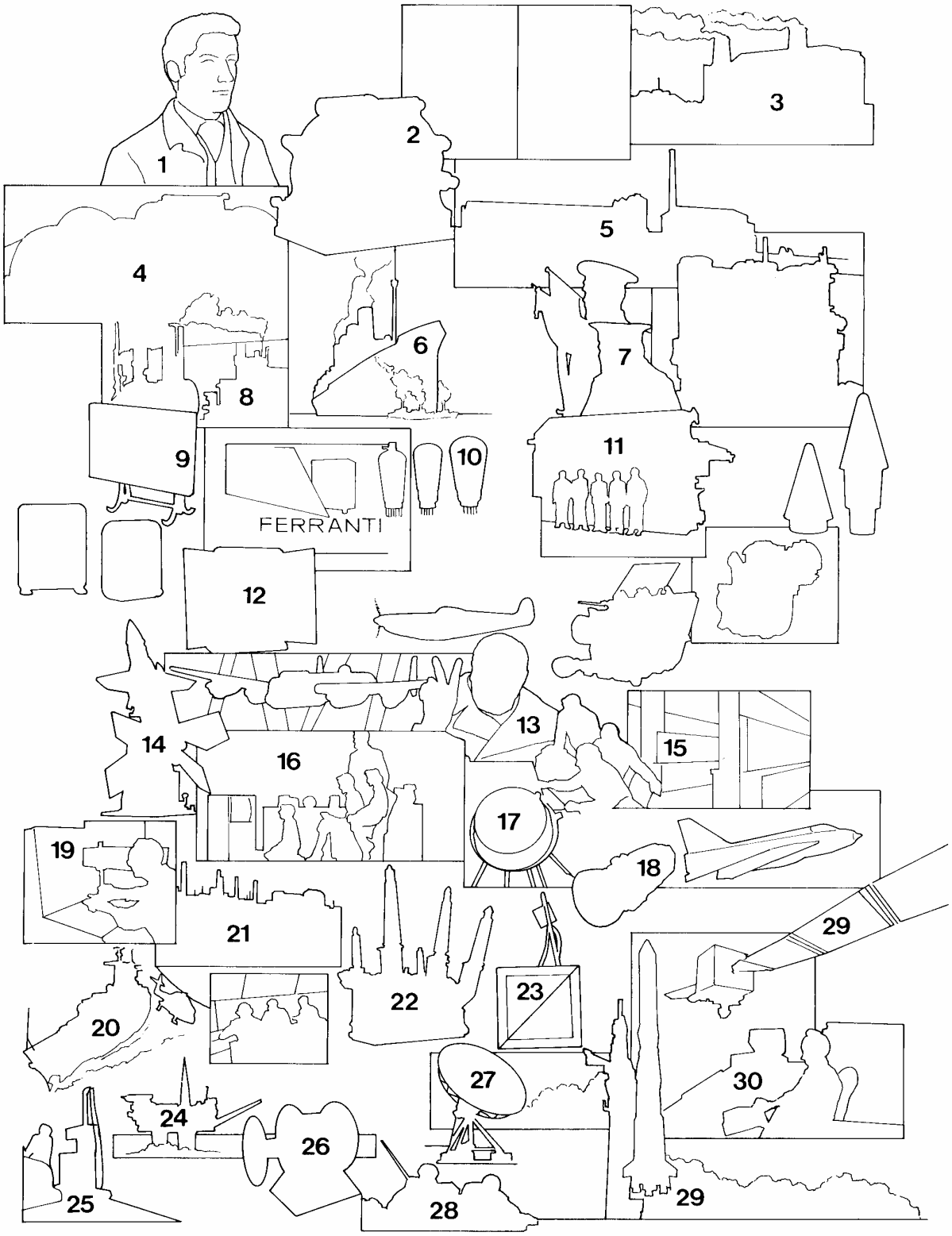
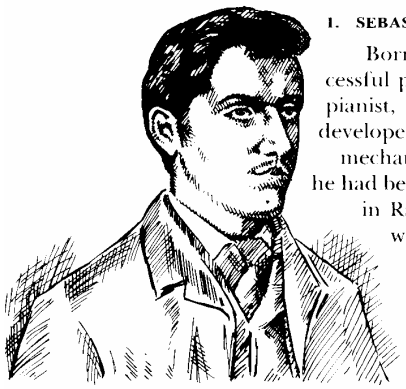
FERRANTI DOWN THE YEARS



THIS BROCHURE IS NOT INTENDED TO BE A FULL HISTORY OF THE COMPANY, BUT ONLY A BRIEF OUTLINE OF SOME OF THE MAJOR DEVELOPMENTS FROM 1882 THROUGH TO THE PRESENT DAY.



