SCHLUMBERGER

1980 ANNUAL REPORT

Schlumberger Limited

IN BRIEF	1980	1979	1978
REVENUE	*$5,137,115,000*	*$3,641,438,000*	*$2,683,942,000*
NET INCOME	*$ 994,347,000*	*$ 658,396,000*	*$ 501,973,000*
NET INCOME PER SHARE	*$5.21*	*$3.45*	*$2.63*
DIVIDENDS DECLARED PER SHARE	*$0.94*	*$0.73*	*$0.56*

To The Shareholders

The first year of the eighties has been a good year, for the Company as a whole and for each of its units.

Net income for the year was $994 million and $320 million for the fourth quarter. For the purposes of comparison, these figures are distorted by two items unrelated to the operations: the profit on the sale of Rowan shares and the loss on foreign exchange.

Approximately 5 million shares of the Rowan company were sold in November 1980, with an after-tax profit of almost $70 million (36 cents per share). Excluding this nonrecurring gain, net income for the year was $925 million, up 40% from the previous year; net income for the fourth quarter was $250 million, up 28% from the fourth quarter last year.

The loss on foreign exchange was $19 million for the full year, and $10 million for the fourth quarter, mainly due to the appreciation of the dollar vis-a-vis most European currencies. In 1979, exchange losses were, respectively, $5 and $4 million for the full year and the last quarter. Unlike the gain on Rowan shares, foreign exchange losses or gains are recurrent. The world does not seem to be heading towards a period of currency stabilization. Currency fluctuations are becoming more extreme and more brutal.

Revenue for the year was $5.14 billion, up 41% from the previous year. The increase is somewhat misleading, as in 1979 Fairchild revenue was consolidated only as of July 1, the date of acquisition. Excluding Fairchild in both years, revenue increased 33% in 1980. Revenue for the last quarter of 1980 was $1.46 billion, an increase of 33% over the same quarter of the previous year. Excluding revenue from the sale of Rowan shares, revenue for the quarter increased 24%.

In response to the continued demand for our services and products, and to prepare our future, we added more to our resources in 1980 than in any previous year.

- FIXED ASSETS. Additions to fixed assets were $748 million in 1980, an increase of 49%. They are budgeted to reach $1.1 billion in 1981.
- RESEARCH & ENGINEERING. R & E expenses increased 43% to $188 million.
- MANPOWER. Almost 2,000 graduate engineers from 70 countries joined Schlumberger in the oilfields, the laboratories and the manufacturing plants. The increasing size and complexity of our Company has caused us to redouble our efforts to improve internal communications and our understanding of the needs and aspirations of our personnel. From January 1, 1980 to March 1, 1981, options to purchase over one million Schlumberger shares were granted to over 900 key people.

All major units of Schlumberger had a good year. Yet, the oilfield services companies had the most spectacular growth as the worldwide surge for more exploration and production of hydrocarbons went unabated.

WIRELINE SERVICES

Wireline services revenue, our traditional logging business, increased 41% worldwide.

In North America, higher crude oil and natural gas prices, hopes that oil prices and even gas prices would be fully decontrolled with the new Administration, have pushed forward drilling activity. By the end of the year, rig count in the U.S. was 3,300, 31% higher than a year before. In Canada, the rate of increase in our activity slowed somewhat in the fourth quarter due to unfavorable federal legislation before parliament.

Growth of wireline services in the Eastern Hemisphere and South America was slightly higher than in North America. Increased activity was everywhere, offshore and on land. It was particularly noticeable offshore Mexico; in the Middle East, where operations in Saudi Arabia and the Gulf States more than offset the reduced activity in Iraq due to the war with Iran; in the Far East where widespread exploration offshore resumed. Wireline operations started on land in the People's Republic of China at mid-year; they have grown steadily and are now being extended to offshore.

Customers continue to demand the logging services performed by the CSUs, the newest computerized logging unit. During the year, 260 new CSU units were put in service in the field.

DRILLING & PRODUCTION SERVICES

Combined revenue of these units grew 33% in 1980. Forex Neptune, Flopetrol and Dowell Schlumberger (50% owned) had a strong performance.

All offshore drilling rigs of Forex Neptune were active throughout the year. On land, six heavy rigs drilling in Iraq ceased operations temporarily last September. Two jack-up offshore rigs and one self-erecting workover tender were commissioned during the year. Five jack-ups are under construction. They are contracted for by customers for periods of two to four years. We sold the bulk of our equity in the Rowan drilling company because we did not think that it was either possible or desirable to acquire control of the company.

The Measurement While Drilling (MWD) operations run by The Analysts

have been introduced commercially in the Gulf of Mexico and in the North Sea. It is a slow and prudent start.

MEASUREMENT & CONTROL

In Europe, revenue of these units increased 19%. After-tax profits were above 6% of sales, and return on investment was better than 18%. These are the best results recorded in the last ten years; a creditable achievement at a time when the U.K. is facing a severe depression and the European economies are sluggish with capital investments and housing starts at low levels. The best performance was in the product lines related to nuclear energy, electricity management, automatic test equipment, data acquisition and recording. A major effort is underway to introduce solid-state and digital technologies into the mature products of electricity management. The first prototypes of a solid-state residential watthour meter are being tested. Three new plants are in the process of being built and will be completed in 1981: one in Lyon, France for nuclear valves, another in Campinas, Brazil for electricity management, and the last one in Dordrecht, Netherlands for gas and water meters.

In North America, Sangamo Weston revenue increased only 9%. The decline of housing starts hurt the sale of residential electricity meters while stiff competition lowered their price. Public utilities have been hesitant to adopt load-management techniques as the growth of demand for electricity is slowing down. Some specialty products, such as modems sold by Rixon, imaging and communications systems sold by Fairchild-Weston Systems to the military, have met with great success.

FAIRCHILD

As was expected, Fairchild took a somewhat bumpy course during the year.

The Test Systems division lost some of its key people late in 1979. Management of this division was reorganized. Orders for the large test systems were slow for the first half of the year but improved during the second half; orders for the less expensive subassembly and component testers were strong throughout the year.

Semiconductor sales were very strong until the fourth quarter. The order rate started to slow down in the summer. During the last quarter, the typical downturn of this cyclical industry moved in. Cancellation of orders was accompanied for a number of products by sharp price cuts, particularly in the MOS product line. Fourth quarter profits were lower. Although the year recorded strong gains in sales and profits, at year's end the backlog is lower and the outlook for the immediate future is uncertain.

Ups and downs, shortages followed by overcapacity, price cuts and stiff competition is nothing new in this industry. It is built in. Boom periods often tend to hide many shortcomings, to cover many short cuts. Periods of recession can bring long term benefits; the only question is what one does with it.

MDSI

In January 1981, the last step leading to the acquisition by Schlumberger of Manufacturing Data Systems Inc. (MDSI) was completed. This is the entry into the fast growing market of Computer Aided Manufacturing. MDSI has built a very special position, both marketwise and in software capability with the large number of numerically controlled machine tool users. This is the beginning of a fascinating new adventure.

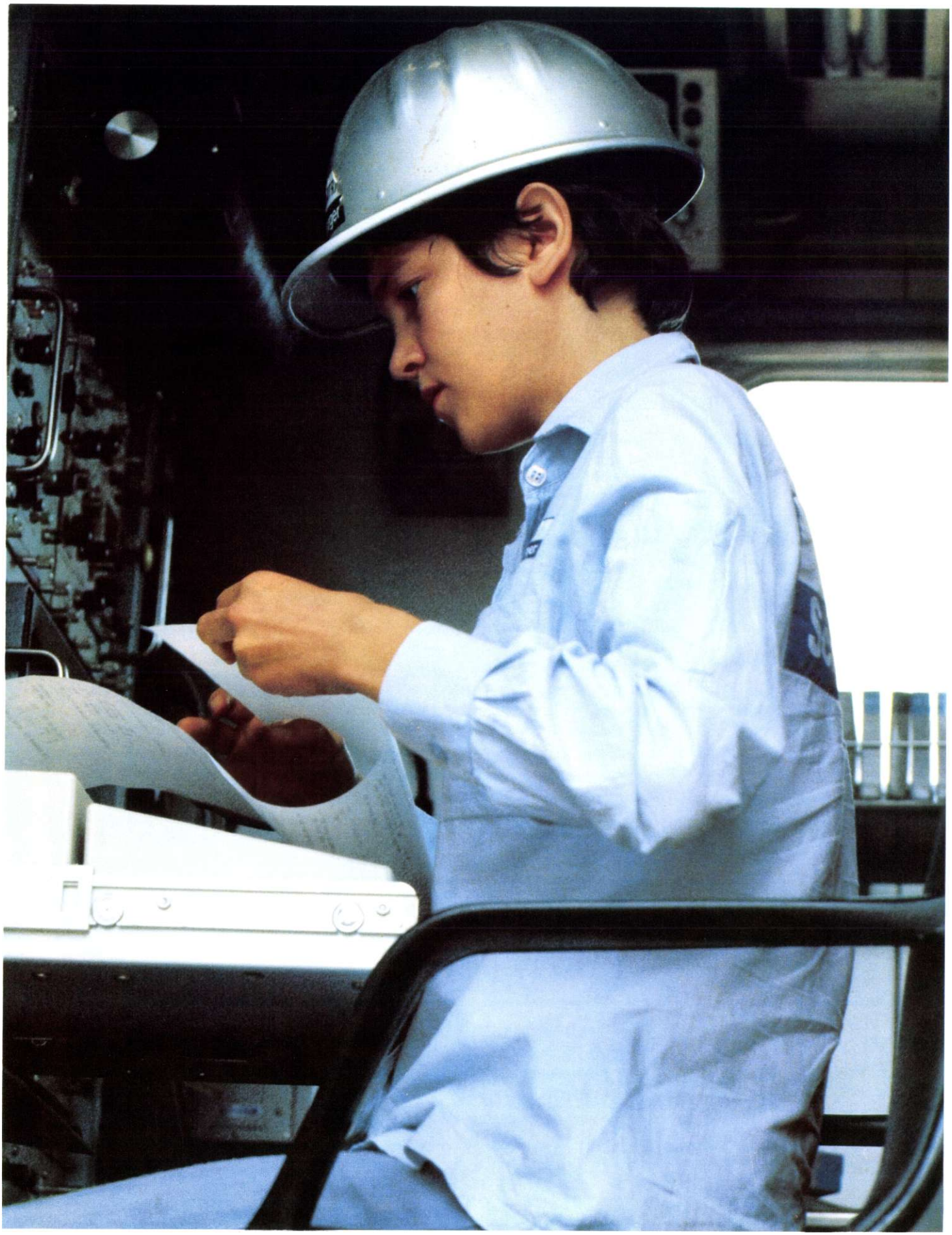
These are the basic facts and figures of 1980. The first indications of 1981 confirm the trends of last year.

- Oilfield Services continue strong.
- Order situation at Measurement & Control-Europe is surprisingly good. However, the impact of the hectic currency fluctuations is unpredictable.
- Outlook at Measurement & Control-North America (Sangamo Weston) is still weak, but not getting any worse.
- At Fairchild, the order position is deteriorating. This is the time to stick to our guns, to maintain the Research & Engineering programs, to improve the manufacturing productivity.

Schlumberger is getting bigger and has plenty of opportunities to grow further. The management has to be strengthened. On February 19, 1981, the Board of Directors elected Michel Vaillaud Executive Vice President-Operations, in charge of Oilfield Services and confirmed Roland Génin as Executive Vice President-Operations, in charge of Measurement, Control & Components. Bernard Alpaerts was appointed as Head of Measurement & Control-Europe, replacing Michel Vaillaud.

February 26, 1981

Jean Riboud
Chairman and President



Wireline Services

BUSINESS REVIEW

Revenue from Wireline operations worldwide was 41% higher than in 1979.

In North America, wireline revenue was up 38% over last year as drilling activity increased substantially in all areas. In the U.S., year-end rig count was 31% higher than a year ago; activity was particularly strong in the Rocky Mountains. In Canada, wireline activity was high during most of the year, especially offshore the east coast.

In the Eastern Hemisphere and South America, revenue was 45% ahead of 1979 as activity was strong in all major areas. The largest gains were reported in South America, the Far East and Europe. In South America, growth was high in Argentina and in the Orinoco oil belt in Venezuela. Operations expanded substantially in Mexico: 16 units are working offshore and two CSU units have been operating on land since mid-1980. In the Far East, the first log was run in August in the People's Republic of China where two CSU land units are active; offshore, work started in December with two units. Indonesia and Australia were well ahead. Growth was evenly spread in Europe and will continue in spite of the imposition of a U.K. windfall profits tax. In West Africa, drilling increased sharply, following a spate of small discoveries offshore.

In response to increased activity, recruiting targets were raised in 1980. Worldwide, 1,105 graduate engineers were hired for the field, a 60% increase over 1979.

Conversion of field logging units to the computerized Cyber Service Units was on schedule as 260 new units were added. In 1980, 65% of all open hole jobs were made with the CSU.

The Sandy Point, Texas perforating center was completed; this $7.5 million plant will design and manufacture shaped charges used in completing oil wells.

Several new services were introduced on a fully commercial basis:

- The Natural Gamma Ray Spectroscopy service was up more than four times to approximately 1,000 jobs in 1980. This tool can identify the origin of natural formation radioactivity which helps evaluate clay content.

- The new Lithodensity tooi is now in full production; density and additional lithology data provided by this tool aid analysis of complex formations.

- The Well Seismic Tool, along with the associated signal processing to integrate the data into conventional seismic records, is finding increasing acceptance. Nearly 700 jobs were run in 1980, up 60% over the previous year. This area of borehole seismic measurements holds great promise for future development.

Field Engineer Mathilde Josso checking a log in a Cyber Service Unit in Sumatra.

ANSWER PRODUCTS

Wireline logs are graphs versus depth of physical measurements made by instruments lowered into a borehole on an electrical cable called a wireline. The first log, run in 1927, recorded electrical resistivity of the formation versus depth. This graph (curve) gained immediate acceptance by the oil industry because it showed known geological sequences, and because hydrocarbon bearing formations were easily recognized. The need for more accurate descriptions of potential reservoir rocks led to the development of additional logging tools to measure other physical properties. Since that first resistivity survey, logs have become one of the most important sources of information that oil companies have for detecting and evaluating the presence of oil and gas.

Correlation of the early logs with geology was straightforward and oil company geologists were deeply involved in the process. However, as additional measurements became available, the Schlumberger engineer was called on more and more to reduce the several logging measurements to a product more easily understood by oil company personnel. Manual or hand interpretation, as it became known, involved several steps:

- quick reconnaissance of the interval logged to separate potentially hydrocarbon bearing zones from the shales, water bearing horizons and other unproductive zones
- reference to a series of computational aids using data from zones identified as having hydrocarbons to obtain porosity and water saturation estimates;
- an interpretation as to what kinds and amounts of fluids each of the zones would produce.

Data processing center in Clamart, France; a high-speed four color plotter (foreground) is used in printing oilfield maps.

Examples of logs produced by computer processing.

In the early 1960s, the digital computer was brought to bear on the problem of log computation. The first application was the conversion of resistivity and tool orientation data from the Continuous Dipmeter tool to formation dip azimuth and dip magnitude. Prior to that time, dip computations were made manually by a trained engineer. In fact, the success of the Dipmeter as a data acquisition service depended most on the dip computations, and so computation charges were included for the first time in addition to the acquisition charges. Demand for this service quickly grew and led to the establishment of a network of Field Log Interpretation Centers (FLIC) around the world to provide the client with answers in the timeframe he required.

In the mid-1960s, the computer was applied to standard log computation problems, initially to reproduce the manual interpretation methods of the field engineer. By the end of the decade, however, two major improvements had been introduced. First, sophisticated computer processing was applied to multiple measurements and presented as entirely new geologic models called Answer Products: one for shaly sands (SARABAND) and the other for complex lithologies (CORIBAND). Second, and probably more important, every level in the logged interval was considered to be part of a potentially hydrocarbon bearing zone, and was independently evaluated on that basis. In the long term, this latter concept has proved significant since many commercial reservoirs by 1980s' standards are zones which were overlooked or discarded as noncommercial in the 1960s. Quantitative evaluation of these low permeability and low natural productivity zones requires refined measurements, which increases the need for computer processing. In many respects, data processing has not only improved wireline log interpretation, but also has led to the recognition of the need for better and additional measurements.

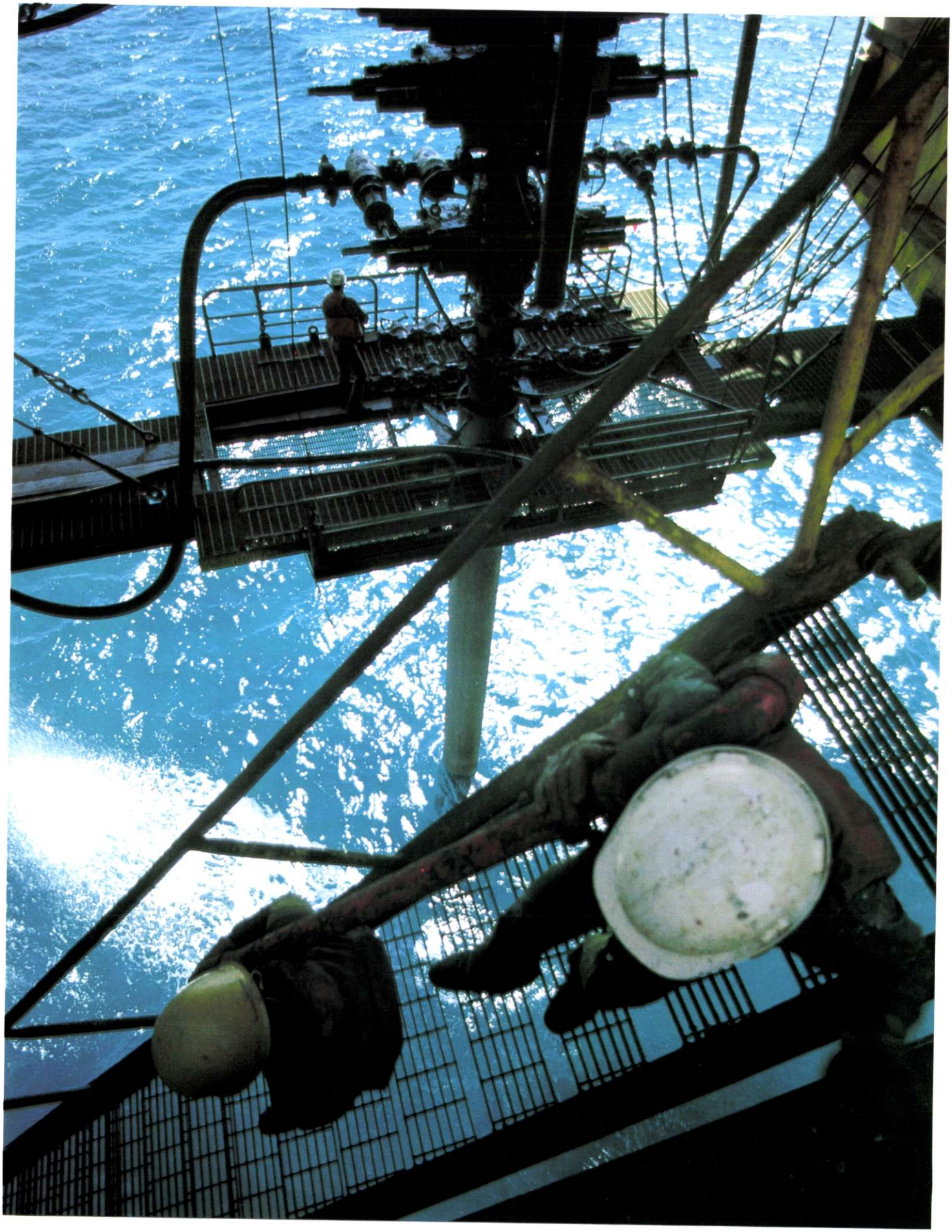
The development of a family of Answer Products to serve the needs of various technical disciplines within the oil companies is a natural evolution which began in the 1970s. The same logs may be processed in different ways to provide valuable answers to different users. Take, for example, the Formation Density Compensated Log, a logging service that has been commercial for almost twenty years.

