











Northern Electric now... and the future



**NORTHERN ELECTRIC COMPANY, LIMITED.**

1600 DORCHESTER BLVD. W., MONTREAL, QUE. H3H 1R1, CANADA.

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A FINAL WORD



## FOREWORD

Telecommunications is one of the fastest growing industries in North America. The market, valued in excess of \$8 billion in 1972, is expected to double in the next decade. Northern Electric Company, Limited is the Canadian leader in the industry. World-wide sales in 1973 exceeded \$600 million.

Northern Electric began by manufacturing telephones in 1882, and it is still in the forefront of today's rapidly developing telecommunications technologies. Recent Northern achievements in product innovation, development and design,

as typified by its stored program electronic switching system and CONTEMpra and LOGIC telephones, have established the company in a position of leadership in the international industry.

It is one of the few companies developing a technological concept from the idea stage to the final product and installation throughout the world—entirely within its integrated group of companies.

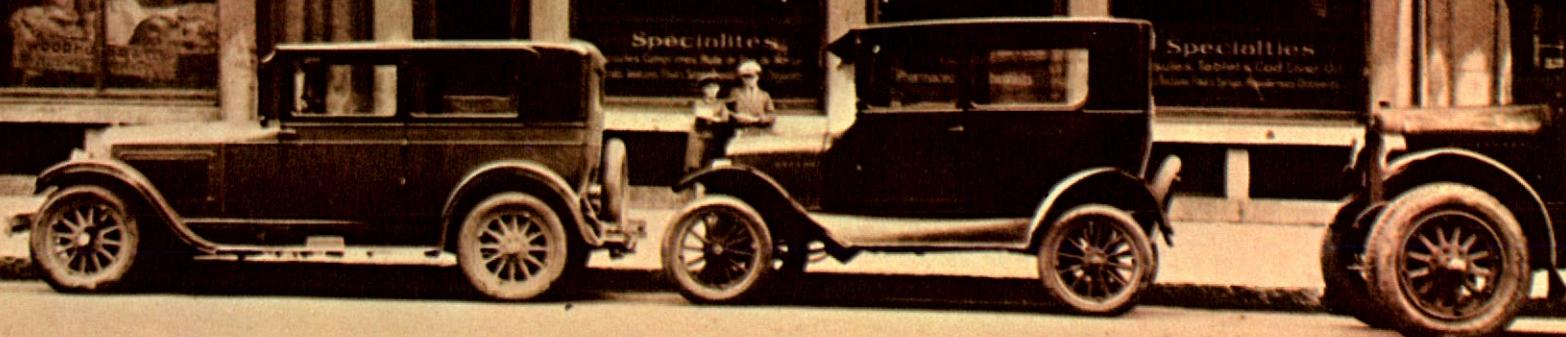
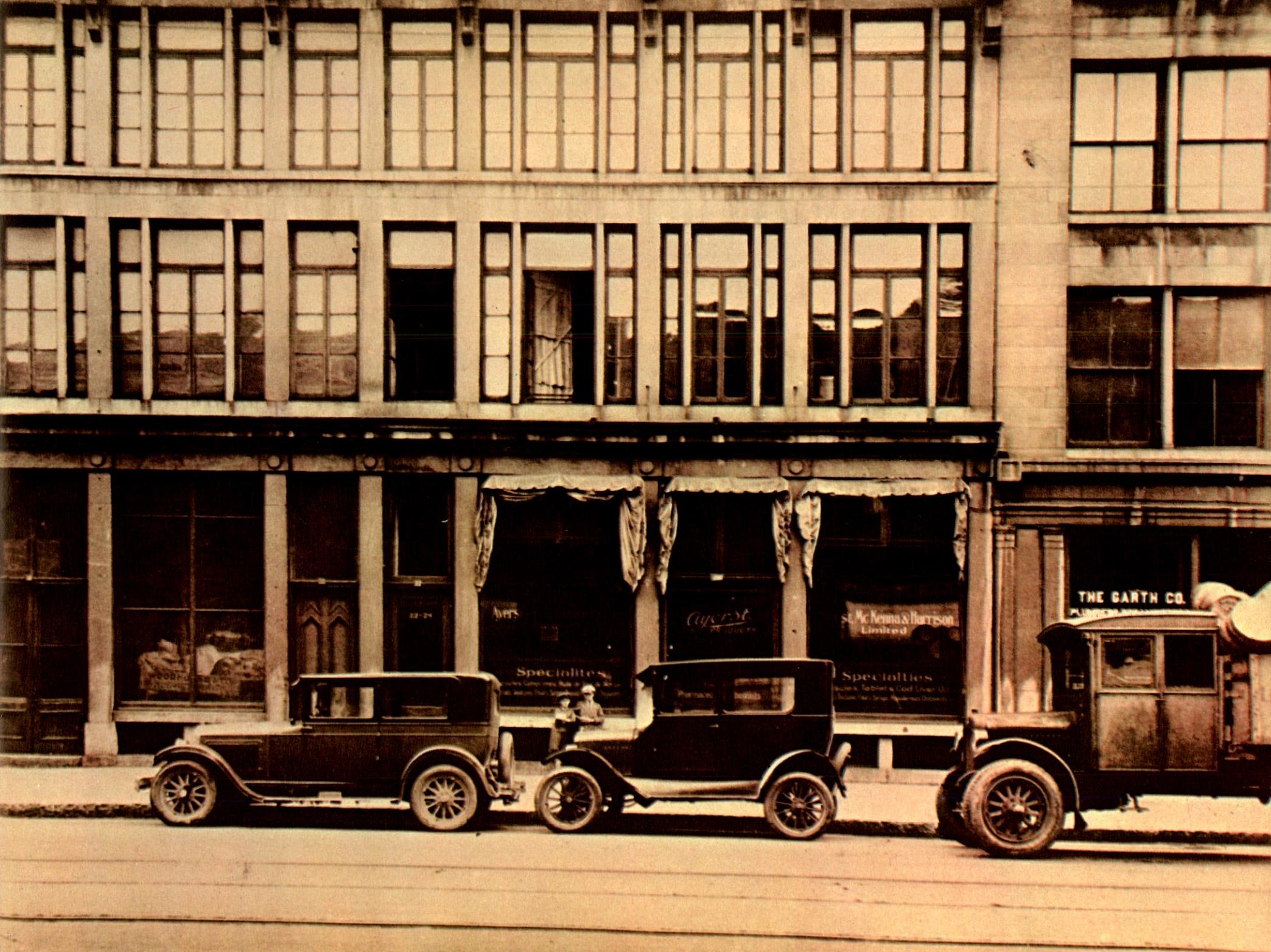
Here, then, is an introduction to Northern Electric, its people and its products.

## NORTHERN ELECTRIC THEN

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Northern Electric began manufacturing telephones just eight years after Alexander Graham Bell's epic discovery was announced to the world. The first plant is shown on the facing page. In addition to telephones, the company now manufactures a complete range of telecommunications equipment—over 6,000 products in all, extending from basic components to major installations such as telephone exchanges, microwave relay networks and satellite communications systems.

Because of close coordination between research, development and manufacturing, Northern Electric products are totally compatible. Customers are assured maximum efficiency and complete flexibility for future expansion as required. The size and scope of the company's operations give it considerable influence in setting standards for equipment used by the industry.



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Wood



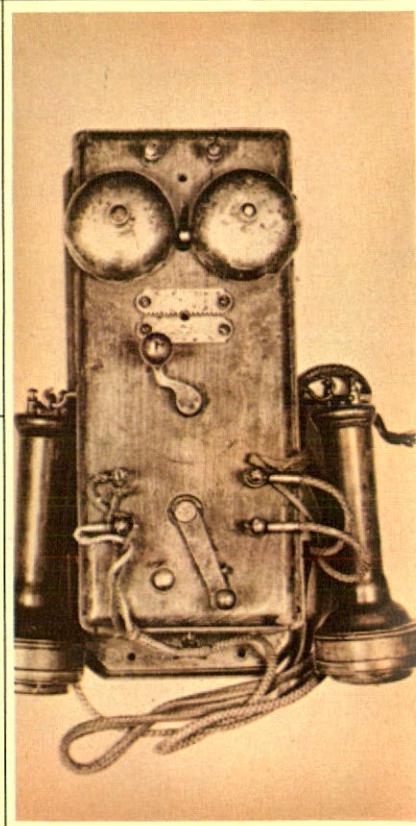
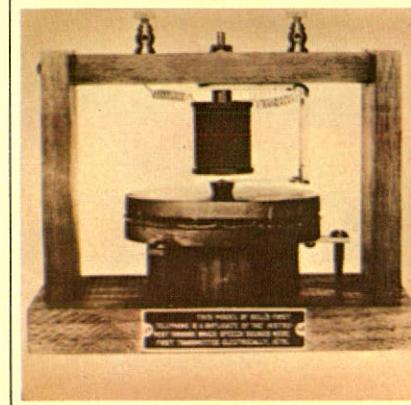
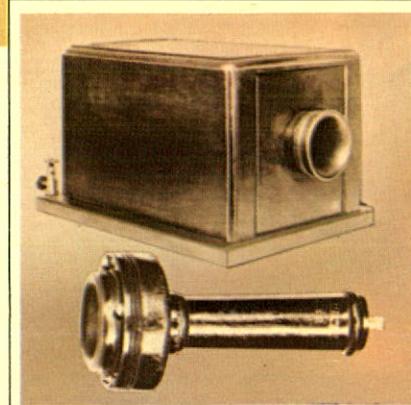
## NORTHERN ELECTRIC NOW

