Stark Electronic Instruments Ltd.
VALVES AND STEAM TRAPS	Velan Engineering Companies	

CIRCLE REPLY CARD No. 1

Alden Industries Ltd. produces sturdy, low-cost instruments for safe, simple, reliable illustration of the fundamental laws of optics.

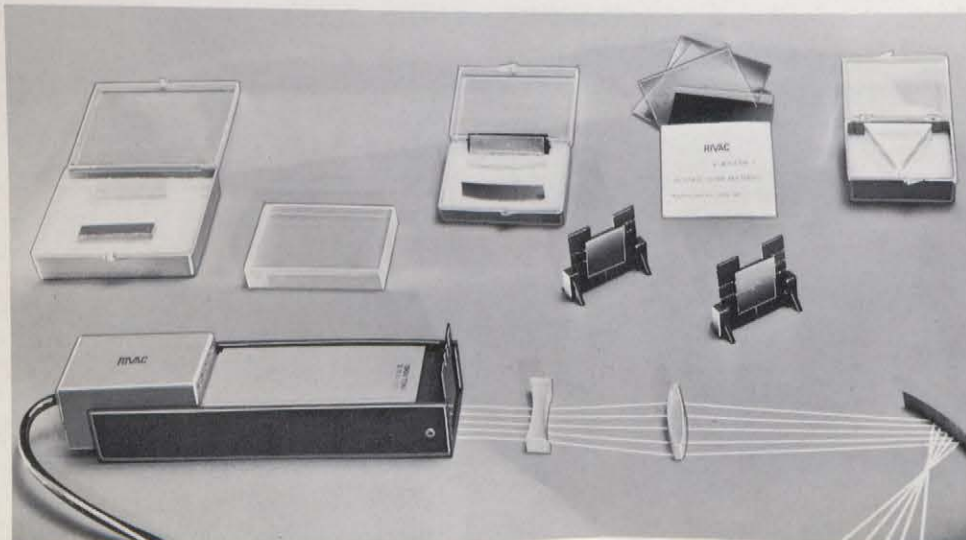
A basic Rivac optic set comprises a ray box to demonstrate angles of reflection and refraction, concave and convex lenses and mirrors and a plane mirror. By placing the various optics on white paper in front of the ray box, reflections and refractions can be traced and accurately measured, and the paper retained for reference.

Prism, filter and screen accessories enable colour experiments to be conducted simply and inexpensively. Parallel-sided

optic blocks and semi-circular discs provide index of refraction data in the simplest possible form.

Rivac instruments are sturdily constructed and economically priced to enable students to conduct experiments individually. Three models of the ray box — which has a rigid extruded vinyl base and an adjustable metal light box with mounted transformer — are available. They operate on electric systems of 110-volt 50/60 cycles, 220-volt 50 cycles or from a 12-volt power source.

Brochures and price lists are available on request. Delivery is prompt with shipping arranged to mutual convenience.



Alden Industries Ltd. — Rivac ray box and related optical accessories

ATOMIC ENERGY OF CANADA LIMITED
Commercial Products — Marketing Division
P.O. Box 93
Ottawa, Ontario, Canada

Tel: (613) 836-2790

Telex: 013-462

Cable: NEMOTA

CIRCLE REPLY CARD No. 2

Atomic Energy of Canada Limited has recently developed an automatic isotopic X-ray fluorescence/neutron activation analysis system for routine analysis and quick identification of unknown elements in the mining and foundry industries, pollution monitoring and analytical and research laboratories.

Modular concept enables the basic system to be readily modified to suit special requirements at reasonable cost.

The company also produces a wide range of instruments for uranium and thorium exploration, including scintillation counting systems for ground and aerial applications.

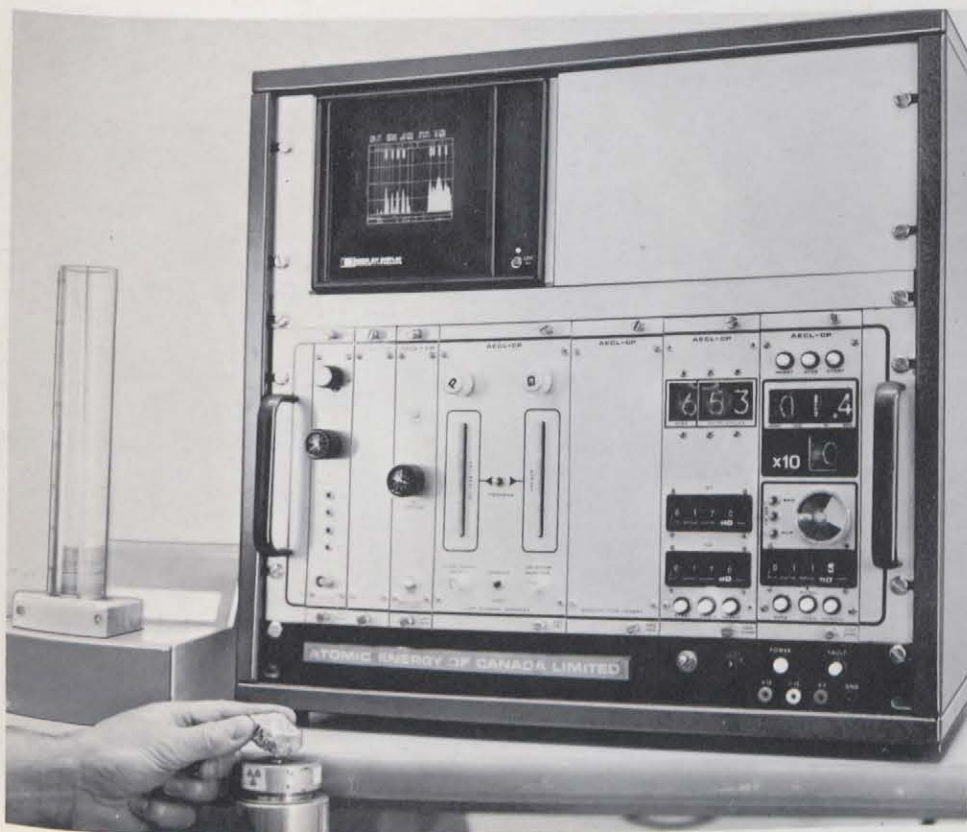
Ground instruments include two versions of a ground survey spectrometer. Model CPD-153E, a four-channel instrument, measures counts in any four regions of the spectrum precisely and quickly. A

prospectrometer — model CPD-290 — measures the integral and thorium count with comparable precision in slightly longer time. Both units are portable. The spectrometer weighs 18 pounds (8.17 kg) while the prospectrometer, one-third the cost, weighs four pounds (1.814 kg).

Another portable ground system — a radon counter that detects uranium and thorium in soils and water — provides an interesting alternative to the classic method of using instruments to measure gamma ray emissions.

Atomic Energy also produces an ultra-high sensitivity spectrometry system for precise airborne geological mapping and a smaller version for mineral exploration. Both properly compensate for temperature and height variations and offer various readout options which give immediate presentation of data, and data storage, for future computer processing.

In North America, AECL operates an analytical service based on nuclear techniques and conducts on-the-spot industrial radio-tracer studies. Inquiries are invited.



Atomic Energy of Canada Limited, Commercial Products — X-ray fluorescence analysis system showing rock sample over radioactive source and detector, in foreground, with the electronic package

BARRINGER RESEARCH LIMITED
304 Carlingview Drive
Metropolitan Toronto
Rexdale, Ontario, Canada

Tel: (416) 677-2491

Telex: 06-217893

Cable: BARESEARCH

CIRCLE REPLY CARD No. 3

Formed in 1961 to perform research in earth related sciences, Barringer Research Limited now manufactures geophysical and pollution instrumentation and provides highly specialized mineral exploration and pollution measurement services. Products include marine magnetometer systems and spectrometers which detect and measure various gases and vapours.

The spectrometers are based on a remote sensing principle which uses the characteristic spectrum for detection and quantitative measurement. Using a patented correlation technique, they provide previously unattainable information about atmospheric gases and measure the average concentration of a gas over a long optical path which is more representative of ambient pollution levels than a point sampling device. They are also free from sample conditioning and treatment errors.

These instruments are compact and lightweight. A two-gas correlation

spectrometer for sulphur dioxide and nitrogen dioxide detection, for example, is just 20 by 12 by 6 inches (50.8 by 30.4 by 15.2 cm) and weighs 30 pounds (13.6 kg). It is normally set on a tripod and can be easily mounted on a vehicle. Working temperature range is 0°F to 100°F (-17.8°C to 37.8°C). Operating from 12 or 24 VDC, its output is 0 to 10 VDC for either the 1 to 1,000 ppm metre range or 100 to 10,000 ppm metre range. International calibration is provided.

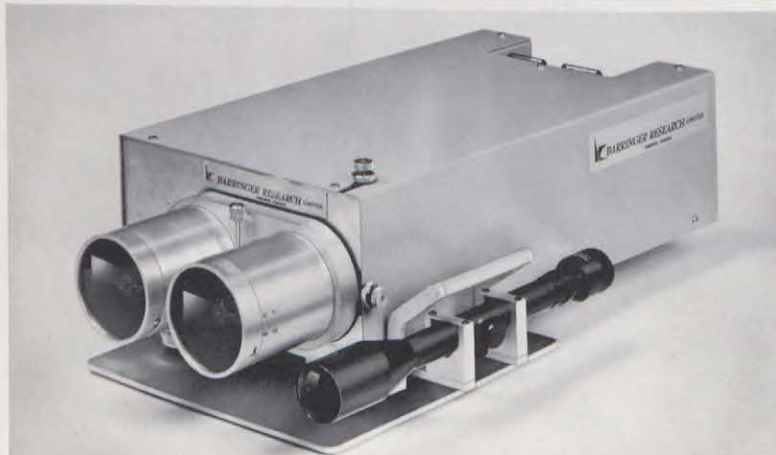
Barringer's portable 104 series magnetometers for land, vehicular, airborne or marine use are extremely reliable. An OM104 model was used for a long series of scientific experiments during a recent circumnavigation by the CSS Hudson of the North and South American continents.

Stock model OM104 has a basic sensitivity of one gamma at cycling rates from once a second to once in three minutes but other sensitivities are available. The instrument comprises a monitoring

oscilloscope, AC/DC power supply with selectable polarizing current and a choice of analog recorder. Options include various types of digital data acquisition systems, towing systems and on-board cables. Customized systems are readily provided.

Standard towing systems of 750 feet (215.1 m) have a breaking strength of 1,500 pounds (680 kg) and maximum tow speed of 20 knots (57 km/hr). Analog, digital and visual numeral outputs can be interfaced with existing recording systems. With switch selection and broad band tuning, the unit can operate unattended.

Delivery on magnetometers is immediate and on spectrometers, two months after receipt of order. Barringer Research generally ships f.o.b. Toronto but other quotations are available.



Barringer Research Limited — marine magnetometer system model OM104 and correlation spectrometer for SO₂ and NO₂ measurement

BUILDING PRODUCTS OF CANADA LIMITED
P.O. Box 6063
Montreal 101, Quebec, Canada

Tel: (514) 861-9331

Telex: 012-0067

Cable: WATERPROOF

CIRCLE REPLY CARD No. 4

For all laboratories handling corrosive wastes or high purity water, or both, Building Products of Canada Limited produces Vulcathene sinks, cup sinks, drainage and transmission systems made entirely of virgin polyolefin plastic.

In addition to superior resistance to corrosion, polyolefin sinks are resilient, incurring less breakage and damage to fragile materials than glass, metal or stoneware sinks, and withstand greater temperature extremes of waste products. They are also lightweight, permitting economies in shipping and installation costs. Maintenance is minimal.

The sinks are produced in various sizes and in a range of colours to blend with any interior décor. Many models have molded tailpieces which eliminate leakage.

The company's Vulcathene drainage systems comprise pipe, fittings, floor drains and traps. Joints and connections are entirely fused to make the system monolithic, in sizes $\frac{1}{2}$ inch to 6 inches (1.27 cm to 15.2 cm).

Also, Building Products offers pipe and compression fittings, which make up a complete polyolefin system for the transmission of high purity water with minimal contamination, and non-metallic faucets specifically designed for high purity water systems. The faucets are available for overhead, wall or bench mounting with self-closing or manual valves.

Prices are generally quoted f.o.b. factory but c.i.f. quotations are available. Delivery is prompt.



Building Products of Canada Limited —
Vulcathene sinks

CIRCLE REPLY CARD No. 5

Model HS-2 Murray Hydrogen Sulphide Analyzer, jointly developed by the British Columbia Research Council and the Canadian Research Institute, is a self-maintaining instrument for continuous monitoring and control of the hydrogen sulphide and sulphur dioxide content of flue gases to 2 ppm. It has excellent results used in paper mills — particularly those producing kraft — steel mills and in communities taking air pollution measurements.

