

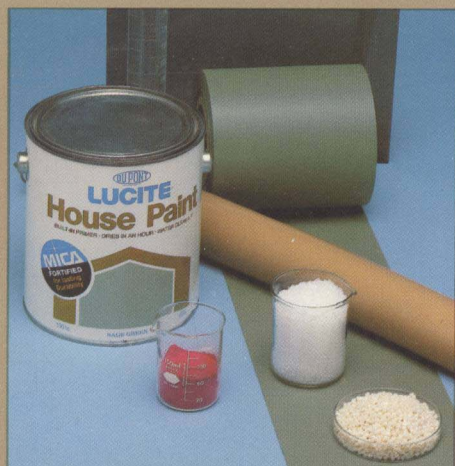
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# DuPont Annual Report 1978







## YOU AND DU PONT: THERE'S A LOT OF GOOD CHEMISTRY BETWEEN US

San Francisco, shown on the cover, is not often associated with Du Pont...yet Du Pont is everywhere in the picture. The reason you don't see us is that most of our products are converted by our customers before they reach you. Ubiquitous, essential, yet generally unseen or unnoticed, they vitally affect the living standards of everyone.

Several Du Pont products used in housing and construction are shown at left. The can of "Lucite" house paint is familiar; less familiar is the red pigment, which provides the color for paints. The white and tan beads are

pellets of plastic which provide insulation for the miles of wire and cable that go into skyscrapers. The plastic pipe is used in local gas systems; the roll of green film protects the siding on a building. The acrylic sheet (rear) is used for home and industrial glazing; the formaldehyde in the cylinder is a key ingredient in adhesives for plywood. Hundreds of other Du Pont products go into housing and construction—but by the bag and the carload, not by the beaker.

Other areas of "good chemistry" between you and Du Pont are illustrated on pages 10-23.

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# E. I. DU PONT DE NEMOURS & COMPANY ANNUAL REPORT FOR THE YEAR 1978

## HIGHLIGHTS

	1978	1977	Percent Change 1978 vs. 1977
(Dollars in millions, except per share)			
SALES	\$ 10,584	\$ 9,435	12
NET INCOME	787	545	44
DIVIDENDS	358	288	24
PER SHARE OF COMMON STOCK			
Earnings	16.17	11.06	46
Dividends	7.25	5.75	26
EARNINGS BEFORE MINORITY INTERESTS AS PERCENT OF:			
Sales	7.5%	5.9%	1.6*
Average Total Investment	5.6%	4.3%	1.3*
EARNINGS ON COMMON STOCK AS PERCENT OF AVERAGE COMMON STOCKHOLDERS' EQUITY	18.1%	13.6%	4.5*
CAPITAL EXPENDITURES	\$ 786	\$ 780	1
DEPRECIATION AND OBSOLESCENCE	776	724	7
RESEARCH AND DEVELOPMENT	377	367	3
PROVISION FOR INCOME TAXES	548	427	28
<b>AT YEAR END</b>			
TOTAL INVESTMENT	\$ 14,714	\$ 13,507	9
WORKING CAPITAL	\$ 2,349	\$ 1,949	21
COMMON STOCKHOLDERS' EQUITY	\$ 4,523	\$ 4,080	11
EMPLOYEES	132,140	131,317	1
COMMON STOCKHOLDERS	202,573	206,824	(2)

\*Change in percentage points.

The annual meeting of the stockholders will be held at 12 noon on Monday, April 16, 1979, in The Playhouse Theatre in the Du Pont Building, Wilmington, Delaware. For holders of common stock, formal notice of the meeting, proxy statement, and form of proxy are included with this report. Proxies are solicited by order of the Board of Directors.



## To The Stockholders

Strong progress in sales and earnings during 1978 demonstrated the Company's inherent strengths and suggested its future potential. We are moving in the right direction, but in view of the major commitments of capital and technical resources that have been made in recent years, much remains to be accomplished. We emerged from 1978 encouraged but not satisfied.

Consolidated sales in 1978 were \$10,584 million, 12 percent above the prior year. Net income of \$787 million was equivalent to \$16.17 per share, compared to \$11.06 in 1977. The improvement reflects, primarily, a 7 percent increase in the physical volume of shipments. Selling prices rose only modestly, averaging 5 percent higher than in 1977. Return on investment was 5.6 percent, compared to 4.3 percent in the prior year, and return on common stockholders' equity was 18.1 percent, up 4.5 percentage points from 1977.

### CPS Continues Strong, Fibers Improving

Most product lines and geographic areas posted improved sales and earnings. The CPS businesses (chemicals, plastics, and specialty products) showed a 6 percent gain in physical volume, and earned \$11.66 per share compared to \$9.85 in 1977. Total CPS sales were \$7,140 million, 13 percent higher than the previous year, and accounted for 67 percent of corporate sales. These CPS businesses showed a return on investment of 6.6 percent, compared with 6.3 percent in 1977. Du Pont's specialty lines (including agrichemicals, electronic products, explosives, finishes, and medical and printing products) continued their excellent growth with an earnings gain of 38 percent. Sales and earnings of plastics also increased, although the earnings improvement was moderated by nonrecurring charges detailed on page 5. Chemicals sales improved modestly but earnings were down somewhat, reflecting worldwide overcapacity in commodity chemicals and certain nonrecurring charges detailed on page 4.