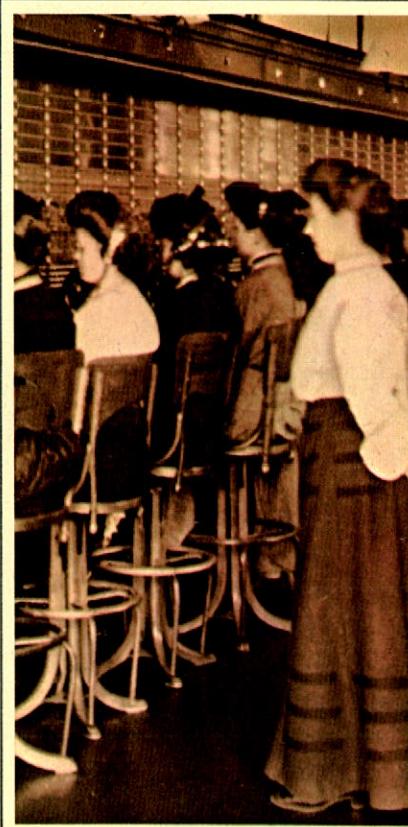
Northern Electric and its family of companies operate 30 plants in five countries—more than 6,000,000 square feet of manufacturing space—and employ some 25,000 people. Together with Northern's parent company, Bell Canada, this family constitutes an integrated group involved in every phase of telecommunications. Its activities cover

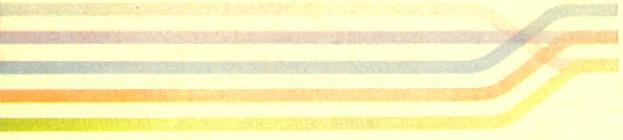
research and development, from pure scientific investigation to practical applications of new technologies, and development of products through the design stage to marketing and distribution, installation and servicing, and operation of one of the world's most modern telecommunications networks.



Northern Electric has supplied the North American market for close to a century. The Trans-Canada Telephone System, which links the continent-wide Canadian telephone network, operates largely with Northern-made equipment. The experience Northern has gained in this sophisticated market, coupled with its advanced technology, have been factors in winning contracts to build communications systems in other areas of the world, and in its present success in establishing itself as a multinational company.







## THE NORTHERN ELECTRIC FAMILY

Northern Electric today is aggressively expanding into world markets, particularly the nearby United States where there is compatibility of equipment. This expansion resulted in the formation, from 1971 to 1973, of four subsidiaries and the construction and acquisition of 11 plants in North America and overseas.



The expansion into new manufacturing and marketing areas has created a corporate structure which already reaches from the Bosphorus to the St. Lawrence river, and from Malaysia to Montreal. It includes:

BELL CANADA, operating the largest telephone network in Canada with more than 7.7 million telephones in service.

NORTHERN ELECTRIC, largest manufacturer of telecommunications equipment in Canada and the third largest in North America; more than 6,000 products.

BELL-NORTHERN RESEARCH, a subsidiary of both Bell and Northern. Ranked in the top one per cent of research organizations in Canada, it carries out in Ottawa, 40 per cent of all telecommunications research and 15 per cent of all industrial research in Canada, estimated at \$260 million.

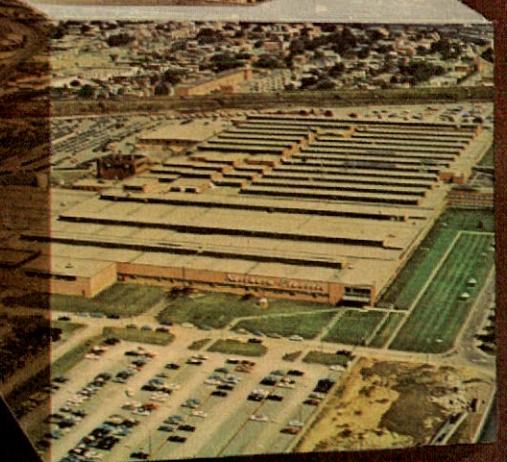
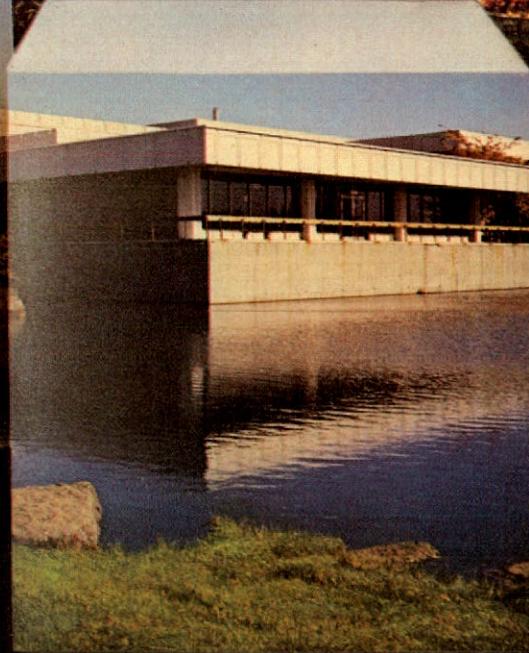
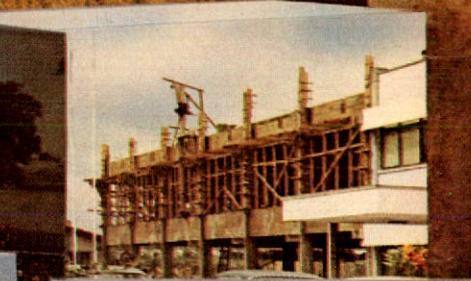
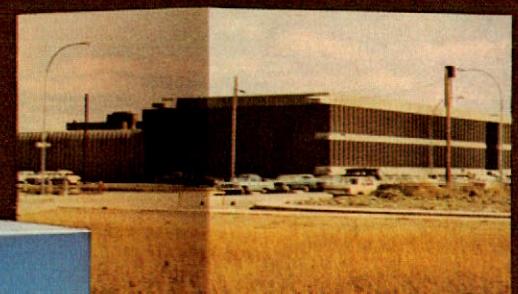
MICROSYSTEMS INTERNATIONAL LIMITED, Canada's leading manufacturer of semiconductors, including integrated circuits, for the computer and telecommunications industries. It operates plants in Ottawa and Penang, Malaysia, and sales subsidiaries in the United States and West Germany.

NEDCO Ltd., the largest distributor to industry and the electrical trade in Canada, with 50 warehouses and sales offices across the country. Nedco has one subsidiary, Zenith Electric Supply Limited, Toronto, Ontario.

NEVRON INDUSTRIES COMPANY LIMITED, a special venture capital firm that offers potential investing partners not only funds but access to the technological, marketing and manufacturing expertise in Northern Electric.



- NORTHERN ELECTRIC COMPANY, LIMITED
- NORTHEAST ELECTRONICS CORPORATION
- NEVRON INDUSTRIES COMPANY LIMITED
- MICROSYSTEMS INTERNATIONAL INC
- NORTHERN TELECOM, INC
- NEDCO LTD



NORTHERN TELECOM, INC., Boston, Mass., Northern Electric's U.S. subsidiary. It manufactures many Northern products in its plants in Port Huron, Michigan; Butner, North Carolina; Mangonia Park, Florida and Mountain View, California. NTI markets the complete line of Northern products in the U.S. In 1973 Northern Telecom acquired NORTHEAST ELECTRONICS CORPORATION of Concord, New Hampshire, a leading manufacturer of test equipment to the telecommunications industry.

NORTHERN ELECTRIC COMPANY (IRELAND) LIMITED with a plant in Galway. This subsidiary was formed in 1973 to establish a springboard to the European Common Market.

NORTHERN ELECTRIC TELEKOMÜ-NIKASYON ANONIM, SIRKETI, Istanbul, Turkey, a joint manufacturing venture with the Turkish Post, Telephone and Telegraph Administration.

In 1973, Northern Electric entered into a 10-year licensing agreement with Plessey Telecommunications of England, giving that international organization the right to manufacture and market certain Northern Electric products in England, South Africa, Australia, Portugal and Brazil where it would be otherwise costly and difficult for Northern to sell.



## FROM TELEPHONES TO SATELLITES

Somewhere on the Canadian prairie  
a plow slices a furrow into the earth to  
receive a coaxial cable ...

At Cape Kennedy a rocket, in a roar  
of sound and light, lifts a communications  
satellite into orbit above the earth.