The Formation Density Log measures the rock bulk density which depends on the lithology and porosity of the rock and the density of the fluid in the pores. Answer Products such as CORIBAND using Density, along with other measurements, provide an evaluation of these variables in terms that a geologist needs: lithology, clay content and fluid type, as well as porosity and water saturation.

The Density measurement is also a factor in the formations' reflectivity-coefficient. This parameter is needed by geophysicists in refining interpretations of seismic data used in mapping subsurface structures where oil or gas may be found. An Answer Product called GEOGRAM Survey integrates Density with Sonic and Dipmeter data to compute an improved synthetic seismogram for the geophysicist. Similarly, other logging services are being combined in new ways to provide Answer Products for other client disciplines: Production Management Log, Producibility Log, Mechanical Properties Log, Well Seismic Profile, Log Analyst Log, etc.

Data processing and interpretation capabilities are now implemented at three different levels to serve specific client needs. At the wellsite, the computer-equipped Cyber Service Unit is a significant development. Digital data acquisition has made possible a new generation of downhole tools heretofore limited to the laboratory because of their complexity and data rate; in addition, computer processed quick-look answers support immediate wellsite decisions. Decentralized computer facilities in field centers take logging data acquired at the wellsite and, through processing, provide customers with more comprehensive log analysis in a format designed for his specific needs. Advanced computing centers in Houston and Clamart, near Paris, handle more complex and extensive processing of log data over a complete field.

Commercial log data processing has grown significantly faster than the log acquisition business in the last four years, and this trend will continue. For the Wireline, the challenge of the 1980s will be to manage the increasing data load as a result of new services and digital data acquisition. New approaches such as Artificial Intelligence will certainly have a role to play.



Drilling & Production Services

BUSINESS REVIEW

Drilling & Production Services revenue increased 33% in 1980. Revenue of each operating division improved, as oilfield activity increased in every area of the world.

■ Forex Neptune revenue was 26% over 1979; both land and offshore rig utilization remained at high levels. By the end of 1980, the Forex Neptune group owned and operated 53 land rigs and 15 offshore rigs. In addition, seven labor contracts were active.

■ Flopetrol revenue increased 37% from the 1979 level. Activity was higher everywhere particularly in Europe, Africa and the Middle East. Work on production wells, including testing, slick-line and conductor-line operations, and workover made significant contributions to the results.

■ Two of the U.S. divisions, Johnston and Macco, were merged at the beginning of 1980. Their combined revenue was 19% greater than a year ago. Drill-stem testing activity was very strong throughout North America. The drill-stem test evaluates the reservoir potential of a well by temporarily initiating production. A jack-up service vessel, the Big Mac 1, was put into operation in the Gulf of Mexico during the year.

■ The Analysts revenue was 44% higher than in 1979. The activity increased in all sections of the U.S. particularly in the Gulf of Mexico. Efforts to increase market penetration in the North Sea and Africa were successful. Measurement While Drilling (MWD) operations were initiated in both the Gulf of Mexico and in the North Sea; MWD is a drilling service that collects downhole data and transmits them to the surface while drilling is in progress. This information is needed for drilling safety and efficiency.

■ Dowell Schlumberger (50% owned) reported a 46% increase in revenue as all regions showed significant activity growth. Additional stimulation vessels were put into service in the Middle East and in the Gulf of Guinea.

Offshore Sarawak: underneath the platform of Trident 1 jack-up rig, showing the riser and blowout preventer.

TESTING

Testing services represent about 20% of the revenue of the Drilling & Production Services group. These services have grown more than 50% as compared with 1979. This is due to a combination of factors: the acceleration of exploration throughout the world, client demand for more and better reservoir information, and the introduction of new techniques and tools.

WELL TESTING

Well testing consists of temporarily producing a well to gather reservoir information needed by oil companies. For newly discovered fields, test data help determine the reservoir characteristics, and provide an estimate of reserves. For producing fields, test data aid in checking reservoir behavior against predictions.

During a well test, produced fluids flow through a choke manifold to control pressure, and then are usually heated before being separated and metered. Fluids are disposed of through special smokeless burners.

Data gathered include the amount of oil, gas and water produced under varying conditions, the reservoir pressures and temperatures, and also the characteristics of the fluids produced. All these data, when interpreted, give accurate information about the reservoir such as its size, its permeability, and the presence of natural fractures.

Well testing services are available from Johnston-Macco in the U.S. and Canada and from Flopetrol in the Eastern Hemisphere and South America.

DRILL STEM TESTING

In newly drilled wells, flow tests of limited duration—from a few hours to several days—are required to select the zones to be completed (i.e. brought

Production test being carried out offshore Brazil by a Flopetrol team.

into production). The technique is called Drill Stem Testing (DST). A combination of test tools is run into the well at the end of the drill pipe through which the well fluid can be brought to the surface. These tools include: a packing element to isolate the reservoir and relieve the pressure of the mud column, valves to open and shut off the flow, a sampling chamber and pressure and temperature sensors.

The full range of drill-stem testing services is now provided in North America by Johnston-Macco and in the Eastern Hemisphere and South America through Flopetrol and Dowell Schlumberger (50% owned).

NEW TECHNIQUES

Two significant developments were introduced in 1980:

- Highly accurate electronic pressure gauges were introduced to replace conventional mechanical pressure recorders. In the simplest configuration, the battery-operated gauge is run in the well and data are stored in a solid-state memory downhole. After the gauge has been pulled out of the hole, the pressure data can be read into a computer for interpretation. In a more elaborate configuration, called Surface Pressure Read-Out (SPRO), a conductor cable connects the gauge to the surface and the pressure information is processed by computer while a drill-stem or production test is in progress. Well behavior can be monitored at the surface in real time and test sequence and duration adjusted to optimize the operation.
- On-site well test interpretation services were started in 1980. The purpose of interpretation is to use the data acquired during testing (fluid types, flow rates and pressures) to determine reservoir parameters. Interpretation programs were developed in-house and computers are now being installed in all operating regions.

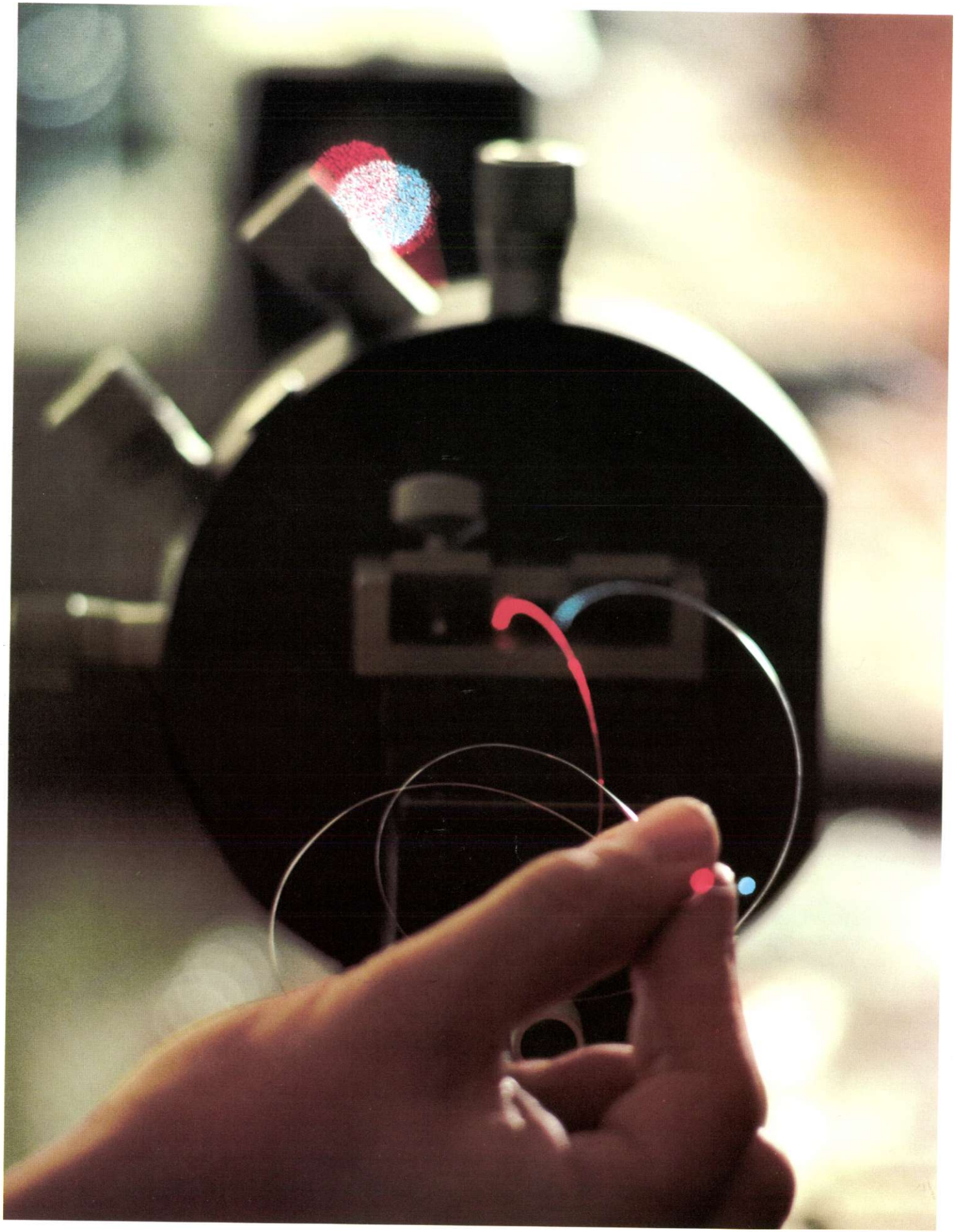
The introduction of new techniques for optimizing test and interpretation is expanding the scope of testing services from simple data acquisition to the most advanced reservoir appraisal.

Trident 4 drilling off the coast of Nigeria on well Isobo for Mobil. This new cantilever jack-up rig was constructed in 1980 in Brownsville, Texas for Forex Neptune.

This type of platform is considered the most adaptable for exploration or development drilling and workover operations in waters up to 300 feet deep. The cantilever design makes this possible since the derrick assembly can be moved as a unit up to 45 feet out from the stern and also can be skidded transversely 12 feet in either direction from the center line of the hull.

Today, the Forex Neptune group owns 53 land and 15 offshore rigs. The offshore fleet comprises three semisubmersible platforms, ten jack-ups, of which five are of the cantilever type, and two swamp barges. On order, today, are four diesel-electric land rigs and five more jack-ups, each having two- to four-year drilling contracts.

In keeping with this fast growth, Forex Neptune has increased recruiting and expanded training installations. The company will spend $2.8 million in 1981 for new facilities and training equipment, including drilling simulators, life-size heavy derricks, pumps and engines, as well as a 4,000-foot borehole. Some 15 different training programs and refresher courses will be available for new recruits as well as senior personnel.



Measurement & Control-Europe

BUSINESS REVIEW

Revenue of Measurement & Control-Europe improved 19% in 1980. The Service division and Flonic in France, Solartron Systems and Membrain in the United Kingdom had the strongest growth.

The best gains were recorded by products related to nuclear energy, data acquisition and recording, automatic test systems and electricity management.

Research & Engineering expenditures amounted to $44 million, an increase of 23% over 1979. Capital expenditures were up 66% to $59 million.

- Enertec revenue improved 19% as activity of all units was ahead of the previous year:

  Sales of watthour meters, load management systems and equipment for the protection of electrical networks increased 15%.

  Sales of magnetic tape recorders and data acquisition systems increased 35%, partly as a result of growing demand by the aerospace industry.

- Flonic revenue increased 24% as sales of gas meters and gas network equipment remained strong. A new vortex gas meter successfully passed tests by several European gas companies. Flonic was one of the three companies selected by a group of French banks to develop a system of electronic fund transfer using off-line equipment at points of sale.

- Sereg revenue increased 9%; only high performance nuclear valves had a sustained growth linked to the progress of the French nuclear power program.

- Service division revenue increased 30% as contracts for the installation of industrial piping in nuclear plants expanded greatly.

- Revenue of the International division increased 25%: sales of gas meters were strong, mainly in Argentina, and sales of watthour meters have grown rapidly, particularly in Brazil. Two new plants will be completed early 1981: one in Dordrecht, Netherlands and the other in Campinas, Brazil.

- Revenue of the U.K. division expressed in pounds sterling increased only 1%; in U.S. dollars the increase was 10%. This reflects the severe recession in the United Kingdom compounded by difficulties in export markets due to the strengthening of the pound. Despite this unfavorable environment, Membrain and Solartron Systems continue to grow.

An agreement in principle has been reached early in 1981 for the acquisition of Balteau International, a Belgian company which specializes in instrument transformers for electric utilities and nondestructive testing (x-ray). The purchase price is approximately $15 million. Completion of the acquisition is subject to certain conditions including an audit. For 1980, Balteau had unaudited revenue of approximately $60 million.

An experimental fiber optics data transmission set-up. Applications are for electrical distribution systems where strong electrical interference occurs.

THE NEW AIT 6000 RIPPLE CONTROL RECEIVER IN ELECTRICITY LOAD MANAGEMENT

Electrical energy is one of the most attractive forms of energy available because it does not cause pollution and it can be converted easily into heat, light and motive power. However, electrical energy has a drawback: it cannot be stored in significant quantities.

Since electrical energy storage is impractical, generating capacity, that is, the electrical power available to consumers, must exceed the highest demand which may occur at any particular time. This required peak power can vary sharply on a daily basis, with peak hours occurring typically around 11 a.m. and 8 p.m. Demand also changes with the seasons.

Ordinarily, electrical utilities have spare generators that can be turned on to supply extra power needed during hours of peak demand. However, such generators are expensive. More economical is to find a way of uniformly distributing power consumption throughout the day. More and more, utilities are turning to this load-management approach.

LOAD CONTROL

The effective methods for controlling peak demand are *rate management* and *load control*. With rate management, consumers are charged higher prices for power used at peak demand times. Load improvement by this means tends to have limitations: some consumers ignore the rate incentive, and unexpected peaks can occur through failure of a part of the electrical supply.

Direct load control by the utility itself is most effective for cutting peaks. With the customer's prior consent, the utility switches on and off nonessential loads such as space heaters, air conditioners, and pumps.

Today, both rate and load control

AIT 6000 ripple control receivers being assembled in the Enertec manufacturing plant in Poitiers, France.

are done by a centralized ripple-control system which transmits a control message via a higher frequency signal or ripple carried on the power lines. This control signal appears simultaneously in the homes of the thousands of consumers supplied by the power system. Each customer has a receiver that decodes the control message and switches loads on and off or changes tariffs in a multitariff meter.

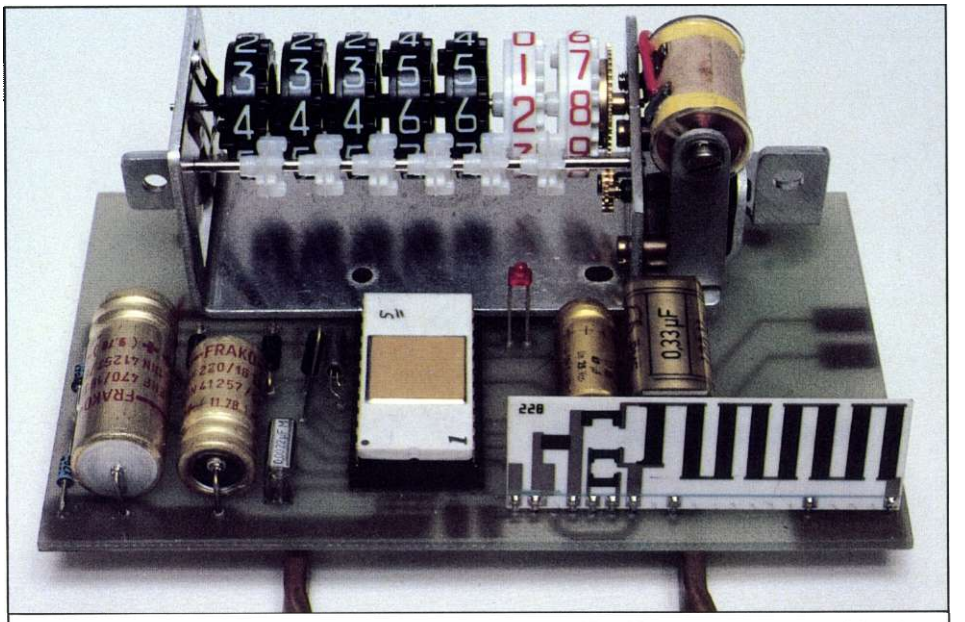
A NEW RIPPLE-CONTROL RECEIVER

The AIT 6000 is a new ripple-control receiver that offers significant improvements in load control. It consists of a microprocessor and a selective filter mounted inside an insulating box installed in a residence. The selective filter detects the message signal and the microprocessor then decodes the message and activates control relays.

The microprocessor-based receiver permits substantially improved operation and expanded capabilities. Practically all existing codes can be detected and detection reliability is greatly enhanced.

With the AIT 6000 the utility can avoid sudden variations in power that can be caused, for instance, by simultaneously switching on or off 3,000 water heaters precisely at the same time. Two timers in the AIT 6000 can be programmed to delay load switching for eight groups in a block of customers for up to 5 minutes.

To reduce power without interrupting it for a long time, certain appliances like space heaters and air conditioners can be turned off and on over short intervals of time. The AIT 6000 can be programmed to do this too. For example, on transmission of a particular code, the first group of receivers disconnects the load for 5 minutes, then reconnects for 10 and repeats the cycle; a second group goes through an identical cycle with a 5 minute time-lag; and a third group does it with a 10 minute time-lag. This reduces power consumed by one third.



Prototype of an entirely electronic residential watthour meter. The European research and development group has worked for a number of years on this project.

RECORDING SATELLITE DATA

One application of the high-density magnetic tape recorders manufactured by Enertec is storing the very large amounts of data which are transmitted by earth observation satellites.

As a satellite orbits the earth, an electronic camera continuously scans the surface below. The image it "sees" and stores in an on-board magnetic-tape recorder made by Enertec, is a strip a few hundred miles wide, and length limited by daylight viewing time.