Du Pont's fibers business, recovering from a low base, showed the greatest improvement in 1978. Demand for fibers is beginning to reach a better balance with supply, but substantial excess capacity still exists worldwide. Cost-reduction programs made a significant contribution

to Du Pont's improved results. Fibers sales of \$3,444 million (11 percent ahead of 1977) accounted for 33 percent of corporate sales in 1978, and earnings were \$4.51 per share—nearly four times the \$1.21 earned in 1977. Return on investment from fibers was 4.0 percent in 1978 compared to 1.1 percent in 1977—hardly acceptable in either case. However, the apparel fibers business is making progress and there is considerable strength in certain other markets, notably carpet and industrial fibers.

For Du Pont's international operations, including exports, 1978 was a year of strong recovery. International business contributed \$4.75 per share to consolidated earnings, 128 percent above the \$2.08 earned in 1977. Sales abroad were \$2,992 million (19 percent ahead of the prior year) and during the past five years have grown appreciably faster than domestic sales. Earnings from plastics and specialty products were particularly good, and Du Pont's international fibers business, which showed losses in the three previous years, turned around in 1978. However, our fibers business outside the United States still has room for improvement.

### Meeting Changing Needs

The organization of Du Pont's research and development effort was realigned at year-end and Dr. Edward G. Jefferson, a member of the Executive Committee, assumed direct responsibility for the broad direction and coordination of worldwide R&D programs. Changing market conditions, government regulations, changes in availability and cost of energy and raw materials, and environmental considerations have made top management direction essential to the effective deployment of research and development effort and the coordination of business diversification programs.

In another move, the position of vice president-external affairs was created. This reflects our awareness that the Company's interface with government, the public, special-interest groups, and plant communities will be ever more important in the years ahead. The new position will provide coordinated leadership of such sensitive areas as public affairs and legal activities. Further, the Company has organized a Governmental Affairs Action Program involving communications with legislators, employees, shareholders, pensioners, and other opinion leaders on public policy issues that have a vital effect on our business.

A consolidation involving four industrial departments, and a realignment of their product lines, was effected on January 1, 1978. The integration of these businesses into two new departments, following the pattern of earlier realignments, was designed to increase operating efficiency by bringing together product lines that serve similar markets. These changes have had good effect.

### Public Issues and Du Pont

Public policy decisions continue to have major impact on our business activities.

Inflation has been a major domestic problem throughout the 1970s. There is a pressing need to bend these inflationary pressures downward because inflation destroys jobs, reduces purchasing power, undermines efforts to assist the underprivileged, and works special hardship on people with fixed incomes.

In this setting, President Carter has embarked on a long-term effort to slow inflation. Although the business community did not advocate the voluntary wage and price guidelines that are now in effect, we believe there is no practical alternative to full cooperation. Quite properly, the President has recognized that government must deal effectively with the fundamental causes, rather than the symptoms, of inflation. He has promised to hold down government spending, reduce the budget deficit, and eliminate needless regulations and other forms of waste. If unemployment rises significantly this year, the Administration will come under pressure to stimulate economic growth. However, we believe the Administration must not surrender to short-term pressures. In a very real sense, the major economic issue of 1979 will be long-term economic policy, not short-term performance.

Another area of concern is the needless and counterproductive government regulations that have been placed on the business community. Many regulations bring little or no benefit to the public, yet are strongly inflationary. In the end, it is the individual citizen who bears the costs of these regulatory excesses. What is needed is more common sense and a greater emphasis on free-market approaches to regulation.

In striving to meet legitimate needs, government too often has acted in haste and lost perspective on the relative costs and benefits of its regulation. There is a need for increased accountability by regulatory agencies, and for a review mechanism that will identify unreasonable



regulation. President Carter's formation of the Regulatory Council, to coordinate and improve regulatory processes, was a positive move in 1978, but the Council's task is formidable and its effectiveness remains to be demonstrated.

An encouraging development was the Revenue Act of 1978, which reduced the corporate tax rate from 48 percent to 46 percent and made the investment tax credit permanent at a 10 percent rate. We view these changes as a good start. They should be followed by additional measures to ease the problem of capital formation as promptly as fiscal circumstances permit.

### The Future

The Board of Directors declared a first quarter 1979 interim dividend on common stock of \$1.50 per share, an increase of \$.25 from the \$1.25 quarterly rate paid in recent years. The action reflects Du Pont's higher level of earnings, and management's confidence in the long-term outlook.

Capital authorizations during 1979 will exceed \$1,000 million, compared to about \$860 million in 1978. A substantial portion of our capital program will be directed to facility modernization, with the objective of lowering operating costs.

The outlook for Du Pont in 1979 depends importantly on the strength of our key customer industries (automotive, housing, and textiles) and on the economic climate in the U.S. and other major world markets. There are some uncertainties in the United States, but we expect our overseas markets, on balance, to show continued growth. The Company should have a reasonably good year in 1979.

We are grateful to Du Pont's talented and dedicated employees throughout the world. The results achieved in 1978 reflect their accomplishments.

*Irving S. Shapiro*

Irving S. Shapiro  
Chairman

*Edward R. Kane*

Edward R. Kane  
President

Wilmington, Delaware  
February 19, 1979



Du Pont's Executive Committee consists of (seated) Chairman Irving S. Shapiro and President Edward R. Kane and (from left, standing) Senior Vice Presidents William G. Simeral, Edward G. Jefferson, Richard E. Heckert, and Robert C. Forney.