These extremes—equipment buried  
beneath the earth or placed thousands of  
miles above the earth—illustrate the  
range of products manufactured by  
Northern Electric for sound, image and  
data communications through the use of  
telephone circuits, microwave radio,  
switching equipment and electronic systems  
for communication satellites.

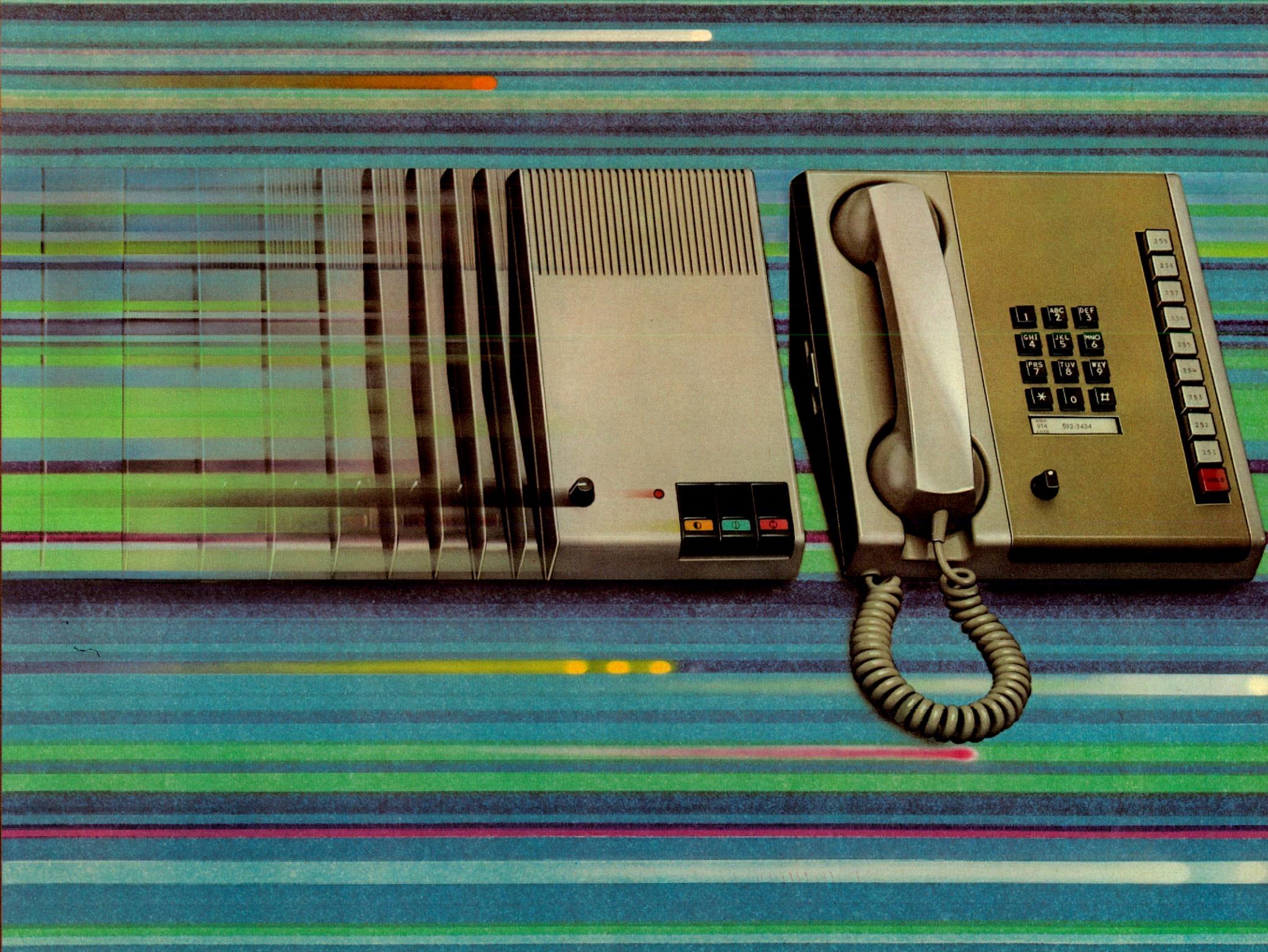


Briefly, Northern's products fall into five main categories: subscriber apparatus, business communications systems, central office switching equipment, wire and cable and transmission equipment. In apparatus the company products more than 350 different types of telephones. Most advanced in concept and design are the LOGIC and CONTEMPRA.

The LOGIC is the initial building-block telephone into which can be plugged

add-on units such as the company's LOGIC handsfree unit and such scheduled products as calculators and telephone answering units to provide an array of vital business services.

The CONTEMPRA represents a breakthrough in modern telephone design. Compact, stylish and featuring the dial-in-hand set, the CONTEMPRA has won design awards as well as world-wide consumer acceptance, being sold in 37 countries.