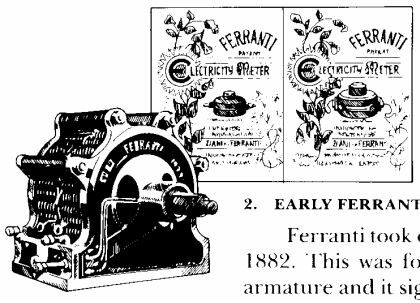
1. SEBASTIAN ZIANI DE FERRANTI

Born in 1864, the son of a successful photographer and a concert pianist, Sebastian Ziani de Ferranti developed an early interest in the mechanical arts and by the time he had been sent to a boarding school in Ramsgate an inventive talent was already emerging. After spending a brief period at University College he soon moved on to more practical work as a research assistant in the Siemens laboratories at Woolwich.

This provided him with the opportunity to expand his knowledge of electrical engineering, and by the time he was seventeen two backers, Francis Ince and Alfred Thompson, were willing to support his own venture. This started him off on a career that was to bring him wide recognition as one of the most innovative electrical engineers of his era.

He received many accolades in recognition of his achievements, including being made a Fellow of the Royal Society (1927) as well as holding the presidency of the Institution of Electrical Engineers (1910-1912) for what was at the time an unprecedented two consecutive terms.

As *The Engineer* noted on his death in 1930: *"Ferranti was essentially a pioneer with the ability to seize upon essentials, the inventive instinct and the power of influencing the minds of other men"*.

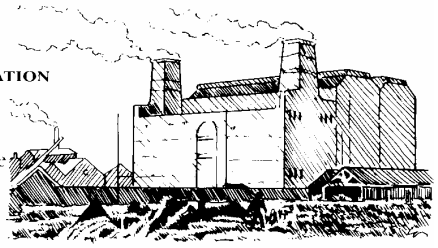


2. EARLY FERRANTI PRODUCTS

Ferranti took out his first patent in 1882. This was for a zig-zag form of armature and it significantly improved on the efficiency of the alternator, giving an output far greater than any other comparably sized machine available at that time.

In 1883 his patent for a mercury motor meter provided a more accurate means of measuring electricity than had hitherto been available and the Ferranti house service meter became one of the most widely used. For many years meters provided the bulk sales needed to finance the development of a wide range of electrical products.

Jointly with G. L. Addenbrooke of the United Telephone Company, Ferranti took out his first patent for transformers in 1885. Although the patent was related to telephony, he continued to develop this product and produced the first 10,000 volt transformers for Deptford, again introducing a product for which the company was renowned for many years.

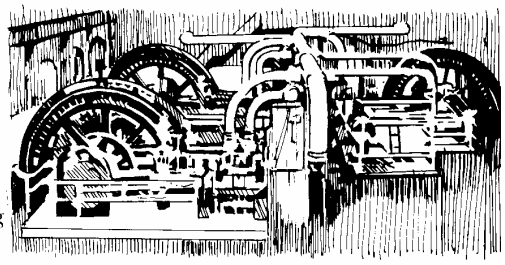


3. DEPTFORD POWER STATION

After establishing his reputation as one of Britain's most innovative electrical engineers, from 1886 Ferranti moved on to publicise his views on the mass distribution of electricity. Sponsored by the wealthy Lindsay family, he initially overhauled their Grosvenor Gallery installation and then constructed the world's first modern power station at Deptford between 1887 and 1891.

At Deptford he laid down the basic principles of the system which was eventually to become accepted as the standard means of transmitting this new source of power. It is to his credit that most of the ideas he was postulating in the 1880s were later implemented in Britain in the 1920s.

Among the more notable innovations at Deptford were the first successful high-voltage cables and the largest generating equipment built in the world at that time.