# Chemicals Record Modest Growth in Sales

The Chemicals segment of Du Pont's business—consisting of commodity chemicals, special purpose chemicals, and pigments—had sales of \$1,807 million, up 3% from 1977, and net income of \$124 million, down 6%. Markets served by the Chemicals businesses include the rubber, paper, printing, textile, fuel additive, coatings, plastic, and agrichemical industries. Demand increased over the level of the prior year for a number of important products—including formaldehyde, aromatics, and refrigerant applications of "Freon" fluorocarbons.

The decline in Chemicals segment earnings was due to the adverse effects of worldwide overcapacity in commodity chemicals and increased imports of low priced chemicals into the U.S. market, although this was offset somewhat by earnings improvement in certain special purpose products. Chemicals earnings

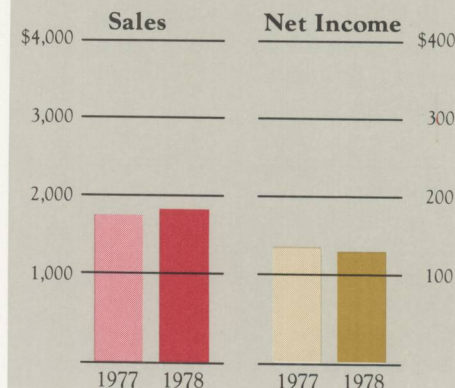
also were reduced by \$22 million for two nonrecurring charges related to (1) a penalty for withdrawal from a raw material contract to achieve a more favorable price on future purchases of such material and (2) a supplemental depreciation provision to recognize a possible further reduction in consumption of lead additives in gasoline due to U.S. government regulations.

Several steps are being taken to improve profitability of the Chemicals businesses. These include utilization of new capacity with curtailment of less efficient facilities, increased development of foreign markets, and concentration of research and development efforts on cost reduction and energy conservation.

Major capital programs in this segment include new facilities for titanium dioxide at DeLisle, Miss., and methanol at Deer Park, Tex., both of which are expected to start up in 1979.

Feedstock synthesis gas for the methanol facility will be provided by Syngas, a joint venture of Du Pont and National Distillers and Chemical Corporation.

**CHEMICALS: Sales and Net Income**  
Dollars in Millions



Emiliano Cortes Velasquez, left, does product development work on colored pigments at Toluca, Mexico, as laboratory technician for Colorquim, S.A. de C.V., a Du Pont subsidiary. Donald L. Brown, manager of Hazardous Materials Training, conducts a seminar, above, on "RHYTHM"—"Remember How You Treat Hazardous Materials"—a handling and shipping system which Du Pont devised for its own use and now markets to other companies.



# Plastics Segment Shows Continuing Sales and Earnings Growth

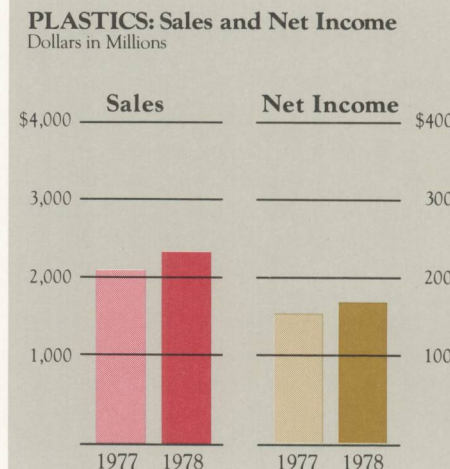
Plastics sales in 1978 reached an all-time high of \$2,330 million, up 13% from the prior year. This segment consists of thermoplastic resins, elastomers, films, and other plastic products, which generally have high value-in-use and are sold to a variety of industries including packaging, automotive, electrical, and construction.

Net income was up 9% from 1977 to \$165 million, after nonrecurring charges which decreased net income by \$19 million resulting from a decision to discontinue the manufacture of the powder form of "Surlyn" ionomer and from explosions at two plants in Texas. Without these charges, Plastics net income would have increased 22% over the prior year.

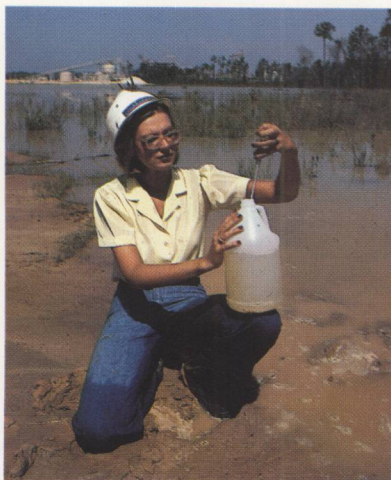
Engineering resins, certain fabricated plastic products, fluoropolymers, packaging films, and specialized elastomer

products showed the greatest earnings improvement from 1977. Increased demand for these products was offset in part by price weakness in polyethylene resins due to industry overcapacity. In general, the sales and earnings performance of Plastics was stronger overseas than in the U.S. Particularly strong performances were recorded by "Delrin" acetal resin and "Mylar" polyester film in Europe and fluoropolymers in other foreign markets.

In 1978, the first half of a major capacity expansion program for "Teflon" fluoropolymer resins was completed at Parkersburg, W. Va. In 1979, new facilities are expected to start up at the Fayetteville, N.C., Works for the production of "Nafion" perfluorosulfonic acid membranes and related chemical intermediates. (See essay, p. 14)



A titanium dioxide facility at DeLisle, Miss., is scheduled to come on stream during 1979, but many employees of the Chemicals, Dyes and Pigments Department have been on site for several months. At right, Julianne Harvey, environmental group supervisor, conducts a water quality field test. Below, Sue Vincent, supervisor of integrated data processing, prepares the plant's computer system for start-up.