The analyzer is housed in a free-standing steel cabinet 22 inches wide by 18 inches deep by 72 inches high (55.8 cm by 45.7 cm by 182.8 cm). It comprises a sampler to analyze gas, a drier to remove water and an ultra-violet spectrophotometer to view gas before and after it passes through a catalyst.

The first pass reads the sulphur dioxide content and the second the molecular

total of hydrogen sulphide plus sulphur dioxide. A small computer reads out either gas, or both, on a full scale adjustable from 10 to 2,000 ppm.

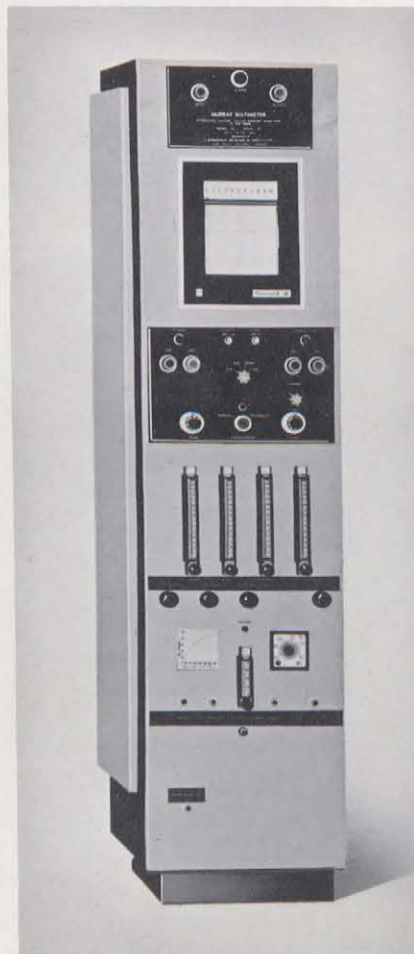
Audio-visual warnings indicate when the undesirable gas constituent exceeds a preset point. The device automatically standardizes itself by flushing with instrument air and correcting the zero reading once every eight hours. A full range of flow meters and automatic regulators permit operations to be inspected at any time.

Entry to the cabinet is by a side, gasketed door. Thermostatic control maintains uniform interior temperature. Predominantly solid-state circuitry and integrated circuits ensure maximum reliability during long periods of untended operation in remote locations.

Services required are a source of cool water and 115-volt, 60 hertz or 240-volt, 50 hertz electrical systems. Power requirement is less than one kilowatt.

Shipment, arranged to customer's convenience, is three months from receipt of order.

Canadian Research Institute produces hundreds of other instruments for chemical, mechanical, industrial, electrical, electronic, acoustical, radio and medical applications. Catalogues are available on request. Delivery on standard items is usually one to two weeks.



Canadian Research Institute — Murray hydrogen sulphide analyzer

CIRCLE REPLY CARD No. 6

The Akkuranger Mark 1 from Carrol & Reed Limited provides a quick, easy, economical, efficient technique of measuring, within approximately ± 1 inch (± 2 cm) accuracy, distances up to 4,000 feet (1,200 m) under any conditions.

The Akkuranger comprises an optical head which emits a high-frequency infrared light beam, a reflector to return the signal to the head and an electronics package which measures the shift in phase of the two signals, computing from this the distance of the reflector.

Once the reflector has been placed in position, the operator requires a maximum of 20 seconds to set the system in operation. One second later, the device records its first measurement, and other measurements follow automatically at one-second intervals, or the instrument will, on command, average 10 readings and display the results.

Operation is unaffected by pedestrian and automobile traffic. Measuring over stretches of water and inaccessible terrain is simplified (time-consuming triangulation is eliminated), and the device can be used for ranging on moving targets.

Another ingenious feature of Carrol & Reed Limited's Akkuranger is that the optical head, separated from the electronics package, can be bracket-mounted on top of a theodolite. This permits the operator to move the theodolite telescope freely while taking measurements.

Printed, integrated circuit boards have pull-out aluminum modules which can be instantly replaced in the field.

The device, weighing less than 45 pounds (20.412 kg), is portable and can be easily operated by one man for legal

surveys, construction, mining, shipbuilding, industrial and community planning applications.

Sales are through distributors only in the United States, Australia, all Scandinavian countries, England, Spain, Portugal, Italy and France. Inquiries from distributorships in other countries are invited.



Carrol & Reed Limited — Akkuranger Mk 1

CIRCLE REPLY CARD No. 7

Plant growth chambers, seed germinators and laboratory rooms by Coldstream Products of Canada Ltd. are built to meet the most precise lighting, temperature, humidity and air movement requirements.

They are also easy to install, requiring only connection to electric and plumbing services. The units, shipped in sections which can be assembled quickly and easily by unskilled workers, are factory assembled and tested before shipment.

Some of Coldstream's capability for exacting design is illustrated in plant growth chamber model PG 511. Glass or plastic film, sometimes placed between lamps and growth bed, is eliminated because each sheet of film reduces light on the growth bed by 10 per cent. The films are also difficult to keep free of dust and condensation which further reduce light intensity and also add to maintenance duties.

With 80 inches (200 cm) headroom between floor and lamp in the PG 511, potted plants may be placed on the floor, or on benches of varying heights, enabling studies of different light intensities to be conducted within the one chamber. Plant bed area is 36.5 square feet (3.39 m²). Six crops a year may be produced. Lamp light is adjustable, and lighting can be programmed manually or by time clocks.

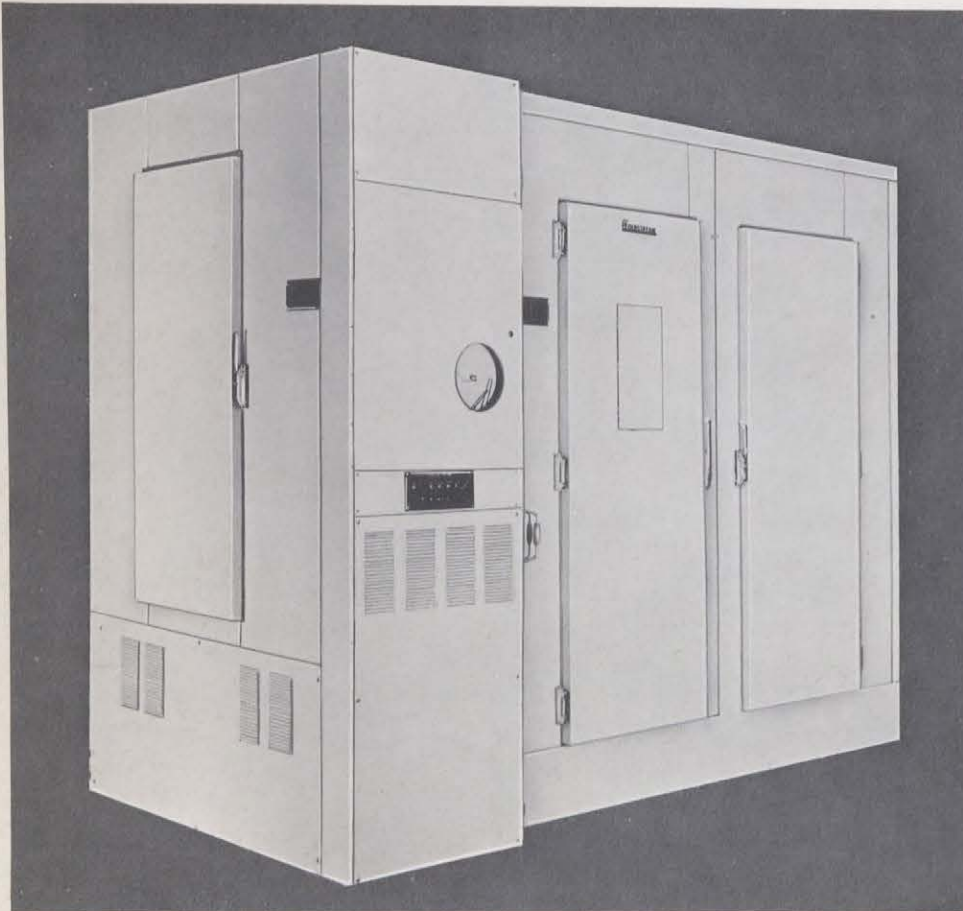
Two types of temperature control systems are available. One, using a liquid-filled stainless steel sensing bulb accurate to $\pm 2^\circ\text{F}$ (1°C), is economical. The other, with sensing elements of the fast thermistor type, responds within two seconds.

Day and night temperature settings are activated by time clocks. Safety controls activate audio-visual warnings in case of mishap.

Even distribution of air, flowing upward through the floor, ensures that temperature in any spot on one horizontal plane will not vary more than $\pm 1^\circ\text{F}$ (0.5°C) from the average temperature in that plane at any one time. Temperature and air flow are adjustable.

Normal humidity, variable from 50 to 70 per cent, can be controlled by hair type humidistats or by a thermistor or liquid-filled wet bulb. Humidifiers of the centrifugal atomizing type or spray nozzles can be used to provide higher humidities. An optional air bypass system provides lower humidities.

Delivery time on the PG 511 is 14 to 16 weeks. Other units leave the factory within 12 weeks of receipt of order. Shipping is generally f.o.b. destination.



Coldstream Products of Canada Ltd. — plant growth chamber model PG 511

CONTROLLED ENVIRONMENTS LTD.
661 Madison Street
Winnipeg 21, Manitoba, Canada

Tel: (204) 786-6451

Telex: 03-5431

Cable: CONVIRON

CIRCLE REPLY CARD No. 8

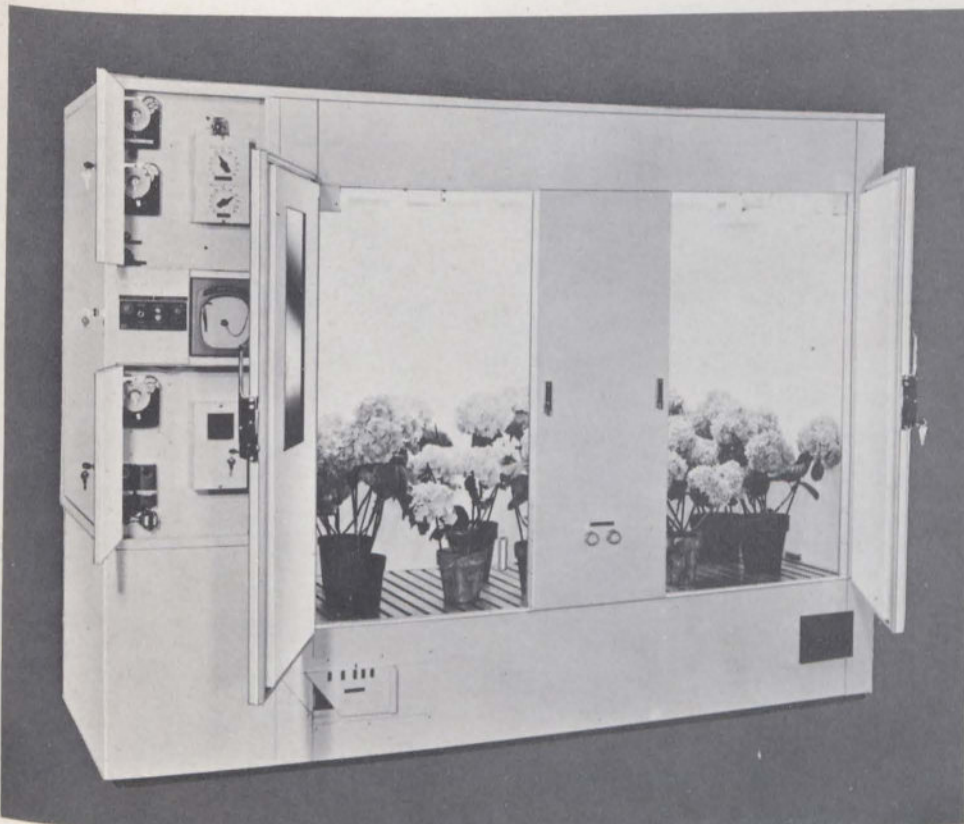
Specialist designers and manufacturers of chambers for plant growth, seed germination and entomology research, Controlled Environments Ltd. has introduced many improved designs, unique features and manufacturing economies to the biological sciences field.

The company manufactures 12 models of growth chambers, six humidity or entomology cabinets and two germinators. Its equipment — from single installations to large Phytotrons with 50 units — is operating in more than 20 countries. All units are factory tested and easily installed.

The company's design excellence is

exemplified in model EY-15 plant growth chamber, which provides a growth height of 48 inches (122 cm) and a growth area of 15 square feet (1.4 m²). An exclusive, patented "Unifloor" feature ensures uniform air distribution and identical temperature and humidity around each plant. An adjustable, counter-balanced lighting fixture permits instant, precise adjustment of lighting as plants grow and lamps age. Other features include an observation window, day and night thermostat, lighting and temperature timers and pilot lights.

