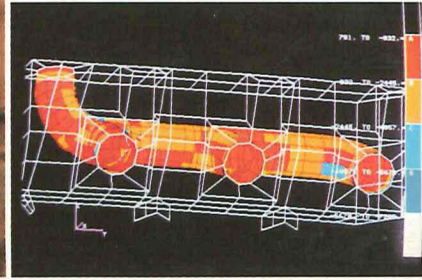
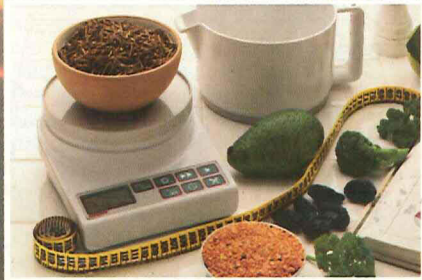
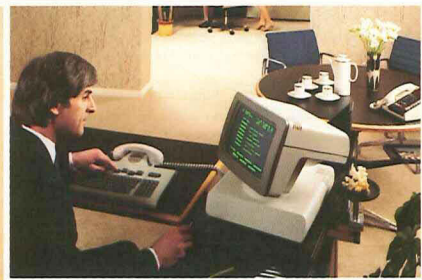


GEC · REVIEW · OF · OPERATIONS · 1984



HIGHLIGHTS

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HOW 1984 COMPARED WITH 1983	1984		1983	
	Sales £m	Profit £m	Sales £m	Profit £m
Electronic Systems and Components	1,578	200	1,409	158
Telecommunications and Business Systems	735	94	735	87
Automation and Control	448	53	425	48
Medical Equipment	435	24	412	16
Power Generation	623	52	680	70
Electrical Equipment	754	50	653	52
Consumer Products	279	24	264	20
Distribution and Trading	197	14	214	13
	<u>5,049</u>	<u>511</u>	<u>4,792</u>	<u>464</u>
Total Profits made before tax		<u><u>671</u></u>		<u><u>670</u></u>
<i>Average number of Employees</i>		<i>170,865</i>		<i>178,061</i>
<i>Their Employment Costs</i>	£	<i>1,584m</i>	£	<i>1,545m</i>
<i>Number of Shareholders</i>		<i>177,267</i>		<i>159,984</i>
<i>Cost of their Dividends</i>	£	<i>95 m</i>	£	<i>82 m</i>
<i>Dividend per Share</i>		<i>3.45p</i>		<i>3.00p</i>

CHAIRMAN'S STATEMENT

When Lord Carrington was appointed Chairman of the Company in February 1983, it was far from his thoughts, that he would be called upon to re-dedicate his life to public service. We wish him well in his new appointment as Secretary-General of NATO, and we know he will bring to the accomplishment of his task the same high quality of leadership, good humour and professional excellence as we have witnessed in the Company during his period of chairmanship.

It falls to me, as Deputy Chairman, to present this year's Chairman's Statement. It is a privilege to do this as I shall be retiring from the Board at the Annual General Meeting, having reached the age of 70 years. I became a director of The General Electric Company in 1957, and it is 20 years almost exactly since I began a four-year period as Chairman of the Company prior to the merger with English Electric. One indication of the growth of the Company in those twenty-seven years is the profit for the year ended 31st March, 1984, after tax and attributable to the shareholders, compared with that of the year ended 31st March 1957, the 1984 figure was £2,397,336, the 1957 figure was £389 million. How far we have come in providing fuller information to our shareholders is illustrated by the fact that in 1957 the Accounts did not even disclose the turnover of the Group, and I must add that not only shareholders but directors too, were short of important information in those days. But one thing has not changed over the years, and that is the preoccupation of the Company

to serve its customers, at home or overseas, whether individuals, corporate bodies or governments.

It is about twenty years ago that the Company's management developed the pattern of behaviour and attitude which has led to the remarkable success of GEC. In the first decade there was a dramatic improvement in efficiency, reduction in costs and increasing research and development - all this in a period of full employment when we are told these things can not easily be achieved in the nation as a whole. And in the second decade, amidst fast technological change and one economic crisis after another, the Company added further to the strength of its base, as well as to its sales overseas and at home. I know of no opportunity for sound investment which has been missed, but many proposals have been examined and discarded for sound reasons.

During this time the Company has been directed from a small headquarters building at 1 Stanhope Gate. There is no large central staff and no elaborate institutional structure. Responsibility has been placed on the managing directors of the operational units, following the financial and management disciplines now well known. There is no intention to change that formula.

With the advancement in technology, the composition of our workforce has changed. More automation, more use of microprocessors, and the micro-miniaturisation of many of our products, mean that fewer and fewer people are needed for a unit of production. But the

people we do need increasingly are those with higher skills; the demand for electronic engineers and technologists, software specialists and computer programmers is unabated. We do much to train our own, but the supply of young people with the right basic educational requirements and with the right inclination for these types of work, is as yet insufficient to meet the demand. At a time of high unemployment, it is difficult to understand why the educational system is apparently unable to satisfy the demand when and where it is required. I hope universities as well as schools will find ways of correcting this. Too many graduates emerge from the universities ill-equipped to fill available vacancies and become disillusioned because the jobs to which they aspire do not exist.

Lord Nelson of Stafford, in his 1982 Chairman's Statement, expressed concern for the problems raised by the high level of unemployment; to quote his words: "improved productivity and the exploitation of new technology will bring about far reaching changes in the patterns of education, training, work and leisure". He went on to say that "we cannot expect to see again what used to be called 'full employment'. The maintenance of stability in the community requires a steady change in attitudes and the evolution of new social patterns. To think out how to control this process is surely a subject on which the efforts, ingenuity and brains of our national and political institutions should be concentrated".

I agree; and it is to be hoped that we shall find a way to a kind of full employment.

There is plenty of room in the world for a British manufacturing industry much larger than today, and plenty of demand at home for its products, many of which are now being imported. GEC has proven that relatively small companies can grow into large ones in twenty years, even during a period of intense world competition in our products. It will help us all if other manufacturing companies do the same, for Britain cannot look for its future prosperity to the service and financial sectors to replace the wealth created by its manufacturers.

What is clear, however, is that the demand for labour is concentrated on highly productive skills. It is, indeed, the two countries in the world whose productivity is highest, the United States and Japan, which have been able to retain something like full employment. In Britain it has been the high productivity industries, such as electronics, where levels of employment have remained high.


In GEC we believe we contribute to national employment in three ways. As a highly productive company with healthily increasing profits we have maintained a good level of employment. As exporters, making extensive use of subcontractors, we bring work to Britain. As manufacturers of the most advanced electronic and electrical equipment, we help raise productivity - and that in turn helps to inspire the competitiveness of British industry. The rise in British productivity in recent years is the solid ground for hope about the future of employment in Britain.

I have been very glad to see the good response to the Share Option Schemes we introduced in 1983 and under which further options were granted in February this year. We intend, with shareholders' permission, to improve the Savings-Related Share Option Scheme, and to introduce a new Option Scheme for GEC Managers, as made possible by the enactment of the Chancellor's 1984 Budget proposals.

We are also recommending to shareholders that the Company be granted authority to purchase its own shares, which can be of benefit to them.

These are detailed, but potentially important changes which will, I am sure, help the Company in the future.

I have emphasised the importance to GEC of highly skilled and well motivated people. Over the years we have to say goodbye to many such people. There is one this year, Sir Robert Telford, to whom I want to pay a special tribute. He is leaving after working for 47 years in the Marconi Company, which when he joined was still operating under its original name of Marconi's Wireless Telegraph Company and was a constituent part of Cable and Wireless. His contribution to the Company's success and to British electronics will never be forgotten, as he leaves to make way for younger people.



Lord Aldington

ELECTRONIC SYSTEMS AND COMPONENTS

PERFORMANCE

	1984	1983
Turnover	£1,578m	£1,409m
including Exports from UK	£ 411m	£ 359m
Profits	£ 200m	£ 158m
Order Book at year end	£2,458m	£2,395m

Space and Defence Systems, the Canadian and Italian Marconi companies, Instruments, Electronic Devices and the Valve Companies showed the most substantial advances in turnover, and, with Avionics and Underwater Systems, contributed most to the higher profits.

Marconi Avionics Ltd. had a satisfactory year. Sales were similar to last year and orders in hand some 10 per cent higher. Exports continue at about 50 per cent of sales and the export order book is growing slightly faster than the home order book. The development programme for the new wide-angle head-up display for the General Dynamics F16 C/D aircraft has been completed, and large-scale deliveries will start in mid-1984. The holographic head-up

display developed for US Air Force night attack systems is successfully undergoing flight trials as part of the LANTIRN system programme. Thermal imaging equipment is now in full scale production and is attracting considerable worldwide attention and orders. The standard air data computer, developed under contract to the US Air Force and Navy, has completed its trial programmes and has been formally accepted as ready for production.

Production of a wide variety of products for the Tornado aircraft continues satisfactorily, as does the supply of advanced data processing equipment for passive sonar for ships and aircraft. Considerable importance is attached to exploiting spin-off from military technology; one example is the supply of radars for the measurement of bunker content for the National Coal Board; another is a pattern recognition equipment for automatic inspection for the Ford Motor Company. Continued progress is being made in the North Sea oil recovery business, where there is a contract to develop a new generation of unmanned undersea inspection vehicles; there are also contracts for the development of high reliability control gear for deep undersea oil wells.

Marconi Avionics Inc.'s sales were similar to last year. The year-end order book is down, but several substantial export orders are awaited which will enable expansion to continue. New premises are under construction.