Rex Cloak, branch supervisor, and Elsie Prisco, sales clerk, operate the computerized order and inventory system at Du Pont's Automotive Refinish Sales Center in Hayward, Calif.



# Specialty Products Lead Growth in Sales and Earnings

The Specialty Products segment, a diverse portfolio of high-technology products, has grown rapidly in recent years and 1978 was no exception. Sales and earnings were at record levels for the fourth consecutive year. This segment's sales in 1978 increased 19% over the prior year to \$3,003 million, and net income grew 38% to \$278 million.

Most major product areas performed well. Agrichemicals set new records, with "Benlate" fungicide and "Lexone" herbicide registering solid gains. Electronic products, one of the fastest growing areas, had a good year as the industry outpaced the overall economy by a significant margin. Medical products, a particularly promising area of future growth, showed healthy gains led by the success of the automatic clinical analyzer.

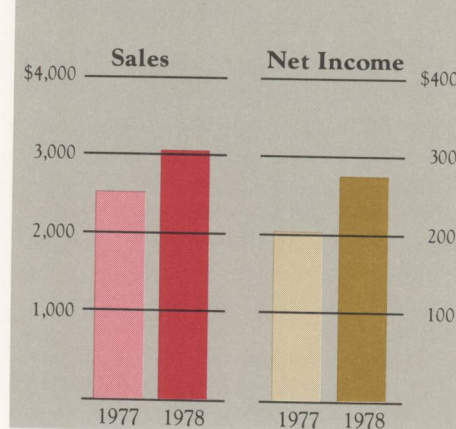
Other areas performing well in 1978 included "Teflon" non-stick metal

coatings, where market acceptance for "SilverStone" has been excellent, and "Cromalin" proofing systems for color printing, considered the optimum method of pre-press color control. "Cromalin" benefitted from good growth in color printing markets. Sales of graphic arts products benefitted from the strong growth of low-silver films for use under room light conditions, and sales of "Corian" counter tops were paced by strong gains in the hotel and motel markets.

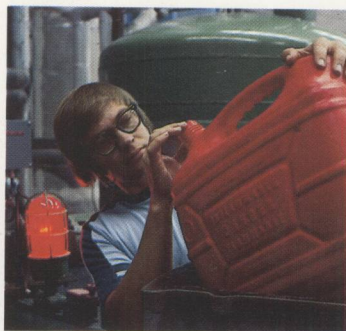
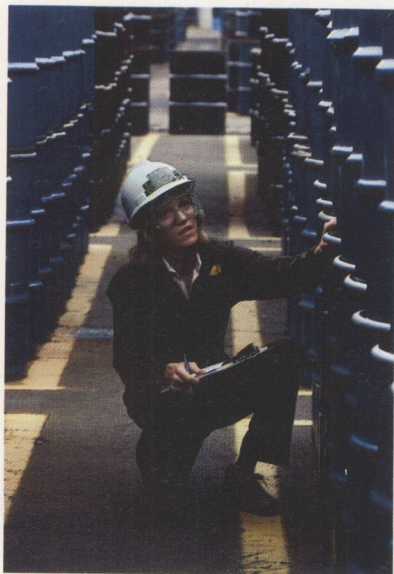
Specialty Products are an important part of the Company's international business. In 1978, the Company's agrichemicals performed particularly well abroad, as did x-ray, graphic arts products and electronic products in Europe, and paints in Latin America and the Far East. The successful program for emphasizing "Tovex" water gel explosives in domestic markets is being ex-

tended to overseas markets. New facilities for "Tovex" water gels were started up in Brazil in 1978 and are scheduled to start up in Hong Kong and New Zealand in 1979.

**SPECIALTIES: Sales and Net Income**  
Dollars in Millions



Emily Maddox, right, is one of 270 participants in Du Pont's Field Engineering Program which offers new engineers a variety of assignments to help them choose career directions. At the Elastomer Chemicals' Chambers Works in New Jersey, she examines inventory during a safety inspection. Her assignment involves a broad range of responsibilities for day-to-day assistance and longer range improvements in the production of "Viton" fluoroelastomer.



Laboratory technician Wayne Irish, left, checks a container made by rotational molding of "Sclair" polyethylene resin at Du Pont of Canada's Kingston, Ontario, research center. Below, clinical chemists Walter Koniecki, left, and Bobby Moore analyze blood samples at the Haskell Laboratory for Toxicology and Industrial Medicine, located at Newark, Del.





# Fibers Operations Show Improvement

Fibers made considerable progress in 1978 to improve profitability from the low levels of 1975-1977. Demand was at record levels, and sales of \$3,444 million were 11% over 1977. Net income was \$220 million—nearly four times the 1977 level. Although Fibers' return on investment of 4.0% does not yet compare favorably with the 6.6% return for the Company's CPS products, the improvement from the 1.1% return recorded last year is encouraging.

Two of the Fibers business sectors, carpet and industrial fibers, showed strong performance while spunbonded products made a substantial turnaround and broke even for the year. Carpet fibers recorded sharp improvement over the strong results of 1977, benefitting from excellent demand for bulked continuous filament nylon, of which Du Pont is a major producer. Industrial fibers con-

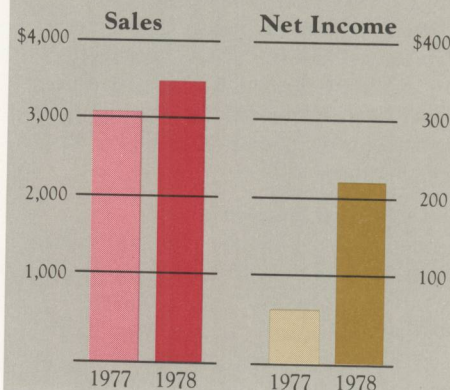
tinued to return a good profit in 1978. Tire manufacturers continued to expand commercial programs in which "Kevlar" is used as a reinforcing material.