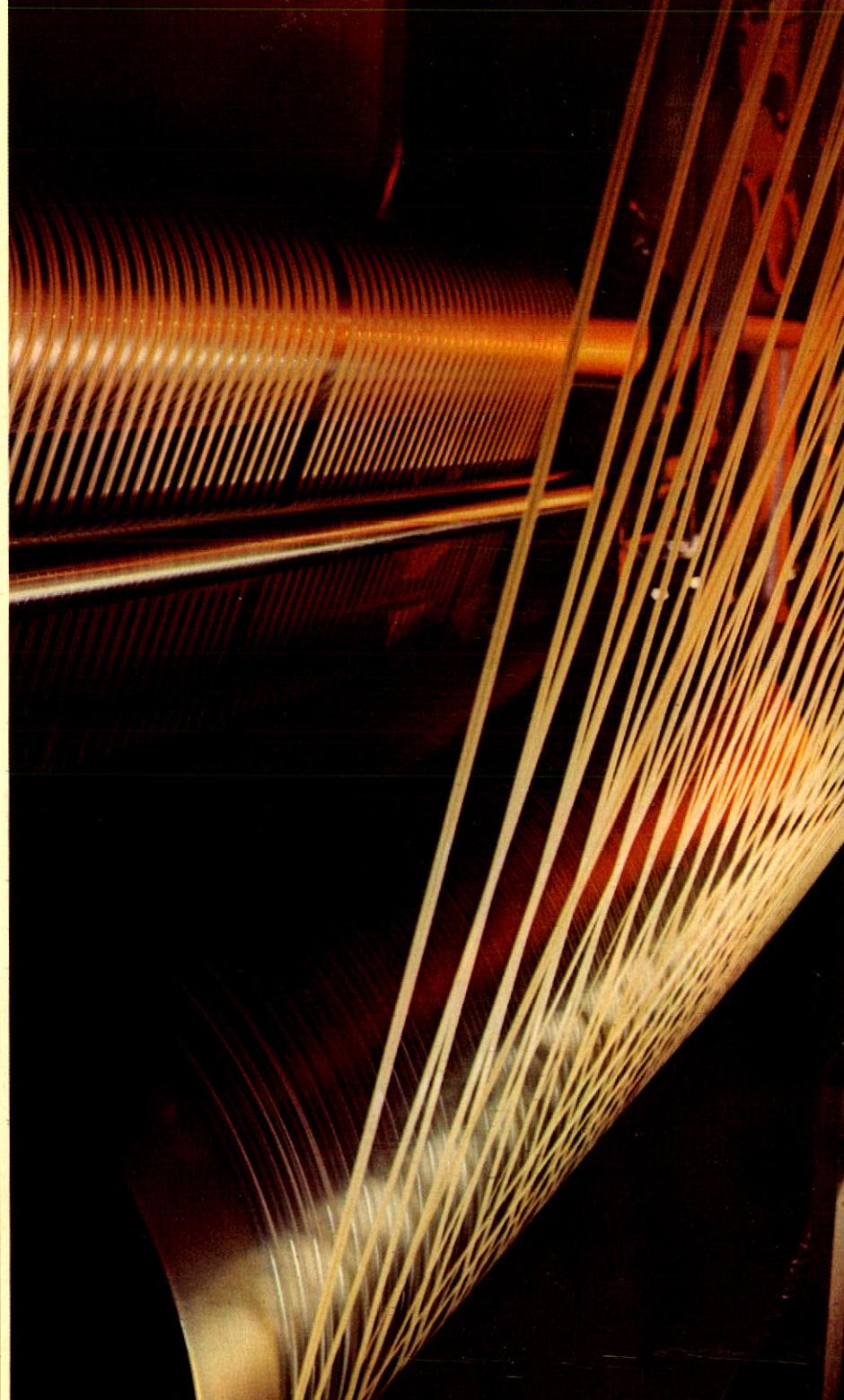


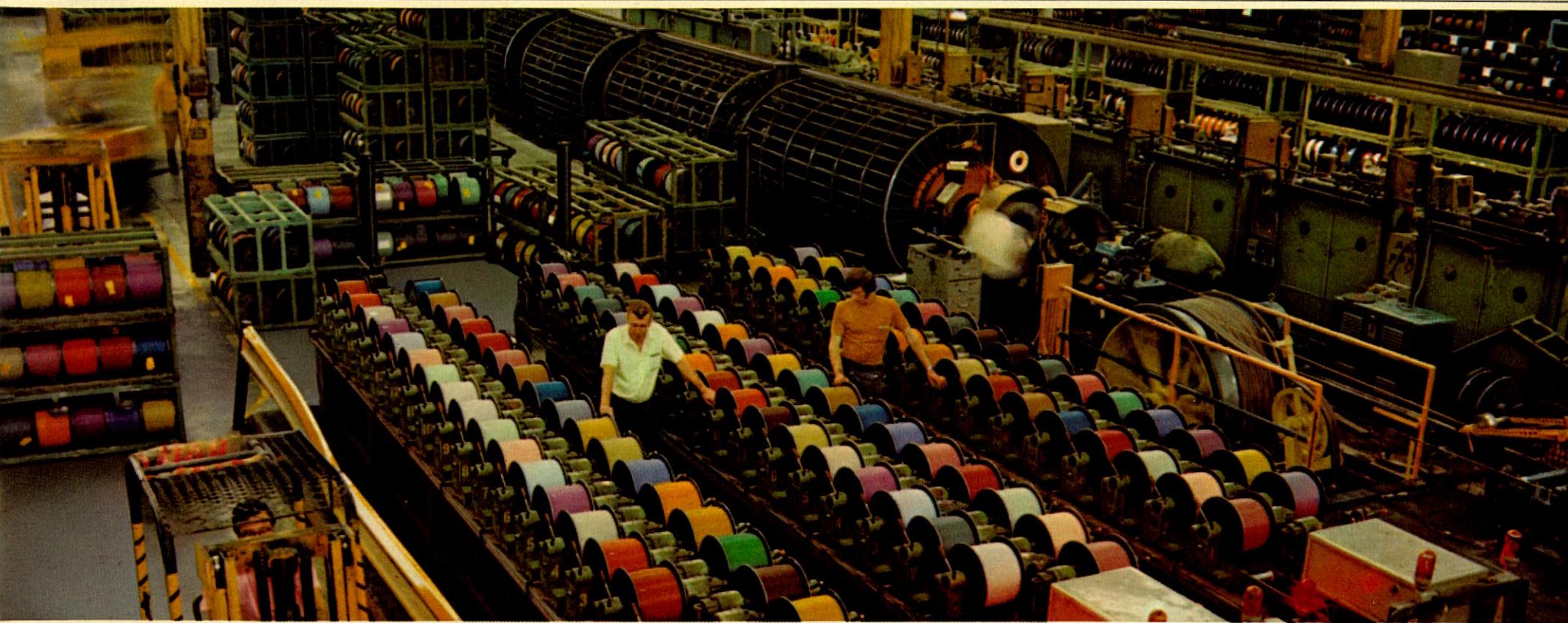
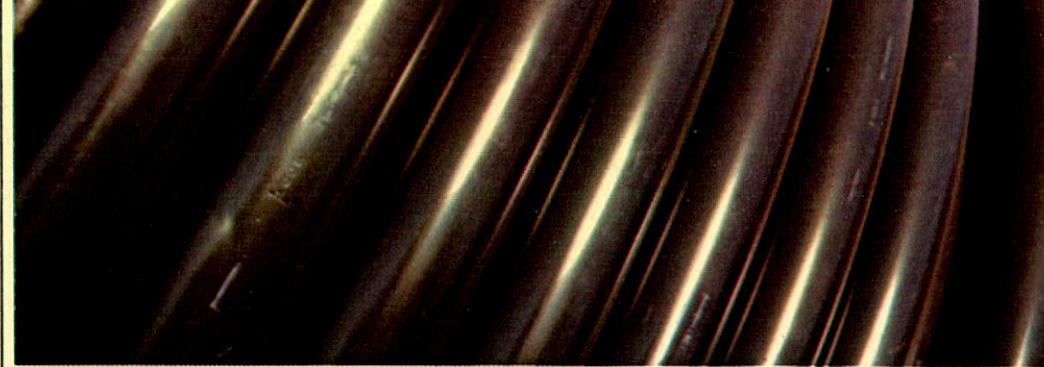
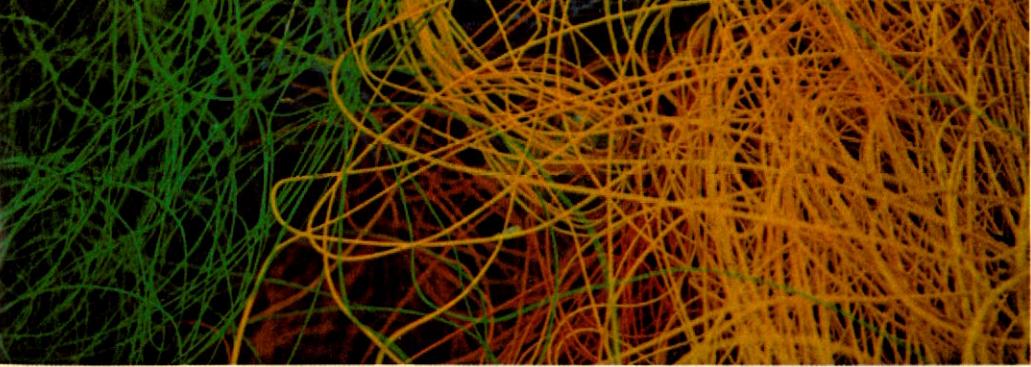
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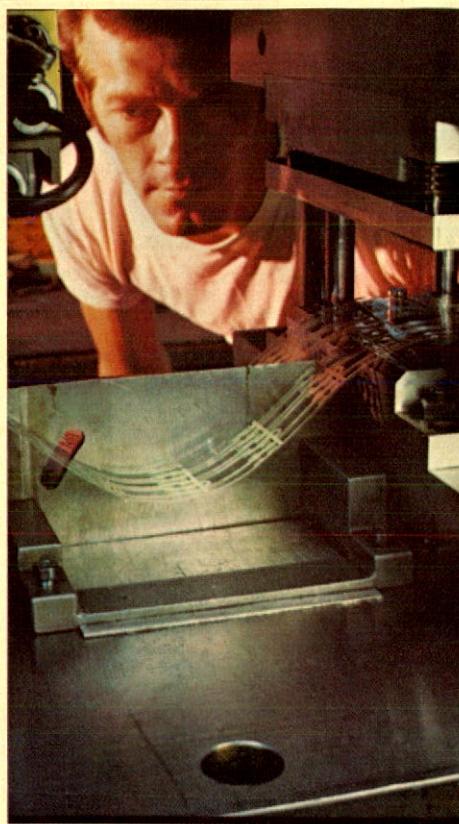
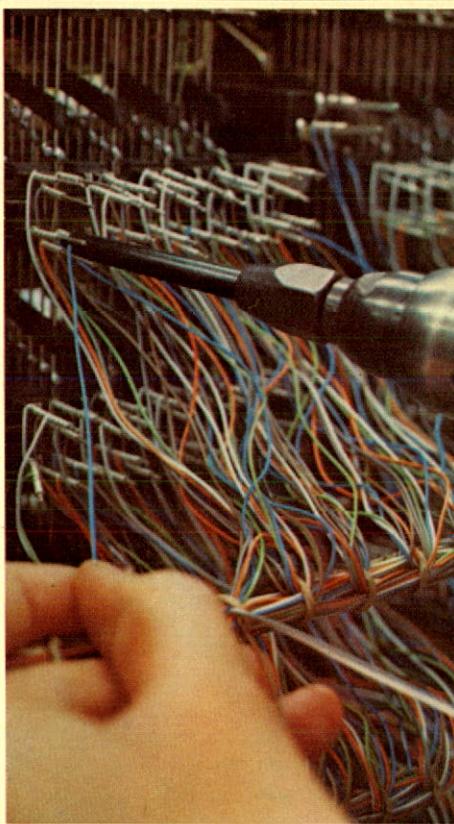
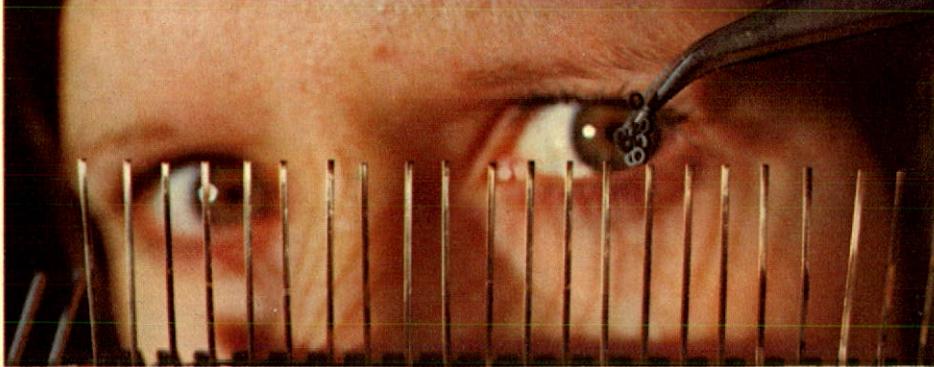
In wire and cable, Northern Electric manufactures thousands of varieties for telecommunications and power applications. The company offers a total systems package of composite coaxial cable, including system design and installation. It pioneered the introduction of large-size paper-insulated telephone cables in the North American market. It even designs and operates plows for coaxial cable burial.