Marconi Space and Defence Systems Ltd. again expanded its operations, and sales were up 20 per cent on the previous year. Sales of radar guided seekers for Skyflash, Sea Dart and Sea Skua missiles reached an all time high, and deliveries commenced of the new Sea Eagle missile seekers. Deliveries of Skyshadow, the world's most advanced jamming pod, reached the full predicted rate. Several advanced satellite-to-ground

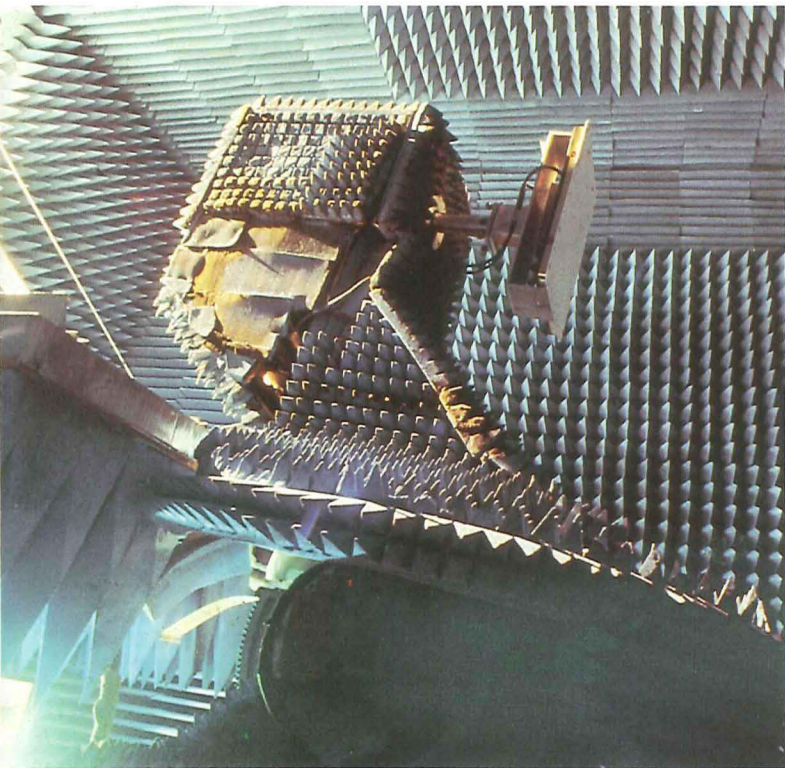
terminals were delivered, particularly a tactical anchor terminal for the UK military Satcoms Network, and an upgraded version of the highly successful naval Satcom terminal, SCOT. A third MARECS maritime communications payload has been delivered and will be launched later this year to provide a service for International Maritime Satellite Organisation (INMARSAT), to whom a major prime bid has been delivered to supply replacement maritime communication satellites. The main work of the year in the space field has been the completion of the design and the start-up of the manufacture of the engineering models of the Skynet 4 and L-Sat communication payloads. Work has continued in the definition of the active microwave instrument (which includes synthetic aperture radar) of the European Remote Sensing Satellite No. 1 (ERS 1). A useful order has been won to design and manufacture sub-systems on four continental Meteosat weather satellites. The order book is still growing, and with the recently announced order for Zeus jamming equipment for Harrier aircraft, now stands at over £650 million. Other important orders for electronic warfare equipment included the Hermes surveillance system for the Indian Sea King helicopters. The award of the ALARM missile contract against keen US competition was a noteworthy achievement for the well-established guided weapons seeker business. A Queen's

Award for Export Achievement has been received for the growing export sales of Rapier tracking radars, and artillery and tank fire control equipment.

A separate company, United Satellites Ltd, was formed with British Aerospace and British Telecom International, to provide through the Unisat series of satellites, a television broadcasting service for the BBC and a transatlantic and European communication service for British Telecom. Work on the satellites was suspended in March as a consequence of a decision of the BBC not to proceed on the originally agreed basis, but will probably resume if new arrangements can be settled.

In the current financial year, four new management companies have been formed, Marconi Defence Systems Ltd., Marconi Space Systems Ltd., Marconi Secure Radio Systems Ltd., and Marconi Command and Control Systems Ltd. This is a reflection of the opportunities for further expansion in the product fields concerned, particularly in export markets, and will provide an additional impetus for new developments.

Marconi Underwater Systems Ltd. has, during only the second year of its existence as a separate company, strengthened and built on its main product base of the Sting Ray, Tigerfish and Spearfish torpedoes. Sting Ray was delivered on time to the Royal Navy and Royal Air Force in September 1983 and is successfully undergoing Fleet acceptance trials; negotiations for the main production order



An antenna being tested in an anechoic chamber at Canadian Marconi. The antenna is for an airborne radar Doppler navigational system. Of great accuracy, the system has been supplied to 40 countries and is fitted to over 100 different types of aircraft.

are at an advanced stage. Spearfish is ahead of programme, and development vehicles have been successfully fired on trials. The project management and engineering expertise gained during the development of these torpedoes is being extended to mines, counter-measures and underwater vehicles, and will be enhanced by the addition of the Defence Division of GEC-McMichael and the Naval Division of Marconi Space and Defence Systems. The product base is thus widened to include sonars. The potential for exports is high; the first orders for both Tigerfish and Sting Ray have

already been received and there are other very encouraging prospects.

Marconi Radar Systems Ltd. continued its recovery following cancellation two years earlier of naval orders. A contract was received for development of Sea Wolf missile systems for the Type 23 frigates together with orders for 14 more Sea Wolf radars for the Type 22 ships.

This brings the total value of orders for the new lightweight Sea Wolf system to more than £100 million. A new vessel traffic system has been developed for harbour approach control; the prototype is under trial at Harwich. The first Martello 3D radar for the Royal Air Force has been completed. Orders were received for the supply of the new Marconi Merlin airfield surveillance radar for Newcastle (already in operation), Amman and Bombay airports; a military version of this radar has also been developed. The new Messenger range of monopulse secondary radars has been introduced, together with two new lightweight military gap-filler radars. Development was completed of the Astrid radar display system and the first order received for the Royal Naval air station in Yeovilton. A new lightweight 400 Series radar, capable of both surveillance and tracking, is now under development together with an associated anti-aircraft turret system. Orders worth more than £4 million were received for the newly-established satellite antenna operations.

Marconi Communication Systems Ltd.'s sales were higher than last year with British Telecom, Cable and Wireless and Mercury as major customers. The digital data network activity is gathering pace with export successes in Australia and New Zealand and further prospects in the coming year. Small satellite ground stations were delivered to British Telecom and to Mercury in

London, and a containerised ground terminal was installed in the Falkland Islands.

Marconi Instruments Ltd.'s continuing success was reflected in its results. Orders received increased almost 40 per cent, with the greatest growth in automatic test equipment. During the year the assets of Quest CAE were purchased to provide a new business in computer-aided engineering, and to complement the interests of existing commercial automatic test equipment products. There is now a broad-based capability for an integrated systems technology and for further development of the "Factory of the Future" concept. The commitment to enhanced development programmes was demonstrated by the introduction of several major new products, including a digital functional test system, a range of microwave power meters, and the Master Driver railway train simulator. Export activities remain healthy, as new markets are penetrated and new sales operations are established worldwide. Over 400 jobs were created in the UK during the year and, with stronger sales and engineering teams, another year of rapid growth is to be expected. The performance of the overseas units was very encouraging, especially in France, where orders received increased more than 50 per cent.

Easams Ltd.'s substantial involvement in the Tornado programme has been maintained and is expected to

continue at the same level during the current financial year. Activities in the fields of operational analysis, mathematical modelling and system studies have shown a steady growth. Business in the new field of command and control has been vigorously pursued and prospects are reasonably bright, mainly for export. Substantial interest continues to be shown in EAMACS (Easams Architecture for Management and Control Systems) which is designed to manipulate and display different types of data in both civil and military command systems. The provision of software adaptors, for use with automatic test equipment, are meeting a growing demand. The results suffered adversely as a consequence of the mutually agreed termination of a project undertaken in 1981 for the British Gas Corporation which was found to be unfeasible.

McMichael Ltd.'s sales of military and professional electronic equipment continued at a steady rate, but elsewhere the company has undergone a year of reorganisation and reconstruction. The work in sonar systems for the Ministry of Defence has been transferred into Marconi Underwater Systems Ltd. and Mobile Radio has been transferred into Marconi Communication Systems Ltd. Electronic equipment for professional users, particularly for broadcasters, has been combined with the Studio Equipment Division of Marconi Communication Systems Ltd. Heavy costs were involved in

these areas, as a result of which a substantial deficit was incurred for the year.

The Marconi International Marine Company Ltd. had another difficult trading year but, although world shipping continues in recession, there were positive signs during the latter part of the year of an upturn in sea trade, a view endorsed by the General Council of British Shipping. The industry has changed radically in recent years in terms of fleet size, disposition, and the methods and centres of operation.

Canadian Marconi Company's sales increased by approximately 30 per cent over the previous year. Incoming orders also rose to a record level, with virtually all the new business coming from non-Canadian markets. The strongest performances were achieved in the two largest product groups, defence communications equipment and airborne systems for commercial and military use. Sun World Circuits Inc. of Florida, acquired in 1982, a manufacturer of double-sized printed circuit boards, showed the first signs of progress. Research and development expenditure was again stepped up and exceeded 10 per cent of sales value.

Marconi Italiana SpA's orders in the year, of which 30 per cent were for export, were 17 per cent lower than for the previous year, which was exceptionally influenced by a very large Middle East contract for military radio stations. There was an

order from the Malaysian Telecommunications Authorities for the new pulse code modulation telephone multiplex equipment, and orders received in the Italian market were satisfactory both in the military and in the civil field. The prospects for the current year are good.

Cincinnati Electronics Corporation, USA, did not secure for its Communications Division the production contract for the US Army "Frequency Hopping Radio" known as Singgars, although the company's radio was declared acceptable by the US Army evaluation team. The final competition with ITT for the initial production contract marked the end of six years of development effort, which had started with five competitors. Since failing to win this contract, the Communications Division has launched five new products which are expected to result in substantial sales in future years to the Department of Defense and in international markets. The Aerospace Division is well positioned technically to continue the growth it achieved during the year. The Systems Division completed development and installation of an electronics warfare simulator for the US Navy; new products include a fire control system and aircraft tail warning receivers.

Norsk Marconi A/S, Norway, had a difficult year due to lack of orders in the offshore oil sector, only partially offset by improvements in the instrument landing system business.

Reorganisation is taking place to improve viability.

Marconi Electronic Devices Ltd.'s business grew rapidly, with sales and orders over 40 per cent higher than a year earlier. Substantial investments were made in development and capital equipment to meet the rapidly growing demand for specialised electronic components, particularly for the telecommunications and defence industries. Greater penetration of export markets was achieved, and for power devices, orders from overseas customers offset the low level of demand in the UK.

Circuit Technology Inc., USA, increased its order book during the year and has enlarged its facilities. The custom hybrid and 1553 multiplex data bus system businesses are expanding at a brisk rate and growth is expected in the integrated circuit design centre and power hybrid market.

English Electric Valve Company Ltd. had a record year with orders increasing by 44 per cent and sales by 23 per cent. It obtained its largest-ever single order, worth £9 million, for state-of-the-art third generation image intensifiers; production facilities are being expanded at the Chelmsford factory. Two Queen's Awards for Technological Achievement were won, one for linac magnetrons manufactured at Lincoln which are used to treat an estimated 12 million patients a year, and the other for hydrogen thyratrons which are

made at Chelmsford and sold mainly to the USA. Other major achievements in the year included doubling liquid crystal display orders, high efficiency broadband VHF TV klystron sales to the USA, 49 per cent increase in variable vacuum capacitor orders for broadcast transmitters, and sales to Japan of new civil marine radar magnetrons. The current year will see the completion of the first large screen video display.