Although market growth met expectations, some areas of the domestic apparel and home fabrics markets continued to suffer from worldwide overcapacity and depressed prices—particularly "Dacron" polyester filament and staple. Over the last several months, however, the demand for polyester filament has increased sufficiently to justify start-up of our plant at Cooper River, S.C.

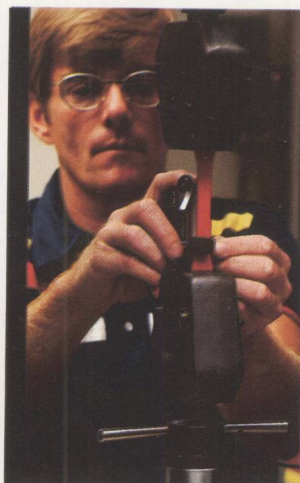
The European market remained the weakest area of the fibers business, although a small profit was recorded in 1978 compared to a substantial loss in 1977. Fibers business in South America, Mexico, and Canada was, in total, modestly profitable in 1978, and the Company's joint venture in Japan did

well. An Iranian joint venture plant started up in 1978, but operations were shut down at year end because of political unrest.

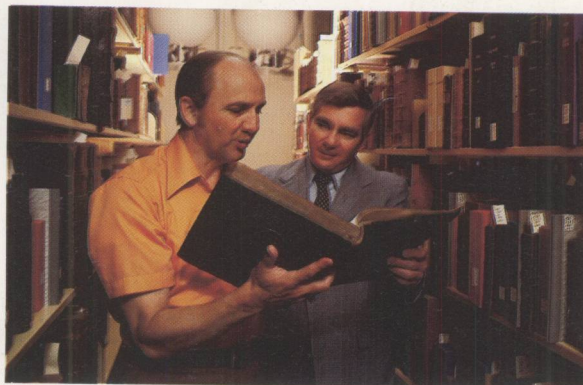
**FIBERS: Sales and Net Income**  
Dollars in Millions



Marietta Beatty, above left, and Florence Joyce process sales orders for the Chemicals, Dyes and Pigments Department at a new, centralized order center at Wilmington, Del., which speeds responses to customer requests.



Phil Alwine, laboratory technician at the Experimental Station near Wilmington, Del., tests the tensile strength of a new Du Pont plastic, "Rynite" polyester resin. Below, rare books are protected by a "Halon" 1301 fire extinguishing system at the University of California at Davis. Assistant University Librarian Nelson Piper, left, shows an 18th Century volume to A. P. Dougherty, sales manager for fire extinguishants.





# International Sales Rise to \$3 Billion in 1978

Du Pont's business outside the United States contributed an increased share of both sales and earnings to corporate performance in 1978.

Consolidated foreign sales of virtually \$3 billion were 19% ahead of 1977, with all geographic areas participating in the increase. Pretax earnings from international operations were 84% above 1977 and exceeded the previous high established in 1973. The increased earnings were due principally to volume increases and improved profit margins in most major product lines in almost all parts of the world.

## Geographic Results

Sales in Europe, Middle East, and Africa increased 24% over 1977 and account for over half of Du Pont's international business. European earnings were more than double the prior year's level, primarily reflecting the stronger demand. Record sales by the CPS businesses—particularly agrichemicals, plastic products, and photosystems—were an important factor in this year's earnings improvement.

Favorable earnings were achieved despite high startup costs associated with Du Pont's Iranian and French affiliated companies which began operations during the year. At this point, most of these costs are behind us—the French adiponitrile plant, which provides an essential ingredient for the manufacture of nylon, had an excellent startup and is operating well; the Company's share of the startup costs of the Iranian fibers venture has already been absorbed in reported financial results to the full extent of our investment, and, thus Du Pont expects to record no significant adverse effect on future corporate earnings

from the current situation in Iran.

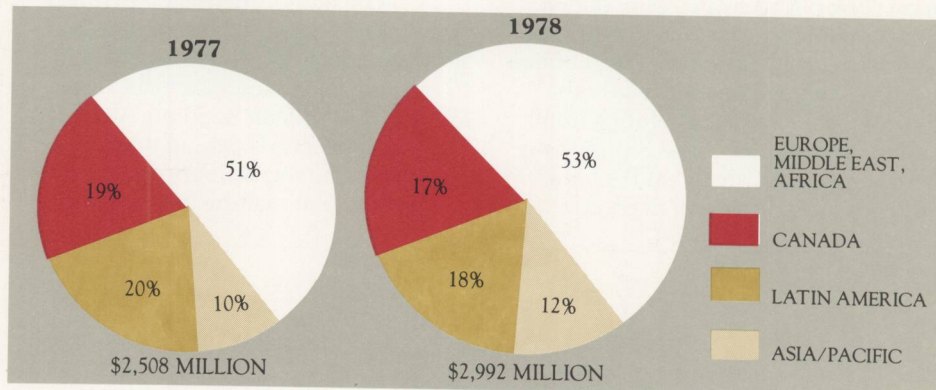
Sales in Canada were up 11% from 1977. Improved earnings reflect selling price increases and higher volumes in Fibers and Plastics that more than offset higher fixed costs connected with the expansion of plastics facilities at the St. Clair River Works.