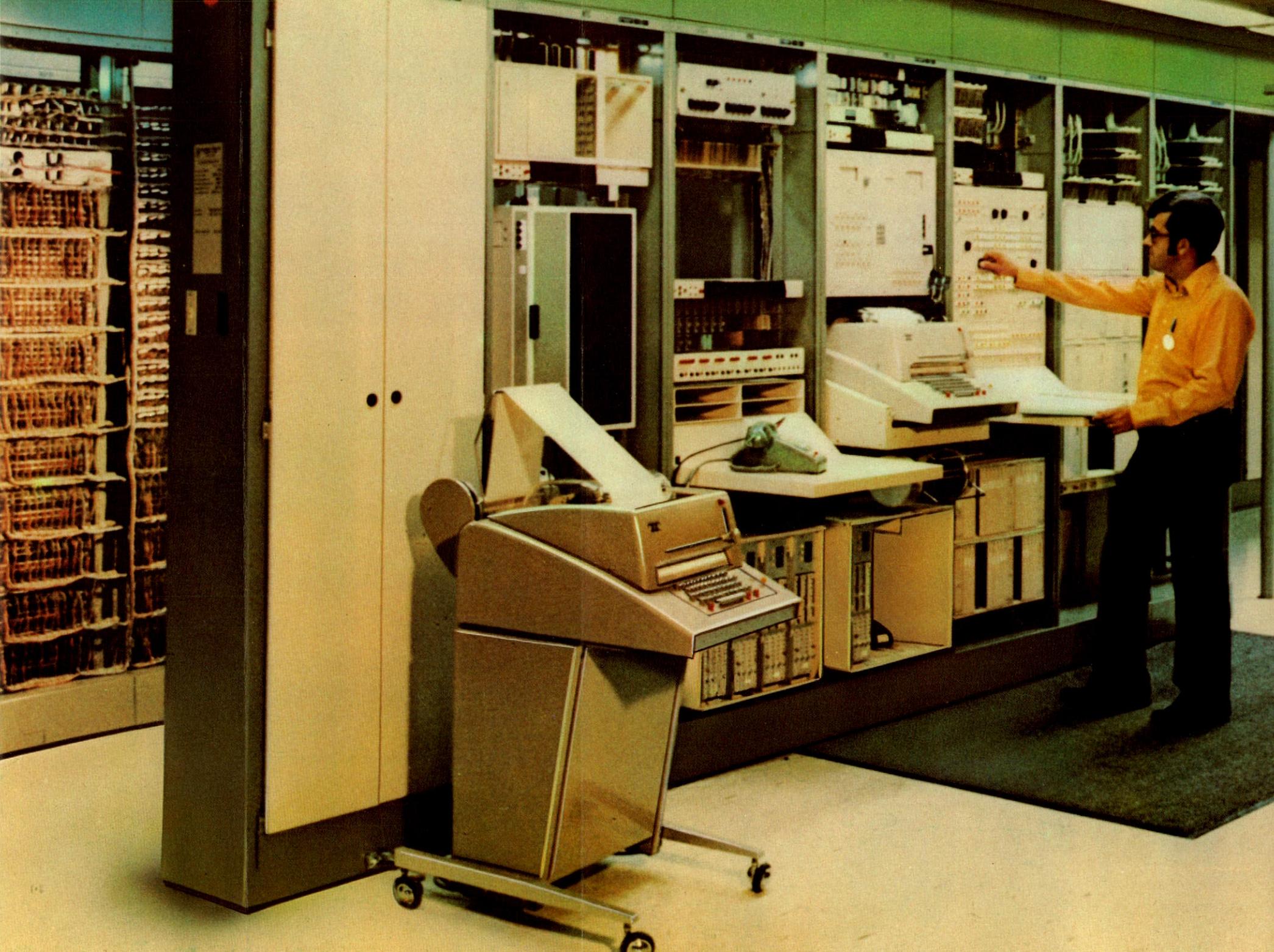




Northern Electric switching systems cover the full range: electromechanical, electronic, toll and data. Its switching systems are operating telephone networks in Canada and many parts of the world. Emphasis is on development of modern switching systems, such as the company's SP-1.

The end product of a \$50 million dollar research and development program, the SP-1 operates under computer control with a fully stored program, making it unique in the industry in its flexibility, range of customer options and ease of maintenance. Introduced commercially in 1971, systems were in service for two years before some competitive systems were made operational. Despite a cost which runs into the millions, depending on customer requirements, more than 70 SP-1's were sold in the two years following its introduction.

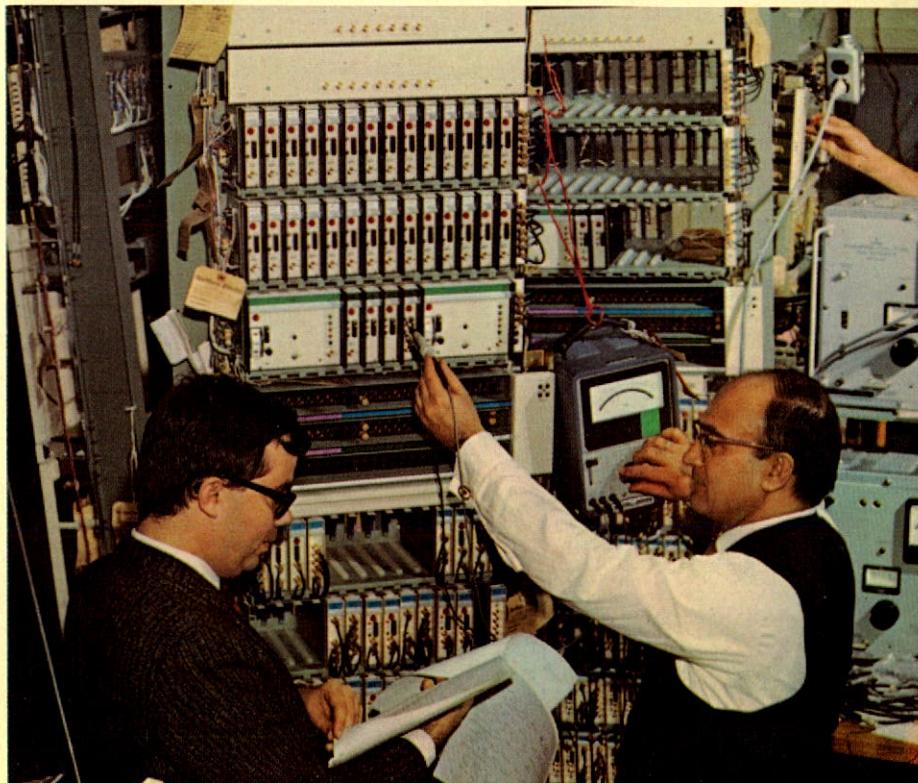




Northern Electric's business service systems include key telephone equipment, business interphone and intercom, automatic call distributor and a choice of several private branch exchanges, one of which is the PULSE 80, a self-contained electronic telephone exchange for small businesses. Totally contained in one cabinet, it is completely modular and can be installed in less than a day. Close to 1,000 PULSE 80's were sold in the 14 months that followed introduction of the product in 1972.