The M-O Valve Company Ltd.'s sales and orders were higher than expected, particularly for surge protection devices, but accompanied by a sharp drop in demand for reed relays for telephone exchanges and receiving valves. Research and development activity is being notably increased, backed with investment in new plant, technical computing, renovation of facilities and marketing support. A new product range, integrated circuit packaging, is being introduced and will become a major activity.

EEV Inc., USA, had a good year with higher sales, and orders up 32 per cent. This was mainly due to first sales of tropospheric scatter klystrons to the US Air Force, microwave integrated circuits for weather radar applications and digital X-Ray Leddicons for medical use.

EEV Canada Ltd. increased its sales by 21 per cent due to greater market share in Leddicon television camera pick-up tubes, sales of integrated microwave packages, linac magnetrons for medical

applications, and power triodes for the steel industry.

Salford Electrical Instruments Ltd. had a good year in its successful Quartz Crystal and Electronics Divisions following the streamlining of its product range and manufacturing facilities. Two new high volume products were successfully launched during the year; an in-car aerial using the rear window heating element was selected by Fords for its "Orion" mid-range car; and a personal radiation dosimeter for use by the Armed Forces.

Salplex Ltd. maintained progress with the development of a multiplex wiring system for motor vehicles. Favourable results in performance and reliability from an ongoing field test programme are arousing increasing interest from UK and overseas manufacturers. The incorporation of the system into a production car is likely to be announced in the coming year.

GEC Australia Ltd. The Digital, Defence and Telecommunications Division, now re-named "Marconi Division", has taken over a new design and manufacturing facility at Silverwater in Sydney, following its appointment as prime supplier to the Australian Telecommunications Commission of digital data network equipment. The Division also received its first important order for defence equipment and has won contracts for the first Australian-designed train describer and for a telemetry system for the New South Wales State Rail authority.

TELECOMMUNICATIONS AND BUSINESS SYSTEMS

PERFORMANCE

	1984	1983
Turnover	£735m	£735m
including Exports		
from UK	£ 41m	£ 41m
Profits	£ 94m	£ 87m
Order Book at		
year end	£510m	£518m

Lower turnover of the Telephone Switching Group and Reliance Systems was compensated by higher sales of the Transmission Group, Telephone Division and Videojet Systems. Better profitability of the Transmission Group, Telephone Division and a turn-round in the results of A. B. Dick more than compensated for the reduced profits of the Telephone Switching Group.

GEC Telecommunications Ltd.'s Transmission Group maintained its growth during the year, based on British Telecom's conversion of the national network to digital operation. Substantial orders were also received from British Rail and Mercury Communications Ltd. Microwave Division introduced

the high capacity, bandwidth-efficient, 4 GHz radio system that forms a key element in BT's future network plan. Continued large orders for pulse code modulation equipment enabled Multiplex and Cable Systems Division to increase sales and optical fibre systems are now being sold in increasing quantity

to BT, Mercury, British Rail and others. Terminal Division's sales of data modems increased satisfactorily.

Telephone Switching Group had a transitional year; production of the modern digital systems, System X and UXD5, has been rising whilst production of the older electromechanical and reed relay systems reduced. This pattern will continue at an accelerated rate during the current year to meet the recently enhanced BT

programme for the introduction of System X into the UK network. Telephone Switching Group, in collaboration with Plessey, was successful in winning the contract to supply 83,000 lines of System X to the City Council of Kingston-upon-Hull, until recently the only independent public telephone operator in the UK. Installation of the first export System X exchange for St. Vincent commenced in August 1983, and of the first UXD5 digital rural exchanges in the Solomon Islands in February 1984.

GEC Telecommunications' Defence Systems Division is prime contractor for Project UNITER which is expected to become the principal strategic communications system for the Armed Forces.

The very substantial investment made over the last few years in product development and advanced manufacturing facilities, has provided GEC Telecommunications with the capability and capacity for volume production of a range of advanced digital switching and

Reliance Systems' new executive workstation Datacom. Built to enable managers to handle voice, data and text in one compact package, it also provides fast access to many information sources. Offering a wealth of facilities, Datacom has been designed in conjunction with GEC's new SLX private telephone exchange. These are two new products introduced by Reliance Systems of Wellingborough to meet the demands of the modern office.



transmission products. The establishment of GEC Telecoms International is giving the Company steadily increasing opportunities to sell these products overseas.

AEI Telecommunications (Canada) Ltd. increased sales and margins, although neither are yet at satisfactory levels. Winnipeg-made products were sharply reduced in volume due to continuing low activity in Canada's telephone switching sector and slow market acceptance of a major new product in the USA.

GEC Information Systems Ltd.'s sales increased by nearly 20 per cent but increasing competitive pressures and high spend on new product development adversely affected margins.

Telephone Division achieved record levels of activity and high order intake. The designs for its range of electronic key-systems and telephones have proved to be very competitive in the UK, and attention is now being directed towards raising export sales, particularly in the Middle East and the Far East. In the expectation of keener competition at home and overseas, the Division is engaged on programmes of cost reduction, at the same time increasing the tempo of development of a wide range of new electronic products with advanced facilities.

Private Systems Division achieved higher sales of the CDSS-1 PABX and is currently the largest supplier to the UK market. The "Lyric", evolved

from CDSS-1, offers voice and data switching capabilities and has potential for sales in North America, Europe and the Far East. The introduction of the large PABX known as the SLX, the successor to the SL-1, has been very successful and market share in 1984 is expected to double.

Reliance Systems Ltd is meeting pressures from the changes in the market place for telecommunications equipment, which impose difficulties but also create opportunities. The successful launch of the Keylink small telephone system and the increased sale of large SL-1 PABX's complete with line wiring, telephones and maintenance, are examples of a new drive to take advantage of these opportunities. So too are other new products, such as the recently introduced Roomcall 500, an advanced microprocessor-driven hotel communication system, and the development of the UK's smallest digital PABX. In the current year, Reliance will launch a sophisticated office communications system based mainly on products developed in co-operation with other GEC units, including SLX, and Datacom, the first truly integrated executive workstation, so that a comprehensive range of office automation products will be offered.

GEC Computers Ltd. Substantially higher expenditure on new product development more than eliminated total gross margins earned on only modestly increased sales. Orders received, however,

increased by more than 50 per cent due to the receipt of an initial production order for project Wavell, first orders for the GEC Series 63, and further large overseas Prestel orders in Malaysia and Austria. The 4100 series continues to do well and further hardware and software developments for these machines are progressing. The strong position in computer-based communications is now extending to the ability to provide complete networks and services. Success in winning the continuing British Telecom Prestel business in the UK will enhance the potential in the growing international Viewdata market. Production of the Series 63 machine will commence in the current year and is expected to make a progressive contribution to results.

Telephone Cables Ltd. Orders received and in hand declined but a large share of the UK market was won for optical fibre cables. Optical fibre cable systems have also been sold in collaboration with GEC Telecommunications Ltd. in Australia, New Zealand, Nigeria and Tunisia. Including other types of cables, overall sales were about the same as for last year, but margins were down in the struggle to maintain factory load. The surplus of capacity relative to the level of demand adds urgency to the drive to reduce costs and improve factory efficiency. But for optical fibre cables, more manufacturing capacity was installed, and is being further increased to meet longer term potential.

GEC Optical Fibres benefited from increased sales of monomode fibre which has now displaced all other types for telecommunication trunk routes. Production capacity was doubled in the year. Further plant is being commissioned and manufacturing methods are being constantly improved so that output capacity will shortly reach 50,000 Km a year.

A. B. Dick Company, the US producer of office equipment, is now in a much healthier condition than a year ago. Extensive organisational changes have been made, facilities streamlined, and operating costs reduced. Concentration on up-to-date improved designs of offset printing machines, the mainstay of the business, led to an increase in sales and margins. Old models of word processor equipment were phased out during the year, and a new range of factored microcomputers is being introduced, the "Knowledge Worker" series, a state-of-the-art shared-resource system which utilises the most popular operating formats and can be programmed in a variety of languages. There has also been brought to the market 'M-Path', a unique software product which makes its machine exceptionally user-friendly in the office environment. A new small offset printing machine, and an improved version of the only updatable microfiche machine offer further extensions to the product range. With the business now earning positive margins and a new impetus in its operations, a more optimistic

view can be taken of its prospects.

Videojet Systems International continued its impressive growth record in automated identification and coding systems and graphics. A new standard in industrial coders was established with the Videojet III coder, a microprocessor-controlled ink jet machine capable of print rates of 1,375 characters per second on virtually any surface. With substantially enhanced features, the VIP system, an advanced online ink jet printer, achieved higher sales to the high volume publishing and catalogue printing houses. Accelerated growth is expected as product date coding legislation becomes effective in more countries.

Scriptomatic Inc.'s business was badly affected by reduced margins because of rapid changes in technology from cardsort systems to microcomputers. A write-down of obsolete inventories, the sale of the Brazilian subsidiary and reorganisation of the Canadian operation also contributed adversely to a very poor performance.

Parnall & Sons Ltd. made good progress and achieved better results. Substantial contracts were obtained for Terminal 4 of Heathrow Airport, and refurbishment work for British Home Stores. New products were introduced in the Tansad office furniture range, and more are planned.

AUTOMATION AND CONTROL

PERFORMANCE

	1984	1983
Turnover including Exports from UK	£448m	£425m
Profits	£ 53m	£ 48m
Order Book at year end	£316m	£257m

Electrical Projects and Industrial Controls substantially increased their sales, but in Australia there was a lower rate of contract completions. Several businesses contributed to higher profits with the most marked advance by W. & T. Avery.

GEC Electrical Projects Ltd. made sound progress with orders and sales well ahead of last year. The high level of exports was maintained. Major contracts secured in the home market included the total electrical and automation packages for the modernisation of the hot strip mill at British Steel Corporation, Port Talbot, the hot strip mill automation system for BSC Llanwern, and the automation of the five-stand cold mill at BSC Port Talbot. Marine Division secured a major

order for the system design and supply of electrical propulsion equipment for the proposed Type 23 Frigates for the Ministry of Defence. Mining Division obtained an order for a large mine winder drive system for the Anglo American Vaal Reefs Mine. Airport Division signed a major contract in Sri Lanka to up-grade Katunayake Airport, Colombo; this Division, in conjunction with Manchester International Airport, developed a new system for automatic taxiway routing and aircraft

docking based on the GEM80 microprocessor-based control system. The first contract was secured from the Cairo Wastewater Authority for the modernisation of the Cairo sewage system, covering complete mechanical and electrical systems for the Ameria pumping station.