Despite a business downturn in Argentina, Latin American sales increased 6% and earnings showed improvement

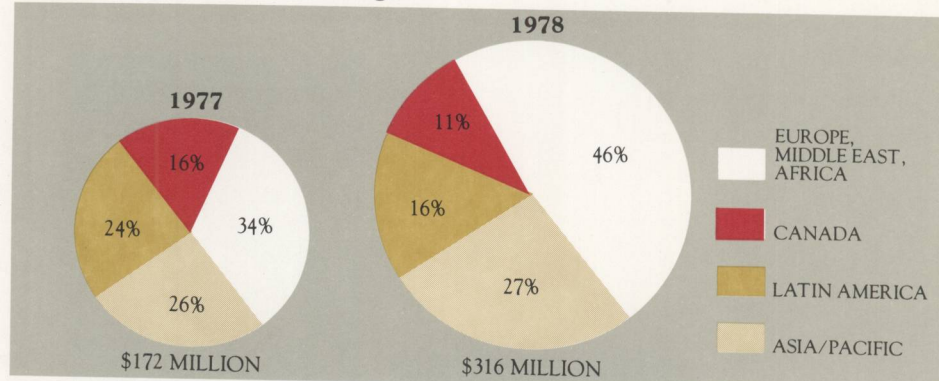
over last year due mainly to improved results from Du Pont's operations in Mexico and Brazil.

Asia/Pacific sales improved 40% over 1977 and displayed continuing strong performances by all major product lines. Earnings improved significantly, largely due to higher volumes in specialties and plastics, appreciation of the yen and an increased contribution from the Japanese affiliates.

## International Sales



## International Pretax Earnings





## **Du Pont's World of Products and Markets**

*Du Pont's many products, seen and unseen by the public, add up to a highly diversified business. And each product must meet the constantly changing needs of its marketplace, accommodating to the requirements of customers throughout the world.*

*The blending of research and development, manufacturing, and marketing into a successful business results in a different story for each product and for each area of the world.*

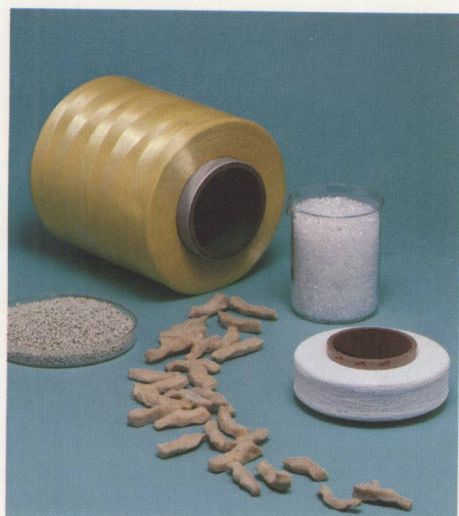
*The following seven essays display the diversity and point to some common characteristics in Du Pont's world of products and markets.*







# New Strategies Working in Apparel Market for Fibers



**You and Du Pont:  
There's a Lot of Good Chemistry  
Between Us  
...in Recreation**

Sailing is one of many sports in which Du Pont plays a role. The Company's plastics, elastomers, fibers, and finishes are important to almost any recreational activity you name. Du Pont products go into bicycles, motorcycles, outboard engines, and recreational vehicles. Outdoorsmen use "Stren" monofilament fishing line and Remington firearms for hunting. "Dacron" polyester is used to make fabric for sails.

The yellow "Kevlar" aramid fiber (above) reinforces tough, lightweight hulls for sailboats. The brown chunks of raw neoprene are the basic material of divers' wetsuits. More stylish garments—snug-fitting swimsuits—are made from the white "Lycra" spandex fiber, one of the many Du Pont fibers used for sporting apparel. Plastics and elastomers, shown in the beaker and dish, are used in ski boots, golf clubs, and snowmobiles.

The manufacture and sale of the apparel we wear is one of the oldest industries known to man; it is also one of the most complex and volatile. The apparel market is fragmented in structure, highly competitive, and subject to sudden fluctuations due to changes in fashion. The result is constant pressure for fabric and fiber innovation.

Nevertheless, there is an underlying stable base involving large volumes of commodity products. Consumption in the United States grew about 1½ percent annually over the past 10 years. Traditionally 6 percent of disposable income is spent on apparel.

This market is important to Du Pont because more than half of the Company's 1978 worldwide corporate fibers sales of \$3,444 million were for wearing apparel. In recent years, however, the profitability of this business has been unsatisfactory, as recovery from the 1974-75 recession has been slowed both by worldwide overcapacity of fiber production facilities and by the increasing levels of low-priced imports into major world markets served by Du Pont, particularly the United States, Europe, and Canada.

Now, the Company is seeing positive results in its three-part strategy to regain acceptable levels of fibers profitability: a broad program of fiber and fabric modification, an intensive marketing and promotional program, and major operational improvements.