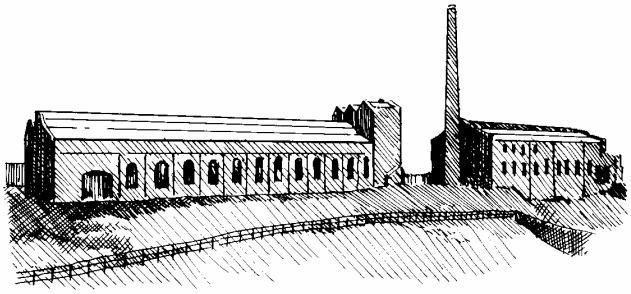


4. STEAM ALTERNATORS

After leaving the Deptford scheme in 1891 Ferranti went on to market his ideas on electricity generation by manufacturing what he called his Steam Alternator.

Contemporaries were sceptical of their ability to reduce the cost of electricity, but at Portsmouth in 1894 he proved them wrong and proceeded to sell such machines in large numbers in this country and abroad. The firm, now called S. Z. de Ferranti Ltd., was by now becoming a major force in the industry on the basis of its founder's ability to design generating and distributing equipment which improved both the efficiency and safety records of electricity supply.

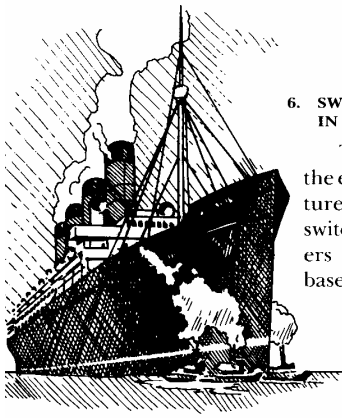
It was also at this time that Ferranti began to think about machines which would eventually replace his steam alternators. Although C. A. Parsons had already patented the turbine and it was his firm which dominated the early market in this area, Ferranti introduced the concept of superheating turbines. This idea was to come into general use in power stations in the 1920s, but only after the Ferranti patent had expired, illustrating once again how his ideas on electricity generation were so advanced.



5. HOLLINWOOD WORKS

The increase in business necessitated a move out of the cramped premises in London, and by 1896 the firm had found a new base in Hollinwood, near Oldham. Here, steam alternators, switchgear, rectifiers, instruments, transformers and meters could be manufactured in much larger quantities, and Ferranti was able to establish development teams for each product range.

By 1900 the workforce had already reached 1,000, compared to 450 in London, and although foreign competition forced a reorganisation of the business in 1905 the newly-renamed Ferranti Ltd. remained a powerful competitor.



6. SWITCHGEAR FOR THE MAURETANIA IN 1907

The reorganisation of 1905 saw the end of steam alternator manufacture, but the streamlined business of switchgear, instruments, transformers and meters provided a steady base for expansion.

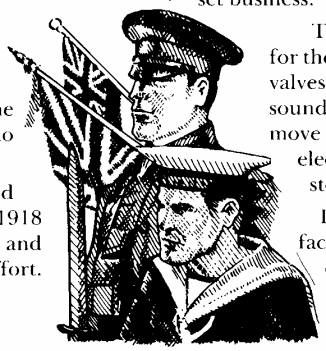
Ferranti had been famous for his switchgear since 1894, when he designed the first cellular switchboard and apart from such prestigious contracts as the "*Mauretania*" the firm supplied equipment all over the world.

It was in this period that the company established its extensive agency network to market Ferranti products. One of the agencies, Ferranti-Canada, blossomed into a manufacturing operation, while the others publicised the Ferranti name at a time when the electrical industry was making great strides forward.

7. MUNITIONS, 1914-1918

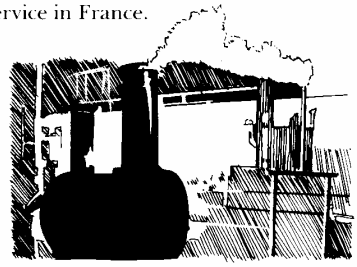
The onset of The Great War brought to a halt the steady growth of Ferranti Ltd, but by the summer of 1915 the Hollinwood works had been converted into a munitions factory.

Ferranti and his personal team worked industriously to improve output, and by 1918 almost £2 million worth of shells, gaines and forgings had been supplied for the war effort.

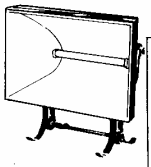


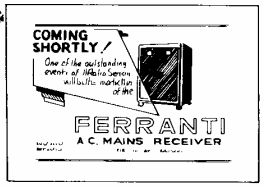
At the same time, Ferranti also suffered a tragic loss during the military conflict, with his eldest son, Basil, failing to return from active service in France.