The Factory Automation Systems Technology (FAST) Division made further progress with new projects, particularly for the food and tobacco industries, considerably expanding its activity in production engineering consultancy and flexible manufacturing systems, in particular on the major

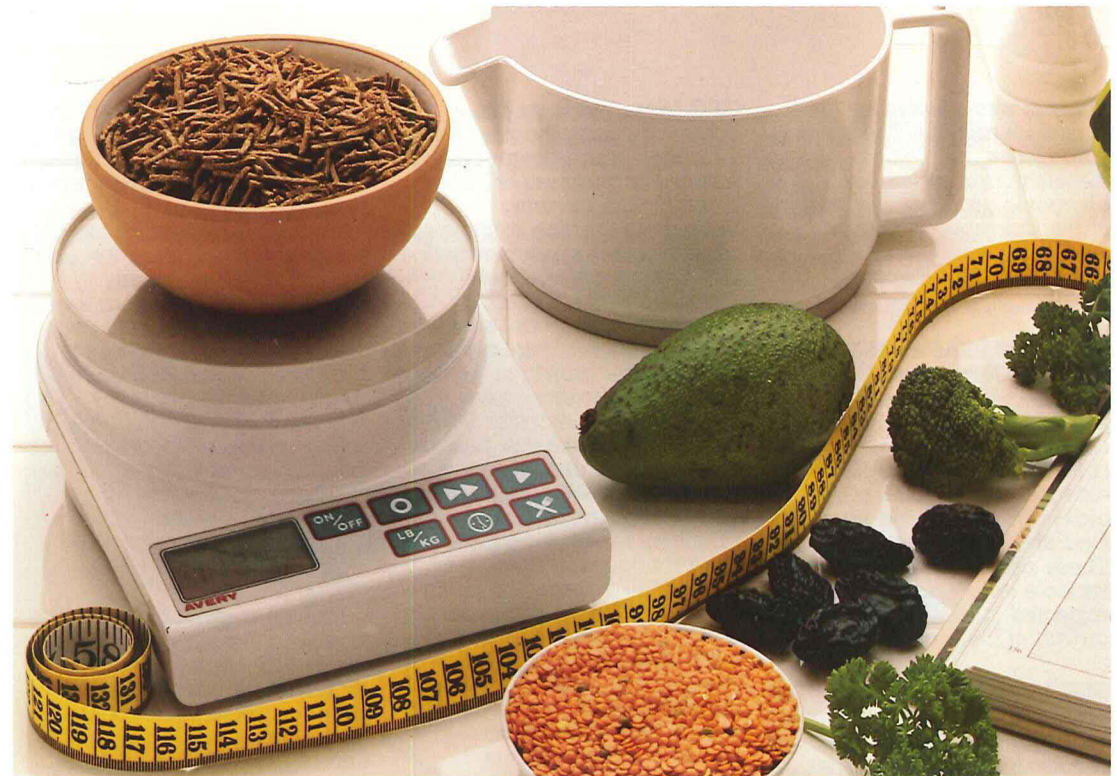
automated factory at Kidsgrove for the manufacture of electronic products.

GEC Robot Systems Ltd. completed the development of a new range of advanced welding systems, the launch of which generated a high level of interest.

GEC Industrial Controls Ltd. maintained expansion of sales and orders, which both increased by 20 per cent, although sales of electronic products grew at a faster rate. Besides the range of ac and dc variable speed drives, this was due mainly to the GEM80 microprocessor-based control system, which now has a major

A new electronic kitchen scale from W & T Avery of Birmingham brings the sophistication of microchip technology into everyone's kitchen. At the touch of a button, the scale can display the calorie, carbohydrate, fat and fibre content of over 1000 foods. Slimmers, athletes, diabetics, invalids or anyone else, only needs to place the food in a weigh jug, key in the appropriate code and the nutritional values are instantly displayed.

share of the UK market and is selling well overseas after its introduction in the USA. Heysham II and Castle Peak power stations accounted for a major part of the sales of motor control gear, with a wide range of these products to offer, business was obtained from customers outside the more traditional market areas in which



AUTOMATION AND CONTROL

demand was affected by lower capital investment. The phased introduction of a flexible manufacturing system for electronic products was started at the Kidsgrove factory, in association with the FAST Division of GEC Electrical Projects.

Electric Machinery Industrial Controls Corporation, USA.

Results improved over the previous year. The launch of the GEM80 microprocessor-based control systems in the US extended the product range; orders were obtained from the food and automotive industries. These products, together with a variable speed drives, are expected to ensure further growth of the business.

GEC Mechanical Handling Ltd.

again improved its order intake, sales and margins. An order was received to supply Mobil Exploration Norway Inc. with a system for the emergency evacuation of personnel from oil platforms to a specially equipped rescue ship. This unique system has advantages over more conventional rescue by helicopter, particularly in very bad weather conditions. Important orders were won from Manchester Airport for advanced automated baggage handling systems. Manufacture began of telescopic passenger loading bridges for airports, six of which were exported to Douala in Cameroon. Order prospects are good, particularly in automation and process plants.

GEC Measurements Ltd.

acquired during the year the Leicester-based power system automation business of Fisher Controls Ltd. covering telemetry, turbine controls and nuclear safety systems, which complement the Stafford Division's power system protection and control activities. This extension of total capacity will facilitate growth in the automated power systems business. The Leicester Division commissioned the first phases of an automated distribution system for the North West Electricity Board, and several large enquiries for similar supervisory control and distribution automation systems are being processed for UK and overseas electricity, water, oil and gas authorities. The performance of the Stafford Division was poor compared to the previous year; export sales were down because some overseas customers were unable to obtain foreign currency, but greater damage resulted from the loss of production early in March through industrial disruption in the factory.

GEC Meters Ltd., formerly the Meter Division of GEC Measurements, improved its performance through persistent efforts towards cost reduction, improved productivity, and a highly motivated workforce, supported by a continuing capital investment programme. Several electronic "energy management" products were introduced, and the first orders were secured for two new technically advanced electronic metering devices. The

electronic manufacturing facilities have been extended preparatory to the introduction of high volume manufacture of a radio controlled load management system for the UK electricity supply industry. Of the increased spend on technical development in the current financial year, 70 per cent will be devoted to microprocessor-based energy management systems.

GEC Moulded Plastics achieved improved results following organisational changes and continuing capital investment to broaden and advance manufacturing technology.

Satchwell Control Systems Ltd.

improved returns quite substantially on sales only slightly higher than the previous year as a result of better cost control and the phasing out of unprofitable lines of business. Marketing expenditure is planned to increase in the current year to take advantage of the potential of the new Building Automation System 700 and new microprocessor-based energy controllers.

Satchwell Sunvic Ltd. had a poor year due to industrial relations problems, rising production costs and declining product prices. A programme to rectify this situation and to speed up the introduction of new products is being implemented following senior management changes. It is intended to transfer the business to a modern factory in Uddington.



Over the next few years, GEC is progressively installing its first total flexible manufacturing system at GEC Industrial Controls' factory at Kidsgrove, Staffordshire. Costing about £7.5 million, the system will integrate the design, assembly and testing of printed circuit boards. Shown here is the test area containing automated test equipment for functional testing and a Marconi Instruments' type 80X in-circuit tester.

W. & T. Avery Ltd. continued to make satisfactory progress. Orders and sales were higher than in the previous year, despite lower unit selling prices and reduced demand from some traditional export markets. New product introductions continued at a rate of two per month to maintain market leadership in established business sectors and to broaden the trading base. Integrated data capture and

management systems are now being supplied to a growing number of customers in the retail and industrial sectors. The new "Independent" electronic retail scale, designed specifically for small retailers, was successfully launched in the UK and is being introduced in overseas markets. The introduction of "Weighlink", a micro computer-based management system to automate weighbridge operations and provide a materials management system, was well received; so was a new range of advanced bar code label printers. The new health/kitchen scale introduced in March, 1984 and described on page 9, employs novel technology which is capable of extension to other



operations. Sales in the previous year benefited from abnormally high sales of factored products to the UK food industry, and so it was not surprising that the sales volume was down. But orders received were up.

Avery-Hardoll Ltd. achieved orders and sales in line with the previous year, in spite of a reduction in Nigerian orders due to shortage of foreign exchange. Sales were higher in the home market, particularly for the Mk V self-service petrol dispensing system. The heavy investment made during the past two years in the design of new products and improved production facilities is expected to show benefits in the current year.

Pump Maintenance Ltd. continued the trend to improvement in spite of the declining number of petrol stations in the UK. Opportunities will arise from the change from traditional mechanical equipment to more complex electronic self-service pumps and the growth of associated point-of-sales and garage management systems.

Avery Australia Ltd. had a poor year due to lower demand for mechanical weighing equipment and consequently under-utilised capacity. Costs have been reduced and new retail and industrial products brought in from W. & T. Avery; performance in the current year should improve.

Avery New Zealand Ltd. achieved results substantially better than for the previous year following the introduction of new products from W. & T. Avery.

South African Scale Company Ltd. had a reasonable year but the out-turn was slightly down due to the continued recession and the drought which depressed the agriculture sector. Order intake for new W. & T. Avery products is encouraging.

GEC Traffic Automation Ltd. increased its turnover, despite continuing pressure on margins

A replenishment-at-sea system supplied by GEC Mechanical Handling of Erith, Kent. The picture shows stores being transferred from ship to ship.

in home traffic signal maintenance. Several overseas contracts for major traffic management projects have been delayed, but with orders in the home market at a higher level than expected and more new products on the way, further growth should be attainable.

GEC Marine and Industrial Gear Ltd.'s results were maintained at last year's level. Exports accounted for over one third of the business in difficult trading conditions. The planned entry into the traction gear market is intended to open up longer term opportunities for expansion.

GEC Australia Ltd.'s Automation and Control Division had a good year with record results. But there were fewer contract completions and falling demand in some sectors of the Projects Division. The recession also required a scaling down of the activity of the Industrial Products Division.

The English Electric Company of India Ltd.'s Relays and Control Panels Division increased its sales but the forward order book reduced. New products, such as static distance protection equipment, are being brought forward and work is progressing to introduce the microprocessor-based PERM system and railway signalling relays.

GEC Composants SA, France. Results were static in a depressed market, and margins narrowed on sales of imported fluid control and thermal control equipment.



new products planned for the ensuing months now that Avery has entered the market for home kitchen products.

Avery-Denison Ltd. achieved better results through new products and measures taken in the previous year to improve manufacturing efficiency. Capability in a range of liquid filling machines to complement existing equipment was acquired from Neumo Ltd., and development was completed of five new testing machines and a new microprocessor-based belt weigher. Order intake for the new products is encouraging.