Data are transmitted directly from the satellite to a ground station in digital form at a rate ranging between 15- and 120-million bits per second. The high data rate is necessary because all the image information collected by one orbit must be sent to the ground during the 20-minute window when the satellite is within range of the ground station.

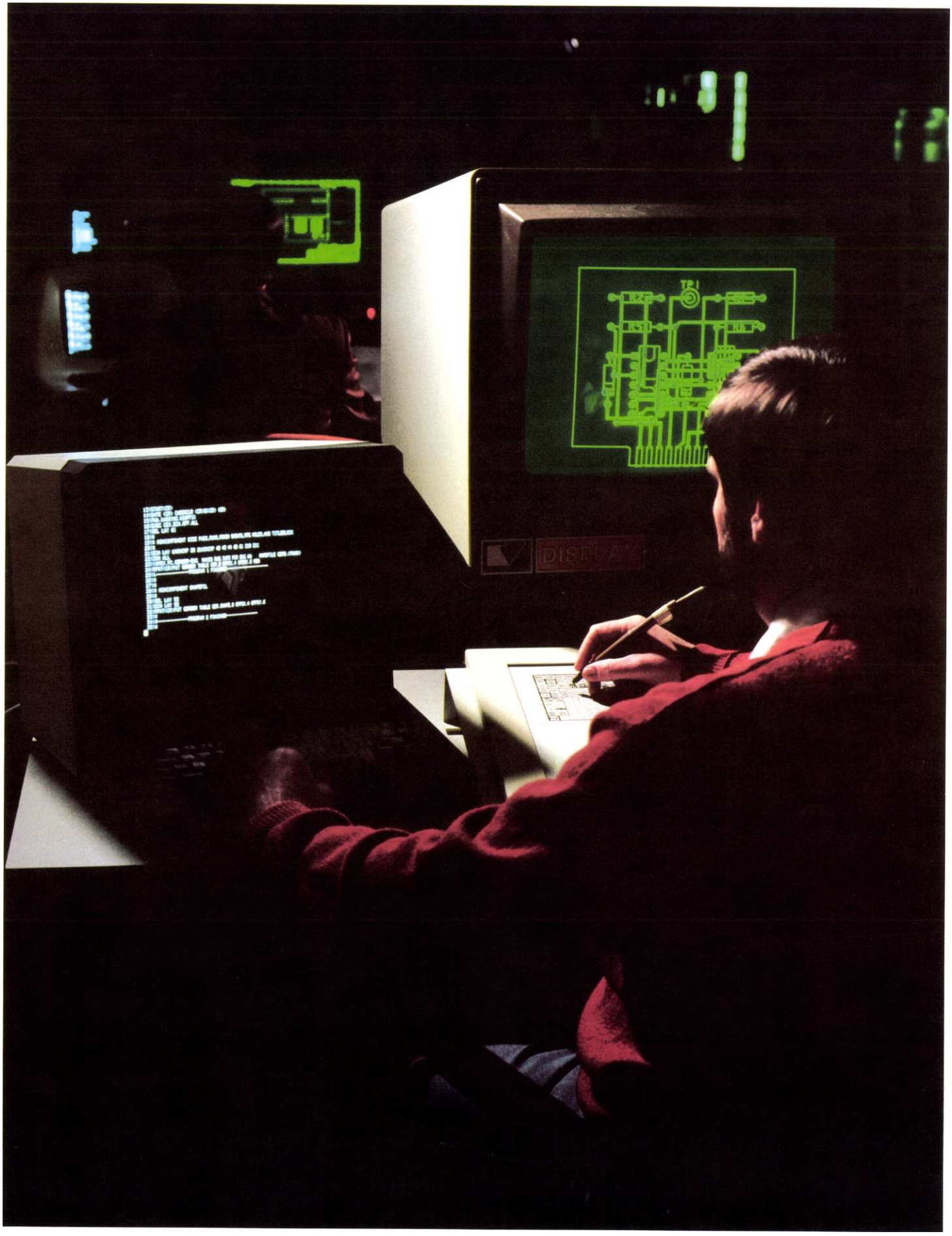
These data are recorded on Enertec high-density magnetic tape recorders as received and are archived to permit easy access and retrieval. The data volume is very large: with 10 passes a day, 1 million billion bits of data are collected every three years from a single satellite, or 10 times the overall data volume kept by the U.S. Social Security Administration. Processing this data requires powerful computers.

The Enertec recorder can store a single bit in a space of 4/100 of a thousandth of an inch. On a reel containing about two miles of tape and 42 recording tracks, more than 100 billion bits can be stored by this recorder.

Special techniques are required to reread these densely packed data: for example, synchronizing electronics extract meaningful signals from noise, realignment circuits compensate for the time-shift between two simultaneously-recorded pieces of information that is caused by tape stretching or flexing.

The playback rate must be slowed down by a factor of about 60 to give the computer enough time for processing the data. It therefore takes 20 hours to process the data gathered from a single orbit of the satellite.

High-density tape recorders currently have ten times the storage capacity of conventional computer data storage peripherals.



Sangamo Weston

BUSINESS REVIEW

Revenue increased 9% at Sangamo Weston, with the largest gains coming from the sales of modems, electro-optical systems and industrial watthour meters.

Backlog at year end was up 24% over 1979. The biggest gains in orders were recorded for oilfield equipment to be supplied to the Schlumberger Wireline group, high speed data sets, nuclear control systems and electro-optical equipment.

■ Sales of products and systems for electricity management were off 2% in the U.S. but increased 16% in Canada. Sales of residential single-phase watthour meters dropped 15% from the prior year due to the decline in housing starts in the United States.

Shipments of polyphase watthour meters for commercial and industrial applications were higher than last year's record level. Sales of survey and billing recorder systems also set a new high. As a result of slowing growth of electricity demand in the U.S., utilities have been slow in adopting load management techniques and orders for Sangamo Weston load and rate control systems have been disappointing.

■ Sales by Rixon of data sets, used for computer communications, jumped 75% ahead of 1979. Demand for high-speed modems continued extremely strong and was a major factor in the record backlog, double that of a year ago.

■ Shipments of electro-optical systems such as cockpit TV for military aircraft and countermeasures equipment contributed significantly to the good performance of Fairchild-Weston Systems. In addition, orders for nuclear instrumentation and controls were up substantially.

■ Sales were higher than expected for aerospace flight instruments and both analog and digital meters. Sales by Engler of vehicle recorders were bolstered by a large order from the U.S. Post Office.

■ Sales of telemetry systems remained flat whereas instrumentation data recorder sales grew by 19%. Industrial products sales and incoming orders have slackened.

The Microsonics division in Weymouth, Mass. was sold in January at approximately book value.

Computer-aided design facility at the Data Systems division in Sarasota, Florida. This equipment is used for designing printed circuit boards.

VEHICLE MANAGEMENT SYSTEM

Operators of fleet vehicles such as trucks and buses, for years have used tachographs to obtain data about their vehicles' operations. Fleet operators need this information for managing fleet performance and maintenance.

The Engler Instruments Division of Sangamo Weston has developed a Vehicle Management System that significantly advances fleet management data reporting. From the reports, fleet operators can determine fuel consumption, operator efficiency, vehicle utilization, maintenance effectiveness and vehicle trip history.

While tachographs provided fleet operators with paper charts that require manual processing, the Engler Vehicle Management System provides the fleet manager with more data in a format that can be computer processed.

The Engler system comprises an instrument, typically mounted in a truck's cab, which records selected information about the vehicle, engine and driver performance. This information is stored in a memory cartridge which plugs into the tamper-proof "black box". Periodically, the memory cartridges are removed from fleet vehicles for subsequent computer processing.

Reports summarize trip data such as time spent traveling and idling, vehicle speed, engine RPM, fuel consumption and total trip time.

Fleet managers have several options in generating reports from this information:

- data can be fed directly from a memory cartridge into a small desk-top computer for analysis and summary report printing.
- a desk-top "data pooler" is available to accumulate the data from many memory cartridges and store this data on a diskette for later analysis at a central processing site.

Vehicle management instrument package, made by Engler, which records trip data for fleet vehicles.

Telemetry computer system installation at NASA Wallops Flight Center.

- for fleets which do not have, or do not want to use, their own data processing system for this purpose, Engler Instruments makes available data processing/reporting services.

The Vehicle Management System is a management tool for increasing fleet productivity. The system is available as a complete package, comprising the memory cartridge and associated data acquisition system, the compact desk-top analyzer for generating on-the-spot reports, and the data pooler for generating comparative reports. The Engler data processing service will generate reports for companies upon request.

After thorough field tests have been completed, the Vehicle Management System will be introduced to the market by mid-year.

TELEMETRY COMPUTER SYSTEM FOR NASA

In 1980, the Data Systems division of Sangamo Weston delivered a large Telemetry Computer System to the NASA Wallops Flight Center. The system permits the storage

and display of test and scientific data transmitted from rockets and aircraft in flight.

The NASA Wallops Flight Center is located on the Atlantic Coast, not far from Washington, D.C. The Center conducts experiments and flight tests for a wide variety of scientific groups from many countries. Technical assistance has been given to 61 nations.

Various types of aerospace vehicles are used to propel the payloads into the desired environment. The mission may be to check out scientific concepts or instruments, to gather information about the atmosphere and space or to monitor the flight characteristics of the vehicle itself.

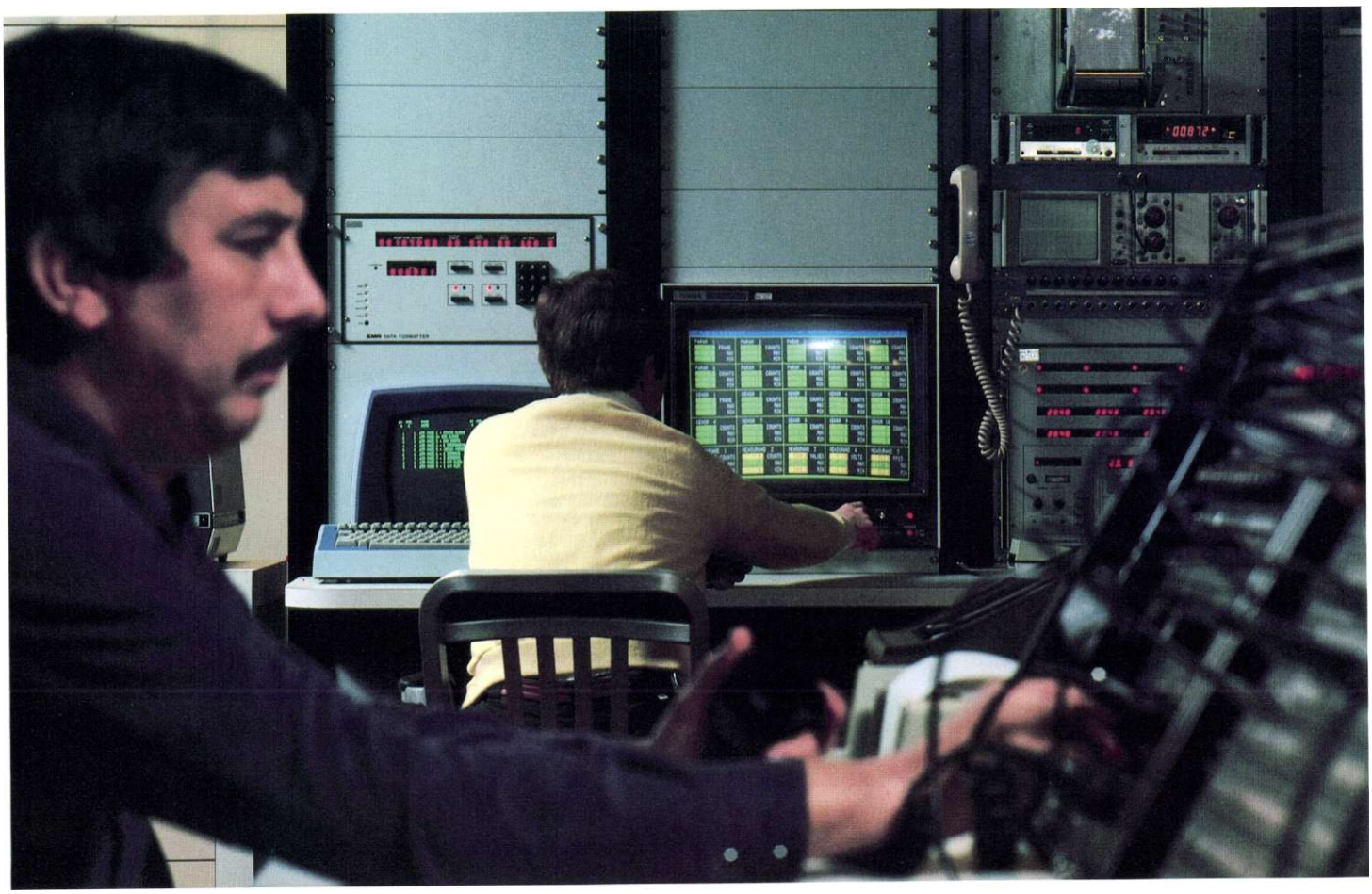
The scientific information is analyzed and published results are distributed freely to the world scientific community. Most of the findings relate to the advancement of manned space flight and aeronautical research, astronomy, atmospheric physics, worldwide communications and weather forecasting.

TELEMETRY SYSTEM

The Telemetry System provided by Sangamo Weston is one of the major tools used at the Wallops Flight Test Center for the collection and reduction of test data. It supports prelaunch checkout as well as flight test. The system can analyze data while a flight is in progress or process recorded data after test flights are over.

The telemetry system conditions and preprocesses the data, which are fed to a dual computer system. The computers format the data for storage on disks and tapes which can be used for additional processing on other computers. The computers also feed processed data to three display stations. These display stations are the link between the operators and the system. From them, the user can completely control the system and select the parameters he would like to view. Displays are designed for maximum readability. This was accomplished by using color graphics and many different types of display formats. Hardcopy devices are available to make a permanent on-the-spot record of data seen on a display. Displayed data are seen in real time so the user can make decisions while the test is still in progress.

The entire system was designed and developed by Sangamo Weston. The system integration included bringing together telemetry equipment manufactured by Sangamo Weston with computers, peripherals and display devices manufactured by many other companies. Sangamo Weston provided a complete software package for operating and controlling the telemetry and display modules.



Fairchild

BUSINESS REVIEW

Fairchild's 1980 revenue increased 21% from that of the preceding year. Orders declined 8% and order backlog fell about 9%.

Although the overall business picture was relatively good for Fairchild in 1980, demand slowed in the second half of the year. This trend has continued into early 1981 and the year will be difficult.

Funding for total research and development rose by 59% in 1980, while that for research alone doubled. Capital spending was approximately $95 million, or 31% ahead of the full year 1979 level. New facilities were added to the Linear division, and construction was completed on a semiconductor assembly plant in the Philippines. A second building for the Test Systems group in San Jose, California was put in operation early 1981.

- Semiconductor revenue, which accounted for 80% of total 1980 sales, increased 24%. The year started strong with bookings exceeding billings in the first half; however, orders slowed in the second half. By year end, prices of many products were falling and order backlog dropped 12%.

  Revenue of the LSI Products group was 34% ahead. Both prices and orders for MOS circuits dropped throughout the second half of the year and into 1981. Bipolar and digital products performed well for most of the year, but the market softened for some products at year end. Prices and demand for microprocessors remained stable for much of the year. The redesigned 16K MOS memory went into production near year end and yields improved steadily. Design of the 64K dynamic RAM has been completed and it is scheduled for sampling with key customers early in 1981. The new 9445 16-bit bipolar microprocessor will go into production during the first half of 1981.

  Revenue of the Analog and Components group was up 11% over 1979 as demand remained strong until the third quarter. Fairchild made its first move into fiber optics when the Optoelectronics division shipped its first product of this type to a customer for evaluation. Also, first shipments of large-area liquid crystal displays were started in 1980.

- Test Systems revenue rose 24% in 1980; year-end backlog was about even with the 1979 level. The effects of the recession were felt early in the year as sales of large, general-purpose LSI test systems declined but then improved during the second half. Demand for subassembly and component test systems remained strong throughout 1980, but orders slowed early in 1981 as a result of the semiconductor business downturn. Sales of memory test systems and printed-circuit board testers were up 75%.

Early in 1981, Great Western Silicon Corporation was sold to General Electric Co. for $7.7 million. Great Western was 55% owned by Applied Materials, Inc. and 45% by Fairchild.

Late in 1980, Fairchild became aware that certain tests required on some types of military-grade semiconductors had not been fully performed. The company voluntarily notified the U.S. Government, and users of these products, and took immediate corrective actions. No quality problems concerning these products have been reported to Fairchild. The U.S. Government has not completed its consideration of the matter. However, it has audited and recertified facilities producing some of the involved products, while audit and recertification of other facilities are expected to take place in the near future.

Direct step-on wafer processing of bipolar circuits at the South San Jose plant of Fairchild.

ELECTRON BEAM MASK MAKING

In a significant upgrading of integrated circuit design and manufacturing capability, Fairchild installed a second generation electron beam mask making machine in 1980. The new $2 million machine, the most advanced of its kind, will allow Fairchild designers to double the density of circuits put on a silicon chip as compared to previous electron-beam machines.

A key to efficient microelectronic circuit manufacturing is the ability to print simultaneously hundreds of circuits, each could be a complete computer memory, side by side on a pure silicon wafer. Manufacturers continually try to reduce circuit dimensions and thus chip size, since the more chips that can be packed on a wafer the better the production yield and the lower the costs.

The first monolithic integrated circuit, made by Fairchild in 1961, was a simple switching device that had a density of about 4,000 components per square inch. Today's 64K random access memory has a density exceeding 2.7 million components per square inch.

Microcircuits are built up in layers on the silicon wafer by a series—as many as 10 or 12—of photographic exposures followed by chemical processing. A key to chip size is the precision of the circuit patterns on the glass photographic plate (mask) that are subsequently transferred to the silicon wafer.

Until the late 1970s masks were made optically using complex digitizing and pattern generating techniques. However, it became apparent that the wavelength of light would soon limit the fineness of detail that could be achieved and electron-beam mask making machines were designed. The circuit design is digitized and recorded on magnetic tape which drives a beam of electrons to create the desired pattern on special electron-sensitive material on the glass mask.

New electron-beam mask making machine installed at Mountain View, California.

Fairchild Series 80 System is designed for testing linear integrated circuits.

Fairchild began operating the industry's first production E-beam machine in 1977, producing masks with ten times greater accuracy than optical systems. The new second-generation E-beam system essentially doubles this performance having a positional repeatability of 1/400,000 of an inch. The new machine also has twice the scanning rate and can automatically handle nine masks at a time compared with a single mask in the earlier system. In addition to permitting denser circuit designs, the electron-beam process significantly reduces mask making time. In practical terms, a complete mask set for a new circuit design can be produced in a day with the E-beam process, versus several weeks by optical methods.

SERIES 80 ANALOG TEST SYSTEM

The market for large-scale integrated circuits that perform analog functions is growing fast. Such circuits are indispensable in consumer products like high-fidelity audio and television, and also are important in telecommunications, telephones, and military electronics applications. Consequently, semiconductor designers have learned to crowd numerous analog circuits on a single chip and even, in some cases, to combine analog and digital functions on the same chip.