8. FIRST BRITISH MILLION VOLT SPARK IN 1925



Although the manufacture of switchgear was terminated in 1918 and the general electrical business suffered from the effects of a major military conflict, during the First World War Ferranti actually found time to design a new range of transformers. Such was his firm's reputation in this field by the 1920s that a large business in both distribution and testing transformers was established. This reputation was built on the work of the High Voltage Laboratory, where in 1925 Britain's first million volt spark was produced.



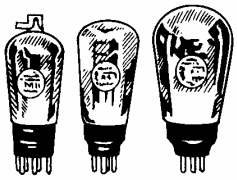


9. RADIO COMPONENTS AND FIRES

While the heavy electrical business was once again being rejuvenated at Hollinwood, Ferranti also ventured into the design of domestic electrical appliances. With the introduction of radio Ferranti designed and produced from 1923 the AF3 audio frequency transformer which significantly improved upon the quality of sound reception.

Although between 1912 and 1914 the company had produced a range of fires, cookers and irons, it was only from 1927, with the introduction of the parabolic reflector fire, that this side of the business really started to expand. Later, clocks and water heaters were added to the range and Ferranti became a household name in this market.

10. RADIO AND VALVES



The design and mass-production of radio components, in particular the highly successful AF3 audio frequency transformer, led Ferranti into the radio set business.

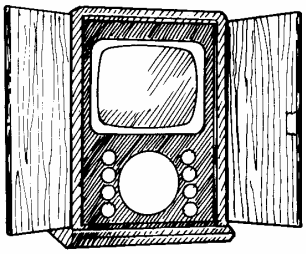
The first model was produced for the 1930 season, and in later versions Ferranti valves were incorporated to improve the quality of sound reception. This was the first momentous move into what was to become the field of electronics, providing another important milestone in the company's long history.

It also brought the expansion into a second factory, in Stalybridge, further illustrating the company's growing strength in this period.

11. LARGEST GRID TRANSFORMERS

The construction of a 132 kV grid network by the State-created Central Electricity Board from 1926 to 1932 brought a surge in demand for the large transformers produced by Ferranti Ltd. The company accounted for the largest share of the market for 132 kV transformers and supplied the largest three-phase units of 75,000 kVA.

Sadly, just as his ideas on the bulk generation and distribution of electricity were being implemented, Ferranti died (in 1930), bringing to an end a fascinating and remarkable career. His eldest surviving son, Vincent, succeeded him as Chairman, and took Ferranti Ltd. into a new era of expansion.



12. TELEVISION

By the 1930s Ferranti Ltd. was becoming a more diversified concern, with interests in heavy electrical engineering, instrumentation, domestic appliances and electronic devices.

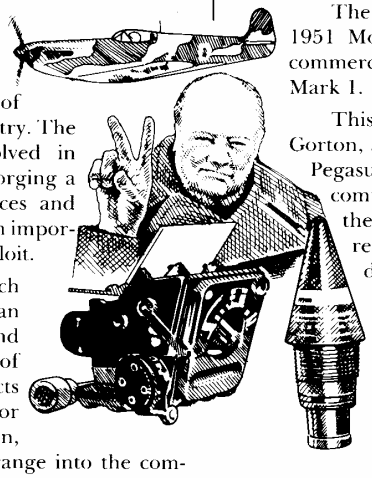
The expansion in radio production led to the opening of the Moston factory in 1935, and here development work was carried out on such innovative schemes as television. The first Ferranti television (or televisor, as they were then called) was produced in 1937, using a cathode ray tube designed by the Moston team. Only a small number of these were ever sold, but it was another indication of the company's willingness to venture into new areas of electrical technology.

It was this innovative spirit, inherited from the company's founder, that was to provide the springboard to success in the decades to come.

13. WARTIME PRODUCTION

During the Second World War Ferranti Ltd. supplied a wide range of products for the defence of the country. The company had actually been involved in Britain's rearmament since 1935, forging a strong relationship with the Services and establishing contacts which have been important in opening up new fields to exploit.