Driver Southall Ltd. completed the consolidation into a modern factory at Tamebridge, Walsall, of its previously dispersed

MEDICAL EQUIPMENT

PERFORMANCE

	1984	1983
Turnover	£435m	£412m
Profits	£ 24m	£ 16m
Order Book at year end	£140m	£140m

Picker International Inc. develops, manufactures, sells and services a wide range of medical diagnostic equipment, and factors many health care products. It has manufacturing facilities in the USA, Canada, West Germany and the UK.

The Systems Division offers a full spectrum of medical X-ray equipment. About one-fifth of sales is accounted for by radiography, radiography/fluoroscopy and vascular products and a similar proportion comprised fourth-generation computer tomography (CT) scanners. A growing sector is in magnetic resonance imaging (MRI) machines. About ten per cent of sales came from nuclear imaging equipment, some with on-board computing capabilities and incorporating principles of emission computed tomography, and from ultrasound equipment.

Other items in the Picker range include X-ray tubes, monitors, cardiology and patient monitoring products.

The Health Care Products Division contributed a quarter of total sales covering such items as disposable supplies, X-ray film and chemistry products for hospitals and clinics. The Film Systems Service Group works with hospitals, clinics and physicians to meet their daily film processing requirements.

Picker's Service Division, which accounted for some fifteen per cent of sales, provides a full service capability in respect of Picker's entire



product range.

Expanding sales of manufactured equipment, especially CT scanners, enabled trading margins to improve during the year. Orders for CT scanners and conventional X-ray equipment were at a record high level, including the largest single medical equipment order ever placed for 24 CT scanners by the US military. There are now twenty Picker MRI scanners operating around the world and these include the first production cryogenic MRI units made in the UK for the British Health Service and the USA, Japan and Germany.

At the Radiological Society of North America's annual meeting, Picker introduced ORACLE™, a system concept for storing, organising, sorting, transmitting and retrieving diagnostic imaging data recorded in digital form.

Development work in the magnetic resonance and ultrasound fields will bring more new products, including a digital system for the diagnosis of vascular disease.

A magnetic resonance medical imaging system made by Picker International. The system produces pictures of the body from measurements of magnetic resonance excited by radio-frequency signals. Picker scientists have led the way in development of this advanced technology, pioneered in British universities and hospitals.

POWER GENERATION

PERFORMANCE

	1984	1983
Turnover	£ 623m	£ 680m
including Exports from UK	£ 359m	£ 433m
Profits	£ 52m	£ 70m
Order Book at year end	£1,468m	£1,620m

Export sales of gas turbines and Ruston Diesels were down. Profits were adversely affected by provisions and costs amounting to £15m relating to the reorganisation of the activities of large gas turbines, and the reduction of the workforce of turbine generators. Ruston, Paxman and Dorman Diesels increased their trading profits but Ruston Gas Turbines could not maintain the record level of the previous year and Large Gas Turbines recorded a loss. The outstanding order book declined because turbine generators did not secure any major power station contract in the period.



GEC Turbine Generators Ltd.'s sales, of which 70 per cent were for export, were the highest ever recorded. At home, machines were commissioned at Littlebrook, Hartlepool and Heysham; overseas, units were commissioned in Korea, Hong Kong and South Africa. In the USA, the two 1200 MW units for San Onofre nuclear station, the largest sets ever made in Britain, reached full power and have performed very successfully. In Hong Kong, the third unit at Castle Peak "A" station was commissioned several months ahead of programme, and the station will be completed with the installation of the fourth unit before the end of 1984. Construction of the Castle Peak "B" station is also proceeding

ahead of programme. The Duhva power station of the Electricity Supply Commission of South Africa was completed seven months ahead of programme when the sixth unit entered service in February 1984. Installation of the first two machines at the Tutuka power station, the second of three stations for the Commission, is now proceeding. The world's economic difficulties reduced the export market opportunities and order intake was consequently well down on the previous year, but opportunities are being pursued in China and India.

Ruston Gas Turbines Ltd. Sales were lower than in the previous year, which included the

'CAREFUL' is one of four Ministry of Defence tractor tugs powered by two six-cylinder Ruston RK engines each developing 1320 horsepower at 900 revolutions per minute. A further five similar tugs are currently on order.

Siberian gas pipelines contracts. Product development is directed towards broadening the horsepower range and improving fuel efficiency in order to make the most of a reduced total market. Work on new products led to the winning in 1983 of the important MacRobert Award for innovation, and to the first multiple orders for the new 8500 hp Tornado gas turbine — four for the Arabian Gulf, three for the USA and two for Holland. In the absence of very large projects, orders were obtained

POWER GENERATION

for many smaller ones, including 16 more gas turbines for the North Sea and 14 for combined heat and power duty. With orders from Spain, Ras al Khaima and Thailand, Ruston gas turbines have now been sold to 48 countries overseas.

Ruston Gas Turbines Inc. was also affected by the reduction in demand, but the impact on the results was lessened by higher productivity. Orders improved in the second half and included further units for Alaska and major combined heat and power plants for California and the Midwest.

Napier Turbochargers Ltd. continued to make progress, acquiring new export accounts despite the generally depressed diesel engine market. Recently introduced high performance models are gaining acceptance by the world's leading engine designers for application with the new generation of fuel efficient engines.

GEC Gas Turbines Ltd. faced greatly reduced demand for larger gas turbines. Orders for future delivery worth £26 million were taken for seven 32000 hp generating sets and compressor drives for a major North Sea platform, but orders for delivery in the year were low; the results were very unsatisfactory, and remedial measures have been taken. A new company, GEC-Ruston Gas Turbines Ltd, was formed to integrate the sales and engineering functions with those of Ruston Gas Turbines; manufacture will later be concentrated at Lincoln. An agreement has been entered

into with Rolls-Royce Ltd. for the formation of GEC Rolls-Royce (Power Generation) Ltd. to specialise in the gas turbine power generation market above 10 MW. These changes, and other action to improve efficiency, speed up product development and re-energise marketing, are designed to re-establish a successful business in large gas turbines.

GEC Energy Systems Ltd. continues to be heavily involved in the completion of the Hartlepool and Heysham advance gas cooled reactor (AGR) stations currently being brought into service. Combined with work in hand for the new AGR's at Heysham "B" and Torness, this means that a substantial part of the total activity is still being devoted to this type of main station contract. Other areas of business are being developed which include improvements to operating nuclear stations, hydro power, wind generation and combined heat and power capability.

Ruston Diesels Ltd. reported improved results despite lower sales than the previous year. Order intake improved; demand in the UK was strong for small ship propulsion engines for tugs, minesweepers, maintenance and salvage vessels, and there was a contract for 10 engines for Twin Unit Tractor tugs for the Ministry of Defence. Export marine orders were also up, but industrial and traction opportunities declined, affected by investment restrictions in such territories as Saudi Arabia and Nigeria. However, the overall order book improved,

and further new engine orders are expected for the Falklands Airport Project. Ruston Diesels received the Queen's Award for Export Achievement in recognition of its exports of diesel engines to over 50 countries.

Paxman Diesels Ltd. achieved better results for the year with a major increase in order intake. The Royal Navy took delivery of the first engines for replacement Type 22 frigates. A contract was secured for 32 engines to be used for propulsion and electrical power generation in the new series Type 23 frigates.

Dorman Diesels Ltd., following several lean years, enjoyed much better results. The 6 SE engine range was successfully launched, and further new models will be added during the coming year. Sales of engine kits boosted export sales. The improved performance of the business is expected to be maintained.

Kelvin Diesels Ltd.'s business continued to be adversely affected by the general decline in construction and re-engining of fishing vessels. Further measures of reorganisation have been taken to improve the viability of the business. Prospects improved slightly in the last quarter when some traditional export markets showed signs of revival as international funds became available.

GEC Diesels Australia Ltd. was unable to maintain the sales volume of the past two years, but new engines now available



from Dorman and Baudouin have started to make an impact on the market and the outlook is better.

GEC Diesels Inc., Canada, despite a depressed market, achieved higher sales and increased its order book. Orders included a number of Ruston engined diesel generator sets for replacement engines in the Canadian Government icebreaker "NORMAN McLEOD ROGERS", additional generating units for Arnok Mines in Northern Saskatchewan and for a coal terminal in Indonesia. Dorman spark ignition gas engines are in increasing

Maintaining competitiveness means constant investment in modern equipment in GEC's factories. Picture shows the heavy machine shop at GEC Turbine Generators, Trafford Park, Manchester.

demand for gas and oil field applications.

Société des Moteurs Baudouin SA, France. Results were affected by the continued depressed state of the market for marine engines, but a joint product development programme with Dorman Diesels and diversification into military and industrial applications led to substantially improved order intake during the last quarter.

ELECTRICAL EQUIPMENT

PERFORMANCE

	1984	1983
Turnover	£754m	£653m
including Exports from UK	£239m	£169m
Profits	£ 50m	£ 52m
Order Book at year end	£720m	£819m

Most of the units increased their turnover. High Voltage Switchgear, Transmission and Distribution Projects, and Power Transformers advanced at a higher rate, as did Traction and Transportation Projects in respect of their content of the Korea Seoul Metro contract. Profits were affected by a high incidence of reorganisation costs, particularly associated with Traction which also showed reduced trading profits.

GEC High Voltage Switchgear Ltd. won important export orders for 145 kV gas-insulated switchgear including four substations for Saudi Arabia and a turnkey substation contract for Oman. Deliveries commenced on the major 420 kV GIS feeder

substation for the CEBG's Sellindge cross channel link, and contracts completed included switchyards at Drax and Dinorwic power stations. Developments included a new 36 kV SF6 outdoor circuit breaker; further improvements

in the product range will be introduced during the current year.

GEC Distribution Switchgear Ltd. Because of low level of commitment for delivery in the first nine months, output for the year fell. But the extension of the range of both indoor and outdoor vacuum switchgear up to 36 kV brought in more orders than in the previous year, with a high export content.

GEC Transmission and Distribution Projects Ltd. combined for the first year a number of previously separately conducted activities. Orders were received for power supply equipment for ac and dc traction schemes in the USA, South America, Europe and in the UK. The "Transidrive" vehicle mounted inverter successfully completed six months pre-commercial service in Vancouver; this equipment will also be supplied for transit systems in Toronto and Detroit and is installed on the Maglev vehicles at Birmingham Airport. Orders were obtained for rectifier/converter applications and for substations in Central Africa and the Far East; for static compensator equipment in Australia, Singapore and Zimbabwe, for saturated reactors for a transmission line in Tanzania, and for a steelworks in Mexico. Manufacture of the major items of equipment for the 2000 MW high voltage dc scheme linking the national grid systems of the UK and France proceeded satisfactorily.

GEC Installation Equipment Ltd. experienced a year of integration and consolidation of

the two Liverpool businesses of GEC Fusegear and GEC Distribution Equipment; a capital project spread over two years to modernise and reduce the size of the Liverpool site is nearing completion. Performance and market prospects have been enhanced by the introduction of new and improved products.