Controlled Environments ships f.o.b. destination in North America, and c.i.f. port of entry for overseas destinations.



Controlled Environments Ltd. — plant growth cabinet model EY-15

CIRCLE REPLY CARD No. 9

Conway Electronic Enterprises Limited has a well-established reputation for building instruments that combine high performance with low cost and operational ease. Products range from power supply units and meters to educational analog computers and display oscilloscopes for industrial, medical and educational uses.

Oscilloscopes are available in standard electric, solid-state and transistor design. Type 383 is a versatile, transistorized multitrace display model for use where many persons must see the display simultaneously from a distance.

Its 9 by 12.9-inch (23 by 33 cm) screen simultaneously accommodates up to four brilliant orange, long-persistence traces which are clearly visible at 50 feet (15.2 m) in normal room lighting. Traces can be shifted over the full height of the screen and, because each has its own Y gain and shift control, they can be brought into juxtaposition or superim-

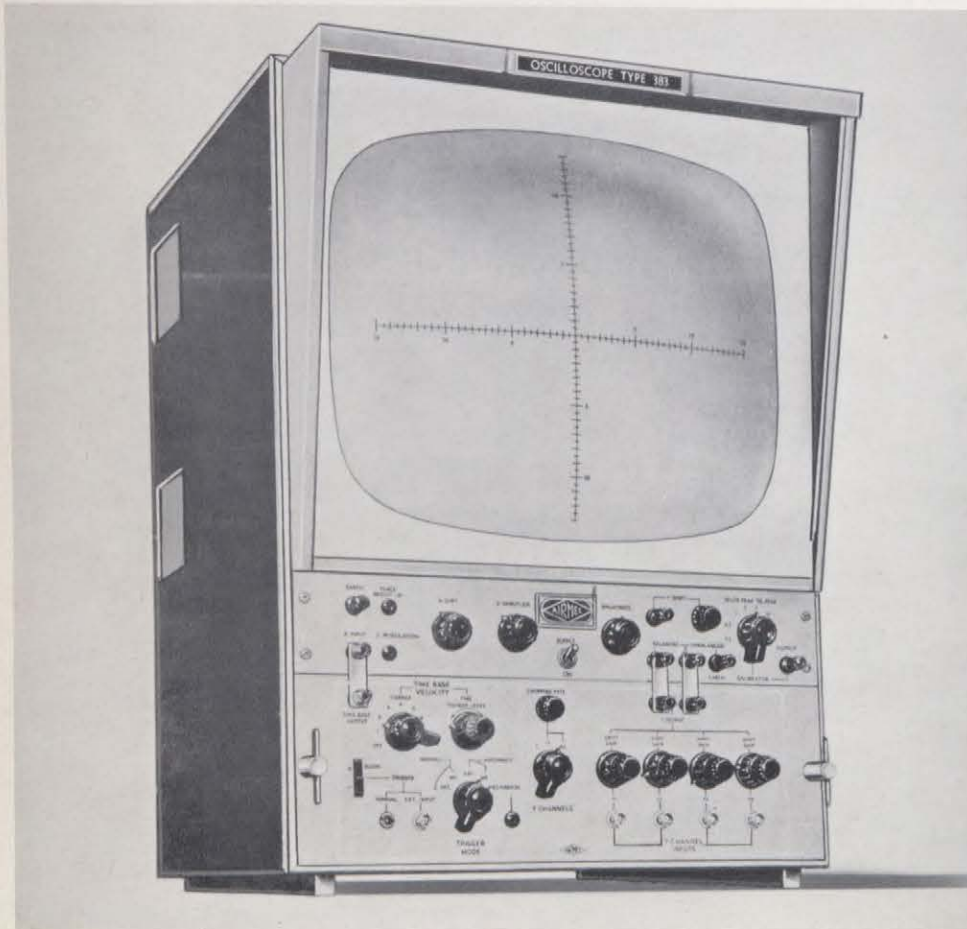
posed one on another. Traces are brightened only during the forward sweep to minimize risk of screen burning. A graticule printed directly on the tube face prevents parallax error and easy access to the tube face permits additional markings with a grease pencil.

Time base speed range — 30 seconds to one millisecond per sweep — is divided into seven switched bands with continuously variable fine control. Multitrace display is simultaneous on three low-speed bands and sequential on four high-speed bands. The unit offers full synchronizing, triggering and square wave calibrating facilities, polarity selection, variable trigger level, push button or remotely controlled one-shot operation and direction of the X sweep can be reversed. With a remote control box, an optional extra, the unit can be operated up to 15 feet (4.6 m) from the main instrument.

As an example of its medical applications, the oscilloscope can be used during cardiac catheterization for simultaneous display of arterial pressure, pulmonary arterial pressure, electrocardiogram and heart sounds. The unit's brief fly-back time, which ensures that no significant detail is missed, is particularly valuable in medicine.

In industry it can usefully display many waveforms encountered in industrial research and production testing. These include amplitude-frequency characteristics of active or passive networks, analog computer function waveforms, comparison of magnetic B-H loops and multichannel recording of pressure, vibration and strain.

Shipment, arranged to customer convenience, is made two days after receipt of order.



Conway Electronic Enterprises Limited —
display oscilloscope type 383

CIRCLE REPLY CARD No. 10

The Testograph, a recent development of DBM Industries Limited, provides an economical, efficient, foolproof method of examining and evaluating human behaviour.

It offers broad applications to schools, hospitals, universities, personnel and rehabilitation administrators, psychologists and psychiatrists.

Various written psychological tests, pre-printed on paper rolls and inserted into the unit, can be conducted without supervision. This encourages the examinee to respond more naturally and frees the examiner for other duties.

The Testograph presents a question with answer space on a paper strip, allows a predetermined time for a reply, then removes the paper from sight and records the time. Should an examinee reply in less than the allotted time, his action is

automatically recorded, and by turning a handle he can move on to the next question. Time allotment — which can be adjusted in increments of 10 seconds — can be varied from zero to two minutes.

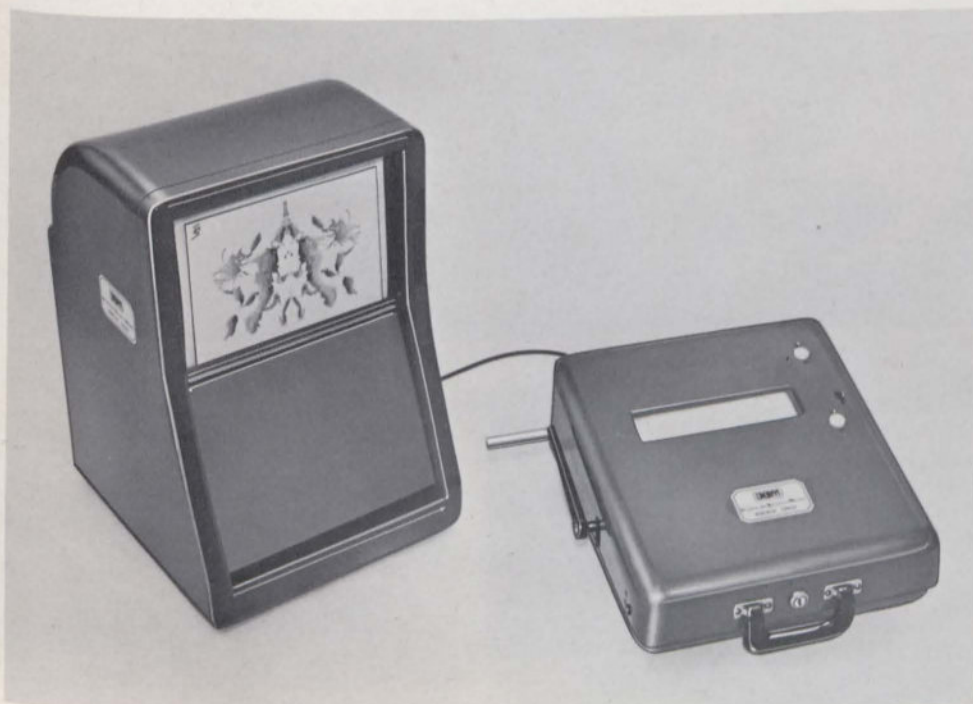
An easy-to-operate attachment is available for ink blot or other visual tests.

Another ingenious device is DBM's automatic surgical stapler with a pre-loaded, pre-sterilized, disposable magazine. Holding up to 20 staples, depending on size, the magazine is designed to ensure one-at-a-time feed. It is constructed from transparent surgical plastic enabling doctors and nurses to check on the number of clips at any time.

With magazine inserted, the stapler is 6 inches (15.2 cm) long, 1 $\frac{1}{4}$ inches (3.18 cm) wide and $\frac{5}{8}$ inches (1.6 cm) deep. It is easy to hold and operate as

clips are dispensed by slight hand pressure on the side bars.

Shipping can be arranged to mutual agreement. Delivery time is three weeks.



DBM Industries Limited — Testograph with ink blot test on visual testing attachment

CIRCLE REPLY CARD No. 11

With Detronic's model TER 120 distortion meter, routine testing of audio equipment can be carried out quickly by unskilled personnel.

When the unit is used to measure the total harmonic distortion content at a fixed level determined by an output meter or voltmeter, controls require no adjustment.

The model contains two inductive type stop band filters — the bandwidth being plus and minus five per cent of the centre frequency, wide at the one per cent, or -40 dB point, and wider at higher distortion levels. Because of the wide stop band (wide compared to the "Wien" type bridge) the distortion read-

ing is unaffected by source frequency changes of up to four per cent. Readability is excellent, meter response immediate, recovery fast and stability high.

The model consists of an overload protected preamplifier with an input impedance of 50 K ohms driving a fixed attenuator used in the level set position, and driving the stop band filter in the distortion 100 or 1,000 Hz position.

Long life and trouble-free operation is ensured by rugged construction and solid-state design.

Detronics Limited ships f.o.b. Toronto. Delivery is from stock.



Detronics Limited — distortion meter model TER 120

CIRCLE REPLY CARD No. 12

Dominion Welding Engineering Company, Limited custom designs environmental chambers for surgery and therapeutic treatment, fungus research, and animal, industrial, high altitude and oceanographic studies.

To the company, which pioneered in the field, safety of the chambers' occupants is of paramount importance. Design, therefore, incorporates latest proven devices and techniques to ensure dependability and operational procedures have set standards for simplicity. Dominion Welding also assumes responsibility for installation and start-up of its chambers and for staff training.

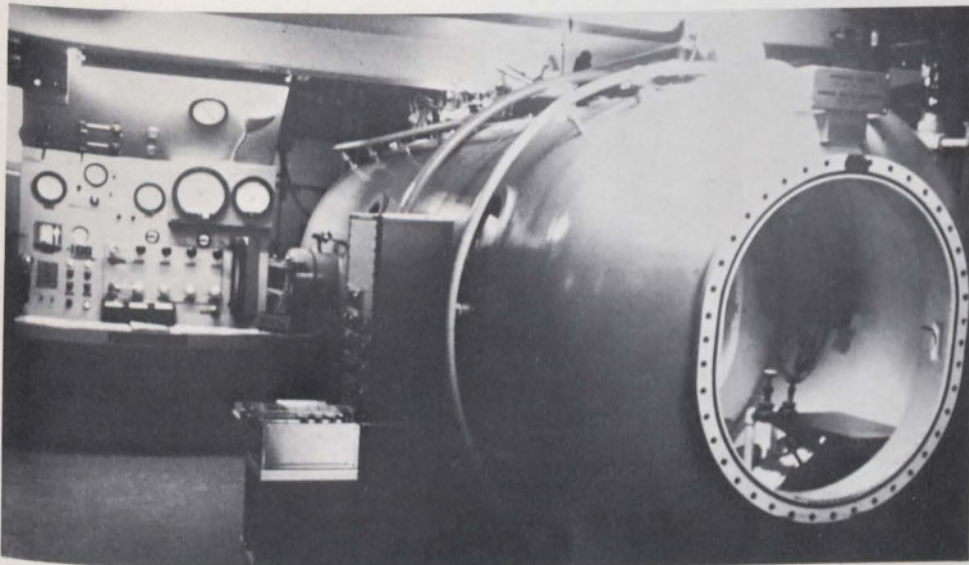
Typical hyperbaric facilities consist of a main chamber with attached personnel lock, pressurized from a central system and automatically controlled by pressure regulators. Chamber and lock can operate independently or simultaneously.

The chamber, of welded steel construction, has a medical lock that permits passage of medical instruments and supplies while it is under pressure, and ports for viewing and for electrical penetrations and other accessories.

A compact, easy-to-operate, semi-automatic control console monitors and regulates chamber conditions and supporting systems which include lighting, intercommunication, air compression and conditioning, sound muffling and fire control.