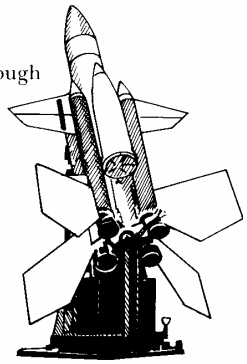
Among the product ranges which have their origins in this period we can find fuzes (Moston and Oldham) and avionic instruments (Moston). One of the most successful Ferranti products was the IFF (Identification Friend or Foe) equipment produced at Moston, introducing another new product range into the company, radar.



The manufacture of gyroscopic equipment was also established at this time, and increased demand for gyro-gun sights resulted in the transfer of this product team to Scotland.

The Crewe Toll factory in Edinburgh went into production in 1943 and has ever since provided a steady source of growth within the company as the team expanded into other avionic and electronic products.

14. BLOODHOUND CONTRACT, 1948



In the post-war search for security through strength the British government instigated a series of guided weapons development contracts, and Ferranti was given responsibility for assisting the Bristol Aircraft Co. in the construction of what later became the Bloodhound missile.

Work began in 1948 at Moston, but by 1954 the Wythenshawe factory had been purpose-built to provide more suitable development and production facilities. Two variants of the Bloodhound missile were built and the Mark II version is still in service with the RAF, illustrating the value of the Wythenshawe team's contribution to guided missile technology in this country.

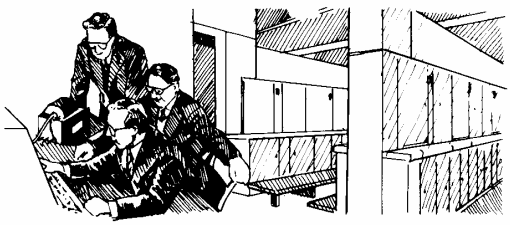
More importantly for the long-term expansion of the company, the production of process control computers arose from the design of Bloodhound's launch control post, pushing the Wythenshawe team into another field of advanced technology.

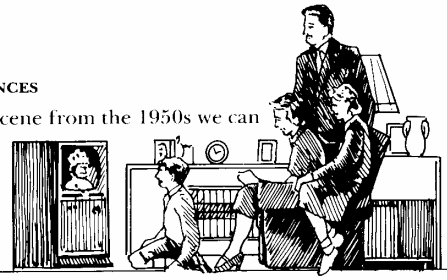
15. MAINFRAME COMPUTERS, 1948-1964

After Manchester University scientists had developed a successful and more efficient means of storing information on cathode ray tubes, and then moved on to build a prototype computer, Ferranti's Moston engineers were brought in to help design and produce machines for the market.

The first contact was made in 1948, and by 1951 Moston was marketing, arguably, the first commercially-available computer in the world, the Mark 1.

This business soon expanded into a factory in Gorton, and new models were developed, like the Pegasus, Orion and finally the world's largest computer at that time, Atlas. Until the sale of the computer business to ICT in 1964 Ferranti remained the British market leader, and its designs formed the basis of the successful 1900 Series computers produced by ICL.

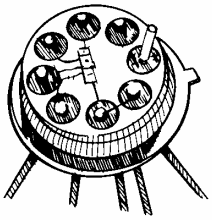




16. DOMESTIC APPLIANCES

In this domestic scene from the 1950s we can see the wide range of Ferranti appliances produced at the Moston factory. The fires had been on the market since the 1920s, while clocks had been introduced in 1931, but by far the most important after the War was the range of televisions built with Ferranti cathode ray tubes.

Radios were also produced in large numbers, but most effort went into designing and marketing televisions as the national broadcasting service took off in the 1950s. Other devices which made an appearance at this time included the fridge-heater.



17. SEMICONDUCTOR DEVICES

Another important spin-off from the Bloodhound development contract was the venture into semiconductor devices in 1954. The Wythenshawe team had been struggling with the problem of fitting all the equipment into a missile, using miniature valves, but by adapting the new semiconductor technology emanating from the States they could improve packaging density and circuit reliability. An innovative feature of this work was the early decision to use silicon, as opposed to germanium, in the construction of the first range of devices, putting Ferranti ahead of their European rivals when this material became popular in the 1960s.

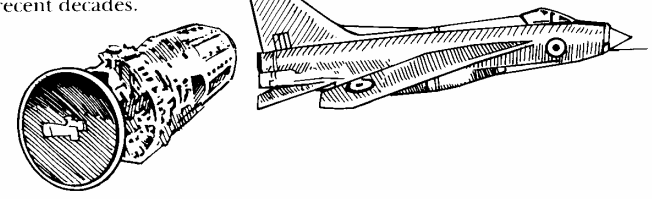
The Gem Mill factory was converted to the mass production of semiconductors after the sale of the television tube business in 1957, and by 1961 it was producing Europe's first integrated circuits.