Observation lifts which travel on the outsides or within the atriums of buildings are becoming popular in Britain. For the owners, they allow more floor space, while often providing passengers with spectacular views. This lift is one of a group installed by Express Lifts of Northampton in Lloyd's Chambers, Goodman's Yard, London.



ELECTRICAL EQUIPMENT

Vynckier NV of Belgium maintained sales volume. Exports to European countries improved, and the German, Dutch and French subsidiaries maintained their positions in their respective markets. Increased export orders were achieved for moulded case circuit breakers and earth leakage circuit breakers. A range of enclosures was successfully introduced in the USA, and a new development of floor-standing enclosures was well received at the Hanover Fair.

GEC Power Transformers Ltd. continued to improve. Orders were received from the CEBG for two unit transformers for the Heysham power station, two 400 kV 240 MVA transmission transformers, and a 400 kV transformer and saturating reactor for installation at Ninfield associated with the cross channel link. Overseas orders were booked for transformers and reactors for installation in Mexico, Tanzania and Brazil.

GEC Distribution Transformers Ltd. did better than a year earlier, with order intake being kept up despite depressed markets at home and abroad. The largest converter transformers to be produced at Broadstairs were manufactured for the Sicartsa steel works in Mexico.

The General Electric Company of India Ltd. suffered from the severe recessionary conditions which prevailed throughout the year. The transformer activity was particularly affected by the

greatly reduced level of ordering by the State Electricity Boards, and so was Motors Division which suffered a two months strike at one of the Calcutta factories. The order input for the new range of vacuum circuit breakers was encouraging and other new products to gain customer acceptance included higher capacity induction melting furnaces, dc breakers and air pollution control equipment.

The English Electric Company of India Ltd.'s Fusegear Division held its share of a reduced market, but the introduction of additional capacity put pressure on margins. The new, indigenously developed moulded case circuit breaker was well received and plans exist to widen the product range further.

GEC Australia Ltd.'s Heavy Engineering Division had a good year, but electricity consumption declined and so did the requirement for transformers and high voltage switchgear. The volume of forward orders is quite good but margins are down. Machines Division, has been amalgamated with Industrial Products Division in view of the declining activity.

AEI Cables Ltd.'s results were influenced by reduced margins arising from the surplus of capacity against demand, both in the UK and export markets. The effect was felt particularly in the first half, but reduced operating costs made trading results somewhat more favourable towards the end of



the year. Further orders for submarine power cable were won, and production of the range of materials used in cable making was increased during the year; sales were made to cablemakers in Korea, Indonesia and South America and in Europe. Demand for wires and cables for use in telephone exchanges reduced sharply as a result of the changes in technology, but demand is holding up for high frequency coaxial cables and for cables containing optical fibre.

GEC-Henley Ltd. increased

home and export sales in spite of the low level of demand from some major customers in the Middle East and Nigeria. A continuing programme of product development is being combined with improvements in manufacturing efficiency.

Kent Electric Wire Ltd. and F. D. Sims Ltd. Results improved due to greater efficiency in production and distribution: further improvement is expected.

Rodco Ltd. had a satisfactory first full year of production.

GEC Transportation Projects was responsible for the project management and system engineering for the Maglev (magnetically levitated) people mover at Birmingham, opened in May 1984 by Her Majesty The Queen. This, the world's first revenue earning Maglev project, operates between the new Birmingham International Airport and the National Exhibition Centre.

Vactite Ltd.'s better results were derived from increased sales made possible by the further development of high performance wires and cable.

GEC Traction Ltd.'s margins were lower in spite of increased sales over previous years with

an export content of 84 per cent. Major deliveries included complete 1500 volt chopper controlled propulsion units for the 134 train set contract for the Korea Seoul Metro, and similar equipments for the Dublin suburban stock. Order intake was drastically reduced in the year due to low demand at home and the smaller number of available railway projects worldwide. Although it was necessary to make a major reduction in manufacturing capacity, including the closure of the Sheffield Works, new capital investments at the factories at Preston and Manchester will enable a quick response to be made to any upturn in railway business. Engineering development is also being increased, utilising recently commissioned laboratories and test beds. New technologies are likely to feature in traction propulsion units in the second half of the decade, including ac drives, microprocessor controls and the use of gate turn off devices.

GEC Transportation Projects Ltd. achieved sales of almost £100 million, all for export. The major areas of activity were ongoing transit systems for Melbourne, Dublin, Seoul and Recife, main freight line electrification in Brazil, and the successful conclusion of the main line electrification project in Zimbabwe. A new project was secured in Turkey for main line traction equipment. Orders in hand remain at a satisfactory level and sales in the current financial year are expected to be maintained. Tendering

activity included projects still to be awarded for India and London's Docklands. A major role has been played with British Rail and other UK suppliers in developing the technically advanced Maglev system at the new Birmingham International Airport, and the experience gained from this installation will assist in winning new orders.

GEC-General Signal Ltd.'s results were down compared with the previous year. At home, a major British Rail order was received for resignalling the line between Paisley and Ayr, and export contracts came from Brazil and Bangladesh. Since the year-end, an important contract has been concluded with Hyundai (Korea) worth approximately £20 million, for the signalling and telecommunications systems of the main railway line linking Kirkut with Haditha in Iraq. The major resignalling contract at Victoria is now complete. Development projects include the solid state signalling pilot scheme at Leamington Spa and part of the Maglev transit system at Birmingham Airport.

GEC Large Machines Ltd. obtained a reasonable level of orders, but did not achieve satisfactory operating results. Benefits are expected from development work directed towards product improvement and more competitive practices.

GEC Small Machines Ltd. Increased demand and higher manufacturing efficiency led to better operating results. More cost effective designs are

continuing to be developed to meet market requirements.

The Express Lift Company Ltd. maintained the upward trend of recent years despite a declining home market. A major development saw the successful introduction of "Microglyde" high speed drive systems into the Post Office Tower and the Sedgwick building in London. Overseas, notable orders included 55 lifts for the Shun Tak Macau ferry terminal in Hong Kong, and major projects in the Finance and Trade Centre in Karachi, the Australia and New Zealand Bank in Auckland, the Public Works Department in Dhaka, and the Sheikha Mariam Building in Abu Dhabi. A new components distribution business, Lift Components Ltd, was established to supply lift spares and other parts.

Woods of Colchester Ltd. produced somewhat better results in spite of the continued slow recovery in the civil engineering and construction industries. Growth was achieved largely from new products, including air handling systems and roof units. "Varofoil" pitch-in-motion fans continued to do well. Exports were maintained at nearly half of total turnover with several substantial orders obtained by overseas subsidiaries; there are prospects of increased business in the USA.

Keith Blackman Ltd. had an unsatisfactory year and a complete change of management had to be made. The headquarters of the unit was

transferred from Rugby to Colchester to strengthen ties with Woods and to widen the opportunities for recovery and growth.

GEC Engineering (Accrington) Ltd. obtained more work for the nuclear, space and defence industries to make up for a reduced input from aerospace sources. A notable achievement was the delivery of 70 ft fuel buffer storage tubes to the CEGB's Heysham power station. Manufacture has commenced of the new GEC "Nightstor 100" electric central heating boiler. This appliance has good sales potential as an alternative to domestic oil fired boilers, over which it shows a substantial saving in running costs.

GEC Claudgen Ltd.'s turnover increased over the previous year but margins were substantially reduced due primarily to the loss of two major long-term contracts and to more difficult market conditions. Major new signs were supplied to Piccadilly Circus and other prime sites and the range of heating products was expanded.

The Micanite & Insulators Company Ltd. suffered due to the depressed demand for high voltage insulation products and to the high costs associated with a product rationalisation programme. Sales of the biodegradable "Midel" low flammability dielectric fluids increased, with export orders being obtained in the USA, Singapore, Hong Kong and South Africa. Development has continued on new mica products for electrical and heat insulation

applications.

GEC Reinforced Plastics Ltd. had another successful year with increased turnover, to which a major contribution came from the supply of the structures and components for the hvdc cross channel link.

A. G. Hackney & Company Ltd. increased sales again and maintained margins, despite severe pressure of imports into the home market and greater competition in export markets. A new range of ceramic products for door furniture was introduced.

GEC Foundries Ltd.'s results showed a marked improvement on the previous year with increased sales and a substantial improvement in margins achieved against a background of over-capacity in Europe and severe price cutting.

L. H. Marthinusen (Pvt) Ltd., Zimbabwe. Results withstood the impact of recession as the business in heavy electrical equipment repair work is little affected by the foreign exchange crisis. Steps have been taken to improve productivity.

GEC (New Zealand) Ltd.'s Industrial Machines & Controls, Power & Electronics and Switchgear Divisions did not escape the effects of a sluggish economy, but the results were sustained by the introduction of new products and sales, especially in the Switchgear and Industrial Machines Divisions, for large energy saving projects.

CONSUMER PRODUCTS

PERFORMANCE

	1984	1983
Turnover	£279m	£264m
including Exports from UK	£ 24m	£ 19m
Profits	£ 24m	£ 20m

Hotpoint, GEC-Xpelair and Osram made the greatest contributions to higher sales and trading profits.

Hotpoint Ltd. increased both its sales and margins in buoyant market conditions. Its market share rose in automatic washing machines with the "New Generation" range manufactured at the new plant in North Wales. Sales of refrigerators also increased, and at the end of the year the launch of a freezer/fridge combination proved very successful. Major new investment was made in computer-aided design equipment.

GEC (Radio & Television) Ltd. increased its sales of colour TV, particularly 14 in and 16 in tube sizes, but was unable to make a profit. Its operations were badly affected by the unsatisfactory and now discontinued joint venture with Hitachi.

GEC-Xpelair Ltd. had another successful year with increased

sales, especially in export markets which showed a 20 per cent increase. Improved margins reflected continuing investment in new products introduced during the year, including toilet/bathroom ventilators, condensation control units (specifically introduced to combat serious condensation in local authority dwellings), and a new range of cooker hoods.

Cannon Industries Ltd. made lower sales due primarily to technical delays on the introduction of a range of freestanding gas cookers based on a new method of construction.

Redring Electric Ltd. achieved better margins but lower sales, although sales of components to



appliance manufacturers improved. More new products are in course of introduction.

Hotpoint's new freezer/fridge, designed for the family needing more freezer than fridge space in one unit. It is a best seller.

Osram (GEC) Ltd. continued its recovery. Streetlighting sales were higher, mostly as a result of large overseas contracts. Exports of lamps showed an improvement in volume and margin, and measures are being taken to maintain international competitiveness.