Dominion Welding's experimental chambers simulate diving conditions to 61 atmospheres, animal chambers are built to 31 atmospheres and research fungus chambers to 8 atmospheres. Chambers incorporate pressure and vacuum specified by the customer and can simulate a wide variety of climatic conditions.

Shipment, arranged to mutual convenience, follows three to four months after receipt of order.



Dominion Welding Engineering Company, Limited — hyperbaric chamber and control console

EKOLITE LTD.
525 East Hastings Street
Vancouver 4, British Columbia, Canada

Tel: (604) 254-4424

Cable: CANEKO

CIRCLE REPLY CARD No. 13

Ekolite Ltd. manufactures a complete range of standard and custom-built echo-sounding equipment for locating fish, analyzing feed and studying sea bed conditions.

Products include graph recorders, indicators and sonars of excellent design and craftsmanship for all fishing requirements, survey work and navigation.

Typical of the company's expertise is the EKO-15D recorder, a medium-priced unit in wide use. It can be adapted for either the sensitive wet, or the more permanent dry, paper charts, has a basic scale reading of 0-65 fathoms (0-118.9 m) phasing to 265 fathoms (484.6 m) maximum depth, paper density control, variable illumination, automatic chart rewind and fix-button marking.

Designed specifically for troller use, the EKO-15D has high resolution sounding and high density marking which sharply delineates feed and individual fish and proficiently plots schools of herring and anchovy. Other models show finer density variations of small fish schools, and provide full facilities for sea bed fishing. Models are built for all ship voltages.

Ekolite also manufactures automatic pilots for manual or hydraulic steering systems of vessels up to 125 feet (38.1 m) in length.

While prices are generally quoted f.o.b. Vancouver, Ekolite products are also available from representatives in San Diego, California, U.S., and in Lima, Peru. Delivery is usually two to six weeks.



Ekolite Ltd. — troller recorder model EKO-15D

CIRCLE REPLY CARD No. 14

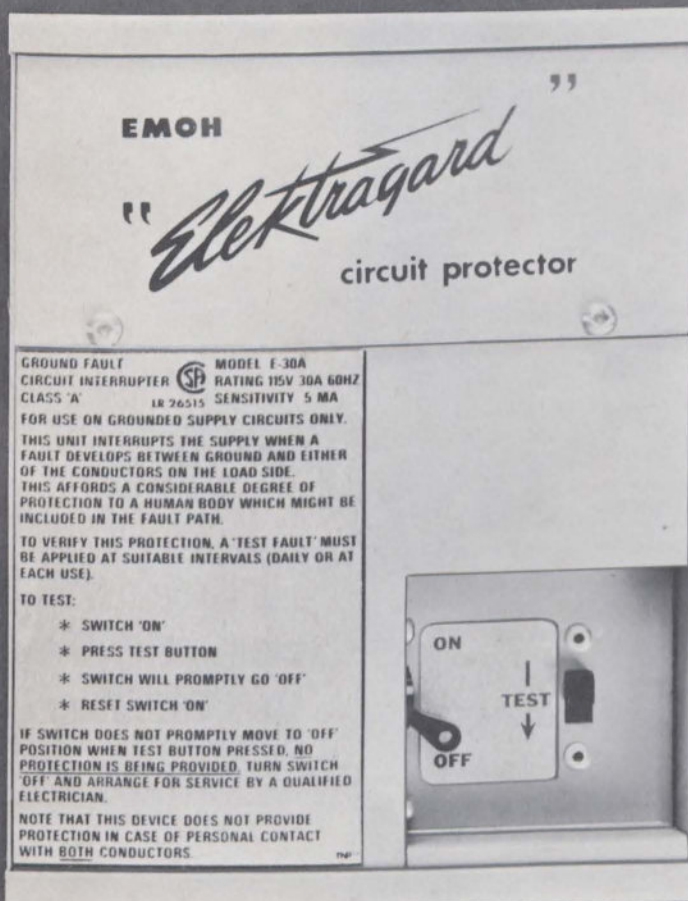
Injury, death, fire or damage to costly equipment caused by electrical line-to-ground faults can be prevented simply by wiring an "Elektragard" into an electrical branch circuit. Recently developed by Emoh Sales & Mfg. Limited, the ground fault circuit interrupter is for use wherever there are electrical circuits, including the home.

The device — unaffected by line transients such as motor starts — detects the "trouble" or ground fault current which flows externally to the normal flow used by lights, motors or electrical appliances. For example, when a person simultaneously touches a conductor of electricity such as water, earth or some

metals and the "hot" side of a 120-volt circuit, Elektragard breaks the circuit within 25 milliseconds or before the current flowing through the person's body reaches five-thousandths of an amp. To cause injury, a current must be at least three times that strength.

Elektragard operates at temperatures ranging from -30°F to 150°F (-34.4°C to 65.6°C) and solid-state design ensures long life and easy maintenance. A built-in, non-polarity sensitive test circuit is included to verify Elektragard's good working order.

Orders, delivered from stock, are shipped f.o.b. plant.



Emoh Sales & Mfg. Limited — "Elektragard"
ground fault circuit interrupter

ENGELHARD INDUSTRIES OF CANADA LTD.
512 King Street East
Toronto 248, Ontario, Canada

Tel: (416) 362-3211

Telex: 02-21319

Cable: BAKERPLAT, TORONTO

CIRCLE REPLY CARD No. 15

Engelhard Industries of Canada Ltd. specializes in the manufacture of platinum and platinum alloy apparatus for medical, mineral, research and analytical laboratories.

Products include crucibles, vessels and electrodes in an exceptionally wide range, anodes, dishes, beakers, combustion boats, trays, crucible tongs, spatulas, spoons, inoculating loops, triangles, seamless tubing, filter cones, sintered filter plates in a variety of diameters and pore sizes, platinum gauze, wire and sheet, and wares and apparatus for microanalysis, micro-weighing and drying.

The company also manufactures special platinum and platinum alloy apparatus to order, salts and solutions of platinum metals, powders of gold, silver and the platinum group of metals and dish re-shapers — made of specially selected hardwood — to restore dented vessels to their original shape.

An illustrated catalogue of Engelhard products is available on request. Prices are quoted f.o.b. Toronto. Delivery time is one week after receipt of order.



Engelhard Industries of Canada Ltd. —
platinum and platinum alloy laboratory ware

CIRCLE REPLY CARD No. 16

Exploranium Corporation of Canada designs and manufactures airborne gamma ray spectroscopy systems for use in mineral exploration and geological mapping.

The systems utilize nuclear instrumentation techniques with an extended operating temperature range. Construction is 90 per cent integrated circuitry to produce compact, lightweight instruments of maximum reliability. All analog and pulse processing circuits are temperature compensated. Models operate from either 12-volt or 24-volt DC aircraft electrical systems.

Model DiGRS-2000 incorporates a special purpose digital computer to correct the analog and digital data for the effects of spectral interaction caused by Compton scatter in the detectors. This feature results in 100 per cent discrimination between the three naturally occurring radioisotopes of interest.

Model DiGRS-3000 digital system features three-digit readout and an analog computer. The digital data output is "raw", allowing full corrections to be applied in the ground-based computer. The analog computer can be programmed to correct the analog data for the spectrum interaction effects.

An advantage of the three-digit system is that the countrate range expansion, or multiplication factors, are not required with conventional detector volumes. Range expansion multipliers are provided, however, in case very large detector volumes are used.

Exploranium Corporation also manufactures heated stylus chart recorders, with six or eight channels, specially constructed for airborne use.

The company guarantees materials and workmanship for one year from date of shipment. Equipment, which may be

leased or purchased, is delivered within three weeks to four months, depending on stock and detector requirements. Shipping is arranged to mutual convenience.



Exploranium Corporation of Canada — model DiGRS 3000 digital spectroscopy system

FOSTER REFRIGERATOR OF CANADA LTD.
Janelle Street
Drummondville, Quebec, Canada

Tel: (819) 478-8101

Telex: 018-3521

Cable: FOSTERFRIDGE

CIRCLE REPLY CARD No. 17

Foster Refrigerator of Canada Ltd. manufactures more than 100 refrigerator and freezer models for long-life, trouble-free, medical and scientific applications throughout the world.

Foster products are constructed of a specially developed aluminum alloy, thoroughly tested under world-wide atmospheric conditions. It will not rust, corrode, pit or discolour, and provides the non-toxic, non-magnetic, non-sparking qualities critical to laboratories.

Low-cost and lightweight, the aluminum equipment is economical to purchase and ship, and, because the all-welded aluminum reflects rather than absorbs radiant heat, it increases the effectiveness of insulation by 25 per cent. Moisture-proof, aluminum interiors are

seam-welded, and exteriors are generally finished in "Satintone", an attractive, easy-to-clean, colourless coating. All products are also available in stainless steel.

A complete line of accessories to meet exacting user requirements is available. These include a 3.2 cubic foot (.09056 m³) automatic defrost, -18°C freezer section for any refrigerator, audio-visual alarms that monitor temperature in up to five cabinets through a central control panel, and explosion-proof cabinets for hazardous applications.

Products are shipped within three to six weeks after receipt of order. Shipping is to mutual convenience. Inquiries are invited.



Foster Refrigerator of Canada Ltd. —
biological refrigerator

CIRCLE REPLY CARD No. 18

Two versions of geophysical electro-magnetometers, using powerful military radio transmitters to produce the primary field, are offered by Geonics Limited. The company, a pioneer in the development of VLF-EM equipment, introduced the VLF-EM 16 for ground prospecting work in 1964 and three years later the VLF-EM 18 for airborne applications.

The VLF units offer several important advantages over other electromagnetic prospecting methods. Their source of primary power is constant, unlike the electrical discharges of thunderstorms relied on by other passive methods, and, unlike active methods, they require no local transmitter, saving on power consumption. Elimination of a transmitter gives the ground model two additional advantages — light weight and simpler design. It can be operated by one man and unskilled personnel can be trained to use it within a few hours.

The VLF-EM 16 comprises three main components: a receiver, a receiving coil and a reference coil. It weighs approximately 2½ pounds (1.124 kg).

The VLF-EM 18 has the same two types of coils — mounted outside the aircraft — and a receiver console for the aircraft cabin.

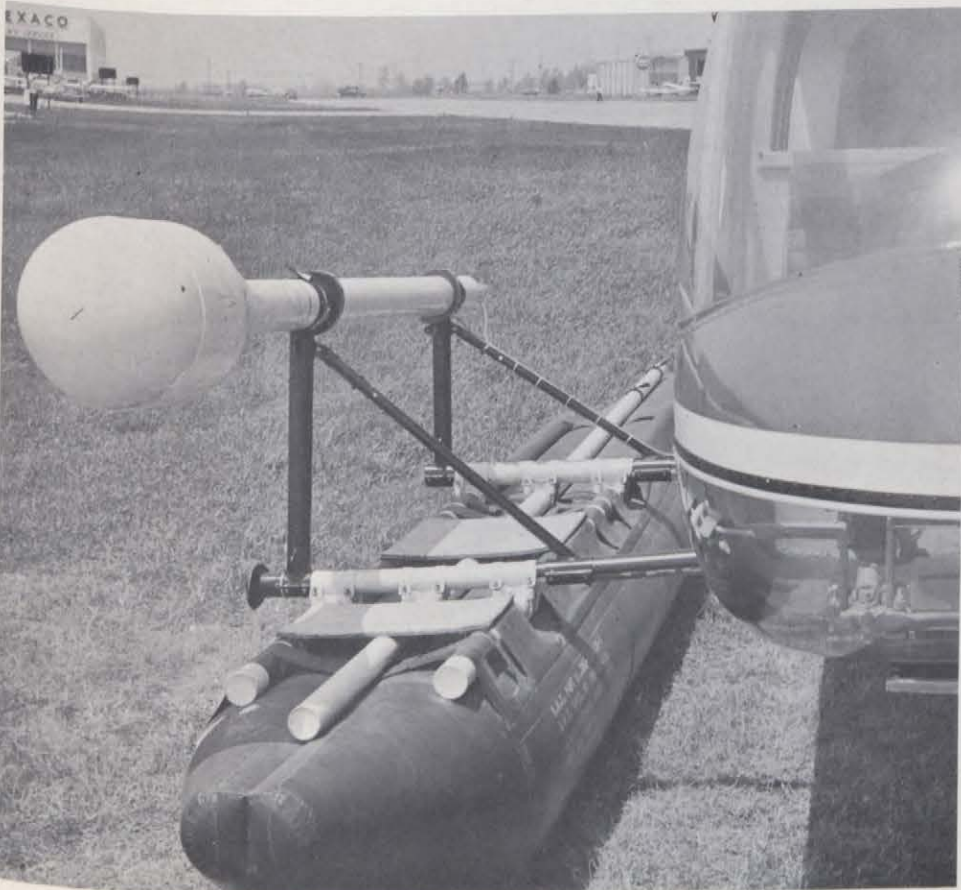
The reference coil picks up the horizontal magnetic component of the VLF signal and the receiving coil any vertical magnetic signal. The receivers amplify the signals and measure the vertical real and quadrature components from the receiving coil against the signal from the reference coil. Both models have plug-in tuning modules designed for the different transmitting stations, conveniently located around the world.