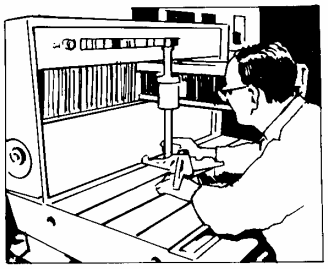
18. AI MK23 MONOPULSE RADAR

After deciding in 1945 to remain in Edinburgh, the Crewe Toll team ventured into a variety of new fields and one area they identified as having great potential was onboard radar. They had already taken over the production of IFF sets from Moston, but more importantly a development team was designing a monopulse radar for the *English Electric "Lightning"*, and in 1954 Ferranti was awarded the contract to fit their equipment into this new form of fighter.

This radar was known as Airpass, or A123, and by selling to both the RAF and the Royal Navy, as well as exporting it extensively, Crewe Toll established themselves as British market leaders in airborne radar.

Although they were badly affected by the cancellation of the *TSR-2*, for which Crewe Toll had designed a new terrain-following radar, the Edinburgh division has since retained this position by participating in most of the advanced aircraft projects of recent decades.



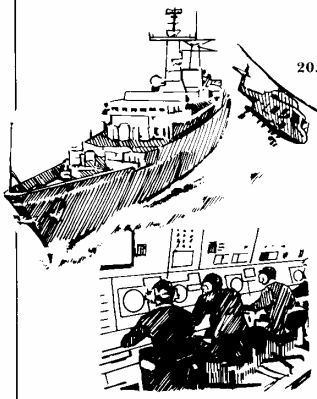


19. MACHINE TOOL CONTROL

The desire to improve production times in the manufacture of highly sophisticated radar wave-guides led Crewe Toll into the successful development of numerical machine tool control techniques.

This work started in 1951 and by 1954 a complete diffraction grating measuring system was ready for the market. After collaborating with the Fairey Engineering Co. a transistorised version was produced in 1958 for the first machine tool in Europe specially designed for numerical control. Using this technology Ferranti also ventured into the production of measurement and inspection equipment, a range which has since become a major part of the Dalkeith operations of the company.

Other aspects of what is now Ferranti Industrial Electronics established at this time include the opening of the Dundee factory in 1954 for the production of special components. It was here that Ferranti first ventured into laser technology, marketing the first commercially-available gas laser in Europe in 1963.



20. NAVAL CONTROL SYSTEMS

While the Gorton factory concentrated on the production of mainframe computers, a London team (later based at Bracknell) worked on specific applications of this technology, and by 1956 the Poseidon computer had been developed for incorporation in the Action Data Automation system to be fitted in *HMS Eagle*. This laid the basis for the highly successful F1600 and FM1600 systems developed in the 1960s, providing the Bracknell division with a large business in equipment which had both military and civil applications.

The Bracknell division, now part of Ferranti Computer Systems, remains a major British contractor for naval systems and since the 1960s the FM1600 computer has been incorporated into Computer-Assisted Action Information Systems and weapons control systems. These have been used by navies around the world, as well as the Royal Navy, and new versions are continually being developed.

Other computer based systems for military and public service applications are carried out at the Cheadle Heath factory which is also a centre for trainer and simulator activities.

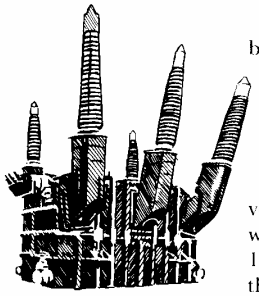
21. PROCESS CONTROL COMPUTERS

The ability of Bloodhound's launch control post to process information rapidly allowed the Wythenshawe team to apply their expertise to industrial situations.

Their first contract, to automate the ICI soda ash plant at Fleetwood, was won in 1959 and by 1961 the machine had been installed. Marketed under the Argus trade-name, this range of computers convinced many large manufacturers that automation was essential for future improvements in productivity.

Other early customers included the Jodrell Bank telescope and BOAC, whilst more recently a military variant has been adopted by the Ministry of Defence.