Unlike digital circuits, which can be tested for simple on-off operations, analog or linear circuits must be tested over wide voltage and current ranges at numerous operating points to assure that performance meets specifications. With most commercial testers this can be a slow and costly process.

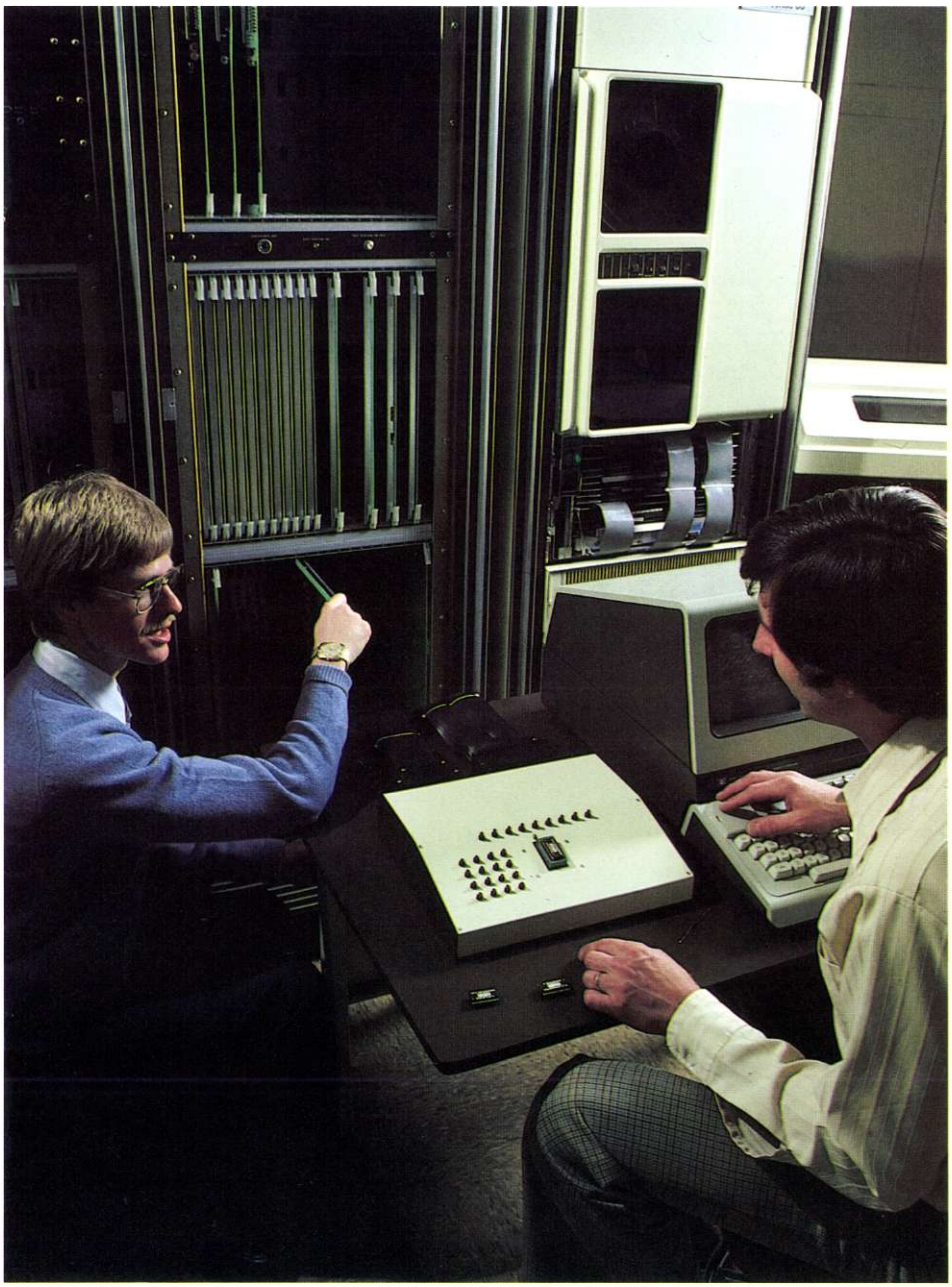
Recently, Fairchild introduced the Series 80, the first linear component test system based on digital techniques. Digital operation allows high testing rates on production lines, as much as ten times faster than competitive systems. Series 80 also is at the leading edge of accuracy possible in a production environment: electrical currents as small as 100 billionths of an ampere are measurable.

Digital signal processing gives the new system the ability to handle components with mixed analog and digital content. This feature is particularly advantageous in telecommunications uses.

Modular design makes the Series 80 cost effective for engineering development and device characterization as well as high-volume production testing and incoming inspection.

The new analog tester is a standalone system that consists of a test station, test station controller bay, operator interfaces, test instrumentation and peripherals. Each of two test heads can accommodate the same or different device programs and can simultaneously measure as many as 14 characteristics.

The Series 80 can be programmed for engineering applications by means of easy to use software.




FANUC 2000 C

Manufacturing Data Systems Inc.

BUSINESS REVIEW

Manufacturing Data Systems Inc. revenue increased 29% over 1979. Results set a record for the eighth consecutive year.

MDSI provides computer services to help clients prepare punched tapes to drive numerically controlled (N/C) machine tools.

At the end of 1980, MDSI had 3,850 customers and 18,500 N/C machine tools under contract.

Results of MDSI will be consolidated with those of the Company beginning in 1981.

Several new computer-aided manufacturing services were introduced in 1980:

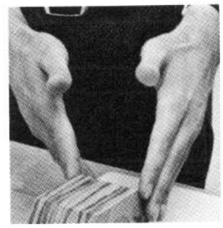
- COMPACT II, the MDSI computer language for N/C tape preparation, was interfaced with two popular interactive computer graphics systems. These interfaces integrate computer-aided design with computer-aided manufacturing (CAD/CAM) for the first time. Customers who use computer-aided design now can directly transfer their designs into the COMPACT II system for N/C tape preparation.

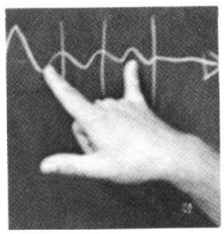
- At midyear, COMSHOP V, a minicomputer-based business application program, was introduced for small independent job shops who build to customer specifications. This management system provides fast, accurate job estimating, job costing and general ledger accounting reports. Additional business application programs are being developed as a financial control system for product shops which build to their own internal specifications.

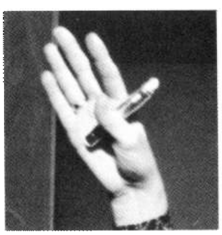
- COMDRAW IV, a two-dimensional computer-aided drafting system, was announced in September; this low-cost system improves the productivity of creating mechanical drawings and applies to all types of product shops.

A machine tool controlled by an MDSI computer-generated N/C tape; the controller is in the background.





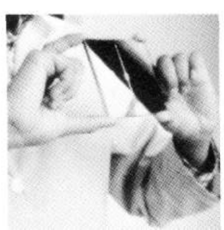









Research at Schlumberger

Research has been fundamental to Schlumberger growth since the company was founded. The research centers, breeding grounds for new concepts and techniques, are supported by engineering and development groups in each of Schlumberger's main activities.

Schlumberger maintains three basic research centers:

- *Schlumberger Doll Research* in Ridgefield, Connecticut, performs research for the Wireline Services.
- The *Fairchild* Advanced Research Laboratories in Palo Alto, California, conduct research on semiconductors and automatic test equipment for Fairchild's three operating groups.
- The *GIERS* located in Montrouge, on the outskirts of Paris, France, undertakes research on electricity management, meters and other products for the companies of Measurement & Control-Europe.

SCHLUMBERGER DOLL RESEARCH

Schlumberger Doll Research is located fifty miles from New York City in the rolling countryside of southwestern Connecticut. It is housed in a striking complex of glass-panelled, multi-level buildings. Here, more than a hundred electrical engineers, mathematicians, physicists, geologists, computer scientists and theoreticians work at the leading edge of the latest technologies to obtain a better understanding of the complex earth in which we work and to develop new concepts and tools for the Wireline Services. This research is the first step in a long process that is only completed when the engineering groups in Houston or Clamart, develop field-tested tools. Researchers in the various departments at Schlumberger Doll are encouraged to devote a portion of their effort to advanced investigations, in which they explore new ideas and to work on projects of their own choosing. If their efforts show sufficient promise, the advanced investigations become formal research programs to which substantial resources are allocated for a considerable period of time. The basic questions addressed by these programs reflect the unifying relevance of the work conducted at Schlumberger Doll Research; how much oil or gas is down there and how efficiently can it be produced?

ACOUSTICAL AND ELECTRICAL

Programs in the Center's Mechanics-Electrical Department are chiefly concerned with the use of acoustic propagation to characterize subsurface rock formations and well bore casings, and with the use of new electromagnetic techniques to measure the conductive and dielectric (or nonconducting) properties of rock formations. Scientists in the Sonic Propagation Program are studying the velocity of low-frequency sound waves in rock formations with the idea of perfecting new sonic tools that will provide information con-

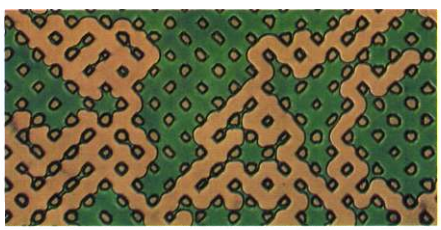
cerning the mechanical properties of oil-bearing rock, especially their strength and their ability to be fractured. Such information is extremely important in low permeability regions where the subsurface formation must be cracked in order to increase the rate of oil or gas flow. Other scientists are experimenting with the potential of high-fidelity sound waves to penetrate through steel casing and cement, in order to evaluate the rock formation.

Acousticians in the Ultrasonic Spectroscopy Program have been experimenting with a variety of ultrasonic frequencies to develop a prototype tool that can measure the adherence of cement to the steel casing in oil wells, and determine regions where the bond has been eroded and fresh cement must be injected. The new tool will provide detailed information on the condition of old casing, which is of great importance in this day and age of high-priced oil, when new possibilities for production are being discovered in many older wells.

Tools that use electrical current to measure the resistivity of underground rock formations have been a major part of the Wireline Services since the first electrical logging experiment in 1927. Today, a new generation of electrical and electromagnetic devices that measure both the resistivity and dielectric properties of rock are being developed in the Mechanics-Electrical Department. One such tool uses high-frequency radiowaves that can penetrate deeply into rock formations, and make measurements several feet beyond the borehole.

NUCLEAR LOGGING

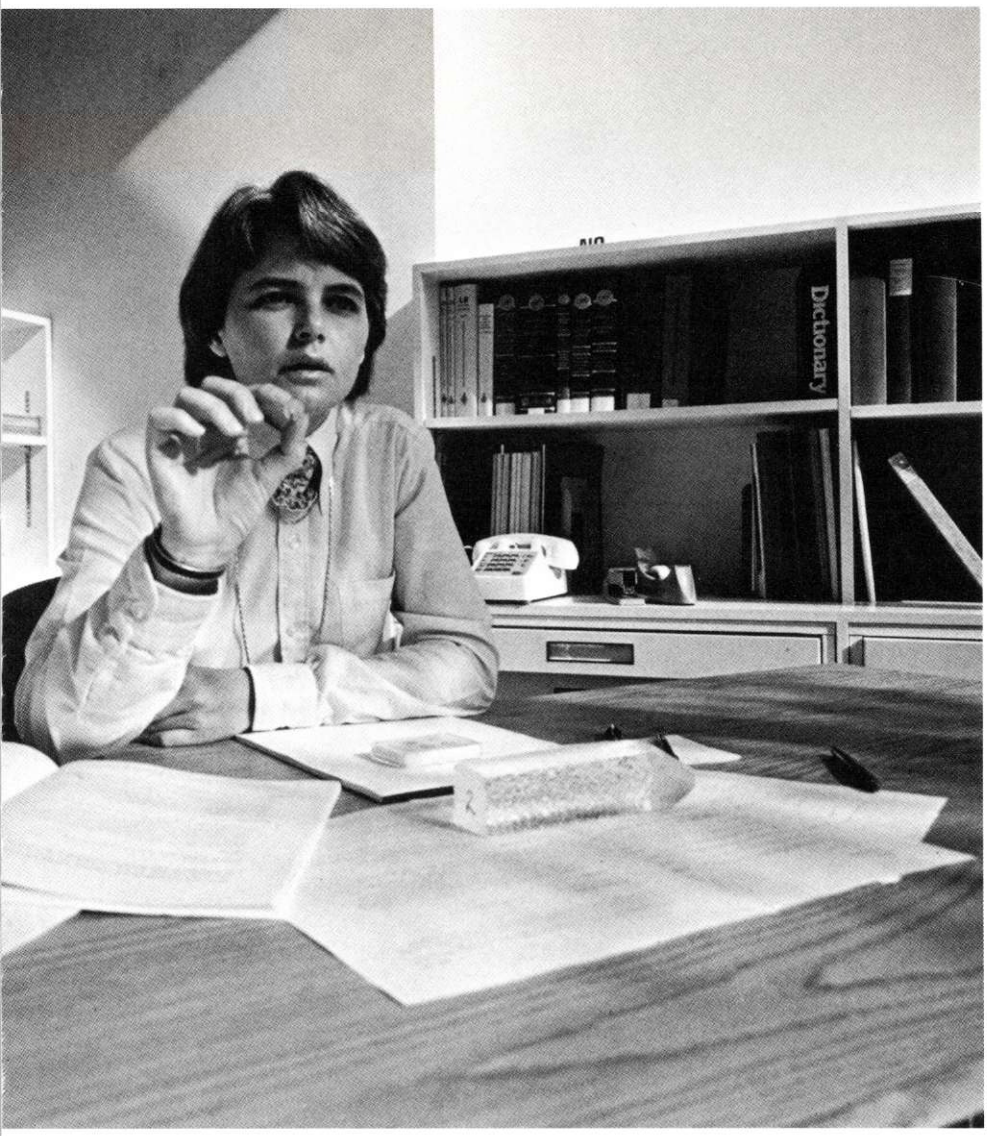
Logging tools that emit nuclear particles to define the characteristics of subsurface formations were first developed at Schlumberger Doll Research after World War II. These days, physicists and other scientists in the Nuclear Department are designing tools with a great capacity for detecting and defining nuclear particles, and developing computer programs capable of recording and interpreting the vast amount of information carried by them. Advanced investigations are underway to study the behavior of neutrons and gamma rays in rock formations, and how they are altered by their interaction with other atoms. Researchers in the Spectroscopy Program have been experimenting with new methods of sorting out radioactive particles according to their energy levels. Recently, they have developed a Gamma Ray Spectroscopy Tool, which can differentiate oxygen from carbon, and thus provide an additional diagnostic technique to distinguish water from oil. Other tools being developed in the Nuclear Department include an improved



A .6 mm x 1 mm section of "simulated" rock used in studies of fluid flow in formations. Oil (yellow) is invading the water-filled (green) interstices. Often water or oil is trapped by this finger-like displacement process.

Rock Physics is a discipline that is unique to the petroleum industry. Some of the questions it raises are how does rock conduct sound, how does it conduct electricity, and, above all, how does it conduct fluids? To answer these questions, scientists in the Rock Physics Program at Schlumberger Doll Research are obtaining new insights into how the shape of tiny rock grains and pore structure play a major role in fluid flow. They have also demonstrated experimentally for the first time in history that when sound is propagated through fluid-containing rock, the fluid vibrates independently of the solid portion of the rock, thus creating a slow wave that travels through the fluid, and a fast wave that travels through the rock. They are now investigating the theory that the speed of the slow wave may be an indication of tortuosity, which refers to the crooked, twisting configuration of the pore space in a rock formation. If tortuosity proves to be related to permeability, slow wave technology could one day lead to the development of a downhole tool, and thus become an important part of oil well logging.

Because water invariably co-exists with oil in subsurface rock formations, researchers in the Rock Physics Program are studying multi-phase flow—how oil and water affect each other as they move together through pores of greatly varying shapes and sizes far below the surface of the earth. To begin with, they simulate multi-phase flow in a single pore having a diameter of 60 microns (about two-thousandths of an inch) which is the size of an average pore in oil-bearing sandstone. They then study the capillary forces governing multi-phase flow in an artificial rock containing approximately 1,000 such pores. As a third step, they construct a computer model of how oil and water flow in a cubic centimeter of sandstone (which is about the size of a thimble) having approximately 10,000 pores. Ultimately, they hope to apply what they have learned about multi-phase flow in a thimble-sized increment to an entire oil reservoir that contains literally *trillions* upon *trillions* of pores.



Jan Brown

is a solid-state physicist who leads the Pressure Measurement Program in the Mechanics-Electrical Department of Schlumberger Doll Research. She is studying the elastic constant of various types of synthetic quartz, in order to develop a more accurate pressure sensor for downhole tools. "We want to be able to measure subsurface pressure on the order of 10,000 pounds per square inch with an accuracy of one tenth of a psi," she says. "To accomplish this, we need a material with enormous resonating stability. As it happens, synthetic quartz can resonate accurately to one part in a billion. Placing an alternating electrical current on a quartz pressure sensor will cause the quartz to vibrate at a particular sonic frequency. This frequency will change as the device is lowered into a borehole and the subsurface pressure increases. Correlating the frequency changes with the pressure changes will permit us to measure the subsurface pressure with extreme accuracy. This could mark an important advance in wireline technology, because minute changes in subsurface pressure can signal profound changes in the flow rate of oil."