A new concept in domestic cooking is the Cannon gas/microwave cooker. It has a combined gas/microwave oven, a "grilling" facility and a four-burner hotplate for cooking. The aim is to add the speed and convenience of microwave cooking to the excellent baking and browning properties of gas. Gas and microwave can be used independently or in combination. An 8lb turkey can be completely cooked without turning or basting in 56 minutes. The normal time by conventional methods is three hours.

DISTRIBUTION AND TRADING

PERFORMANCE

	1984	1983
Turnover	£197m	£214m
Profits	£ 14m	£ 13m

Changes in exchange rates and a lower rate of contract completions in Hong Kong accounted for the fall in turnover.

The English Electric Corporation, USA, has been considerably strengthened to enable it to pursue business opportunities more effectively and across a broader spectrum of GEC activities. Notable orders were obtained from the urban transit authorities.

GEC Australia Ltd.'s Lighting and Wholesale Division's costs have been tightly controlled during the period of a sales recession and margins improved. Trading was adversely affected by the worst drought in living memory. Some recovery in home building has been noted.

GEC New Zealand Ltd.'s Wholesale and Consumer Product Division had a difficult year and has been obliged to embark on restructuring its organisation.

The General Electric Company of Bangladesh Ltd. recorded

better results. The successful development and introduction of a range of single phase motors and vertical hollow shaft motors helped the Chittagong factory to achieve record output. Machinery for a new fan manufacturing unit is being installed to strengthen its strong market position.

GEC Canada Ltd. commissioned a manufacturing facility to supply power conditioning units to Metro-Canada Ltd, and its record results were supported by expansion in motors, fusegear and protection relays.

The General Electric Company of Hong Kong Ltd. was affected adversely by dull markets reflecting investors' nervousness over the future of Hong Kong.

The General Electric Company of Malaysia Sdn. Bhd. had a successful year despite the impact of world recession on the



Malaysian economy; progress was made in a number of business activities. The lighting manufacturing unit made good progress and a number of useful distribution equipment contracts were secured in which local manufacturing content was a key factor. The highlight of the year was the award to Marconi Italiana of a major contract spanning several years for the supply of pulse code modulation equipment to the telecommunications authority.

The General Electric Company of Singapore Pte. Ltd., eliminated loss-making manufacturing activity, but was affected by a sharp fall in demand for electrical consumer goods. Some sectors were more buoyant, particularly those concerned with the construction

industry, but the government's "open door" policy has attracted many new foreign entrants and further sharpened competition.

GEC Zambia Ltd. Severe restrictions on imports continue due to the acute shortage of foreign exchange. Despite a reduced turnover, careful planning achieved a reasonable result for the year but the outlook remains uncertain.

GEC Zimbabwe (Pvt) Ltd. was affected slightly by the cuts in foreign exchange allocations and by a depressed market for new electrical equipment. Short-term prospects for recovery are poor, but operating economies are planned by merging activities with those of L. H. Marthinusen (Pvt) Ltd.

Because GEC trades worldwide, a strong selling network is necessary. This picture shows the headquarters of GEC New Zealand at Elsdon, Porirua, near Wellington. GEC NZ trades through 15 branches, the southernmost one at Invercargill has the distinction of being the electrical trading post closest to the South Pole.

Walsall Conduits Ltd. achieved record sales despite the still depressed conditions in the building and construction industry. Several new products were successfully launched and export sales again increased.

GEC Distributors (Ireland) Ltd. held its share of a dull market for electrical equipment distributed through wholesale outlets.

ASSOCIATED COMPANIES

PERFORMANCE

	1984	1983
Turnover	£417m	£408m
Profits	£ 27m	£ 24m

The figures given show the GEC share calculated by reference to the GEC interest in the equity of the Associated Companies.

GEC-Hitachi Television Ltd.

The unsatisfactory joint venture has been terminated and the Hirwaun factory is continuing to operate under the sole ownership of Hitachi.

National Nuclear Corporation Ltd.

Construction of the new advanced gas cooled reactor (AGR) nuclear power stations at Heysham II and Torness continued to programme, and design work proceeded for the pressurised water reactor station proposed for Sizewell B. The first units at Hartlepool and Heysham I (AGR) nuclear power stations commenced generation of electricity for the National Grid. Agreements have been made with France and Germany for technical collaboration on a commercial demonstration fast reactor programme.

Ruston-Bucyrus Ltd., affected by the continuing depression in construction and mining machinery markets, ceased

manufacturing during the year and its operations are at present largely restricted to spares and service. The Company is in dispute with Bucyrus Erie Company, the controlling shareholder in Ruston-Bucyrus Ltd., and is seeking damages in proceedings in the United States on the grounds that in exercising its control over Ruston-Bucyrus Ltd., Bucyrus Erie Company has violated the United States anti-trust laws and is in default of its fiduciary duties. Pending the outcome of the dispute, a provision in the accounts of the Company has been made to write down its interests in the net assets to a figure not less than it would expect to receive on realisation of its investment.

The Lamp Component

companies returned to profit following a small increase in demand, after benefiting from reorganisation measures.

Cable Makers Australia (Pty)

Ltd. did not have a good year. Demand declined, and measures of cost reduction were inadequate and too slow. The unprofitable moulded foam



activity was disposed of during the year.

GEC South Africa (Pty) Ltd.

slightly increased its trading profit assisted by better management of the capital employed. Poor market conditions particularly affected the transformer and machines activities. Switchgear benefited from efficiency gains, despite a growing shortage of new orders.

The National Nuclear Corporation's principal contracts are for the design and construction of Torness nuclear power station in Scotland and for the nuclear island at Heysham Stage 2 power station, Lancashire. The picture shows the roof of the steel lining for the Heysham reactor pressure vessel being lifted into position.

AEI Henley successfully introduced the CDSS1 PABX with a high level of locally manufactured content.

Telephone Manufacturers of South Africa (Pty) Ltd.

increased its sales and introduced locally-designed telephones and key systems during the year. The changeover from the production of electromechanical exchanges to digital electronic exchanges continues.

ATC (Pty) Ltd. improved its performance and secured further long term contracts with the South African Post Office. Ownership by the Company changed through the sale of 25 per cent of its shares to a South African company.

Winding Wires (Pty) Ltd. had a better year and widened its product range to include insulations, such as kapton and mica, applied by lapping.

Avery Nigeria Ltd. had a reasonable year despite strict import controls. Sales of imported products were well down on the previous year, but this was partially offset by an increase in the service business.

Avery India Ltd. achieved record results. A major investment is taking place to expand production facilities and introduce new electronic weighing equipment.

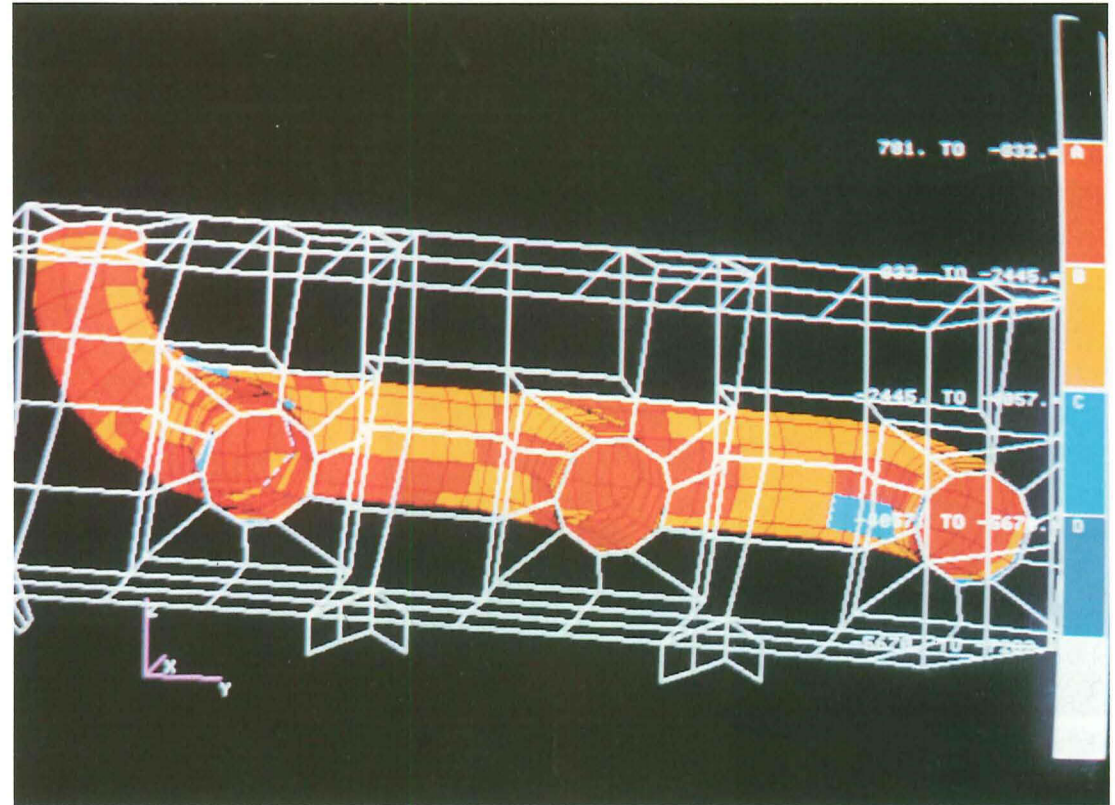
Genelec Ltd., India, had a successful year. The Projects Division received a record value of orders, and the high pressure sodium lamp factory commenced production.

The task of the GEC Research Laboratories is to provide fresh options on which the GEC product units can base their future products and process innovation. This demands wide-ranging interdisciplinary research related to GEC's interest in communications, information technology, industrial, medical and defence electronics, components, and power and transportation systems. The current research programme is illustrated in the following selection.

Materials Engineering is the application of science and technology to the creation of new and improved materials for a variety of applications. Current research includes work on glass-ceramics, fine grain ceramics, made by melting and controlled re-crystallisation. Control of composition and heat treatment permits optimisation of such properties as thermal expansion, thermal shock resistance, infrared and microwave characteristics. New composite materials are being studied for their potential in diesel engines and turbines. Research in electronics has always been strongly influenced by the properties of available materials, such as silicon and gallium arsenide. It is now possible to create, using molecular beam epitaxy, micro-scale composites with novel electrical and optical properties. The Research Laboratories have recently

made bipolar transistors and lasers using these techniques, as a first step toward a new generation of integrated optoelectronic circuits.