For example, the polyester filament business grew very rapidly up to 1973, from a relatively narrow base of doubleknit fabrics. These fabrics lost favor with consumers in 1974, and consumption of polyester in knits started to decline, leading to a collapse of the fiber price structure in 1976. To stop the decline and stimulate growth again in the large polyester filament business, Du Pont began by developing new "Dacron" yarns, including "Serell", which is made of air-jet-textured filament yarns. The yarns were made into a wide range of new fabrics that departed from the "shiny" look of the early doubleknits by providing "natural" aesthetics and functionality. These yarns and fabrics were identified as Today's "Dacron" under a comprehensive advertising, publicity and retail promotion campaign. This program of product development and promotion had a significant impact on the revitalization of the "Dacron" filament business.

Similar programs have proved

effective in other areas. Du Pont is penetrating the denim market with a new type of "Dacron" staple that, when blended with cotton and woven into a denim, fades and softens like cotton jeans. Also under development is a blend of "Dacron" and "Orlon" fibers to be introduced this year under the certification mark "Bi-nell". Fabrics of this blend have a soft, cottony touch, and, due to the ability of "Orlon" to transport moisture to the fabric surface, are very comfortable in underwear and active sportswear.

The Company has stepped up its involvement in other aspects of the marketing chain. Through consumer research activities, Du Pont has gained new insight into retail display techniques, timing of merchandise availability, and advertising and promotional communications. This research has been shared with the apparel manufacturing and retailing community with excellent results. It is now being used to inject needed vitality into the women's apparel business. This leadership establishes a trade audience that is receptive to Du Pont products.

In addition to development work which has produced new polyester products, Du Pont has developed new varieties of other fibers to enable customers to respond to business needs and fashion trends. Notable among these is a new family of "Orlon" fibers for the sweater and craft yarn market, with 40 percent of these new yarns being introduced since 1972.

Du Pont is beginning to reap the rewards of major efforts to improve profitability through operating changes. It has withdrawn from the market several products which failed to meet minimum profitability goals (acetate yarn, "Nandel", and pneumacel) and has retired inefficient manufacturing facilities such as the "Orlon" acrylic plant in The Netherlands. The Company has invested substantially in facilities for mechanization and energy-use-reduction and in new processes coming from R&D programs to cut the cost of production of both fibers and intermediates. Productivity has been improving sharply as Du Pont realizes the low-cost potential of these modern facilities.

As worldwide overcapacity in apparel fibers is moderated through market growth, Du Pont's product development, market innovation, and facility modernization will enhance the competitive position of the Company's fibers business.



# Computerization of Process Control Increases Profits, Productivity

Modern chemical processes require increasingly sophisticated controls to achieve safe, trouble-free, low-cost operation. The loss of a day's operation in a chemical process can mean a major financial penalty, and reliable computer systems are central to successful operation.

Two of Du Pont's newer process control computer systems, developed by the Company's Engineering Department, are INFOTROL (Information and Control) and PROSE (Process Operating Systems Essentials). INFOTROL is currently in use at 10 Company plants, and PROSE is utilized in 12 processes.

INFOTROL and PROSE were designed as general-purpose operating systems and do not require computer specialists for their implementation. The systems can currently handle up to 1800 individual entries, and process engineers specify the items to be measured or calculations to be made.

Both systems offer significant advantages over older process computer systems. For example, both can monitor and store virtually all the information developed by instruments throughout a particular process, and, upon request, display data from previous operations on

a cathode ray tube similar to a television screen. The form of display can be adjusted to the requirements of the operator.

By comparing current and past data, engineers can determine cause-and-effect relationships in complex chemical reactions. The past (historical) data display capability enables Du Pont's process engineers to identify and explain departures from normal conditions and to develop new approaches which increase yields, minimize energy usage, and maintain safe operating conditions. Both systems also permit refinement of complex control procedures based on calculations of updated heat and material balances, vapor/liquid equilibria, and process kinetics. In large, world-scale facilities, optimum process conditions yield significant savings.

Advanced process control computer systems translate into substantial gains in productivity. A major activity at Du Pont is the development of labor-saving systems, such as those developed for the Textile Fibers Department's mechanization program. The systems utilize a computer network. "Host" computers are connected to local computers in various manufacturing areas.

Interconnection of this "distributed" computer system is accomplished by high speed communications tailored to specific Du Pont needs. One local computer can control many functions, such as collecting data from sophisticated measuring instruments (many of which are proprietary to Du Pont), comparing the data to quality standards, and segregating production according to these standards. Other local computers control product conveyor systems, automated packaging operations, weighing, carton labeling, and final product segregation.

The host computers not only keep track of the exact location of products in the system, but trigger local computers into the appropriate sequence of operations for product handling at each location. An added benefit is a permanent record of the production history of each product.

These and similar applications of modern computer technology are of great importance to Du Pont in ensuring high quality in its products and improving operating efficiency.

## You and Du Pont: There's a Lot of Good Chemistry Between Us ...in Health Care

**A strong, healthy newborn baby characterizes medical care at its best.**

The health-care industry is increasingly important to Du Pont. The automatic clinical analyzer (in the background, left) can make dozens of clinical tests sequentially and quickly. The centrifuge (right) is used in blood banks and a variety of other applications. The microtome (left) helps prepare tissue for analysis. Du Pont's Endo Laboratories manufactures many important pharmaceuticals, including "Narcan", used to improve respiratory function in a patient following surgery. "Cronex" x-ray film is one of the many photographic products made by Du Pont for the health-care industry.