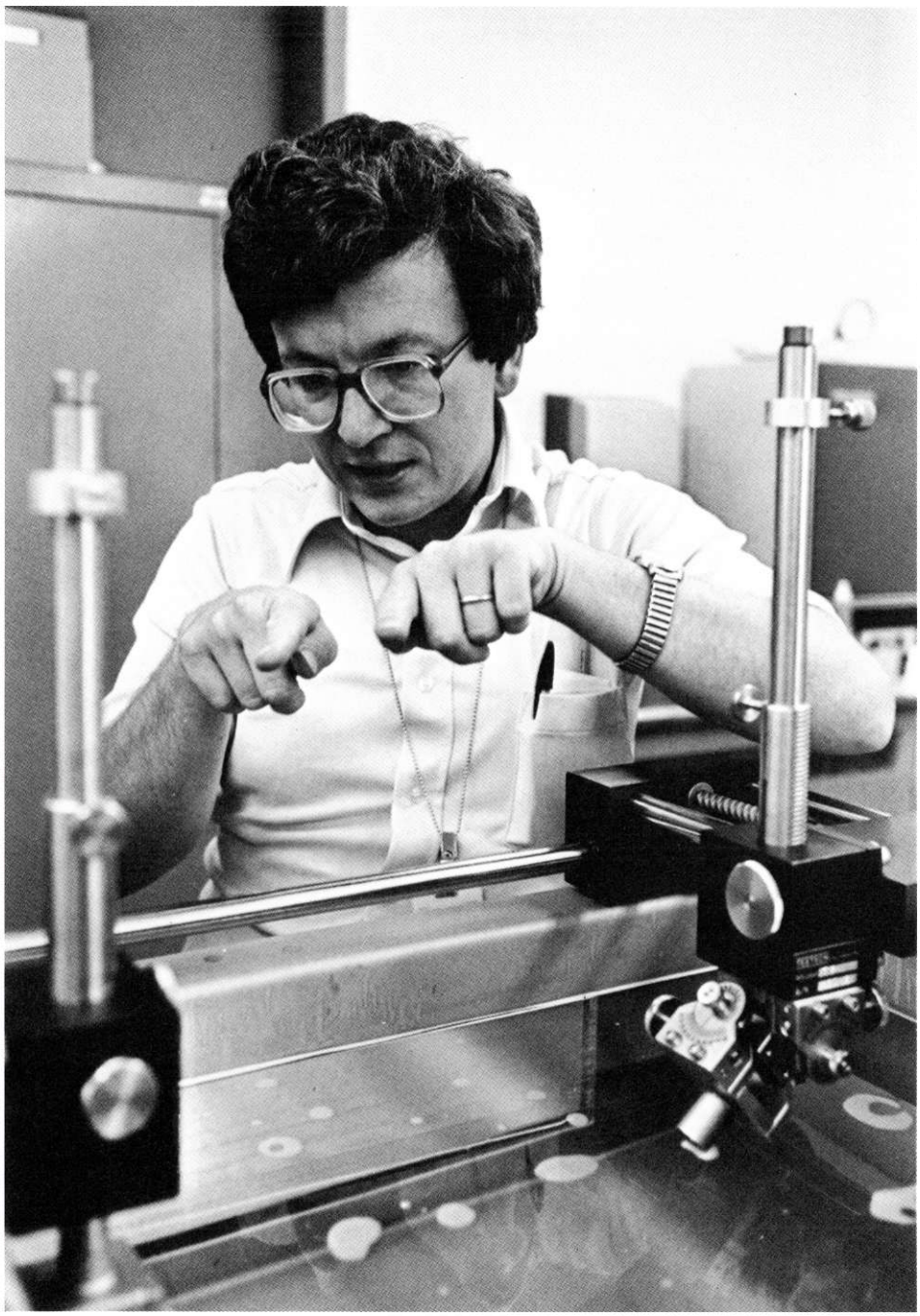
Minitron (Mini-neutron)—a device that can be switched on electrically to generate billions of neutrons per second when it is safely downhole.

Before the creation of OPEC, when oil was relatively cheap, petroleum reservoirs whose flow features were difficult to evaluate were often not produced, and wells whose rate of flow had diminished were often abandoned. Nowadays, with oil selling at more than $40 a barrel, the ultimate recovery of an oil field has become economically desirable. As a result, Wireline Services clients are asking far more detailed questions about the properties of subsurface rock than ever before. They want to know what kinds of rock a reservoir is made of, what the fluid content is, and, above all, how easily the fluids will flow.

To help answer these questions, researchers in the Rock Physics Program of Schlumberger Doll's Petroleum Science Department are studying the microstructure of rock—the shape and size of the nearly invisible pores and grains that make up the rock matrix—in order to understand how a formation conducts fluids. (For additional information on the Rock Physics Program, see accompanying story on previous page.) Other scientists are analyzing dozens of case histories of oil reservoirs that could not be produced economically in the past because of unfavorable charac-

Tom Plona

is an acoustic experimentalist in the Rock Physics Program at Schlumberger Doll Research, where he is investigating the effects of porous rock microstructure on ultrasonic waves. Dr. Plona conducts ultrasonic experiments in a test tank in order to simulate the mud-and-water environment of the borehole, and he uses artificial rocks made of glass beads that have been fused together to duplicate the porosity of natural sandstone. "When we scatter ultrasonic waves off the microstructure of artificial rocks, we find that rock grains of different size reflect sonic energy at different frequencies," he says. "Maximum backscattering occurs when the deflected wavelength is approximately the size of the average rock particle, which is resonating at the frequency of the sound wave. By using a wide range of frequencies, we can tell the average size of the grains in a rock, which can be related to the average size of the pores. Once we know the size of the pores, we can estimate the permeability of the rock. This, in turn, enables us to make an educated guess about the amount of fluid that will flow through the rock under a given amount of pressure. Conceivably, a new acoustical scattering tool may develop from this investigation, which will help us determine the permeability of subsurface oil-bearing rock formations."



teristics of the subterranean formation. By identifying and resolving these problems, they hope to provide Wireline clients with information that will enable difficult reservoirs to be produced in the future.

The collection and interpretation of complex data is the cornerstone of Schlumberger measurement technology. Today, 80,000 bits of information per second come uphole on the average wireline job, the logging tools of tomorrow will send up ten times as much (by contrast, a typical telephone line carries 1,800 bits of information per second). Not surprisingly, the use of computers and semiconductor technology has assumed vast importance in a company for which information processing is rapidly becoming as important as engineering. Logging operations are being modernized to make use of digital

acquisition systems that enable fast interpretation of logs at the well site, but new concepts and hardware being developed in the Systems Science Department of Schlumberger Doll Research will soon give computers a far more important role than merely that of speedy bookkeepers for downhole tools. Researchers in the Interactive Graphics Program are developing methods of integrating and presenting visual displays of large amounts of geological information, including log data and associated interpretation. Experts in Software Research are devising computer programs that will assist Wireline scientists and engineers in utilizing computer systems for solving complex problems of geology and physics. Eventually, they hope to teach computers to interpret technical language, and to write software programs on their own.

ARTIFICIAL INTELLIGENCE

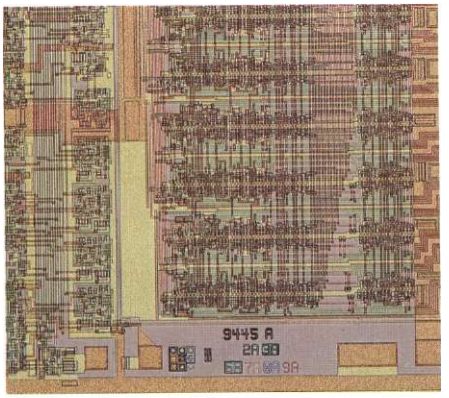
A major goal of the Systems Science Department is to give computers the ability to interpret logging data. In order to do this, computers must be able to correlate and understand data collected by the sensors of downhole tools and to draw conclusions from them. The idea that a computer can be made to manage complexity and to reason is called artificial intelligence. Its ambitious aim is to develop programs that will enable computers to achieve and exceed human-level performance in analyzing information and in solving problems. In the meantime, computer scientists in Schlumberger Doll's Expert Geology Systems Programs have taken a short cut toward making a truly smart machine. They have modelled human expertise by debriefing some of the leading dipmeter experts in Schlumberger, and by incorporating their special knowledge, skills and decision-making processes into a computer program called the Dipmeter Advisor. After being tested to insure performance, the Dipmeter Advisor will be sent into the field to serve as an interpreter of dipmeter data for Wireline Service clients.

THE FAIRCHILD ADVANCED RESEARCH LABORATORIES

The Fairchild Advanced Research Laboratories are located forty miles south of San Francisco in Palo Alto, California, in the heart of a region that is known as "Silicon Valley" because of its high concentration of semiconductor manufacturers. The laboratories are manned by more than 100 computer scientists, circuit designers, chemists, physicists, and electronics engineers, who perform long-range research and development on advanced solid-state and related technologies for the extensive line of semiconductor devices and automatic test systems which are manufactured by Fairchild's operating groups. Major gains in semiconductor design concepts and process technologies usually evolve over a long period of time. For this reason, Fairchild undertakes research with an awareness that the development of products having the greatest potential to produce profit requires careful planning, persistence, and a willingness to take calculated technological risks.

Considerable emphasis at the Palo Alto facilities is being placed upon Very Large Scale Integration (VLSI)—a term applied to integrated circuit chips containing more than 16,000 bits of memory, or more than 5,000 logic gates. A 65,536-bit Random Access Memory (known as the 64K dynamic RAM) has already been developed by scientists in VLSI research. With forecasters predicting a $1 billion market for such devices by 1983, Fairchild's 64K dynamic RAM is being refined by engineers in the Metal-Oxide Semiconductor (MOS) & Bipolar Development Line, whose function is to translate technological innovation into products that can be mass-produced in the operating groups.

VLSI researchers are now pushing ahead to design a 256K dynamic RAM.



A small portion of the 9445 16-bit microprocessor chip. The smallest circuit details visible in this picture, in reality measure less than a 1/10,000 of an inch.

Microprocessors. Advances in software and semiconductor technology have led to the development of tiny integrated circuits, called microprocessors, which are placed on silicon chips smaller than a little fingernail. The microprocessor incorporates all the functions of a central processing unit of a computer. It directs the search of the computer memory, retrieves stored information and makes calculations.

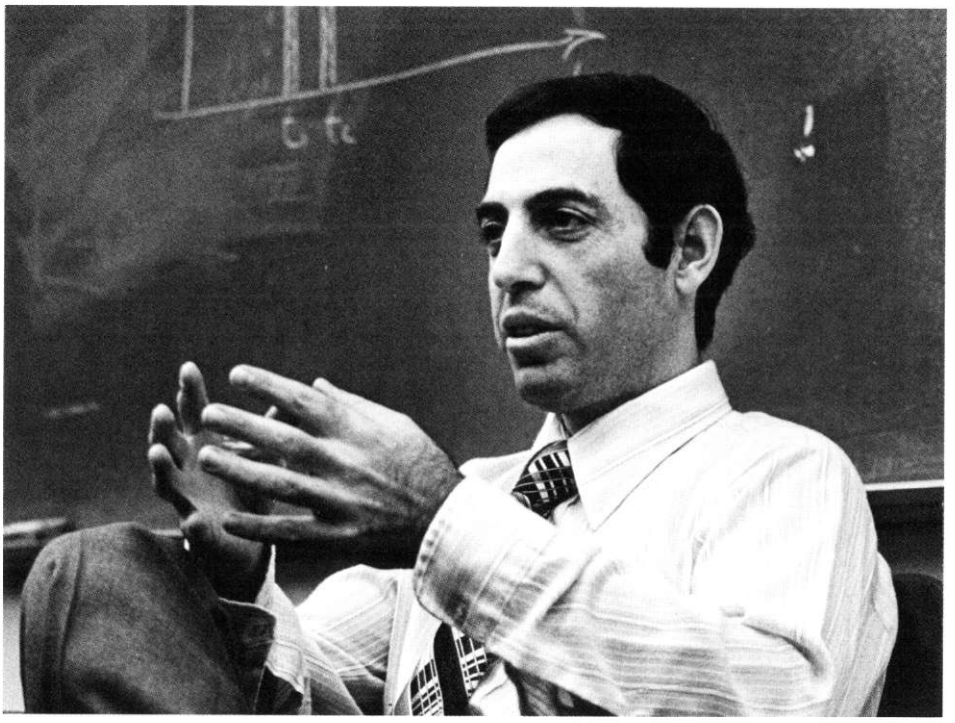
In 1975, the Fairchild Advanced Research laboratory decided to apply a new bipolar process to construct a 16-bit high performance microprocessor instead of using the lower performance metal oxide semiconductor (MOS) process. The chief advantage of using bipolar transistors in the microprocessor is that the logic gates operate faster and more reliably than those made with MOS transistors.

From the start of the project, there was doubt that it was possible to apply bipolar technology to a complex microprocessor. However, during the five-year project, scientists and researchers at the laboratories succeeded in developing an advanced bipolar circuit and a process technology that enabled them to produce a microprocessor with more than 5,000 logic gates. At the same time, software was designed and a general-purpose development system was created to enable customers to implement the microprocessors in their own systems.

Fairchild's 9445 16-bit bipolar microprocessor is about to be sold commercially. It can execute a basic instruction within 250 nanoseconds—a quarter of a millionth of a second—twice as fast as any other microprocessor on the market. In the future, Fairchild expects to apply bipolar technology in the development of microprocessors that contain more than 10,000 logic gates and that can execute a basic instruction in 50 billionths of a second.

Dan Wilnai

is an electrical engineer who is Technical Manager of the Digital Signal Processing Group at Fairchild's Advanced Research Laboratories. At the present time, he is helping to develop signal processors for use in telecommunications, medical instruments and industrial control equipment. "The digital signal processor will be a specialized computer on a chip containing integrated logic and memory," he explains. "It can translate physical parameters such as blood pressure and temperature from analog to digital form, and it also has the capacity to analyze this type of information even as it is being sensed. Giving the device, the ability to analyze data on the fly will solve a complicated software problem, that had required multiple processors and arrays. We're also beginning to perform research in speech processing. In order to develop a device that can recognize human speech, we must first design a device that can define the basic sound frequencies of each word. Speech recognition will involve the use of high-speed signal processing chips to identify and filter out harmonic pitch. The idea, you see, is to design a machine capable of differentiating between such phrases as 'ice cream' and 'I scream.'"



Other scientists and engineers are working to develop new technologies that will be required for the evolution of advanced-memory devices and microprocessors. (For more information about Fairchild's latest microprocessor, see accompanying story on preceding page.) These technologies include processes for the manufacture of MOS and bipolar semiconductors in high-performance integrated circuits containing logic, as well as the use of advanced optical exposure systems and plasma etching methods to achieve two-micrometer circuit geometries (about 1/10,000 of an inch) upon silicon insulators and metal coatings. Fairchild will also investigate application of electron beam and X-ray exposure systems to achieve one micrometer circuit geometries in the near future.

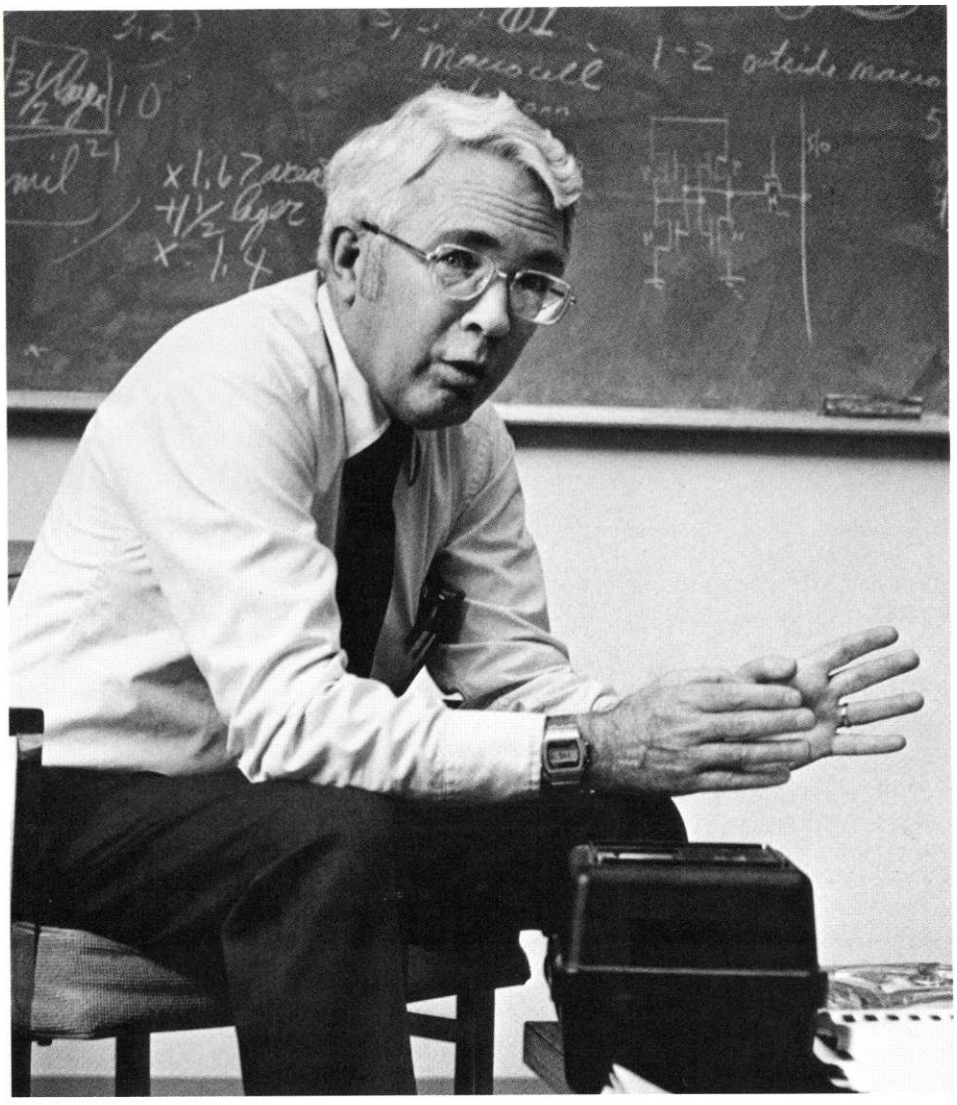
Research involving revolutionary techniques in modelling and simulation is being conducted in the field of computer-aided design (CAD), and a new laboratory has been set up to explore the applications of artificial intelligence to VLSI circuit design and testing. Important advances are being made in logic technology, and research in gate arrays is expected to result in the development of high-density integrated circuits that are flexible enough to be applied to many different computer systems. The logic gates in such advanced semiconductor devices will be able to make decisions in the span of a nanosecond, which is one-billionth of a second.

A new technology with application in computer memories and image sensing is the Charge Coupled Device (CCD), which employs a technique enabling information to be stored and transported by means of packets of minute electrical charges. CCD will aid in the development of low-cost, dynamic memory units, and CCD solid-state sensors are replacing the vidicon tubes in facsimile transmission equipment and some TV cameras.

In still another area, engineers in the Telecommunications LSI Research Group have succeeded in developing an electronic telephone circuit in which a single bipolar chip handles the functions of dialing, ringing and transmitting speech. Moreover, they have employed similar technology to design circuitry small enough to fit in a bread box, yet capable of carrying out the functions of a central telephone switching office.

Jim Early

Silicon integrated circuits are the long-term goal of Fairchild's semiconductor technology development. Jim Early is manager of VLSI research at Fairchild's research and development laboratory in Palo Alto. Jim, with a fresh doctorate from Ohio State and new to semiconductors, invented the high frequency bipolar junction transistor in 1952 and has been in semiconductors ever since. Jim, an 11-year Fairchild veteran, explains, "A micron is about one percent of the diameter of the human hair. Thirty years ago, the smallest parts of the transistors we built were about the size of a human hair," he recalls. "Since then, ideas, process equipment and process technology have come in wave after wave of advance. Today, with wafer-stepper lithography we are creating a 2 micron technology wave, which is giving us a 262,144 bit memory, that is one capable of answering 262,144 yes or no questions—on a piece of silicon smaller than a child's little finger nail. New equipment and new processes will help us make and ride a submicron technology wave, which should give us a 4 million bit memory chip and act as the technical base for a stream of other products no one yet imagines. We know this is our challenge for the next 7-10 years, the next 2 or 3 waves. New technology comes in waves or cycles, you know, and the trick is to be on the right wave at the right time. Here at Fairchild R&D our business isn't simply riding these technological waves. We are making them."