22. 750 MVA TRANSFORMERS FOR CEGB

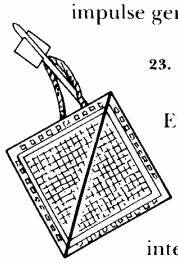


The large transformer business benefitted enormously from the rapid growth in electricity sales after 1945, and in 1947 Ferranti built the Avenue Works to cope with the perceived demand.

With the increase in operating voltages to 400 kV a Super Test Area was added to the Avenue Works in 1966, providing the facilities to develop the largest transformers built in Britain to-date, the 750 MVA units for the CEGB, supplied in 1967.

Large transformers were also sent abroad to customers like the Tennessee Valley Authority, the Kariba Dam project and the Detroit Edison Co., creating novel transport problems for the department.

Another important feature of the Avenue Works activities included the design and production of a wide range of testing equipment, including the Series 200 impulse generators.



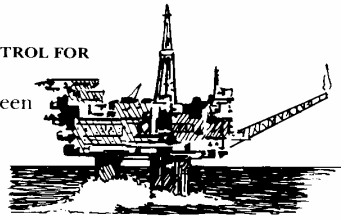
23. ULA CONCEPT AND MICROPROCESSORS

Having established a leading position in the European semiconductor industry in the 1950s, the Gem Mill team continued to develop new ideas on miniaturising electronic components. Although the force of American competition kept them out of the standard integrated circuit market, the successful application of CDI (Collector Diffusion Isolation) technology to the production of non-standard chips resulted in the innovative ULA concept.

This put the business on a sound footing from the early-1970s, but because of continuing difficulties in the market the electronic components division has recently been sold to Plessey. At the same time the Bracknell division has been working on the micro-miniaturisation of computer circuitry and in 1975 the F100-L microprocessor was announced as the first of its kind designed in Europe.

This has helped them to keep ahead in the drive to reduce the size of computers and improve efficiency and reliability.

24. COMMUNICATIONS AND CONTROL FOR OFFSHORE APPLICATIONS



The Scottish division has been working on microwave pulsed data systems since the early-1960s, and the need for speedy communications between the isolated North Sea oil and gas platforms has led to the development of microwave radio relay systems like the Type 1400 series.

A general-purpose tele-control system, Mark 2A, has also been supplied to the Brent field (run by Shell) and the Murchison operations of Conoco. British Telecom approval has been gained for this equipment and consequently on-shore applications have been made possible, notably at the Nuffield Radio Astronomy Laboratories at Jodrell Bank.

The Microwave division at Poynton has also been producing microwave devices since 1958 and its range of parametric amplifiers, microwave generators and small satellite ground terminals has found both civil and military applications.

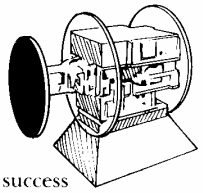
25. FUEL DISPENSING

The Autocourt fuel dispensing system reflects an all-round commitment to Britain's oil and petroleum industry. At its heart is a solid-state electronic computing head, providing more accurate control of forecourt operations, with control and accounting facilities at the kiosk to back up the service.

After the first order was received from Total in 1976 many of the major garage operators now use Autocourt, while an American subsidiary has also been established to exploit the largest market in the world.

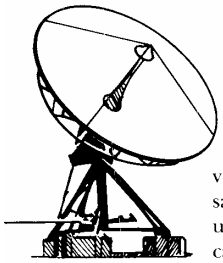
Autocourt is produced by Ferranti Industrial Electronics at Dalkeith where the development and manufacturing facilities for measurement and inspection activities are based.

26. ECR90 RADAR



Ferranti Defence Systems in Scotland is now the largest science-based company in that country, having been established in 1943 as a single-product manufacturing operation purely for war-time purposes. The success with AI 23 and the gyro-stabilisation platform (see section 29) provided the base for thirty years of expansion, and the ECR90 radar, is the most recent innovation to come out of the Crewe Toll laboratories.

Crewe Toll currently supply radar for the Tornado Air Defence Variant, the British Aerospace Sea Harrier, the Westland Lynx helicopter and the AB212 helicopter. Combined with other successful products like helmet-mounted sighting and pointing systems and the COMED (Combined Map and Electronic Display) this keeps Ferranti at the forefront of such technologies.



27. SATELLITE COMMUNICATIONS SYSTEMS

In addition to their range of microwave products the Poynton division has ventured into the production of small satellite ground terminals which can be used either as receive-only terminals for cable television or in mobile situations.