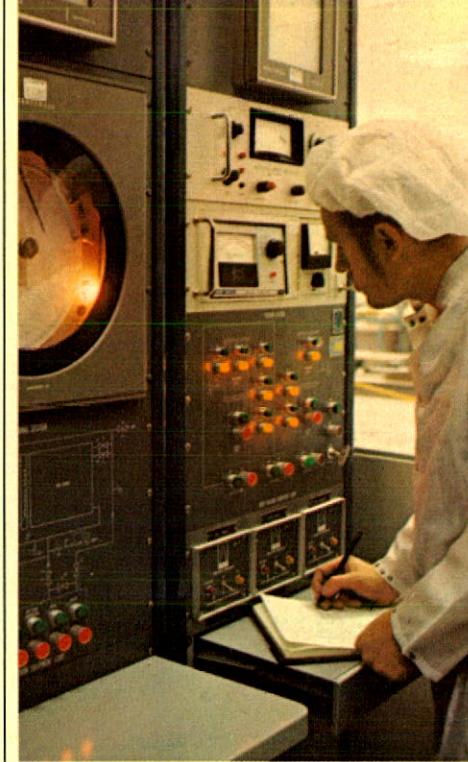


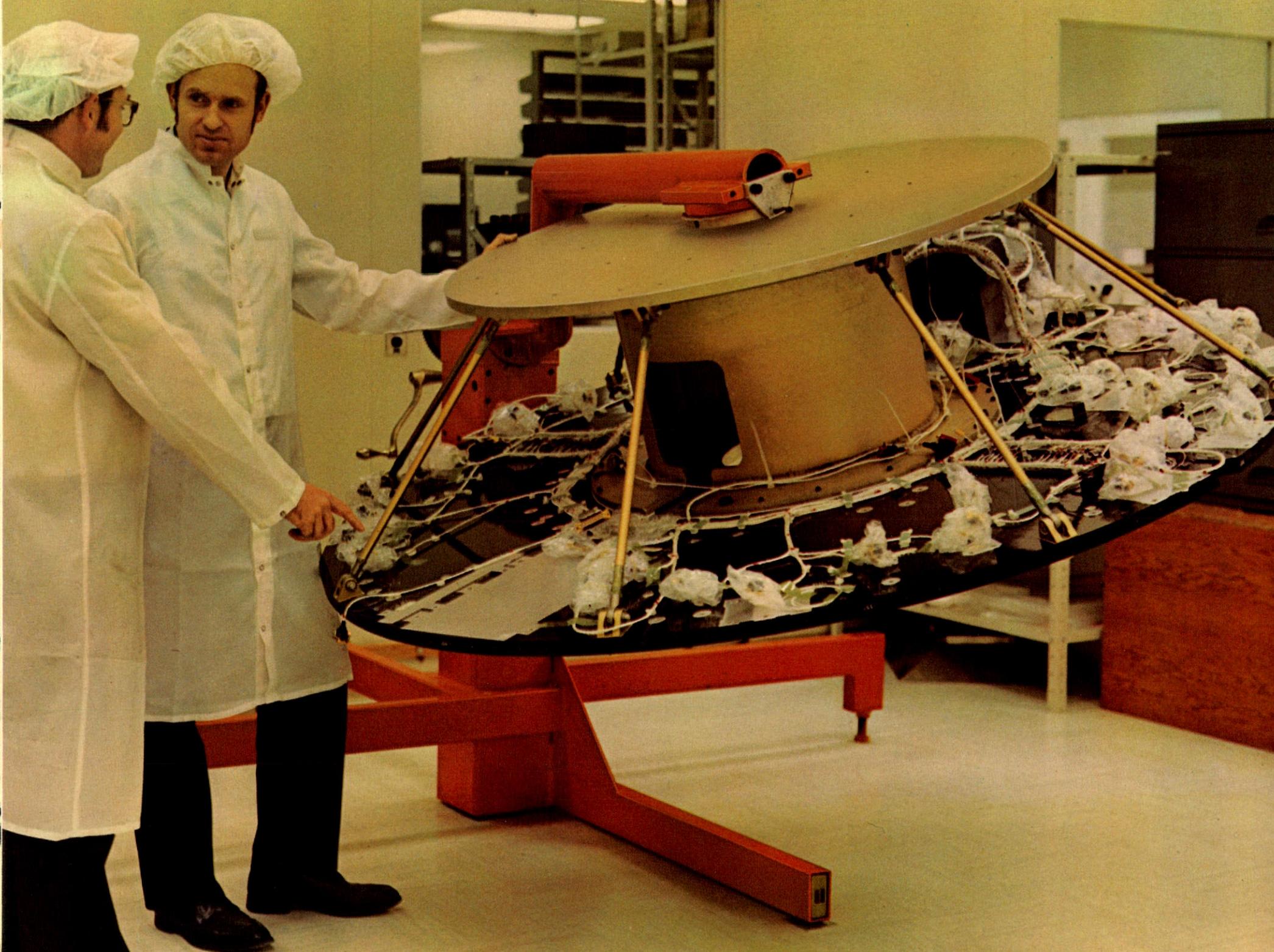
In transmission, Northern supplies one of the widest ranges of transmission systems in North America; carrier multiplex, digital lines and banks, microwave radio and satellite electronics. Advanced products developed by Northern Electric in this field include LD-4, a high-capacity digital transmission system capable of more than 20,000 voice channels carried on a 12-tube coaxial cable, and the RA-3 family of high-capacity heavy-route microwave radio systems. Recent Northern Electric developments in voice frequency have made the company's equipment in this field among the most advanced available.



In communication satellites, Northern Electric has supplied all of the spacecraft electronics for Canada's Anik I, II, and III communication satellites. Similar spacecraft electronics are being supplied for United States domestic satellites. For the Intelsat series of satellites, Northern Electric manufactured the 12-channel microwave transmitter-receivers for Intelsat IV, F4, a large number of microwave transmitters, and is supplying the digital telemetry and control electronics for the new high-capacity Intelsat IVA.

The company at its Lucerne, Quebec, plant operates the only commercial electronic communication satellite assembly line in the world.





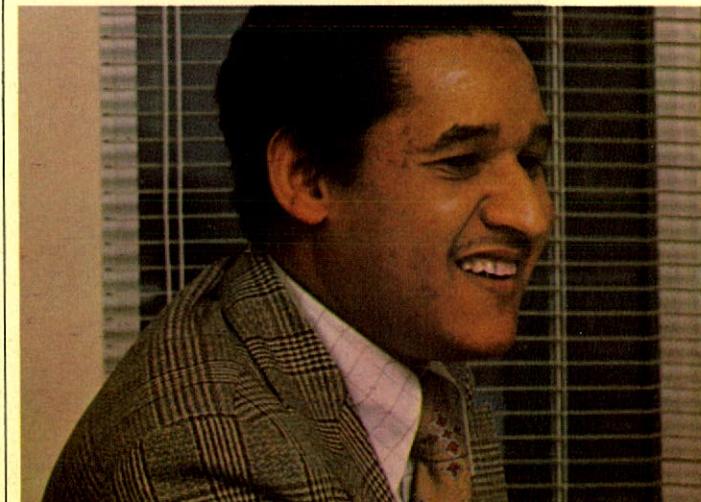
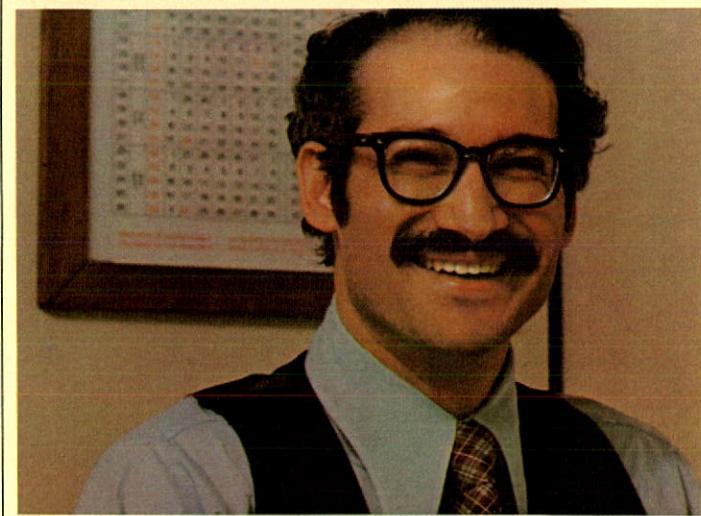
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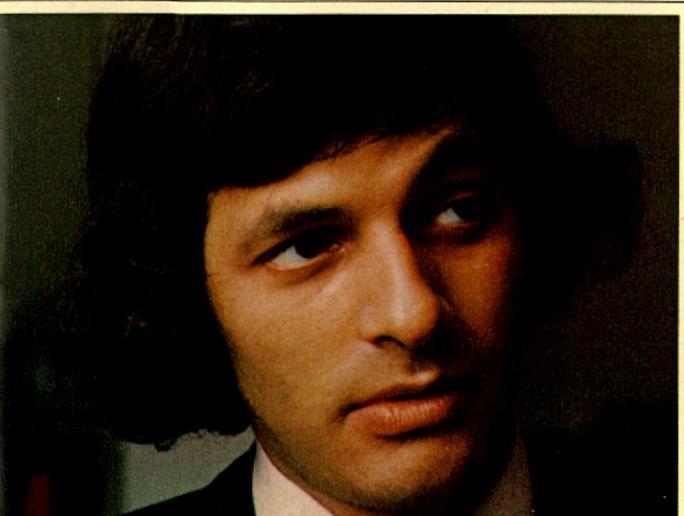
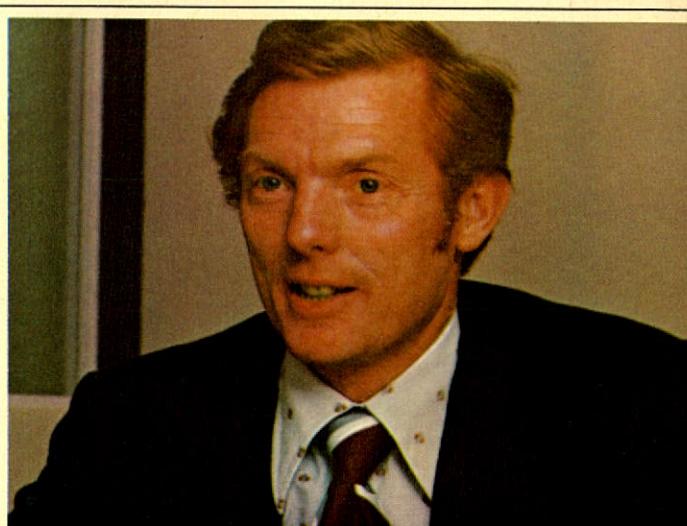
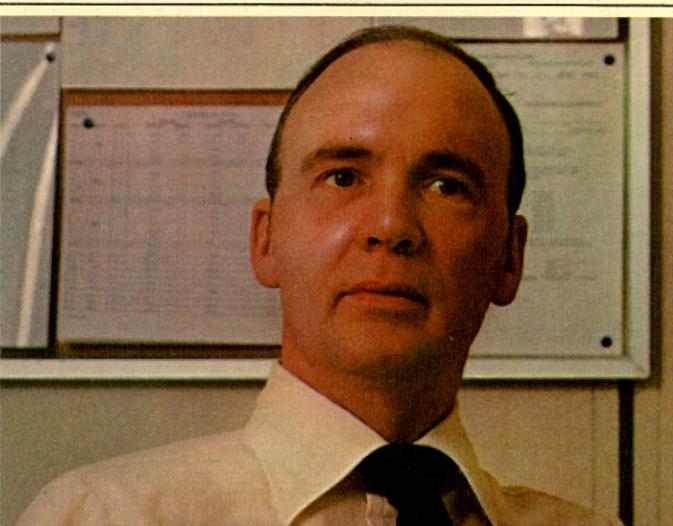
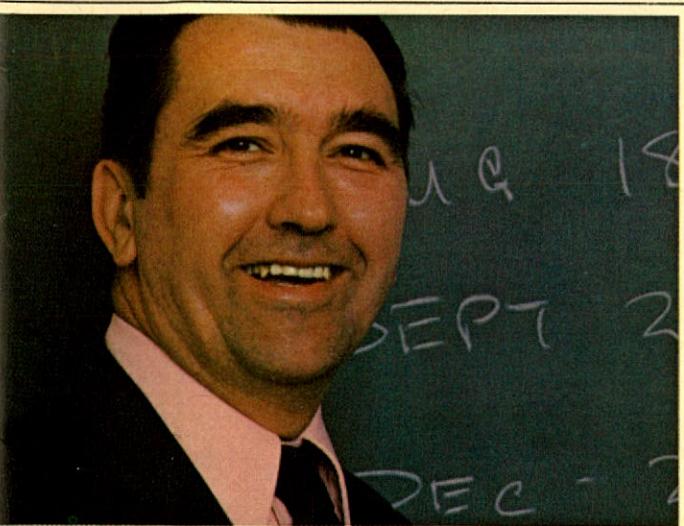
The telecommunications industry is demanding, complex and highly technical.