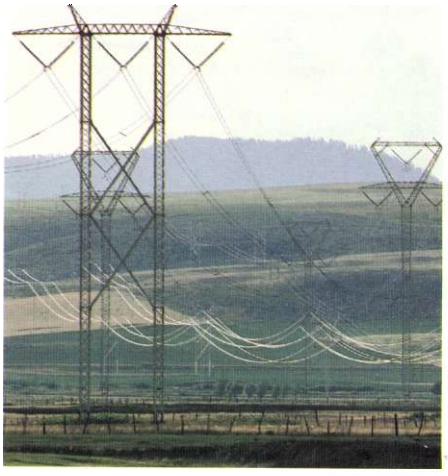
GIERS

The GIERS is a research and engineering laboratory that occupies part of a large manufacturing complex in Montrouge, near Paris. Here, 40 physicists, mathematicians, electrical engineers and other scientists are developing new technologies and new product concepts for Enertec, Flonic and Sereg—the companies that make up Measurement & Control-Europe.

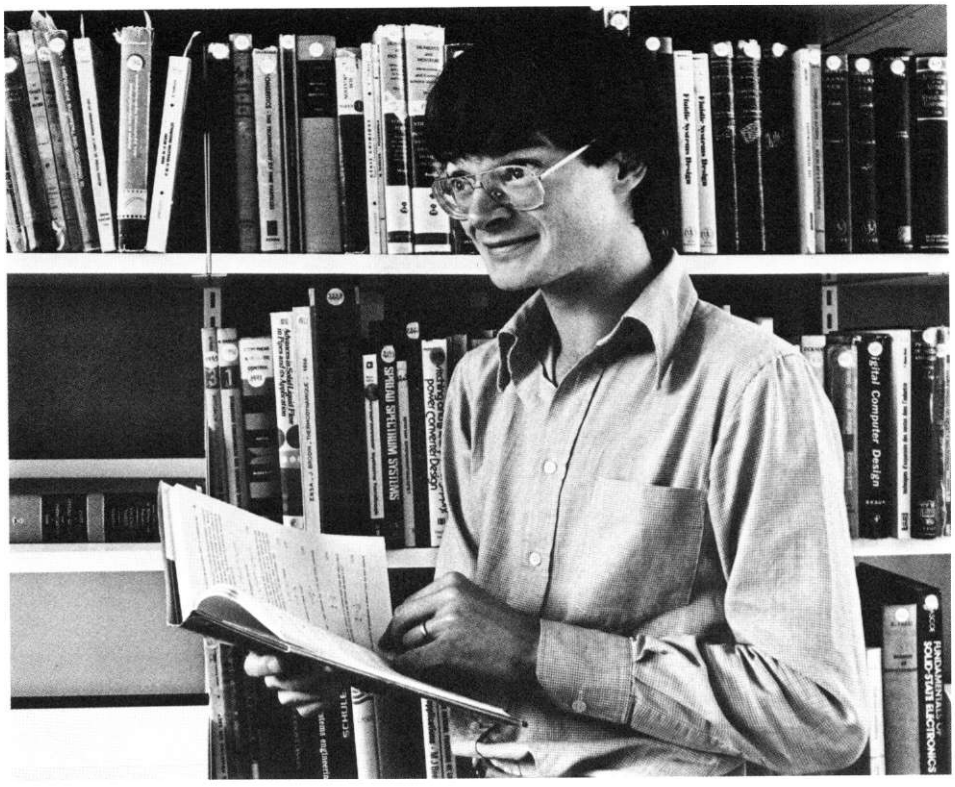
One of the most ambitious projects at the GIERS is a protection system being developed with Enertec for high-voltage power transmission networks. It is designed to detect short circuits and other faults in 400 kv power lines, and to prevent mass overload and breakdown of the network through selective, split second cutting off of power to a damaged section of the line. (For more information about the protection relay system, see accompanying story on following page.) A second project involves fully electronic ripple-control equipment for the load and rate management systems that are widely used in Europe. Ripple control is a signal that is superimposed on power-line voltage in order to command multitariff meters to charge different rates at certain times of the day or night. It can also be used to shut off power to selected appliances such as hot water heaters or air conditioners during peak load periods.

Sophie Goujon-Durand,

a physicist at the GIERS, has spent six years developing a vortex-shedding device that measures the flow of gas or water through a pipe by counting the vortexes, or eddies, created by an obstacle in the pipe. "The basic principle of vortex shedding was evolved by Leonardo da Vinci, who studied the behavior of eddies created by rocks in a stream," she explains. "How to apply da Vinci's principle has been my task. The first and biggest problem was to design an obstacle that would shed a vortex large enough to be measured easily. After much trial and error, I got the idea of using an obstacle of trapezoidal form, which proved to be a breakthrough. Afterward, it was a question of perfecting electronic sensors that could record the velocity fluctuations associated with vortex shedding. Our new method of measuring flow will greatly increase the accuracy of gas and liquid metering. We're now working to apply the same technology in a device that will measure the speed of wind."



Network Protection. Lightning and other incidents can cause short circuits in high-voltage power transmission lines, which, in turn, can result in serious overloading of power lines and generators. In worst-case situations, such as those that occurred in the northeastern part of the United States in 1965 and 1977, and in France in 1978, generators can fall out of synchronization with the rest of the power network, and whole transmission systems can break down in less than a second. Today's network protection systems, which are based upon analog circuits, can detect faults and intervene to cut off power to damaged areas within 160 milliseconds. This, however, is not fast enough, so scientists at Enertec and the GIERS are working to develop a digital protection-relay system that will speed up the process. The new system will use transformers (and eventually fiber-optic technology) to monitor current and voltage on all the power lines of a transmission network. It will employ high-speed signal microprocessors with special logic circuitry to pinpoint the exact location of a fault, and to determine how best to deal with it. The system will then make use of fiber optics, which allow signals to be sent without interference in the heavily perturbed electrical environments that exist in the vicinity of power lines, to instruct protective relays controlling the appropriate circuit breakers to shut off power to a damaged area. Most important of all, the network protection relay system will carry out its entire trouble shooting mission within the amazingly short span of five milliseconds.



NEW METERING DEVICES

Devices incorporating advanced technology for metering electricity, gas, and water are also being developed at the GIERS. The electricity meter used throughout the world today—an electromechanical device that measures current by the number of times the current turns a disc—has remained essentially unchanged since 1884. Recently, engineers in the Electronics Laboratory at the GIERS succeeded in building a solid-state meter which uses integrated circuitry to translate power measurements into digital form. The new solid-state meter has the advantage of being tamper-proof. It can also be "read" electronically from a central office, and can be instantly "commanded" with ripple control to perform complex tariff-charging functions.

The water meter of today, which has also remained unchanged for 100 years, uses a rotating turbine that measures flow by turning a mechanical counter. Researchers in the Physics Laboratory at the GIERS are developing an electronic water meter which measures flow in digital form with an electrode that counts the pulses made by the turning blade of the turbine. They have also applied technology called vortex shedding, in order to develop efficient and accurate gas and liquid meters that do not employ moving parts. The new devices use electronic sensors that measure flow by recording the number and velocity of the vortexes, or eddies, which are created by an obstacle placed in a gas or water pipe.

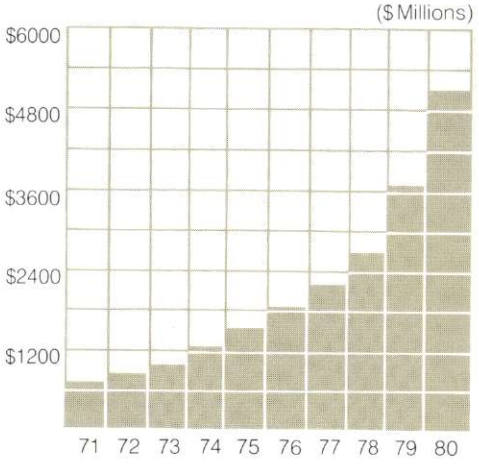
Still another highly innovative concept is aimed at measuring the electrical current in high voltage power lines, through the use of optical signal processing. Most of the ideas being examined are based on the measurement of the strength of the magnetic field around the power line, once this value is known, the amount of electrical current being carried on the line can be determined.

When scientists at the GIERS succeed in developing a similar technique for measuring power line voltage, electronic and optical equipment will replace the bulky and expensive transformers that perform these measurements today.

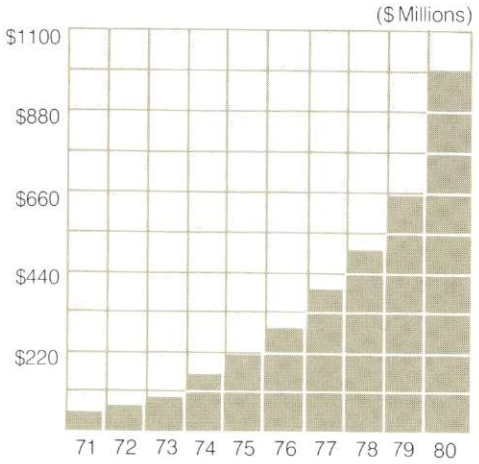
Gregory Gibbons,

a 26 year-old mathematician, has been at the GIERS for a year, and has already made an important contribution to the network protection system. "My job was to devise a mathematical equation to compensate for a problem that was complicating the interpretation by computer of electric waves propagating on high-voltage transmission lines," he explains. "The problem stemmed from the fact that when there's a short circuit or other fault on a power line, abnormal high-frequency currents are injected on the line, which interfere with the information being processed by the computer. Once we determined that the high-frequency interference was a function of the length of the power line, I was able to use mathematical approximation theory techniques to calculate filters that would reduce the error caused by the interference, and thus enable the computer to send corrected information to the protection relays. Recently, I've been working to develop a method of testing for faults in large printed circuit boards. These boards have become so complex that testing them from A to Z could theoretically take an eternity. The trick is to devise a simple model that will simulate the basic behavior of the board, and then write a software program that will test it selectively in given situations. Artificial intelligence should be of great help in solving this problem."

Financial Review



Revenue



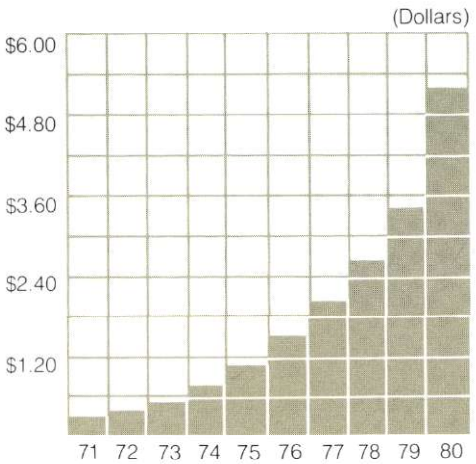
Net Income

RESULTS OF OPERATIONS

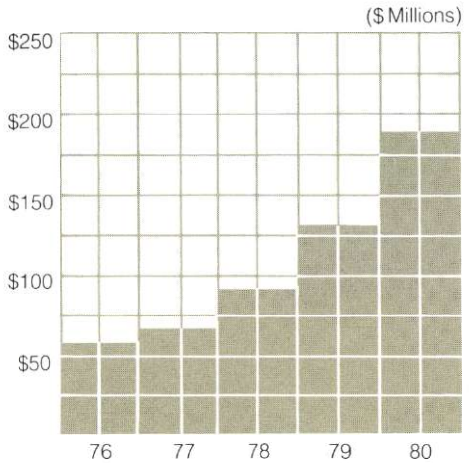
Year-to-year comparisons of operating revenue show growth of 38%, 36% and 21% in 1980, 1979 and 1978, over the respective preceding years. Pretax operating income gained 42%, 29% and 21% over the same years. Excluding the gain on the sale in 1980 of Rowan shares, net income was 40%, 31% and 25% higher on a year-to-year basis between 1980-1977, and net income per share reached $4.85 in 1980 as compared to $2.08 in 1977.

In the Oilfield Services segment, both Wireline and Drilling & Production Services experienced strong improvements in operating revenue over the three year period. Wireline revenue in North America increased 38%, 22% and 25% in 1980, 1979 and 1978, respectively, reflecting high levels of drilling activity in both the United States and Canada. In the United States, year-end rig count was 31% higher than a year ago; activity was particularly strong in the Rocky Mountains. In Canada, wireline activity was high during most of the year, especially offshore the east coast. Wireline revenue in the Eastern Hemisphere and South America grew 45%, 26% and 28% in 1980, 1979 and 1978, respectively. All major areas participated in the improvement. Operations commenced in China as the first logs were run on land in August 1980 and offshore in December 1980. Drilling & Production Services revenue increased 33%, 25% and 22% in 1980, 1979 and 1978, respectively. Rig utilization was 93% during 1980, which compared favorably to 91% in 1979 and 83% in 1978.

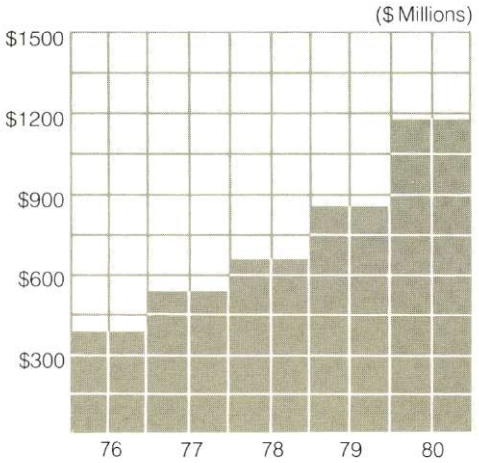
Measurement, Control & Components operating revenue increased 37% for 1980, 54% for 1979 and 18% for 1978. A substantial part of the increase in 1980 and 1979 was due to the inclusion of Fairchild results from July 1, 1979. Sangamo Weston had revenue growth of 9%, 26% and 25% in 1980, 1979 and 1978, respectively, reflecting strong demand in data sets, electro-optical systems and industrial watthour meters, partially offset by the adverse impact of the depressed level of housing starts in the United States on sales of residential single-phase watthour meters. Measurement & Control-Europe sales increased 19%, 21% and 20% in 1980, 1979 and 1978, respectively. Gains were achieved in products related to nuclear energy, data acquisition and recording, automatic test systems and electricity management. Although Fairchild revenue was up 21% in 1980, the decline



Earnings Per Share



Research & Engineering



Funds From Operations

in semiconductor orders, accompanied in some instances by a substantial drop in prices, reduced 1980 fourth quarter profits.

Pretax operating income for Oilfield Services increased 46%, 25% and 20% in 1980, 1979 and 1978, respectively. Measurement, Control & Components pretax operating income grew 22%, 54% and 31% over the same years. The increase in pretax operating income was primarily attributable to the higher level of revenue.

Interest expense of $102 million in 1980 represented a significant increase from prior years. The increase in both 1980 and 1979 was primarily due to additional borrowing incurred in July 1979 in connection with the acquisition of Fairchild. In addition, the average level of interest rates was higher in 1980 compared to 1979.

RESEARCH & ENGINEERING

Expenditures for research & engineering increased 43%, 45% and 32% in 1980, 1979 and 1978, respectively. Oilfield Services expenditures for research & engineering totaled $80 million, $64 million and $50 million in 1980, 1979 and 1978, respectively. Measurement, Control & Components spent $108 million, $67 million and $40 million in 1980, 1979 and 1978, respectively.

Research & engineering expenditures for 1981 are budgeted at $250 million, an increase of 33% over 1980. The largest contributor to the planned increase is Fairchild.

INVESTMENT

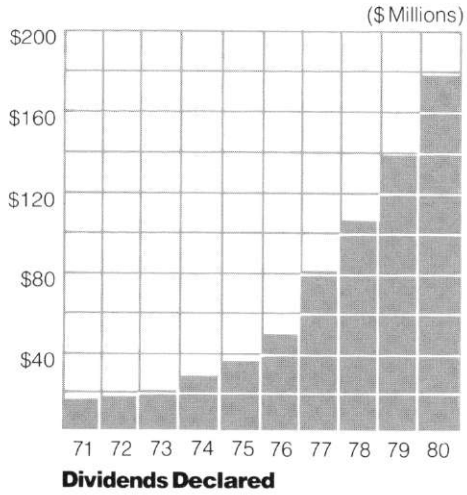
On January 21, 1981, the Company completed the merger of Manufacturing Data Systems Inc. (MDSI) into a subsidiary of the Company. The transaction, which will be accounted for as a pooling-of-interests, was an exchange of stock on the basis of .6375 share of the Company's stock for each share of MDSI common stock. MDSI provides computer assisted software services for numerically controlled machine tools and other specialized computer services for manufacturing industries. MDSI's 1980 revenue and net income were $59 million and $5 million, respectively.

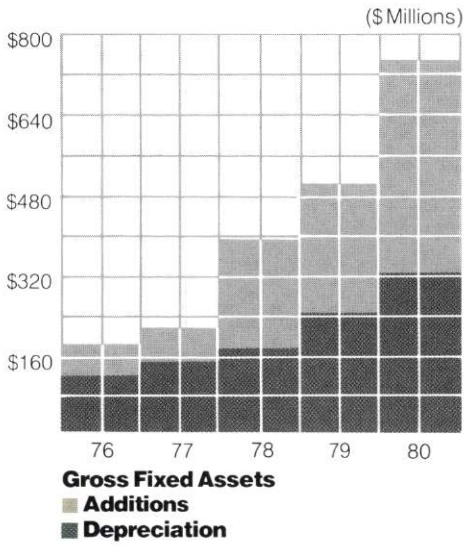
CURRENCY

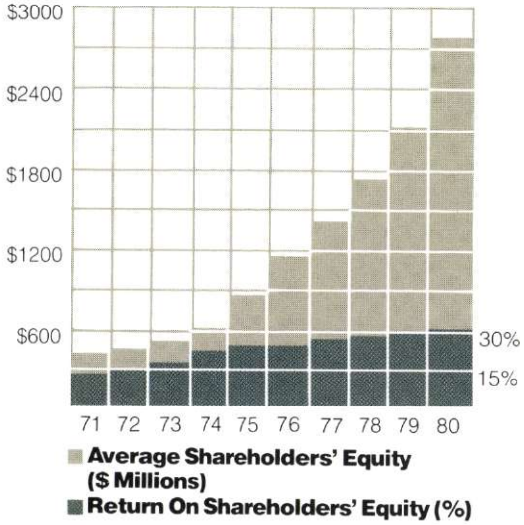
Currency exchange losses were $19 million in 1980 compared to $5 million and $7 million in 1979 and 1978, respectively. The loss in 1980 was due primarily to the strengthening of the U.S. dollar against most European currencies. The loss in 1979 was largely due to devaluations of the Argentine peso, while in 1978 the loss reflected changes principally in the U.S. dollar/French franc exchange rate.

ESTIMATED LIABILITY FOR TAXES ON INCOME

The estimated liability for taxes on income at year end was $643 million, an increase of $151 million from the previous year end. The increase was the result of the higher pretax earnings and provisions for income taxes which may be payable in future years depending upon interpretation of tax laws and regulations of taxing authorities in various countries.







FIXED ASSETS

Expenditures for fixed assets in 1980 were $748 million compared to $503 million in 1979.

Additions by business sector were as follows:

	1980	1979
	(Stated in millions)	
Oilfield Services:		
Wireline	$357	$283
Drilling & Production	208	122
	565	405
Measurement, Control & Components:		
Sangamo Weston	24	16
Fairchild	95	45
Measurement & Control —Europe	59	35
	178	96
Other	5	2
	$748	$503

Fixed asset additions are budgeted at $1.1 billion in 1981. It is anticipated that such planned growth in fixed assets will be financed through internally generated funds.

FINANCIAL POSITION

At year end, working capital was $1.2 billion, $183 million over the prior year; the current ratio was 1.74 to 1. The growth rates of receivables and inventories were well below the growth in business.