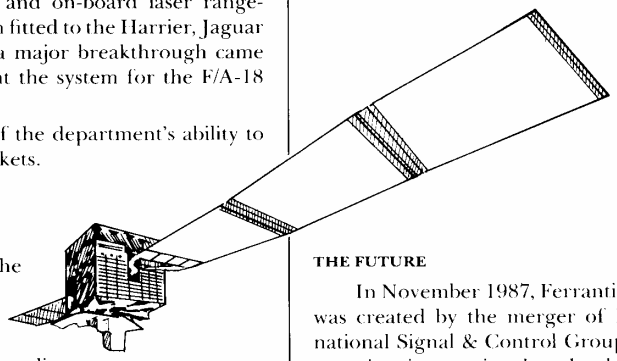
British Telecom have incorporated these into their Satstream service, and a portable military satellite communications terminal suitable for one-man operation, MANSAT, has been developed for the Ministry of Defence. This is the first of its kind to go into full production.

28. SIGHTING SYSTEMS

The military electro-optics activities of Ferranti Defence Systems are based at the Robertson Avenue factory in Edinburgh, and the product base ranges from the Type 306 ground laser designator/target marker in the picture to helmet-mounted pointing systems and on-board laser range-finders. The latter have been fitted to the Harrier, Jaguar and Tornado aircraft and a major breakthrough came when the Americans bought the system for the F/A-18 Hornet aircraft.

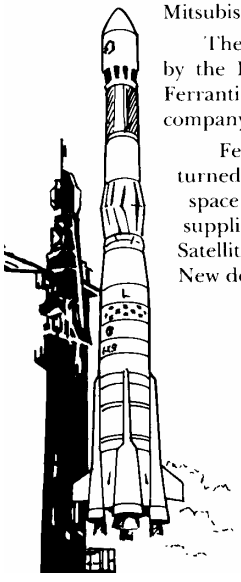
This is firm evidence of the department's ability to compete in the hardest markets.

29. GUIDANCE SYSTEMS



Running parallel with the airborne radar projects of the 1950s was the design and production of inertial navigation systems. Inertial quality gyroscopes were developed in association with the RAE for the Blue Steel missile programme using the latest "clean room" production technology by the 1960s.

Ferranti was the European leader in this field. Since that time the company's inertial navigation equipment, produced at Silverknowes, has been fitted into RAF Phantoms, Harriers, Jaguars, Tornados and the Japanese Mitsubishi F-1.



The successful Ariane space rocket launched by the European Space Agency also relies on Ferranti inertial guidance systems, confirming the company's leading position.

Ferranti Defence Systems has recently turned its attentions to the expanding field of space technology, and gyro packages have been supplied for IRAS (Infra-Red Astronomical Satellite) and Europe's X-ray satellite EXOSAT. New developments include laser gyroscopes.

30. OFFICE AUTOMATION

Both Ferranti Business Communications at Moston and Ferranti Computer Systems at Wythenshawe have recently moved into the office automation field, producing, respectively, a range of commercial and domestic telephone systems and Argus word processors and document managers. The PABX (Private Automatic Branch Exchange) marketed by Ferranti Business Communications has been available since 1981, applying digital solid-state techniques to improve communications within the office environment, and the Rhapsody telephone provides all the features of a modern press-button unit.

The Wythenshawe division has used its Argus range to move from the industrial to the office situation, and its range of personal computers is fully IBM-compatible. This is part of the company's continual search for new markets in which to apply its widely-regarded expertise in the design of electronic equipment, while strengthening the civil arm of the business.

J. F. Wilson.

C. Wimpenny.

THE FUTURE

In November 1987, Ferranti International Signal plc was created by the merger of Ferranti plc and International Signal & Control Group PLC. The company is a major international technology systems contractor supplying world defence, space and civil markets. Annual sales in excess of $1.5 billion are achieved by more than 24,000 employees, a high proportion with professional and scientific qualifications, working in plants and facilities around the world.

The recent history of the company has been a record of sustained growth, profitability, investment and new technology development based on the application of computers, microelectronics, electro-optics, precision engineering and project management skills in many disciplines. The name of Ferranti International Signal represents achievement in defence, space and civil markets.

FERRANTI INTERNATIONAL

Ferranti International Signal

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