The aircraft model produces measurements in a form suitable for in-flight

digitization and tape recording and for analog profiles on a chart recorder. It operates from a standard power supply of 24 to 28 volts and can be used in almost any type of aircraft. One of the most dramatic features of Geonics' VLF System is its ability to discriminate between deep-seated and surface targets.

Another Geonics' instrument, the EM 17 horizontal-loop electromagnetic unit, greatly simplifies field operations. It offers automatic readout, excellent noise suppression — permitting surveys to be carried out near power lines — and can also be used in coaxial-loop mode.

The VLF-EM 16 is shipped air freight within two weeks, the EM 17 within three weeks and the VLF-EM 18 in six to eight weeks after receipt of order. Quotations are available c.i.f. or f.o.b.



Geonics Limited — coil housing boom for the EM18 VLF system, helicopter installation

CIRCLE REPLY CARD No. 19

For many years a leading producer of metrology equipment of highest accuracy, precision and stability, Guildline Instruments, Ltd. now offers a unique data collection system for oceanographic studies.

The system, field-tested for three years, comprises a compact, lightweight probe which can be lowered into water at a rate of three metres a second, and a panel-mounted, solid-state control console for the ship deck.

With unparalleled ease, speed and accuracy, three high-precision transducers of the probe transmit temperature, salinity and depth measurements to the console. Signals are immune to extraneous noise and thermo-electric effects.

The console, with amplifier outputs designed for direct drive of X-Y potentiometric recorders, has controls for four

output scale sensitivities for each function, and 10-step, zero-suppression controls provide an additional choice of recording levels. This enables the operator to obtain optimum presentation of observation range and resolution.

The instrument readily converts from narrow range conductivity (full span, 28 to 40 ppt) with accuracy of ± 0.04 ppt, to wide range (full range from deep ocean, to 40 ppt down to tap water, to 50 ppm) with accuracies of ± 0.06 ppt at 35 ppt. and ± 1 ppm at 100 ppm. Conductivity in the narrow range model is automatically temperature compensated to give a direct analog of salinity.

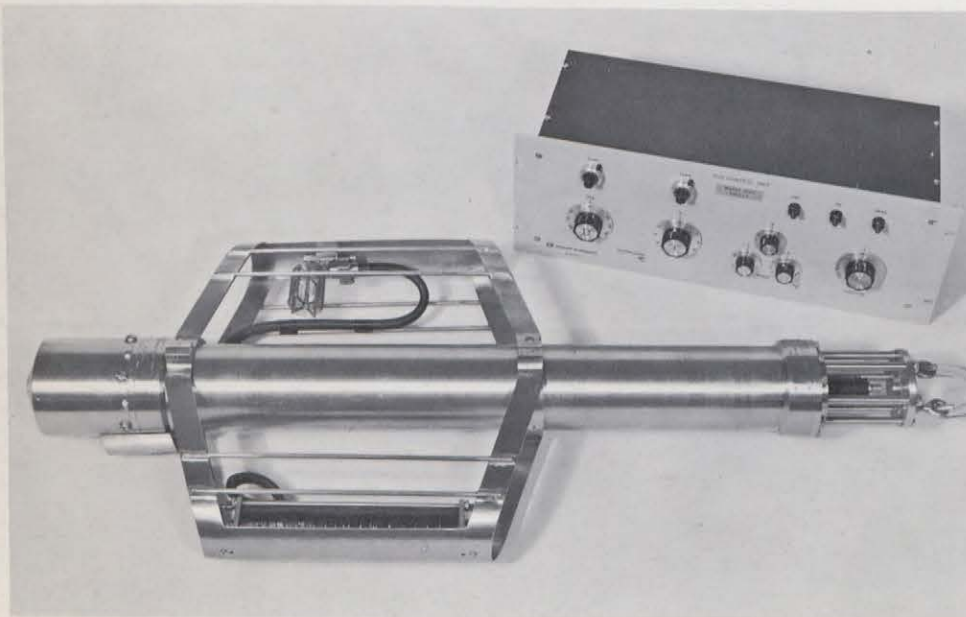
Interchangeable plug-in components can be independently calibrated, and the entire system serviced aboard ship.

Operation procedure is simple. After checking thermometer ice-point, salino-

meter reading and surface pressure and selecting recording levels, the probe is dropped to a selected depth. Maximum depth (limited chiefly by the cable) is 9,800 feet (3,000 m) with maximum pressure 5,000 psi (350 kg/cm²). A normal 3,280-foot (1,000 m) cast, giving both down and up profiles, requires less than 15 minutes. Delivery time is 90 days. Products are generally shipped f.o.b. factory.

The company's metrological equipment includes calibration consoles, current-comparator bridges and potentiometers, temperature-resistance instrumentation, accessories and components.

Guildline is represented in most countries.



Guildline Instruments, Ltd. — oceanographic data collection probe and control console

HOPLAB INC.
342 Jackson Street
Quebec City 8, Quebec, Canada

Tel: (418) 681-0136

CIRCLE REPLY CARD No. 20

In fabrication and function, the Hoplab Inc. front loader washer is one of the most sophisticated units of its type produced anywhere.

Automatic sliding doors interlocked for real pass-through action, keeping soiled and cleaned materials completely separated, are unique features. One-door models are also available.

For use in many hospital departments, industrial and educational laboratories, the unit washes all types of laboratory glassware individually and thoroughly, including hard-to-clean pipettes, needles and rubber tubes. No item requires pre-scrubbing or emptying, and breakage is non-existent. Easily fitted accessories are designed for each type of item washed.

In the washer, every item is pre-rinsed, washed with detergent solution, rinsed

with fresh hot water and then with non-recirculated distilled water. To eliminate all possibility of contamination, water and solution are never recirculated, and the machine is programmed to ensure that no step of the cycle is skipped.

There is a control for additional washing time, special cycle programming for unusual needs, and a choice of water temperatures from cold to 180°F (82.2°C).

Water pressure is independent of local supply and compressed air is not required.

With stainless steel construction throughout, maintenance is minimal. Access for servicing is from the front of the machine; showers and automatic doors are removable; piping dismantles in minutes; and rounded tub corners are self-cleaning.

The washer, winner of an award from Canada's National Design Council, is handsome, compact and can be built-in or free-standing. Five models are available.

Delivery time is six weeks. Orders are shipped f.o.b. Quebec City in North America, and are arranged to mutual convenience for other destinations.



Hoplab Inc. — pass-through front loader washer

CIRCLE REPLY CARD No. 21

Hotpack (Canada) Ltd., manufacturer of a wide range of laboratory equipment, is noted for engineering foresight. Products include incubators, growth chambers, controlled environmental rooms, furnaces, baths and ovens.

An example of the products' superior design is model 273600 low skin temperature vacuum oven for economically testing, conditioning and drying electronic components, glass annealing, rapid drying of chemicals and processing foodstuffs and plastics.

The oven, with an interior temperature range of 40°C to 300°C, remains at a safe, low temperature outside, even when operating at capacity. This feature reduces power consumption and demands on a laboratory's air conditioning and ventilating systems.

In addition to a sealed, adjustable thermostat accurate to $\pm 0.5^\circ\text{C}$, the unit has a built-in safety thermostat that

takes over in case of mishap. Another feature is an enlarged vacuum valve that permits control of pump down rate. The vacuum gauge is calibrated from 0 to 30 inches (75 cm) and pump down to 30 inches (75 cm) requires only 75 seconds.

The heat chamber — square to provide maximum load area — is clearly visible through a heat-tempered window. Shelving, with perforations for optimum uniformity and even evacuation, and the chamber, are of stainless steel.

Insulation is three-inch (7.5 cm) mineral wool, impervious to corrosive fumes and vapours, and a rust-resistant, heavy gauge steel exterior has baked-on enamel finish. Ovens can be stacked or installed side by side.

Delivery on the oven is 30 days; on other products, immediately to 90 days. Shipping complies with customer requirements.



Hotpack (Canada) Ltd. — low skin temperature vacuum oven model 273600

CIRCLE REPLY CARD No. 22

The Hunttec MK III pulse type induced polarization receiver achieves the maximum theoretical limit in time domain measurement in technology.

Once receiver timing is set up to match transmitter timing, signal acquisition is automatic. The triggering circuit responds only to the signal at the electrodes for a short interval preceding and following the signal's expected arrival time. Should the signal not arrive during that interval, the measuring circuit will ignore it. Internal controls permit extensive adjustments to the timing cycle.

True integration of V_p and V_s signals is accomplished by five sample-and-hold integrating registers, each storing the sum: $\sum_{i=1}^N \int V dt$. N is the number of cycles. Since the reference for the digital voltmeter (DVM) is the content of the V_p memory register, there is no need to count cycles. When switched to M , the

DVM displays the ratio: $\frac{\sum_{i=1}^N \int V_s dt}{\sum_{i=1}^N \int V_p dt}$

When registers reach their 10-volt capacity, operation stops automatically with the DVM displaying three digits, plus sign. Accumulation may be stopped at any point, and integration is reactivated by pushing a button. A speed/gain control switch provides extra high resolution.

Three additional M factor registers are offered as options to correspond with the theory that the shape of the I.P. decay curve may be diagnostic of the type of mineralization. The additional M factor readings enable the shape of the curve to be determined instantly.

The MK III receiver carries a one-year warranty. Hunttec ('70) Limited delivers within six to eight weeks of receipt of order. Shipping is arranged to mutual convenience.



Hunttec ('70) Limited — MK III induced polarization receiver

O. H. JOHNS SCIENTIFIC
and THE O. H. JOHNS GLASS COMPANY LTD.
219 Broadview Avenue
Toronto 8, Ontario, Canada

Tel: (416) 461-8153

Telex: 06-217878

CIRCLE REPLY CARD No. 23

O. H. Johns Scientific and The O. H. Johns Glass Company Ltd. have supplied custom glassware and scientific apparatus to the North American educational and research community since 1928. Products, now available world-wide, number in the thousands and range from glass extraction apparatus to laboratory centrifuges and environmental chambers.

Most recent developments include Maple Leaf brand disposable culture tubes which are chemically clean and ready for use. Fully automated equipment assures dimensional uniformity. Tubes are wrapped in plastic with easy Quik-Pik selection.

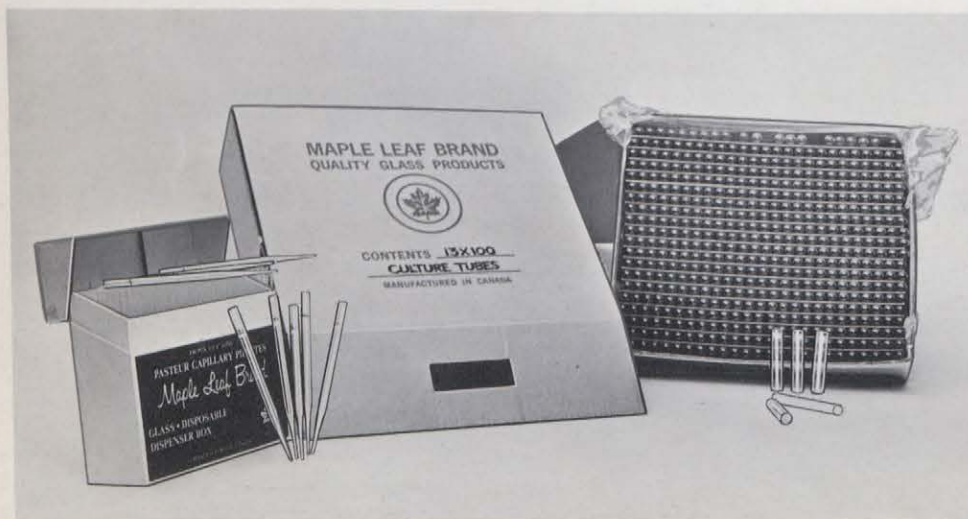
The company also manufactures Maple Leaf disposable Pasteur pipettes. These constriction pipettes are produced under exacting standards with uniform capillary bore. Tips have close diameter tolerances and square, even cut

finish. Constriction near mouth for cotton plugging prevents plugs from slipping down. Both the culture tubes and the pipettes are packaged in convenient, flip-top boxes.

Also recently developed — in conjunction with the Ontario Cancer Institute — is a Sta-Put apparatus for separating cells by velocity sedimentation without decreasing their vitality. Large colonies of differentiated cells may be separated rapidly.

An illustrated 755-page catalogue describing O. H. Johns and its products is available on request. Factory trained specialists service and repair all equipment and apparatus listed in the catalogue. Unique plant facilities include a fully equipped machine shop.

Prices are generally quoted f.o.b. Toronto or Montreal but c.i.f. quotations are available on request. Delivery is prompt.