The emphasis on professionalism at Northern Electric starts with senior management, most of whom have long and varied experience in the industry, and extends down through all levels of management. It has been largely responsible for the success the company has had in its international activities.

To meet its technological and administrative needs, Northern Electric employs some 2,000 managers, 1,700 engineers and technicians, 150 computer analysts and programmers and 500 other kinds of specialists spread through its business functions.

Since product innovation is such a major factor in maintaining a leading position in the industry, a source of Northern's strength is its research arm, Bell-Northern Research. This organization with an annual budget in excess of



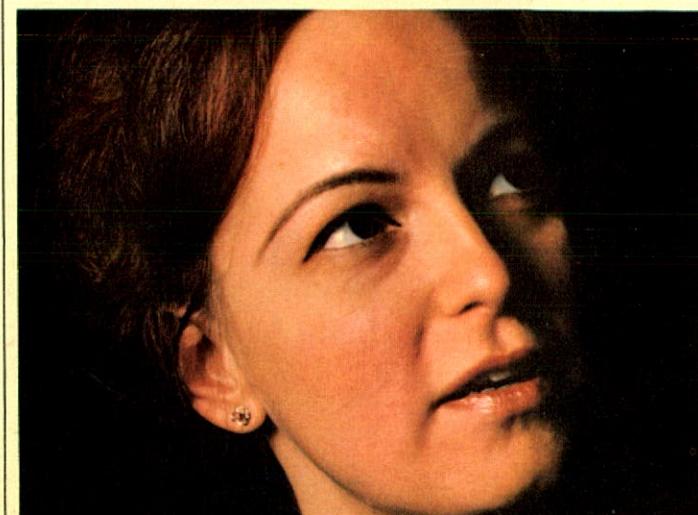
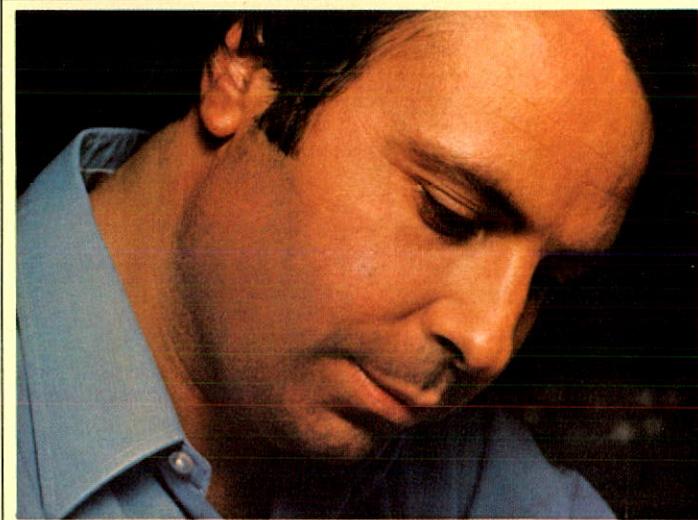


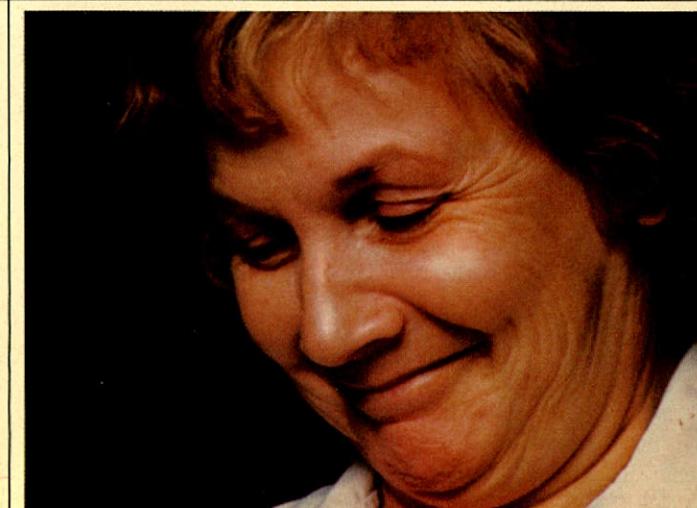
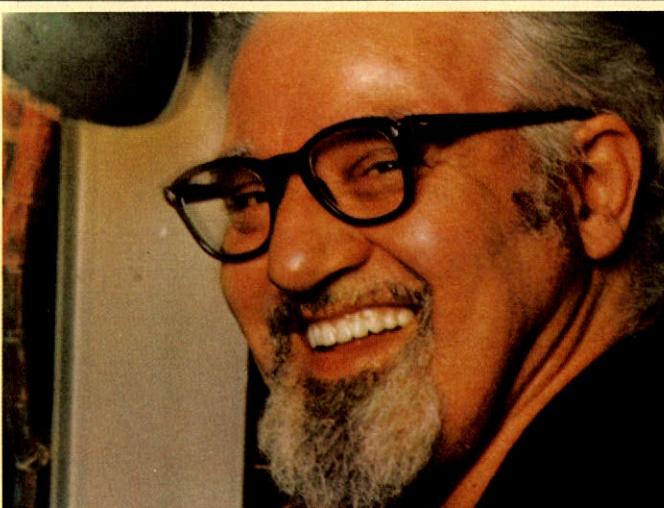
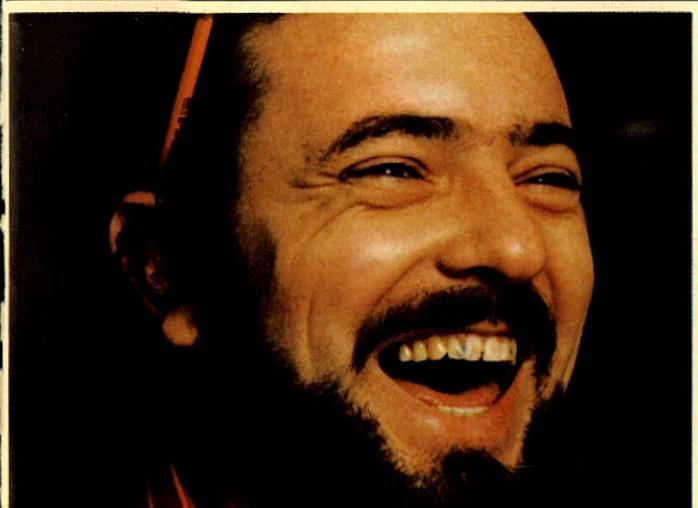
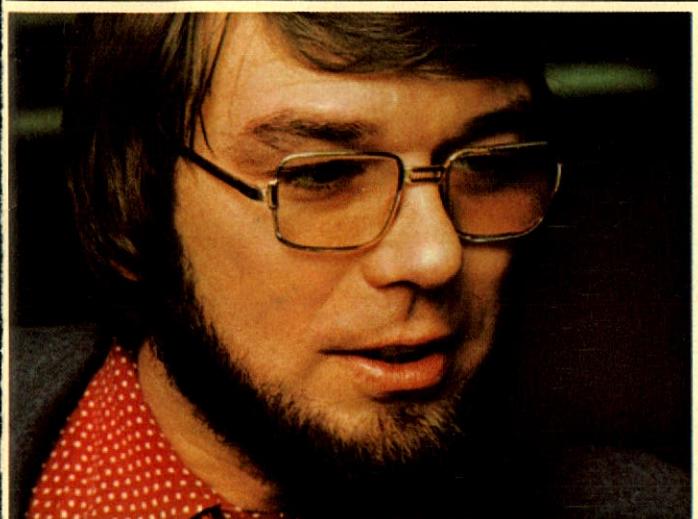
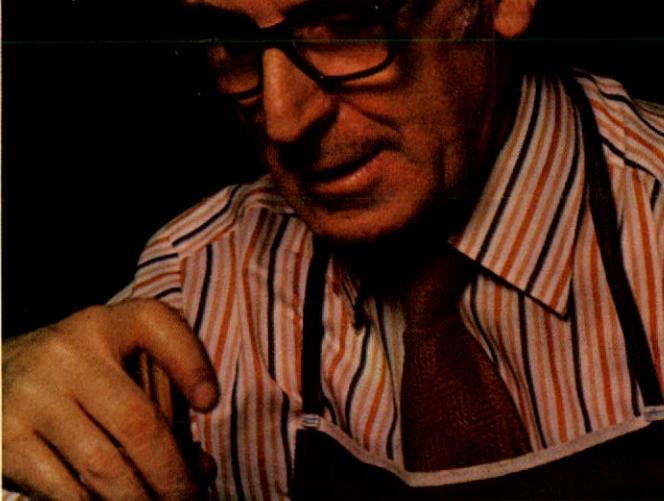
\$40 million, has a staff of more than 1,500 people, 500 of them with university degrees ranging from bachelors to doctorates.