Silicon Very Large Scale Integration (VLSI) continues to be the most important single feature of electronics technology, and our research commitment reflects this, with a Company-wide collaborative programme on improved computer-aided design tools in addition to continued work on high performance bipolar and CMOS integrated circuit technologies. As individual device dimensions are shrunk to one micron or less, our research has shown the advantage of using some form of insulating substrate instead of the more usual bulk silicon. Much of our effort is based on the use of sapphire substrates to give silicon-on-sapphire (SOS)



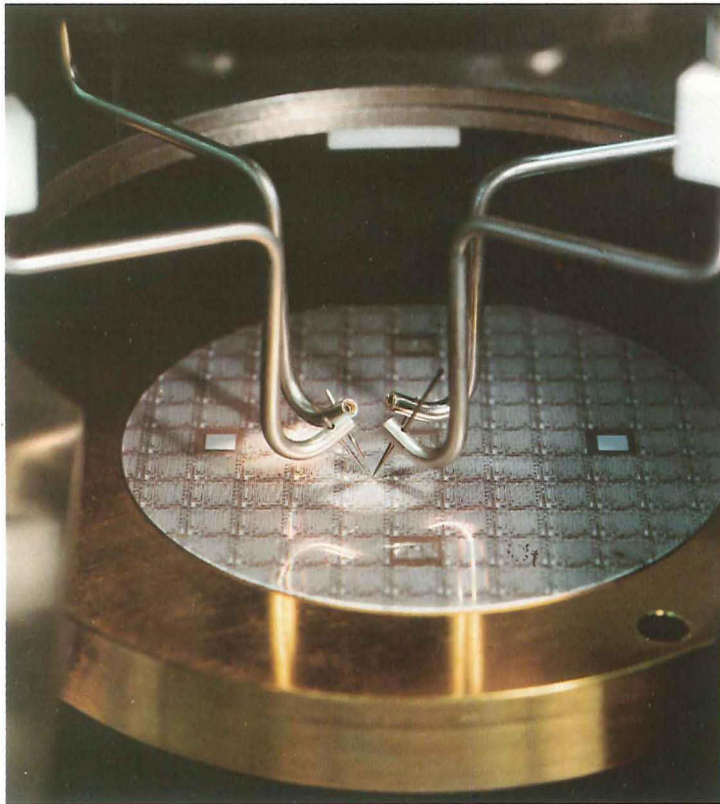
circuits, but we are also exploring promising techniques using recrystallised silicon deposited on an oxide-coated silicon slice. We expect to be able to achieve packing densities of more than 10,000 transistors per square millimetre in this way.

Gallium Arsenide Devices and Circuits are becoming increasingly important because they complement silicon in

A finite element thermal stress analysis being carried out at GEC's Mechanical Engineering Laboratory at Whetstone, near Leicester. The equipment under investigation is the exhaust manifold of a Paxman diesel engine. Features of the analysis, such as stress and temperature, are indicated by the contours and colours.

systems requiring operation at frequencies well in excess of one giga-hertz. Using electron beam direct-writing, we have made sub-micron dimensioned field effect transistors and microwave monolithic integrated circuit amplifiers with a uniform gain of 6db from dc to about 30 giga-hertz. Gallium arsenide and

related compounds involving indium, aluminium, phosphorus and antimony — collectively known as the III-V compounds — are also the basis for our research on light emitting diodes and lasers for use in optical fibre-based communications systems.



Optoelectronics is a rapidly expanding part of our research programme, covering displays, data transmission, signal and image processing. Specific projects include large area liquid crystal displays, integrated optic devices based on lithium niobate, optical modulators for signal distribution in phased array radar, bulk and surface acousto-optic cells, spatial light modulators, and a range of active and passive devices for use in fibre-optic systems.

Medical Diagnostics research includes basic techniques and

VLSI (Very Large Scale Integration) circuit structures under test. The semiconductor substrate is mounted on a vacuum chuck and electrical contact is made with finely pointed tungsten needles which are accurately positioned using micromanipulator controls. Test voltages and currents are applied and the behaviour of the devices monitored.

applications. As examples, research in the last year has resulted in the use of in-vivo magnetic resonance imaging (MRI) to map flow patterns in arteries and veins in the neck, and in the development of methods for contrast enhancement using paramagnetic agents. While the use of contrast in X-ray imaging

is well known, it has proved to be more subtle and less traumatic in MRI.

Instrumentation for a variety of applications forms an important part of our research. The main thrust is towards rugged low cost sensors and the associated signal conditioning and processing. Typical areas of research are a liquid tanker contents gauging system incorporating vibratory sensors, a laser scanning unit for guiding a free-ranging driverless warehouse truck, a novel vibratory cylinder gyro whose simplicity and ruggedness offers new possibilities and tactile sensors for dextrous robot grippers.

Antennas are important in radio communications and radar systems. Our research has led to improved methods of radiation pattern synthesis which enable us to compute the amplitude and phase distribution for a specified array configuration to provide the required far field power pattern. This has been successfully demonstrated on antenna arrays producing multiple beams for the Martello 3-D radar and for the satellite-borne antennae required for direct broadcasting by satellite (DBS), where the separate beam coverage is designed to give the required terrestrial footprint.

Computer Science and Software Engineering are growing in importance, both in terms of the performance of the systems we produce and of the improved design methods for the hardware and software contents of those systems.



Particular research themes include artificial intelligence techniques as applied to automatic problem solving and improved tools for software creation, and computer aids to systems reliability improvement — again, covering software and hardware aspects. This latter work is typified by a programme to improve both the initial quality control and the in-service performance of equipment for high voltage dc power transmission schemes.

Energy and Earth Resources form the background to several research projects: control and monitoring systems for the 20 metre diameter 250 kilowatt wind turbine generator which has been successfully commissioned on Orkney, research on a hybrid power scheme involving photovoltaic solar cells and a wind generator, with battery storage, for powering remote electronic

An extensive programme is being conducted at GEC's Hirst Research Centre, Wembley into speech technology. Its aims are to open up systems of spoken communication between man and machines and provide new services on the telephone network. The equipment shown in the photograph stores and reconstitutes speech in a computer-compatible form and can generate spoken announcements.

equipment such as communication stations, and a solar water heating system designed and installed as a testbed and providing 20,000 kWh of heat each year from a 50 square metre array of evacuated tube solar collectors. Satellite-based remote sensing of the earth provides important data in many areas, and research is being carried out on the design of such systems and of the subsequent image processing and pattern recognition techniques necessary to display and interpret the data.

TRAINING

The types of skill required in GEC are changing, as can be seen by updating figures published five years ago in 'GEC 79' of a GEC unit of 1,000 employees with a breakdown of jobs in the same proportion as the total workforce of GEC in the UK.

In GEC Telecommunications, the transition from electro-mechanical telephone exchanges to electronic systems requires less added value and consequently fewer jobs. Furthermore, many employees have had to be retrained, a challenge to which they have responded positively. Some of the employees in drawing offices have become expert in keyboard skills and developed a thorough understanding of the basic computer-aided design (CAD) systems. Some of the production operatives, maintenance workers and industrial engineers have attended courses to upgrade their skills in the use of computer numerically controlled (CNC) machine tools. And those employed in test and installation departments have received formal training on digital telephone switching systems, including eighteen weeks of classroom instruction on a 'System X' telephone exchange. The required changes in skills are also reflected in the types of trainees recruited. Traditional craft and technician apprenticeships, starting at age 16, are being replaced by

technician engineering and student traineeships for 18 year olds, who undertake training programmes leading to either a Higher Technician Diploma or a university degree. **GEC Measurements** has also been moving steadily towards electronics. Its own school has facilitated the retraining of employees to adapt to the new skills required to produce technologically advanced products. Over 200 employees have obtained engineering qualifications through day release, Open University and other specialist courses. The number of apprentices taken on has trebled. Most are student technologists, and some have attended the M.Eng. programme at Bath University which has been co-sponsored with GEC-Marconi Electronics. Many employees have worked with comprehensive computing facilities which, besides operating financial and business systems, also cover computer-aided design, computer-aided manufacture and the automatic testing of components. Since 1979, 75 per cent of development expenditure has been directed towards the

A TYPICAL GEC UNIT			
	THEN 1979	NOW 1984	CHANGE
Production Operatives	360	315	DOWN 12%
Clerks and Office Workers	140	130	DOWN 7%
Craftsmen	140	125	DOWN 11%
Technicians	140	160	UP 14%
Engineers and Scientists	80	130	UP 62%
Supervisors, Foremen and Chargehands	50	45	DOWN 10%
Salesmen	30	30	SAME
Welfare and Personnel	30	30	SAME
Managerial	30	35	UP 17%

design of sophisticated electronic products which meet the complex demands of generation, transmission and distribution systems.

Marconi Underwater Systems, anticipating the dearth of people with electronics and computing skills, has adopted the unusual approach of recruiting graduates with little or no experience of computers. Graduates in music, classics, ancient history and languages underwent an intensive three-month tailor-made computing course at the University College of Wales, Aberystwyth, with excellent results. At the end of the first

course, participants were assessed as being as good as the top 10 per cent of students who specialised in computer studies. These employees are currently engaged on a six-month project transferring complicated technical data from an analogue to a digital computer.

Marconi Avionics is providing a full-time conversion course enabling its employees to become experts in computer software. Operated in conjunction with the Bromley College of Technology, the course is directed especially to drawing office personnel, and

includes those with no previous knowledge of software who have been away from full-time studies for several years.

In GEC as a whole, management skills are not being allowed to lag behind the changes in technology. Project-based training programmes are used to develop managerial talent, and GEC was among the first companies to introduce the Action Learning approach to management development; this gives managers of high potential the chance to tackle real problems in a business and learn from the experience. The College of Management at Dunchurch is part of a wider

TRAINING

GEC training programme which is extending this and other approaches to learning and self-development.

GEC continues to search for ways to extend employee participation in the improvement of business performance. One initiative will be the secondment over the next year of managers from GEC operating units to the College of Management teaching team to give them a better understanding of how people think and feel. This experience is also intended to develop and foster the important principle of self-help when the managers concerned return to their own units. GEC intends to persist in creating the necessary environment with appropriate facilities to give the widest possible scope for applying the principle of self-improvement.

Pauline Clayton instructing Janice Hunt (foreground) in the use of a semi-automatic assembly machine, which indicates the appropriate component and pinpoints its position for assembly on a System X printed-circuit board. Janice, who used to wire reed-electronic telephone exchanges, has worked for GEC for eight years. Pauline, with over 19 years service, is an instructress in the Helen Street Training School of GEC Telecommunications, Coventry.



FRONT COVER

Osram Solarcolour lamps were used for the new lighting on the Severn Bridge. The lamps save energy, yet give better illumination. The lanterns in which the lamps were installed were specially modified by Osram to resist high winds and vibration.

ANY QUESTIONS?

If you have a question about GEC please write to The Secretary, The General Electric Company p.l.c., 1, Stanhope Gate, London W1A 1EH.