O. H. Johns Scientific and The O. H. Johns Glass Company Ltd. — culture tubes in convenient Quik-Pik packaging with flip-top, tear-off lid, dust-proof plastic wrap, shelf dividers and strong, corrugated shipping container

LINCRAFT LIMITED
P.O. Box 180
111 Verulam Road
Lindsay, Ontario, Canada

Tel: (416) 364-4631 or (705) 324-6183

CIRCLE REPLY CARD No. 24

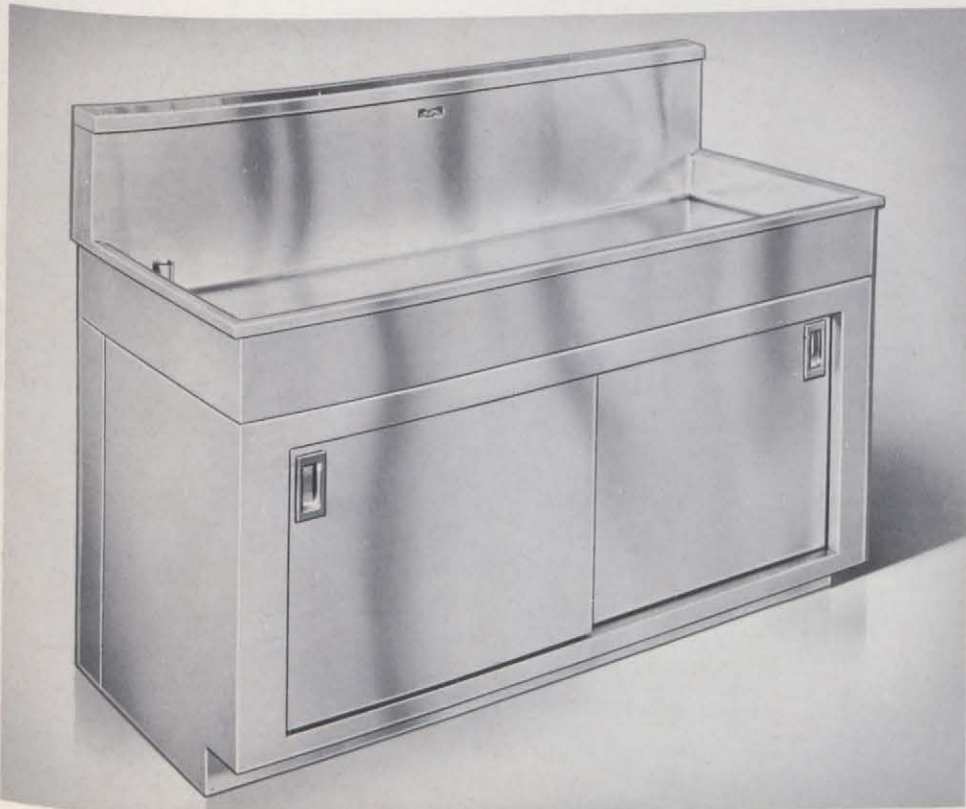
You name it, Lincraft Limited has it — furniture for any type of laboratory plus expert planning and installation services.

The company, designer and fabricator for more than 20 years, has recently opened a new, up-to-date factory and offices to increase its production capacity. Products include a wide range of modular cabinets in wood and enamelled or stainless steel; accessories and auxiliary equipment such as counter tops, sinks, faucets, hose cocks, fume exhaust fans, electrical outlets and switches; special furniture including fume hoods for general laboratory use and for work with perchloric acid and radioactive materials, chemical storage cabinets, vibration dampening balance

and instrument tables. Custom built wood furniture with heavy or light-duty construction is also available.

Lincraft's experienced designers and engineers assist customers in any part of the world to tailor laboratory furniture and layouts to their work routines, and to select materials that will stand up to conditions in each work area. Installation of Lincraft furniture by specially trained crews is provided on request.

Because each laboratory installation is unique, involving some form of special construction, delivery of an order generally requires six to eight weeks. Shipping is arranged to the customer's convenience.



Lincraft Limited — stainless steel sink for general photography work

LISLE INSTRUMENT SYSTEMS LIMITED
49 Sheffield Street
Toronto 385, Ontario, Canada

Tel: (416) 249-9151

Telex: 06-219664

CIRCLE REPLY CARD No. 25

Lisle Instrument Systems Limited, one of Canada's largest designers and manufacturers of electrolytic conductivity measuring equipment, offers a wide variety of conductivity bridges and cells.

The bridges accurately and reliably indicate the conductivity of practically any liquid and measure the specific resistance of distilled, purified or ultra-pure waters of special interest to scientific laboratories.

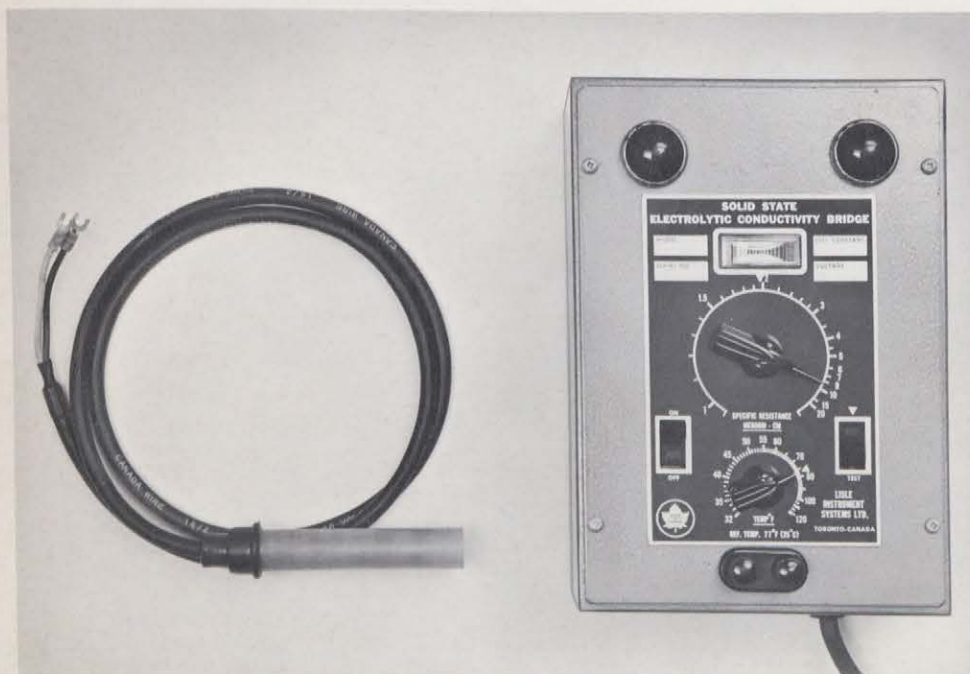
Among the large number of bridges available are measuring and controlling units, mains and battery-operated units and instruments calibrated in terms of microohms, grains per gallon of sodium chloride and percentages of sodium hydroxide, sulphuric acid and other chemicals in solution. More than 100 different ranges are available to suit most applications.

Ruggedly constructed, the solid-state bridges are widely used in Canadian industry and are approved by the Canadian Standards Association. Standard units feature low-voltage AC on the electrodes, accuracy better than one per cent at mid-scale, easy-to-read null-balance meter, attractive styling and manual or automatic temperature compensation.

A full range of conductivity cells is available for use with the bridges.

Lisle Instrument welcomes inquiries for custom-built instruments.

Shipment of standard bridges is two weeks after receipt of order. Price quotations are readily submitted for either f.o.b. Toronto or c.i.f. destinations.



Lisle Instrument Systems Limited — solid-state electrolytic conductivity bridge

CIRCLE REPLY CARD No. 26

Maknur Laboratories Limited produces bacteriological culture media to promote growth and reproduction of microorganisms for university, hospital, public health, pharmaceutical, agricultural, industrial and research laboratories.

Growth substances are formulated to produce antigens that allow selective growth of certain organisms while permitting production of other biological characteristics such as hemolysis, spore formation, pigment production and certain enzymes or enzyme systems to function. Wherever possible, organisms are supplied with the culture media.

Products include dehydrated culture media, their ingredients, prepared sterile culture media, diagnostic reagents, antigens and Ferpule — fermentation and differential medium in sealed, disposable ampoules.

Dehydrated media offer three advantages. They are economical, comparatively simple to prepare and are consistent from lot to lot.

Ferpules, containing sterile prepared culture media ready for immediate use, are designed for laboratories lacking facilities to prepare and test dehydrated media.

Diagnostic reagents include antigens for slide and tube tests, antimicrobial discs, coagulase testing plasma, heterophile antibody testing reagents, dry film fixative slides for cytology and clave-test ampoules.

Ingredients of culture media are available in a wide range of quantities.

All Maknur products are fully guaranteed, and delivery is prompt. Prices are generally quoted f.o.b. Ottawa but c.i.f. quotations are available.



Maknur Laboratories Limited — bacteriological culture media, diagnostic reagents, autoclave testing ampoule and an assay disc

CIRCLE REPLY CARD No. 27

McPhar Geophysics Limited has provided the mining industry with competent contracting and consulting services and the latest state-of-the-art geophysical instrumentation for more than 20 years.

In a modern plant, where research and development are given priority, McPhar produces spectrometers and electromagnetic systems for ground and airborne applications, magnetometers, self potential and sequential transmission units, resistivity equipment, drill hole EM instruments and variable frequency induced polarization equipment.

Contracting and consulting services are carried out by up to 60 five-man crews operating out of Australia, Singapore, Mexico, the United States and Canada.

Model P670 variable frequency induced polarization system is McPhar's newest

product. It is designed for rapid, accurate measurements in moderate or high resistivity environments.

This unit is exceptionally compact and comparatively lightweight to facilitate transportation on difficult terrain. The total system including receiver, transmitter, battery charger, electrodes, spool of wire, handle and winder, spare battery pack or AC interface unit, weighs only 60 pounds (27.21 kg). It fits into a 27 by 20 by 8-inch (68.5 cm by 50.8 cm by 20.3 cm) suitcase.

The receiver is identical to that used in McPhar's more powerful P660 induced polarization system which is designed for use in very low resistivity environments. The P670, powered by batteries of 0.5 amp, 200 volts or 1.0 amp, 100 volts, operates on five frequencies: 0.125, 0.31,

1.25 and 5.0 Hz. With an AC interface, it can be powered by a motor generator of 1.0 amp, 200 volts.

Delivery time is approximately three weeks.

A catalogue of McPhar instruments, case histories, technical papers and quotations are available on request.



McPhar Geophysics Limited — model P670 variable frequency induced polarization system

METRIX MANUFACTURING COMPANY LIMITED
51 Sheffield Street
Toronto 15, Ontario, Canada

Tel: (416) 249-9153

Telex: 06-219664

CIRCLE REPLY CARD No. 28

Since its founding five years ago, Metrix Manufacturing Company Limited has become one of Canada's leading producers of timing devices for scientific and industrial applications.

Metrix manufactures 20 types of timers including the largest available range of the electronic variety, motor driven timers, counters, elapsed time meters and specialized control panels.

Electronic timers by Metrix incorporate the most advanced design features including timing ranges of up to 10 minutes — an unusually long span for electronic timers — and solid-state circuitry.

Casings of white nylon will not chip, dent or fracture, are impervious to temperatures and corrosive materials, easy to clean and attractive.

The electronic timers can easily be wired to other appliances, switch off automatically and simply plug in to a standard octal socket.

Shipping, one week after receipt of order, is f.o.b. Toronto. Metrix Manufacturing welcomes inquiries from interested agents.



Metrix Manufacturing Company Limited —
model MDPX solid-state electronic timer

NATIONAL ELECTROLAB ASSOCIATES LTD.
1130 East 7th Avenue
Vancouver 12, British Columbia, Canada

Tel: (604) 879-9161

Telex: 04-54323

TWX: 610-929-1058

CIRCLE REPLY CARD No. 29

National Electrolab Associates Ltd. offers two specialized services: repair, overhaul and calibration of electrical and electronic equipment; and economical design and production of complex, one-of-a-kind electronic instruments.

National Electrolab's expertise is based on a practical, original approach to design and this is illustrated in a fibre-length counter, sonic-tag receiver and oceanographic telemetry systems.

Used by university forestry departments and wood products companies, the fibre-length counter permits fibre-length distribution in wood samples to be tabulated rapidly. Since a sample can contain up to several hundred fibres, each of which must be classified by length, standard techniques of hand-measurement with mechanical wheels require hours of tedious work. With National Electrolab's counter, measurements are taken indi-

vidually by an electronic probe and an electronic register records the total fibre count. Registers can be built with channels for up to 50 length increments.

The sonic-tag receiver is one of the most advanced, portable devices available to fisheries research workers monitoring underwater signals from submerged vehicles or animals carrying sonic-tags. Fully transistorized, it can operate for almost 12 hours on self-contained, rechargeable batteries. Tuning range is 20 kHz to 100 kHz and there are two receiving bandwidths — one of 2.1 kHz to locate tag signals and another of 0.5 kHz to eliminate interference from other tags.