Liquidity, which represents cash and short-term investments net of debt, was $737 million and $344 million at December 31, 1980 and 1979, respectively. The increase in liquidity reflects the high level of funds generated from operations.

COMMON STOCK, MARKET PRICES AND DIVIDENDS PAID PER SHARE

Quarterly high and low prices for the Company's Common Stock as reported by the New York Stock Exchange (composite transactions), together with dividends paid per share in each quarter of 1980 and 1979 were:

	PRICE RANGE HIGH	LOW	DIVIDENDS PAID
		1980*	
Quarters			
First	$ 81⅝	$58⅞	$0.183
Second	79⅞	66⅜	0.220
Third	101½	77	0.220
Fourth	130¾	94½	0.250
		1979*	
Quarters			
First	$ 47⅜	$41⅛	$0.156
Second	51⅜	45¾	0.183
Third	58¾	48⅛	0.183
Fourth	66⅞	54⅝	0.183

*Adjusted for three-for-two stock split in September 1980

The number of holders of record of the Common Stock of the Company at December 22, 1980 was approximately 25,000. There are no legal or charter restrictions on the payment of dividends or ownership or voting of such shares. United States stockholders are not subject to any Netherlands Antilles withholding or other Netherlands Antilles taxes attributable to ownership of such shares.

INFORMATION ON EFFECTS OF CHANGING PRICES

In September 1979, the Financial Accounting Standards Board (FASB) issued Statement No. 33, Financial Reporting and Changing Prices. This Statement establishes standards for disclosing the effects of general price level changes (constant dollar) and price changes of specific assets (current cost). Information required to be presented does not represent a complete restatement of the financial statements adjusted for the effects of changing prices but focuses on those items most affected by changing prices: inventories and related cost of goods sold, fixed assets and related depreciation expense, and net monetary assets.

The constant dollar method adjusts historical financial data by using the Consumer Price Index for All Urban Consumers (CPI-U) published monthly

by the U.S. Department of Labor. In conformity with the requirements of FAS 33, the CPI-U, an index of U.S. inflation, was applied to both U.S. and non-U.S. operations. Since a major portion of the Company's business is conducted outside of the United States, the restated data may not be indicative of the effect of inflation on its consolidated results and financial position.

The current cost method is intended to show the impact on net income that would have occurred if all products sold by the Company were purchased in the current year, and additionally, if all fixed assets were completely replaced and depreciated at current prices. The current cost of fixed assets was calculated using various internally and externally generated price indexes for each class of asset being measured.

Depreciation expense on the constant dollar and current cost bases is calculated by applying the same historical depreciation rates to the adjusted property amounts.

CONSOLIDATED STATEMENT OF INCOME ADJUSTED FOR EFFECTS OF CHANGING PRICES

	FOR THE YEAR ENDED DECEMBER 31, 1980		
	AS REPORTED	IN CONSTANT DOLLARS	IN CURRENT COSTS
	(stated in millions)	*(average 1980 dollars)*	
Revenue	$5,137	$5,137	$5,137
Expenses			
Cost of goods sold and services	2,813	2,909	2,953
Interest	102	102	102
Other	706	709	711
Taxes on income	522	522	522
Net income	$ 994	$ 895	$ 849

Note: At December 31, 1980, the current cost of inventories was $614 million and the current cost of fixed assets net of accumulated depreciation was $2.2 billion. Depreciation expense as reported was $323 million; adjusted for constant dollar and current cost, it amounted to $361 million and $403 million, respectively.

As required by FAS 33, taxes on income have not been adjusted for the effect of inflation. As a result, the effective income tax rate for 1980 increases from 34% on a historical cost basis, to 37% on a constant dollar basis and 38% on a current cost basis.

The prescribed methods used to calculate the effects of changing prices are still experimental. Therefore, the Company suggests great caution be exercised in using these data to assess the effect of present or future inflation, or to make comparisons from company to company or industry to industry.

FIVE-YEAR COMPARISON OF SELECTED FINANCIAL DATA ADJUSTED FOR EFFECTS OF CHANGING PRICES

	YEAR ENDED DECEMBER 31,				
	1980	1979	1978	1977	1976
	(In average 1980 dollars, except as reported amounts; dollar amounts in millions except per share)				
Revenue					
—As reported	$ 5,137	$ 3,641	$ 2,684	$ 2,206	$ 1,840
—In constant dollars	5,137	4,134	3,390	3,000	2,663
Net income					
—As reported	994	658	502	401	293
—In constant dollars	895	653			
—In current costs	849	616			
Net income per share					
—As reported	5.21	3.45	2.63	2.08	1.52
—In constant dollars	4.69	3.43			
—In current costs	4.45	3.23			
Loss from decline in purchasing power of net monetary assets	21	41			
Excess of increase in constant dollar over current cost*	80	42			
Net assets at year end					
—As reported	3,218	2,400	1,900	1,550	1,280
—In constant dollars	3,405	2,873			
—In current costs	3,530	3,032			
Dividends declared per share					
—As reported	.94	.73	.56	.42	.27
—In constant dollars	.94	.83	.70	.57	.39
Market price per share at year end					
—As reported	117.00	62.50	42.11	32.33	28.55
—In constant dollars	111.75	67.09	51.22	42.88	40.43
Average consumer price index	246.8	217.4	195.4	181.5	170.5

*Increase in constant dollar value of inventories and fixed assets held during the year over increase in current cost value.

Net income for 1980, as adjusted for both the constant dollar and the current cost methods is, as expected, less than net income as reported using historical cost.

The restatement of revenue for the five years ended December 31, 1980 is intended to provide a comparison of revenue for each year on an equivalent purchasing power basis. This restatement should not be used to compute the real growth in the physical volume of products sold or services provided by the Company, since the Company's worldwide pricing decisions are not based on the CPI-U.

Consolidated Balance Sheet Assets

	DECEMBER 31,	
	1980	1979
	(Stated in thousands)	
CURRENT ASSETS:		
Cash	$ 18,445	$ 16,694
Short-term investments	1,217,448	1,006,959
Receivables less allowance for doubtful accounts (1980—$24,004; 1979—$23,373)	1,050,792	875,891
Inventories	589,882	488,357
Other current assets	55,147	44,920
	2,931,714	2,432,821
INVESTMENTS IN AFFILIATED COMPANIES	167,582	191,886
LONG-TERM INVESTMENTS AND RECEIVABLES	47,222	52,248
FIXED ASSETS less accumulated depreciation	1,758,592	1,334,920
EXCESS OF INVESTMENT OVER NET ASSETS OF SUBSIDIARIES PURCHASED less amortization	296,270	305,915
OTHER ASSETS	40,622	32,651
	$5,242,002	$4,350,441

SEE NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

SCHLUMBERGER LIMITED (SCHLUMBERGER N.V., INCORPORATED IN THE NETHERLANDS ANTILLES) AND SUBSIDIARY COMPANIES

Consolidated Balance Sheet Liabilities & Stockholders' Equity

	DECEMBER 31,	
	1980	1979
	(Stated in thousands)	
CURRENT LIABILITIES:		
Accounts payable and accrued liabilities	$ 730,666	$ 650,464
Estimated liability for taxes on income	642,940	491,528
Bank loans	193,488	123,183
Dividend payable	47,772	34,978
Long-term debt due within one year	68,092	66,681
	1,682,958	1,366,834
LONG-TERM DEBT	237,701	489,629
OTHER LIABILITIES	86,851	81,158
MINORITY INTEREST IN SUBSIDIARIES	16,091	12,493
	2,023,601	1,950,114
STOCKHOLDERS' EQUITY:		
Common stock	281,470	268,172
Income retained for use in the business	3,110,664	2,295,680
Deduct Treasury stock at cost	(173,733)	(163,525)
	3,218,401	2,400,327
	$5,242,002	$4,350,441

SEE NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Consolidated Statement of Income

	YEAR ENDED DECEMBER 31,		
	1980	1979	1978
		(Stated in thousands)	
REVENUE:			
Operating	$4,883,944	$3,549,647	$2,619,245
Interest and other income	153,333	91,791	64,697
Gain on sale of Rowan shares (before income taxes, $30,131)	99,838	—	—
	5,137,115	3,641,438	2,683,942
EXPENSES:			
Cost of goods sold and services	2,813,089	2,061,392	1,498,939
Research & engineering	188,152	131,334	90,519
Marketing	217,685	173,192	119,565
General	299,731	209,981	160,089
Interest	101,752	52,175	17,962
Taxes on income	522,359	354,968	294,895
	4,142,768	2,983,042	2,181,969
NET INCOME	$ 994,347	$ 658,396	$ 501,973
Net income per share*	$ 5.21	$ 3.45	$ 2.63
Average shares outstanding (thousands)*	190,764	190,676	191,223

*Adjusted for three-for-two stock split in September 1980

SEE NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

SCHLUMBERGER LIMITED (SCHLUMBERGER N.V., INCORPORATED IN THE NETHERLANDS ANTILLES) AND SUBSIDIARY COMPANIES

*Consolidated Statement of Stockholders' Equity**

	COMMON STOCK				INCOME RETAINED FOR USE IN THE BUSINESS
	IN TREASURY		ISSUED		
	SHARES	AMOUNT	SHARES	AMOUNT	
	(Dollar amounts in thousands)				
Balance, January 1, 1978	7,538,260	$ 77,765	199,407,336	$246,334	$1,381,316
Purchases for Treasury	1,597,050	54,900			
Sales to optionees			416,442	9,209	
Net income					501,973
Dividends declared ($0.56 per share)					(106,172)
Balance, December 31, 1978	9,135,310	132,665	199,823,778	255,543	1,777,117
Purchases for Treasury	609,450	30,860			
Sales to optionees			573,774	12,629	
Net income					658,396
Dividends declared ($0.73 per share)					(139,833)
Balance, December 31, 1979	9,744,760	163,525	200,397,552	268,172	2,295,680
Purchases for Treasury	136,800	10,208			
Sales to optionees			487,870	13,298	
Net income					994,347
Dividends declared ($0.94 per share)					(179,363)
Balance, December 31, 1980	9,881,560	$173,733	200,885,422	$281,470	$3,110,664

*Shares and per share amounts adjusted for three-for-two stock split in September 1980

SEE NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

SCHLUMBERGER LIMITED (SCHLUMBERGER N.V., INCORPORATED IN THE NETHERLANDS ANTILLES) AND SUBSIDIARY COMPANIES

Consolidated Statement of Changes in Financial Position

	YEAR ENDED DECEMBER 31,		
	1980	1979	1978
	(Stated in thousands)		
SOURCE OF WORKING CAPITAL:			
Net income	$ 994,347	$ 658,396	$ 501,973
Add (deduct) amounts not affecting working capital:			
Depreciation and amortization	335,313	250,197	186,972
Gain on sale of Rowan shares	(69,707)	—	—
Earnings of companies carried at equity less dividends received (1980—$11,249; 1979—$8,335; 1978—$7,167)	(46,897)	(30,147)	(20,693)
Other—net	(28,355)	(12,474)	(18,766)
Working capital provided from operations	1,184,701	865,972	649,486
Increase in long-term debt	49,605	425,029	44,149
Retirement and sale of fixed assets	24,157	37,148	13,080
Decrease in other long-term investments and receivables	9,265	—	—
Proceeds from sale of shares to optionees	13,298	12,629	9,209
Proceeds from sale of Rowan shares less related income taxes	136,669	—	—
Other—net	4,413	1,396	4,730
Total working capital provided	1,422,108	1,342,174	720,654
APPLICATION OF WORKING CAPITAL:			
Net noncurrent assets of Fairchild Camera and Instrument Corp. acquired and consolidated	—	407,747	—
Investment in Rowan	—	22,379	44,626
Increase in other long-term investments and receivables	—	15,066	7,334
Additions to fixed assets	748,235	503,415	393,312
Dividends declared	179,363	139,833	106,172
Reduction of long-term debt	301,533	66,985	15,061
Purchase of shares for Treasury	10,208	30,860	54,900
Total working capital applied	1,239,339	1,186,285	621,405
NET INCREASE IN WORKING CAPITAL	$ 182,769	$ 155,889	$ 99,249
INCREASE IN WORKING CAPITAL CONSISTS OF:			
Increase in current assets:			
Cash and short-term investments	$ 212,240	$ 239,414	$ 104,995
Receivables	174,901	249,460	129,899
Inventories	101,525	146,364	45,057
Other current assets	10,227	8,753	5,772
Increase in current liabilities:			
Accounts and dividend payable	(92,996)	(259,847)	(93,574)
Estimated liability for taxes on income	(151,412)	(154,560)	(53,065)
Bank loans and debt due within one year	(71,716)	(73,695)	(39,835)
NET INCREASE IN WORKING CAPITAL	$ 182,769	$ 155,889	$ 99,249

SEE NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Notes to Consolidated Financial Statements

SUMMARY OF ACCOUNTING POLICIES

The Consolidated Financial Statements of Schlumberger Limited have been prepared in accordance with accounting principles generally accepted in the United States. Within those principles, the Company's more important accounting policies are set forth below.

PRINCIPLES OF CONSOLIDATION
The Consolidated Financial Statements include the accounts of all significant majority-owned subsidiaries. Significant 20%-50% owned companies are carried in investments in affiliated companies on the equity method. The pro rata share of revenue and expense of Dowell Schlumberger, a 50% owned oilfield services company, is included in the individual captions in the Consolidated Statement of Income. Schlumberger's pro rata share of after tax earnings of other equity companies is included in interest and other income.

TRANSLATION OF NON-U.S. CURRENCIES
Balance sheet items recorded in currencies other than U.S. dollars are translated at current exchange rates except for inventories, fixed and intangible assets and long-term investments which are translated at historical rates. Revenue and expenses are translated at average exchange rates during the year except for those amounts related to balance sheet items translated at historical rates. Translation adjustments and gains or losses on forward exchange contracts are recognized in income currently.

SHORT-TERM INVESTMENTS
Short-term investments are stated at cost plus accrued interest, and comprised mainly U.S. dollar time deposits.

INVENTORIES
Inventories are stated principally at average or standard cost, which approximates average cost, or at market, if lower.

FIXED ASSETS AND DEPRECIATION
Fixed assets are stated at cost less accumulated depreciation, which is provided for by charges to income over the estimated useful lives of the assets by the straight-line method. Fixed assets include the cost of Company manufactured oilfield technical equipment for use in wireline operations. Expenditures for renewals, replacements and betterments are capitalized. Maintenance and repairs are charged to operating expenses as incurred. Upon sale or other disposition, the applicable amounts of asset cost and accumulated depreciation are removed from the accounts and the net amount, less proceeds from disposal, is charged or credited to income.

EXCESS OF INVESTMENT OVER NET ASSETS OF SUBSIDIARIES PURCHASED
Costs in excess of net assets of purchased subsidiaries having an indeterminate life are amortized on a straight-line basis over 40 years. Accumulated amortization was $25 million and $16 million at December 31, 1980 and 1979, respectively.

DEFERRED BENEFIT PLANS
The Company and its subsidiaries have several voluntary pension and other deferred benefit plans covering substantially all officers and employees, including those in countries other than the United States. These plans are substantially fully funded with trustees in respect to past and current services. Charges to expense are based upon costs computed by independent actuaries.

In France, the principal pensions are provided for by union agreements negotiated by all employers within an industry on a nationwide basis. Benefits when paid are not identified with particular employers, but are made from funds obtained

through concurrent compulsory contributions from all employers within each industry based on employee salaries. These plans are accounted for on the defined contribution basis and each year's contributions are charged currently to expense.

TAXES ON INCOME

Schlumberger and its affiliated companies compute income taxes payable in accordance with the tax rules and regulations of the many taxing authorities where the income is earned. The income tax rates imposed by these taxing authorities vary substantially. Taxable income may differ from pretax income for financial accounting purposes. To the extent that differences are due to revenue and expense items reported in one period for tax purposes and in another period for financial accounting purposes, appropriate provision for deferred income taxes is made. The provisions were not significant in 1980, 1979 or 1978.

Approximately $3.0 billion of consolidated income retained for use in the business at December 31, 1980 represents undistributed earnings of consolidated subsidiaries and Schlumberger's pro rata share of 20%-50% owned companies. It is the policy of the Company to reinvest substantially all such undistributed earnings and, accordingly, no provision is made for deferred income taxes on those earnings considered to be indefinitely reinvested.

Investment credits and other allowances provided by income tax laws of the United States and other countries are credited to current income tax expense on the flow-through method of accounting.

NET INCOME PER SHARE

Net income per share is computed by dividing net income by the average number of common shares outstanding during the year.

RESEARCH & ENGINEERING

All research & engineering expenditures are expensed as incurred, including costs relating to patents or rights which may result from such expenditures.

ACQUISITION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

In 1979 the Company acquired Fairchild Camera and Instrument Corporation at a cost of $425 million (including expenses). The acquisition was accounted for as a purchase and the accounts of Fairchild have been consolidated with those of Schlumberger since July 1, 1979. Cost in excess of the fair value of net assets acquired of $253 million is being amortized on a straight-line basis over 40 years.

The following pro forma consolidated amounts combine the historical accounts of Schlumberger and Fairchild for 1979 and 1978 and reflect all purchase accounting adjustments as though Fairchild had been acquired January 1, 1978.

	YEAR ENDED DECEMBER 31,	
	1979	1978
	(Stated in millions)	
Revenue	$3,956	$3,208
Net income	$ 666	$ 506
Net income per share (dollars)	$ 3.49	$ 2.65

FIXED ASSETS

A summary of fixed assets follows:

	DECEMBER 31,	
	1980	1979
	(Stated in millions)	
Land	$ 46	$ 37
Buildings & improvements	384	321
Machinery and equipment	2,439	1,843
Total cost	2,869	2,201
Less accumulated depreciation	1,110	866
	$1,759	$1,335

Estimated useful lives of buildings & improvements range from 8 to 50 years and of machinery and equipment from 2 to 15 years.

GAIN ON SALE OF ROWAN SHARES

During the fourth quarter of 1980, the

Company sold 4.8 million shares out of total holdings of approximately 5.5 million of Rowan common stock. The gain before income taxes amounted to $100 million. Income taxes amounting to $30 million are included in the taxes on income caption in the Consolidated Statement of Income. The Company's net income for the year and for the fourth quarter of 1980 was increased by $70 million as a result of the sale which had the effect of increasing earnings per share by $.36.

LONG-TERM DEBT

Long-term debt, excluding amounts due within one year, consisted of the following:

	DECEMBER 31, 1980	1979
	(Stated in millions)	
Bank loan due 1982-1985, interest 105% of U.S. prime rate	$200	$425
Other bank loans, interest 5.75%-13%	38	65
	$238	$490

Long-term debt at December 31, 1980 is payable principally in U.S. dollars and is due $62 million in 1982, $54 million in 1983, $59 million in 1984, $53 million in 1985 and $10 million thereafter.

LINES OF CREDIT

Effective January 1, 1981, the Company's principal U.S. subsidiary entered into a Revolving Credit Agreement with a group of banks, which provides that the subsidiary may borrow up to an additional $300 million until December 31, 1985 at prime or other money market based rates.

At December 31, 1980 the Company had unused short-term lines of credit of $225 million. There are no material compensating balances or significant conditions, such as commitment fees or other restrictions, in connection with short-term bank borrowings.