There are also some 600 technologists and managers and 400 support people.

Whether in Canada, the United States, Ireland, Turkey or Malaysia, all workers on Northern Electric production lines have been specially trained to fulfill their roles in the manufacturing process. The training for new workers on certain processes is as long as three months. Yet, so exacting are some of these processes, particularly in the wiring of terminals, that computers assist the operator, making it virtually impossible for the worker to make mistakes.

Together the managers, specialists and workers, professionals all, form an organization that is making a distinctly Canadian mark on the international business scene.





## NORTHERN ELECTRIC AND THE FUTURE

The pace of development in telecommunications, startling as it has been, is not slackening; rather it is accelerating. Voice frequency, digital transmission systems, electronic switching, new business communications concepts—all are areas where advances follow one another with increasing rapidity.

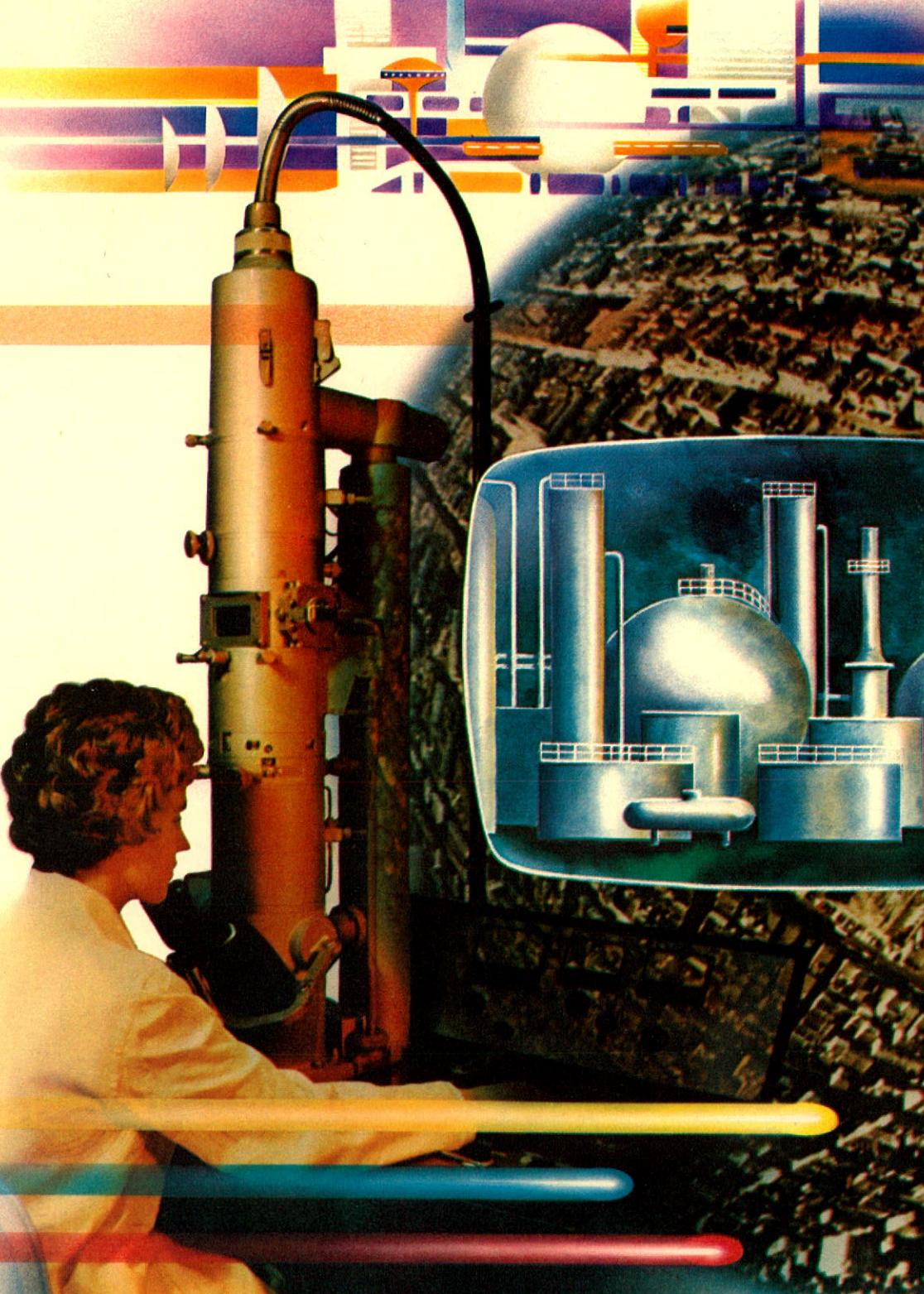
Northern Electric is busy meeting the sophisticated demands of today with a comprehensive range of modern products. But even more important, it is searching out the needs of tomorrow to anticipate them. More than 100 professionals at Bell-Northern Research are analysing the economic and service opportunities made possible by advances in world technologies. From there it is possible to foresee broad trends and respond in a way that will keep Northern Electric in the forefront of development, despite intense international competition.

The most pronounced trend sees digital encoding used throughout the entire telephone plant. Telecommunications systems will have the flexibility to handle an arbitrary mix of voice, video and data signals with greater reliability and accuracy. First models of such systems are now being studied in the laboratory. Northern Electric marketing is actively defining customer requirements for the next generation of competitive products. Coupled with an extension of the software control used in SP-1, these systems will allow new levels of manufacturing and system flexibility.

Today the customer wants a product that does more than just meet his technical needs; it must also satisfy his aesthetic needs and enhance his working ambiance. An analysis of human factors in industrial design is now a fundamental part of all development programs.

In tomorrow's wired city, the only limit to communications services will be that which is dictated by the limit of the human imagination. The term embodies a total approach to the communications needs of a community. Bell-Northern Research has 125 professionals devoting all their time to studying these future needs. Following are just a few of the communications luxuries that might be in store.

- ... stock market reports at home as they happen
- ... shopping from home
- ... education at home
- ... medical diagnostic services monitoring patient while at home
- ... home access to public libraries



Northern Electric has entered a new phase of its development—the multi-national phase. It has been able to reach this point because of its strengths: its long experience in the telecommunications industry; its past record of product excellence; the integrated operations of the family group of companies to which it belongs; the professionalism of its people; the technical expertise and the scope and proficiency of its research organization. And, because of these strengths, it looks to its future in the highly competitive world marketplace with confidence.