Reliable, comparatively low-cost oceanographic telemetry systems use a single conductor towing cable to transmit up to five analog and 10 on/off functions from underwater to surface vessels. Com-

mands can also be transmitted below from the surface on the same cable.

National Electrolab also manufactures aquatic monitoring and recording systems, wildlife telemetry systems and custom data acquisition systems.

While delivery time on custom products depends upon the complexity of the project, standard equipment is shipped within one to three months of receipt of order. Shipment is f.o.b. Vancouver.



National Electrolab Associates Ltd. — sonic-tag receiver model 30-07

CIRCLE REPLY CARD No. 30

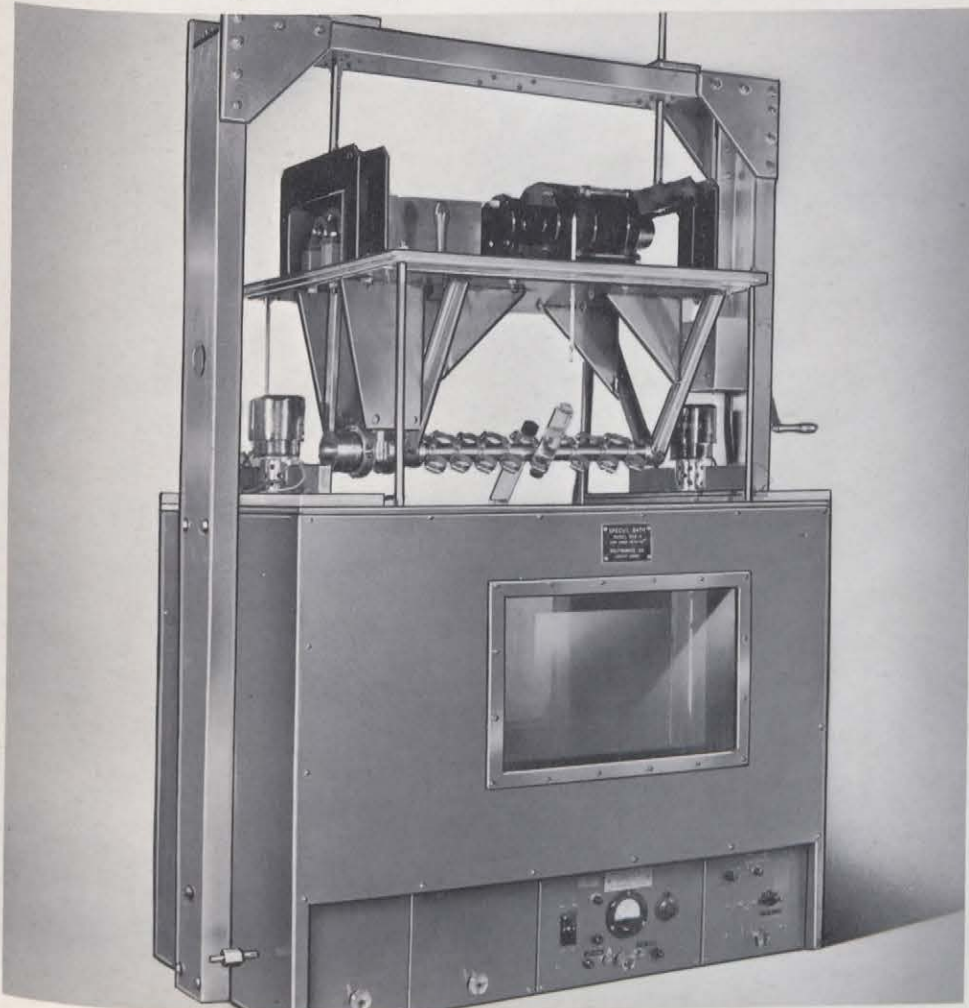
Polytronics Co. designs and manufactures quality measurement and control instruments for industrial and research laboratories. These include viscosity baths, Zeitfuchs cross-arm viscometers, non-indicating temperature controllers of high accuracy and stability, hypsometers to test thermometers at 212°F (100°C) with atmospheric pressure correction, precision wire-wound resistors and precision instruments using the resistors as main components. All are built to specifications of the American Society for Testing and Materials.

Of special interest to the oil industry is Polytronic's model 804 improved oil bath for testing kinematic viscosity. Designed to meet the exacting requirements of ASTM test D 445-60 and D 2170, the unit may be used in any application requiring precise temperature control ranging from 80°F to 300°F (27°C to 150°C).

Control is achieved by a temperature-sensitive AC bridge circuit with a resistance thermometer in one arm which senses the bath temperature. The signal is then amplified and applied to silicon controlled rectifiers. These supply current to a magnetic amplifier to control the heating element's power supply.

A 10-turn helical potentiometer permits bath temperature adjustment within the specified value of $\pm .05^\circ\text{F}$ ($\pm .03^\circ\text{C}$) and specially designed impeller and heater of open construction permit temperature uniformity that exceeds ASTM test requirements. As the oil bath has fully automatic operation, few controls are needed. The absence of DC amplifiers contributes to the unit's stability, and the elimination of vacuum tubes and of all moving parts, including relays and variable transformers, gives it excellent long-term reliability.

Polytronics delivers standard products within four weeks and custom equipment within 10 weeks of receipt of order. Shipment is f.o.b. Toronto.



Polytronics Co. — special bath model 958-A permits test tubes to rock or rotate at different speeds and temperatures

THE ROBERT MITCHELL CO., LIMITED
350 Decarie Boulevard
Montreal 379, Quebec, Canada

Tel: (514) 747-2471

Telex: 05-25713

Cable: ROBMITCO

CIRCLE REPLY CARD No. 31

With quality control equipment by The Robert Mitchell Co., Limited, paper mills are assured of instruments that exactly meet international standard requirements. The company manufactures the four standard British pulp evaluation apparatus units — sheet machine, disintegrator, press, drying rings and plates — and the Canadian standard freeness tester.

In constructing units according to standard procedure, Robert Mitchell uses only highest quality materials and workmanship carries a one-year guarantee. Before delivery to the customer, every unit is inspected and calibrated at the Pulp and Paper Research Institute of Canada, also in Montreal, which is responsible for maintaining the official Canadian standard freeness tester.

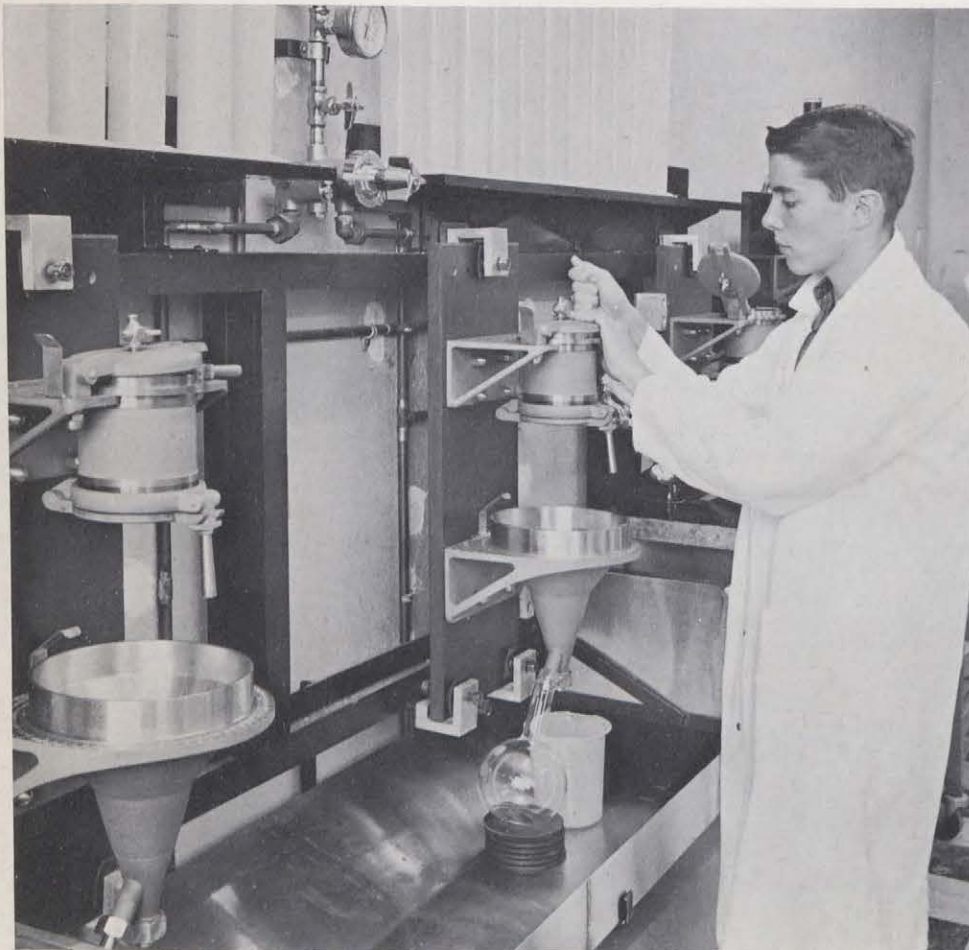
The institute's work with the freeness tester is typical of tests and adjustments

which all Robert Mitchell units undergo before distribution to the field. The instrument's critical parts are the screen plate, bottom orifice and the head and volume of water in the conical section. Screen plates are etched with nitric acid until they match the performance characteristics of a master standard plate. The bottom orifice is calibrated by reaming the opening so that it will deliver a fixed volume of water at a predetermined temperature.

The freeness tester is then mounted on a special rack in the calibrations laboratory. After components are aligned, the position of the side orifice is carefully adjusted to provide the required head of water over the bottom orifice, and the total volume of water in the conical section is adjusted by means of a threaded plug. The tester is then fitted with a calibrated screen plate and bottom orifice, and its performance

checked against that of a standard instrument, using a pulp suspension. Minor adjustments may be required in the gaskets of the upper chamber. When the new tester matches the standard instrument to within ± 2 cc, it is returned to the manufacturer for delivery to the customer.

By stocking tested equipment, Robert Mitchell can offer immediate delivery on any order. Prices are quoted f.o.b. or c.i.f. Montreal.



The Robert Mitchell Co., Limited — Canadian standard freeness tester undergoing inspection and calibration at Canada's Pulp and Paper Research Institute

CIRCLE REPLY CARD No. 32

- Sensitive, accurate
- Lightweight, compact
- Solid-state design, integrated circuits

These are the outstanding features of Scintrex Limited's MK VII induced polarization system for prospecting. The system offers a choice of three transmitters — 25 watts, 2.5 kilowatts and 15 kilowatts — all of which will combine with the same receiver.

Recently developed, the 25-watt transmitter is a featherweight unit for light reconnaissance prospecting, drill hole measurements, model studies and physical property testing. Sealed, lead-acid batteries can be recharged in 10 hours from AC or DC sources.

The two larger transmitters, suitable for almost all exploration problems, are

motor driven and provide single phase, regulated Hz current. Removable circuit boards facilitate servicing. The 15-kilowatt unit will identify porphyry copper bodies to depths of at least 2,000 feet (600 m). All transmitters provide alternating, interrupted square wave current pulses and on and off times of two, four and eight seconds duration.

A self-triggering receiver eliminates the need for direct cable connection to the transmitter, increasing mobility and operation flexibility. It has automatic self-potential compensation, automatic summation of any number of polarization signals, built-in AC noise filter and the ability to obtain transient curve shape information. With the system's inherent noise suppression capability, surveys can be conducted closer to

sources of spurious electrical noise. Direct reading of chargeability values enables even an inexperienced operator to recognize an anomaly.

The Mark VII system has an excellent record of performance under a wide range of climatic and topographical conditions and temperature ranges of -20°F to 130°F (-30°C to 55°C).

Products are generally shipped by air one to six weeks after receipt of order.



Scintrex Limited — the 2.5 kilowatt transmitter and IPR-7 Newmont type receiver of the MK VII induced polarization system

SIGMA INSTRUMENTS (CANADA) LTD.
55 Six Point Road
Toronto 18, Ontario, Canada

Tel: (416) 239-8161

Telex: 02-29576

Cable: THERMOVOLT

CIRCLE REPLY CARD No. 33

Electrical instrumentation for indication, control monitoring and recording produced by Sigma Instruments (Canada) Ltd. can be calibrated to read actual units from any transducer with an electrical output.