COMMON STOCK

Common Stock, par value $1.00 per share, comprised the following number of shares adjusted for the three-for-two stock split in September 1980:

	DECEMBER 31, 1980	1979
Authorized	300,000,000	300,000,000
Issued	200,885,422	200,397,552
In Treasury	(9,881,560)	(9,744,760)
Outstanding	191,003,862	190,652,792

Options to officers and key employees to purchase shares of the Company's Common Stock were granted at prices equal to 100% of fair market value at date of grant.

Options previously granted by Fairchild to its employees which were assumed by the Company were converted to options to purchase shares of the Company's Common Stock at prices not less than 50% of fair market value at date of assumption in accordance with the terms of the 1979 Stock Option Plan.

Transactions under stock option plans were as follows:

	NUMBER OF SHARES*	OPTION PRICE PER SHARE*
Outstanding Jan. 1, 1979	1,711,335	$18.77- 39.86
Granted	1,187,922	$28.63- 63.75
Exercised	(573,774)	$18.77- 36.89
Lapsed or terminated	(65,982)	$20.83- 44.86
Outstanding Dec. 31, 1979	2,259,501	$21.13- 63.75
Granted	339,292	$60.83-108.06
Exercised	(487,870)	$21.13- 63.75
Lapsed or terminated	(54,300)	$25.08- 85.58
Outstanding Dec. 31, 1980	2,056,623	$21.13-108.06
Exercisable at Dec. 31, 1980	700,322	$21.13- 63.75
Available for grant:		
Dec. 31, 1979	6,550,114	
Dec. 31, 1980	6,265,121	

*Adjusted for three-for-two stock split in September 1980

INCOME TAX EXPENSE

The Company is incorporated in the Netherlands Antilles where it is subject to an income tax rate of 3%. The Company and its subsidiaries operate in over 100 taxing jurisdictions with statutory rates ranging up to about 50%. Consolidated operating revenue of $4.9 billion in 1980 shown elsewhere in this report includes $2.0 billion derived from operations within the United States and Canada. On a worldwide basis, the Company provided income taxes at an effective rate of 34% in 1980, 35% in 1979 and 37% in 1978.

CONTINGENCY

During 1980, a floating hotel, the Alexander Kielland, functioning as a dormitory for offshore work crews in the North Sea, capsized in a storm. The substructure of the floating hotel had been originally built as a drilling rig by an independent shipyard from a design licensed by a subsidiary of the Company. The Company's subsidiary was not involved in the ownership or operation of the drilling rig or in its conversion or use as a floating hotel. The accident is being investigated by a Commission appointed by the Norwegian Government, which has not yet rendered its report.

While the Company does not believe it has liability in this matter, litigation may ensue which would involve complex international issues which could take several years to resolve and would involve substantial legal and other costs. In the opinion of the Company, any liability that might ensue would not be material in relation to its financial position or results of operations.

INVESTMENTS IN AFFILIATED COMPANIES

Investments in affiliated companies are principally 20%-50% owned companies.

At December 31, 1980 and 1979, equity in undistributed earnings of 20%-50% owned companies amounted to $150 million and $112 million, respectively.

LEASES AND LEASE COMMITMENTS

Total rental expense was $93 million in 1980, $68 million in 1979 and $52 million in 1978. Future minimum rental commitments under noncancelable leases for years ending December 31 are: 1981—$30 million; 1982—$24 million; 1983—$18 million; 1984—$12 million; and 1985—$9 million. For the ensuing three five-year periods, these commitments decrease from $31 million to $12 million. The minimum rentals over the remaining terms of the leases aggregate $20 million. Noncancelable rental commitments are principally for real estate and office space.

TAX ASSESSMENTS

As previously reported, the Company contested assessment of additional tax by the U.S. Internal Revenue Service with respect to its U.S. income tax returns for 1967-1969. The principal parts of the assessment arose from nonrecurring transfers of assets from a subsidiary to the parent company and from continuing wireline operations on the U.S. outer continental shelf. In 1980 these issues were settled with the U.S. Government. The settlement had a negligible effect on net income.

For years subsequent to 1969, including 1970 through 1975 where the Internal Revenue Service has completed its examinations, the Government has or is expected to propose additional assessments based upon income from continuing wireline operations on the U.S. outer continental shelf. The determination for the earlier years does not resolve the taxability of this income subsequent to 1969. Management is of the opinion that the reserve for estimated liability for taxes on income is adequate and that any adjustments which may ultimately be determined will not materially affect the financial position or results of operations.

PENSION AND DEFERRED BENEFIT PLANS

Expense for pension and deferred benefit plans was $79 million, $55 million and $39 million, and for compulsory contributions for French retirement benefits $26 million, $22 million and $17 million in 1980, 1979 and 1978, respectively.

Actuarial present value of accumulated benefits at January 1, 1980 and 1979 for U.S. and Canadian defined benefit plans was $124 million and $116 million, respectively, substantially all of which were vested. Net assets available for benefits at January 1, 1980 and 1979 for such plans were $175 million and $145 million, respectively.

The assumed rate of return used in determining the actuarial present value of accumulated plan benefits in both years was between 6% and 6.5%.

SUPPLEMENTARY INFORMATION

Operating revenue and related cost of goods sold and services comprised the following:

	YEAR ENDED DECEMBER 31,		
	1980	1979	1978
	(Stated in millions)		
Operating revenue:			
Sales	$2,128	$1,557	$1,004
Services	2,756	1,993	1,615
	$4,884	$3,550	$2,619
Direct operating costs:			
Goods sold	$1,393	$ 998	$ 636
Services	1,420	1,063	863
	$2,813	$2,061	$1,499

The caption "Interest and Other Income" includes interest income, principally from short-term investments, of $135 million, $82 million and $60 million for 1980, 1979 and 1978, respectively.

Accounts payable and accrued liabilities are summarized as follows:

	DECEMBER 31,	
	1980	1979
	(Stated in millions)	
Payroll, vacation and employee benefits	$205	$180
Trade	285	231
Other	241	239
	$731	$650

The Company's business comprises two segments: (1) Oilfield Services and (2) Measurement, Control & Components. The Oilfield Services segment offers well site services to the petroleum industry throughout the world. The Measurement, Control & Components segment manufactures measurement and control products and electronic components, which are sold to public utilities, government, laboratories and industrial plants primarily in the U.S. and Europe. Services and products are described in more detail earlier in this report.

SEGMENT INFORMATION

Financial information for the years ended December 31, 1980, 1979 and 1978 by industry segment and by geographic area is as follows:

(Stated in millions)

Industry Segment—1980	OILFIELD SERVICES	MEASUREMENT, CONTROL & COMPONENTS	ADJUST. AND ELIM.	CONSOLIDATED
Operating revenue—				
Customers	$2,814	$2,070	$ —	$4,884
Intersegment transfers	—	77	(77)	—
	$2,814	$2,147	$(77)	$4,884
Operating income	$1,184	$ 230	$(14)	$1,400
Interest expense				(102)
Interest and other income less other charges—$34				119
Gain on sale of Rowan shares				100
Income before taxes				$1,517
Depreciation expense	$ 256	$ 66	$ 1	$ 323
Fixed asset additions	$ 565	$ 178	$ 5	$ 748
At December 31—				
Identifiable assets	$2,173	$1,837	$(48)	$3,962
Corporate assets				1,280
Total assets				$5,242
Industry Segment—1979				
Operating revenue—				
Customers	$2,037	$1,513	$ —	$3,550
Intersegment transfers	1	59	(60)	—
	$2,038	$1,572	$(60)	$3,550
Operating income	$ 809	$ 189	$(14)	$ 984
Interest expense				(52)
Interest and other income less other charges—$11				81
Income before taxes				$1,013
Depreciation expense	$ 197	$ 43	$ 2	$ 242
Fixed asset additions	$ 405	$ 96	$ 2	$ 503
At December 31—				
Identifiable assets	$1,630	$1,624	$(31)	$3,223
Corporate assets				1,127
Total assets				$4,350
Industry Segment—1978				
Operating revenue—				
Customers	$1,636	$ 983	$ —	$2,619
Intersegment transfers	1	37	(38)	—
	$1,637	$1,020	$(38)	$2,619
Operating income	$ 648	$ 122	$ (6)	$ 764
Interest expense				(18)
Interest and other income less other charges—$14				51
Income before taxes				$ 797
Depreciation expense	$ 155	$ 27	$ 2	$ 184
Fixed asset additions	$ 340	$ 50	$ 3	$ 393
At December 31—				
Identifiable assets	$1,281	$ 814	$(12)	$2,083
Corporate assets				847
Total assets				$2,930

Transfers between segments and geographic areas are for the most part made at regular prices available to unaffiliated customers. Certain Oilfield Services segment fixed assets are manufactured within that segment and some are supplied by Measurement, Control & Components.

Corporate assets largely comprise short-term investments.

During the years ended December 31, 1980, 1979 and 1978, neither sales to any government nor sales to any single customer exceeded 10% of consolidated operating revenue.

Geographic Area–1980

(Stated in millions)

	U.S. AND CANADA	FRANCE	OTHER EUROPEAN COUNTRIES	OTHER	ADJUST. AND ELIM.	CONSOLIDATED
Operating revenue—						
Customers	$1,747	$745	$677	$1,715	$ —	$4,884
Interarea transfers	288	180	23	256	(747)	—
	$2,035	$925	$700	$1,971	$(747)	$4,884
Operating income	$ 486	$ 93	$177	$ 657	$ (13)	$1,400
Interest expense						(102)
Interest and other income less other charges—$34						119
Gain on sale of Rowan shares						100
Income before taxes						$1,517
At December 31—						
Identifiable assets	$1,563	$714	$401	$1,406	$(122)	$3,962
Corporate assets						1,280
Total assets						$5,242

Geographic Area–1979

Operating revenue—						
Customers	$1,206	$619	$469	$1,256	$ —	$3,550
Interarea transfers	149	131	7	94	(381)	—
	$1,355	$750	$476	$1,350	$(381)	$3,550
Operating income	$ 349	$ 82	$118	$ 448	$ (13)	$ 984
Interest expense						(52)
Interest and other income less other charges—$11						81
Income before taxes						$1,013
At December 31—						
Identifiable assets	$1,369	$633	$340	$1,023	$(142)	$3,223
Corporate assets						1,127
Total assets						$4,350

Geographic Area–1978

Operating revenue—						
Customers	$ 789	$497	$363	$ 970	$ —	$2,619
Interarea transfers	113	100	—	2	(215)	—
	$ 902	$597	$363	$ 972	$(215)	$2,619
Operating income	$ 263	$ 61	$ 88	$ 362	$ (10)	$ 764
Interest expense						(18)
Interest and other income less other charges—$14						51
Income before taxes						$ 797
At December 31—						
Identifiable assets	$ 635	$563	$262	$ 687	$ (64)	$2,083
Corporate assets						847
Total assets						$2,930

QUARTERLY RESULTS (UNAUDITED)

The following table summarizes results for each of the four quarters for years ended December 31, 1980, 1979 and 1978.

	OPERATING		NET INCOME	
	REVENUE	GROSS PROFIT*	AMOUNT	PER SHARE**
	(Stated in millions)			*(Dollars)*
Quarters—1980				
First	$1,130	$ 480	$191	$1.00
Second	1,206	514	234	1.23
Third	1,234	529	249	1.31
Fourth***	1,314	548	320	1.67
Total	$4,884	$2,071	$994	$5.21
Quarters—1979				
First	$ 735	$ 304	$128	$0.68
Second	782	338	161	0.84
Third	962	407	174	0.91
Fourth	1,071	440	195	1.02
Total	$3,550	$1,489	$658	$3.45
Quarters—1978				
First	$ 607	$ 262	$ 97	$0.51
Second	657	283	132	0.69
Third	652	283	136	0.71
Fourth	703	292	137	0.72
Total	$2,619	$1,120	$502	$2.63

*Operating revenue less cost of goods sold and services
**Adjusted for three-for-two stock split in September 1980
***Net income includes gain on the sale of Rowan shares of $70 million ($.36 per share)

Report of Independent Accountants

PRICE WATERHOUSE & CO.
153 EAST 53RD STREET
NEW YORK 10022

FEBRUARY 11, 1981

TO THE BOARD OF DIRECTORS AND STOCKHOLDERS OF SCHLUMBERGER LIMITED:

In our opinion, the accompanying consolidated balance sheet and the related consolidated statements of income, stockholders' equity and changes in financial position present fairly the financial position of Schlumberger Limited and its subsidiaries at December 31, 1980 and 1979, and the results of their operations and the changes in their financial position for each of the three years in the period ended December 31, 1980, in conformity with generally accepted accounting principles consistently applied. Our examinations of these statements were made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

Price Waterhouse & Co.

SCHLUMBERGER LIMITED (SCHLUMBERGER N.V., INCORPORATED IN THE NETHERLANDS ANTILLES) AND SUBSIDIARY COMPANIES

Five Year Summary

	YEAR ENDED DECEMBER 31,				
SUMMARY OF OPERATIONS	1980*	1979**	1978	1977	1976
	(Amounts in millions except per share amounts)				
Revenue:					
Oilfield Services	$ 2,814	$ 2,037	$ 1,636	$ 1,310	$ 1,005
Measurement, Control&Components	2,070	1,513	983	850	805
Interest and other income	153	91	65	46	30
Gain on sale of Rowan shares	100	—	—	—	—
	$ 5,137	$ 3,641	$ 2,684	$ 2,206	$ 1,840
% Increase over prior year	41%	36%	22%	20%	16%
Cost of goods sold and services	$ 2,813	$ 2,061	$ 1,499	$ 1,231	$ 1,071
Operating income:					
Oilfield Services	$ 1,184	$ 809	$ 648	$ 540	$ 383
Measurement, Control&Components	230	189	122	93	77
Eliminations	(14)	(14)	(6)	(1)	—
	$ 1,400	$ 984	$ 764	$ 632	$ 460
% Increase over prior year	42%	29%	21%	37%	27%
Interest expense	$ 102	$ 52	$ 18	$ 16	$ 15
Taxes on income	$ 522	$ 355	$ 295	$ 248	$ 168
Net income	$ 994	$ 658	$ 502	$ 401	$ 293
% Increase over prior year	51%	31%	25%	37%	34%
Per common share:					
Net income	$ 5.21	$ 3.45	$ 2.63	$ 2.08	$ 1.52
Cash dividends declared	$ 0.94	$ 0.73	$ 0.56	$ 0.42	$ 0.27
SUMMARY OF FINANCIAL DATA					
Net income as % of revenue	19%	18%	19%	18%	16%
Return on average stockholders' equity	36%	31%	29%	28%	25%
Fixed asset additions	$ 748	$ 503	$ 393	$ 212	$ 187
Depreciation expense	$ 323	$ 242	$ 184	$ 159	$ 130
Average number of shares outstanding	191	191	191	194	194
AT DECEMBER 31—					
Working capital	$ 1,249	$ 1,066	$ 910	$ 811	$ 650
Total assets	$ 5,242	$ 4,350	$ 2,930	$ 2,360	$ 1,970
Long-term debt	$ 238	$ 490	$ 85	$ 56	$ 72
Stockholders' equity	$ 3,218	$ 2,400	$ 1,900	$ 1,550	$ 1,280

*Net income includes $70 million after-tax gain ($0.36 per share) on sale of Rowan shares
**Results of Fairchild Camera and Instrument Corp. have been consolidated with Schlumberger beginning July 1, 1979

Directors

Jacques de Fouchier*
Former Chairman, Compagnie financière de Paris et des Pays-Bas, Paris

Roland Génin*□
Executive Vice President-Operations, Schlumberger

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George H. Jewell○
Partner, Baker & Botts, attorneys, Houston, Texas

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Managing Director
Lepercq International N.V., London

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Director, Schlumberger Museum, France

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Chairman and President, Schlumberger

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Jerome B. Wiesner*
Institute Professor, President Emeritus, Massachusetts Institute of Technology, Cambridge, Massachusetts

○ Member Audit Committee
* Member Executive Committee
□ Member Finance Committee

Officers

Jean Riboud
Chairman and President

Roland Génin
Executive Vice President-Operations

Michel Vaillaud
Executive Vice President-Operations

Arthur Lindenauer
Executive Vice President-Finance

Bernard Alpaerts
Executive Vice President

D. Euan Baird
Executive Vice President

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Assistant Secretary

Schlumberger Limited

OILFIELD SERVICES

WIRELINE SERVICES

Wireline Services: *measurements of physical properties of underground formations to help locate and define oil and gas reservoirs and assist in the completion, development and production phases of oil wells. Operations are conducted in 75 countries.*

Vector: *cables for well logging, oceanography and geophysical exploration.*

DRILLING & PRODUCTION SERVICES

Forex Neptune: *drilling services on land and offshore in the Eastern Hemisphere and South America.*

Flopetrol: *production services such as well testing and pressure measurements, production management and workover services.*

Johnston-Macco: *services and equipment for well completion, testing and workover.*

The Analysts: *wellsite computer analysis of drilling operations.*

Dowell Schlumberger *(50% owned): cementing, stimulation and directional drilling services.*

MEASUREMENT, CONTROL & COMPONENTS

MEASUREMENT & CONTROL–EUROPE

Enertec: *meters and load management equipment for electricity distribution, relays and transformers for electricity transmission, instruments and systems, broadcasting equipment.*

Flonic: *water meters and systems, gas meters and systems, heating equipment, mechanical products.*

Sereg: *industrial control equipment, petroleum, nuclear and industrial valves.*

Service: *products and services related to water and energy distribution.*

International: *electricity, water and gas meters and related systems manufactured in several countries of Europe and Latin America.*

United Kingdom: *electricity meters, aircraft and industrial instruments, electronic instruments, training systems, transducers and automatic test equipment.*

SANGAMO WESTON

Data Systems: *data acquisition and control systems and magnetic tape data recorders.*

Rixon: *modems and associated products for data communications.*

Energy Management: *watthour meters and equipment for electric power distribution systems.*

Capacitor: *capacitors for both electronic and electric power applications.*

Fairchild-Weston Systems: *optical and electro-optical data acquisition equipment and signal processing systems for aerospace and defense applications, and also controls for nuclear power systems.*

Instruments: *scientific and aerospace instruments, vehicle performance recorders and photoelectric devices.*

FAIRCHILD

Semiconductors-Analog & Components: *discrete components such as transistors and diodes, linear circuits such as operational amplifiers, and optoelectronic devices.*

Semiconductors-LSI Products: *integrated, large-scale integrated and very large scale integrated circuits such as microprocessors and memories using MOS, advanced bipolar and CMOS technologies.*

Automatic Test Equipment: *automatic test equipment for semiconductors, printed-circuit boards and subassemblies.*

MANUFACTURING DATA SYSTEMS INC.

MDSI: *computer assisted software services for numerically controlled machine tools, and other specialized computer services for manufacturing industries.*

Stock Transfer Agents
Citibank, N.A.
New York, New York

Bank of the Southwest
Houston, Texas

Registrars
Citibank, N.A.
New York, New York

Bank of the Southwest
Houston, Texas

Schlumberger stock is listed on the following exchanges:
New York (trading symbol: SLB)
Paris
London
Amsterdam
Geneva

Form 10-K
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