## Fluoropolymers Provide Earnings, Societal Benefits

The year 1938, in which Du Pont introduced nylon, saw a second major Du Pont contribution to the advancement of chemistry—polytetrafluoroethylene. This remarkable fluoropolymer, today recognized under the trademark “Teflon”, was an outgrowth of research and development built upon the Company’s strong position in fluorochemistry, which began with fluorinated refrigerants. A very high molecular weight polymer with superior heat and chemical resistance, “Teflon” launched Du Pont into a variety of new businesses which, over the years, have made a significant contribution to earnings. Fluoropolymers are fully integrated within Du Pont and its affiliates, from the mining of fluorspar—a basic mineral for fluoropolymers—to the manufacture in the U.S., Europe, and Japan of products sold throughout the world.

In the past 40 years Du Pont has developed more than 100 fluoropolymer products used worldwide in thousands of applications, and research teams are continually improving the products and processes. In particular, the invention about 20 years ago of melt-processible copolymers led to other discoveries in previously unexplored areas.

Du Pont’s broad line of fluoropolymer products is used in virtually every area of industry, but most applications fall into three basic categories: electrical (especially for wire and cable insulation), chemical (including valve and pipe linings, seals, and gaskets), and mechanical (such as piston rings and bushings).

In addition, fluoropolymers perform other useful, often critical, functions: In environmental protection, filtration fabrics made of “Teflon” fibers, or glass fabrics coated with “Teflon” resin, keep coal ash and other industrial pollutants out of the atmosphere; in energy conservation, flat-plate solar collectors employ glazing of “Tedlar” polyvinyl fluoride or “Teflon” film and are used for heating homes and factories.

Sports stadiums and other structures can be covered with durable, translucent roofs made of fabric coated with “Teflon” which permits natural illumination during daylight hours and thereby reduces power requirements. These fabrics offer an economical, energy-efficient alternative to other materials of construction, and the market shows promise of steady growth.

Another fluoropolymer-based product used in the construction industry is “Tedlar”, applied to aluminum home siding and other exterior building materials to contribute to the long life and

beauty of these products.

“Teflon” also is used in finishes, and cookware coated with “Teflon” saves consumers time and energy in food preparation and clean-up chores. Over 750 million pots and pans coated with “Teflon” have been sold, and “SilverStone” (a newer fluoropolymer and the most durable nonstick finish ever developed by the Company) has achieved worldwide recognition and sales since its introduction late in 1976.

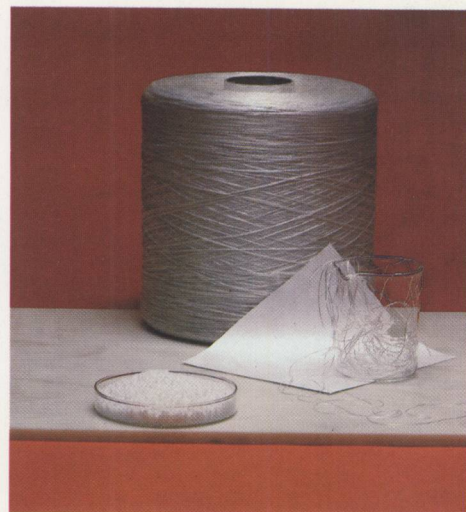
High value-in-use is a characteristic of all Du Pont fluoropolymers and can be exemplified by the “Viton” fluoroelastomers used in industrial sealing applications. Although seals made from “Viton” cost many times more than conventional rubber, their use is justified because chemical plants or oil refineries can reduce maintenance costs and downtime or improve productivity or safety. An even higher performance material is “Kalrez” perfluoroelastomer, used where nothing else works to accomplish previously impossible sealant tasks such as in recovery of natural gas or oil from hostile environments in deep wells.

Fluoropolymers play an essential role in new electronic and telecommunications equipment. Rapid switching systems use wire insulation of “Tefzel”, a second-generation fluoropolymer. In fire alarm and life safety systems for high-rise buildings—such as New York’s World Trade Center, which is equipped with over 300 miles of wire coated with “Teflon”—fluoropolymers provide safe insulation without the use of expensive metal conduit.

In aerospace, fluoropolymers provide crucial safety margins. “Kalrez” is used in the space shuttle; “Viton” is used for critical sealants and coatings in the Concorde supersonic jet. A typical, large commercial jet aircraft may contain up to 140 miles of wire and cable insulated with “Tefzel”, 1,000 different lubrication-free bearings made of “Teflon” fiber, and a variety of seals, gaskets, hydraulic hose, and equipment linings of “Teflon” resin.

“Nafion” perfluorosulfonic acid products are a recent outgrowth of Du Pont’s fluoropolymer chemistry. Market development of these new products is now in progress. A principal use is expected to be in the electrochemical production of caustic and chlorine, where the use of “Nafion” will eliminate the need for toxic mercury or asbestos.

The fluoropolymers business is an example of Du Pont’s doing what it does best—using sophisticated chemistry and technology to explore and develop new frontiers of knowledge to the mutual benefit of the Company and the public.



**You and Du Pont:  
There's a Lot of Good Chemistry  
Between Us  
...in Your Home's Interiors**

**Whether you're making preparations for a dinner party, like the couple opposite, or relaxing in your den, Du Pont products surround you.**

**The photograph above shows two of the many Du Pont fibers that go into carpets, drapery, and upholstery. The plastic pellets become moving parts or housings for appliances—refrigerators, washers, food processors, even trash compactors. The white sheet of “Tyvek” spunbonded olefin is the basis for easy-care wall coverings, and the white slab of “Corian” is used for kitchen counters and bathroom sinks.**

**Other Du Pont products used in the home include “SilverStone” finishes for cookware and “Lucite” paints for the walls—and that's only a few of the ways there's good chemistry between us.**