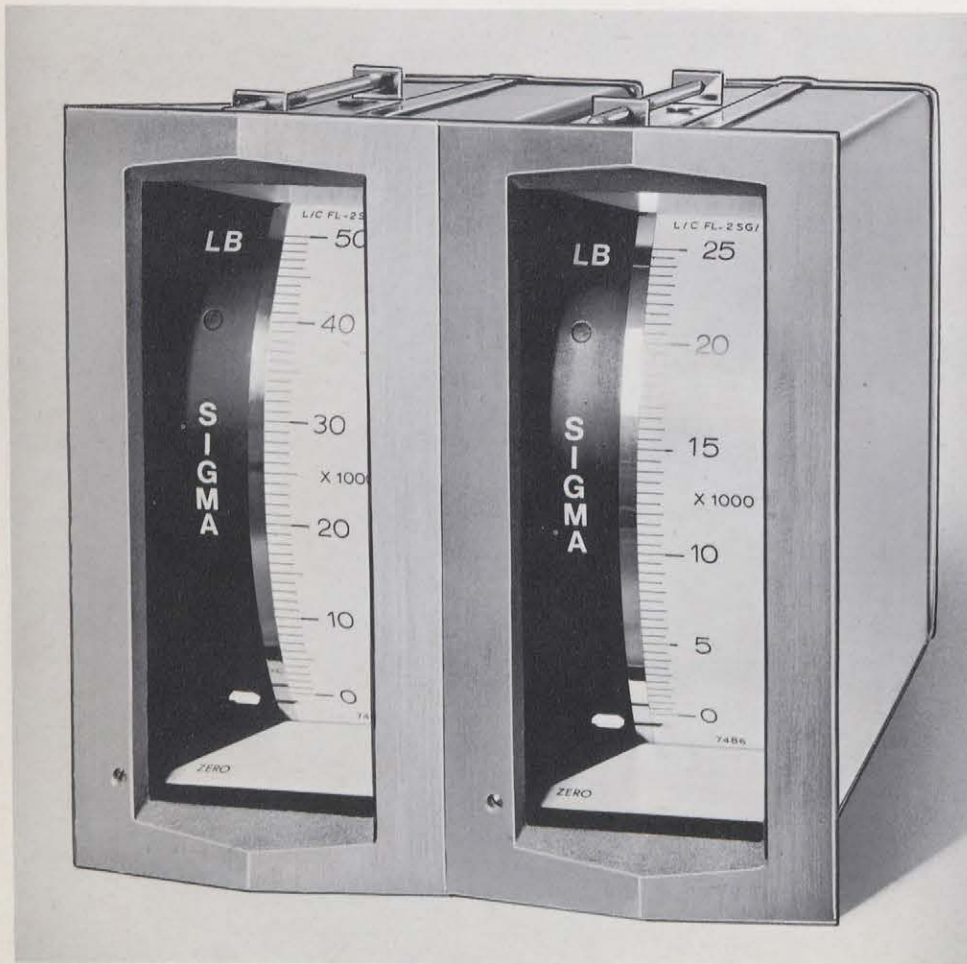
For use in universities, research laboratories, public utilities and the chemical and plastics industries, the instruments measure weight, temperature, speed, pressure and flow. They accept direct inputs from load cells, thermocouples,

resistance temperature detectors, flowmeters and most transducers.

A continuous multipoint temperature monitor will provide automatic alarm immediately any one of up to 100 points exceeds a preset limit. A common indicator allows reading of the actual temperature of any point at any time.

A new line of signal converters — accurate to 1/10 per cent — transforms millivolt signals to milliamp outputs.

All instruments are available for 115 volt, 60 Hertz or 230 volt, 50 hertz operation. Delivery time is generally from four to six weeks. Shipment, by air or sea, is f.o.b. Toronto.



Sigma Instruments (Canada) Ltd. — load indicator for panel mounting

SPACE OPTIC LIMITED
P.O. Box 2608
Station D
Ottawa, Ontario, Canada

Tel: (613) 829-5200

CIRCLE REPLY CARD No. 34

Space Optic Limited's monocomparator makes bridging for control more precise and less costly than traditional methods of ground control acquisition for mapping purposes.

The monocomparator yields photograph co-ordinates of selected points on 9 by 9-inch (22.9 by 22.9 cm) aerial diapositives. These co-ordinates are ultimately transformed into earth co-ordinates in a digital computer programmed with triangulation software provided by the company. An electronic interface to any of the more commonly found digital recording devices and the triangulation software are provided with the instrument. It can be adapted to any power

supply and carries a one year, unconditional warranty.

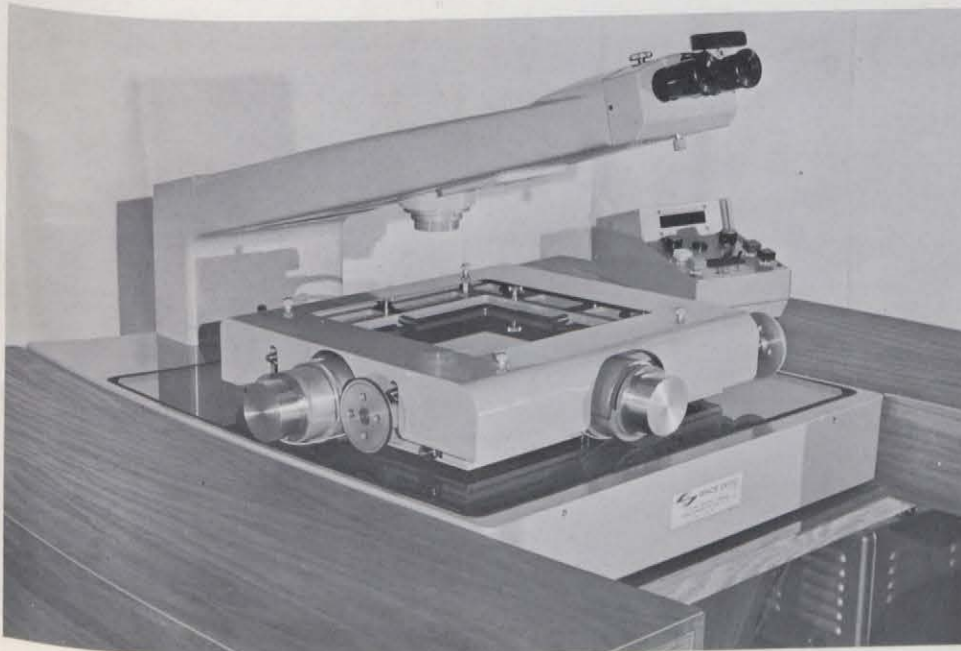
Design of the unit is such that simplicity and economy prevail throughout every phase of its operation — installation, operation and maintenance. The primary aim was to produce a precision instrument capable of trouble-free operation.

Advantages of this monocomparator are lower cost, greater speed of measurement and high accuracy under normal working conditions. It does not require a "white room" environment. Instrument performance is not adversely affected

by moderate changes in the ambient temperature. Delivery time varies from two to five months.

The instrument can be modified for non-photogrammetric purposes.

The company wishes to establish agencies and invites inquiries.



Space Optic Limited — photogrammetric monocomparator

SPAR AEROSPACE PRODUCTS LTD.
825 Caledonia Road
Toronto 395, Ontario, Canada

Tel: (416) 781-1571

Telex: 02-2054

Cable: SPARCAL TOR

CIRCLE REPLY CARD No. 35

Since it was developed in 1960 to meet novel needs of space programs in Canada, the United States and Europe, STEM has become an indispensable aid to space, land and sea environment studies in many countries.

STEM is an acronym for Storable Tubular Extendible Member. Wound onto a spool, it is a pre-stressed, flat strip of lightweight metal. As it leaves the spool, it rolls itself into a strong tube with overlapped edges. As it is rewound, it flattens out again. Extension and retraction is powered by electric motor or hand cranking.

In satellite programs, in Apollo, Gemini and Mercury space flights, STEM has been used for antennas, gravity gradient booms, and for various types of actuators, masts and soil samplers.

On land and sea, for public utility and emergency services, in industrial and military applications, it is used for masts

to elevate antennas, terrain surveillance cameras and floodlighting systems (including vehicular mounted masts), as self-powered, automatically operating homing antennas, antennas for man-portable transmitting equipment and as tripods for mounting surveying equipment.

STEM is available in lengths up to 1,000 feet (304.8 m) and in diameters up to several inches (7.5 cm).

An example of STEM's industrial applications is the diffusion furnace actuator, used in the manufacture of semi-conductor devices. The actuator is used to withdraw crucibles from a diffusion furnace at specific rates to obtain accurately controlled cooling.

Spar Aerospace Products Ltd. also produces the Hotspotter and the MK 11 Decompression Computer. Hotspotter is

a hand-held, easily operated infrared measuring device to locate hard-to-detect fires, and overheating in electrical circuits.

The decompression computer, a small cylinder, is linked to a diver's breathing apparatus and simulates the inert gas transfer in his body. It permits the diver to make an unlimited number of dives, and ascend at maximum rate, without suffering decompression sickness.

Delivery on STEM is four to eight months depending on customer design requirements; on the decompression computer, four months; Hotspotter is available from stock. Shipping is arranged to customer convenience.



Spar Aerospace Products Ltd. — decompression computer and STEM diffusion furnace actuator

STARK ELECTRONIC INSTRUMENTS LTD.
180 Station Street
Ajax, Ontario, Canada

Tel: (416) 942-2120 or (416) 927-1272

Telex: 02-21332

Cable: STARKEX

CIRCLE REPLY CARD No. 36

Educationists recommend that physics students conduct their own experiments rather than watch instructor demonstrations. However, the cost of providing scientific instruments often restricts this practice in many schools.

Stark Electronic Instruments Ltd. has solved this problem with the recent introduction of reasonably priced educational apparatus, solidly constructed to withstand rough use. A manual for instructors, describing the equipment, the experiments that can be performed and their suggested results, is also provided.

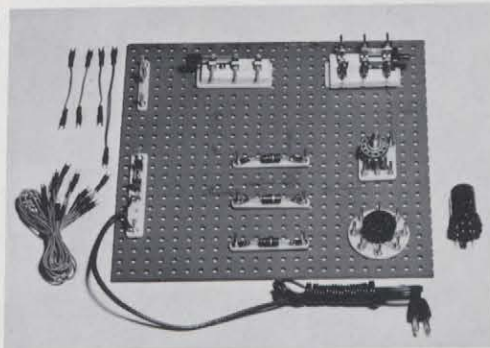
One of the most successful products in the line is the C-725 electrical equipment kit, used for basic study in Ohm's law, thermionic-emission, rectification and amplification of a triode.

The kit, for open ended experiments in PSSC or conventional physics, comprises resistors, neon lamps, tubes, switches and potentiometers on polystyrene plastic bases for mounting on modular boards. Connections are made with fast clips.

Model 710 power supply, which can be used with the electrical kit, provides taps of 50, 100, 150 and 200 volts. The unit also supplies a 6-volt DC tap which, coupled with a rheostat, can give from 0-6 volts DC, with currents up to 10 amps, and supplies 6.3 volts AC for AC and other experiments using tubes.

Stark '69, a catalogue describing all apparatus in the educational line, is available on request.

Stark Electronic ships to customer convenience 10 days after receipt of order.



Stark Electronic Instruments Ltd. — power supply model 710 (top left) with electrical experiment kit model C-725 (top right); (bottom left) Oersted's law demonstrator with long needle which can be shifted, lowered and raised in various directions; (bottom right) apparatus to demonstrate magnetic effects of current

VELAN ENGINEERING COMPANIES
2125 Ward Avenue
Montreal 378, Quebec, Canada

Tel: (514) 748-7743

Telex: 01-20172

Cable: VELANENGIN

CIRCLE REPLY CARD No. 37

Equipped with sophisticated, automatic facilities and a vast reservoir of practical, technical experience, Velan Engineering Companies has gained a solid demand for its products. They include forged globe, gate and check valves of 1/4 inch to 24 inches (.635 cm to 60.96 cm), ball valves and bimetallic and thermodynamic steam traps.

The valves and steam traps are supplied to more than 22 basic industries in 50 countries.

The company, among the first in North America to be awarded the "NPV" certificate of nuclear approval by the American Society of Mechanical Engineers, is a major supplier to nuclear reactor

projects — including nuclear-powered ships — in Canada and the United States.

Velan's nuclear valves also range from 1/4 inch to 24 inches (.635 cm to 60.96 cm) in size. Its large valves are North America's only complete line of forged valves in pressure classes ANSI 150 pounds to 4,500 pounds (10 kg/cm² to 316 kg/cm²).

There are more than 25,000 variations of Velan valves in the oil, chemical, petrochemical, power, marine science and defence industries.

Materials and workmanship are guaranteed for three years. Delivery on standard items is immediate. Shipping is arranged to mutual convenience.



Velan Engineering Companies — 10-inch (25.4 cm) motorized nuclear valve with 1,500 psi (105 kg/cm²), maximum temperature 1125°F (607°C), ANSI 1,500 pounds (680 kg). This is a primary cooling system valve for boiler isolating and primary coolant service in nuclear stations

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Yarralumla 2600
Canberra ACT

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Avenida Paulista, 1765, 9 andar
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