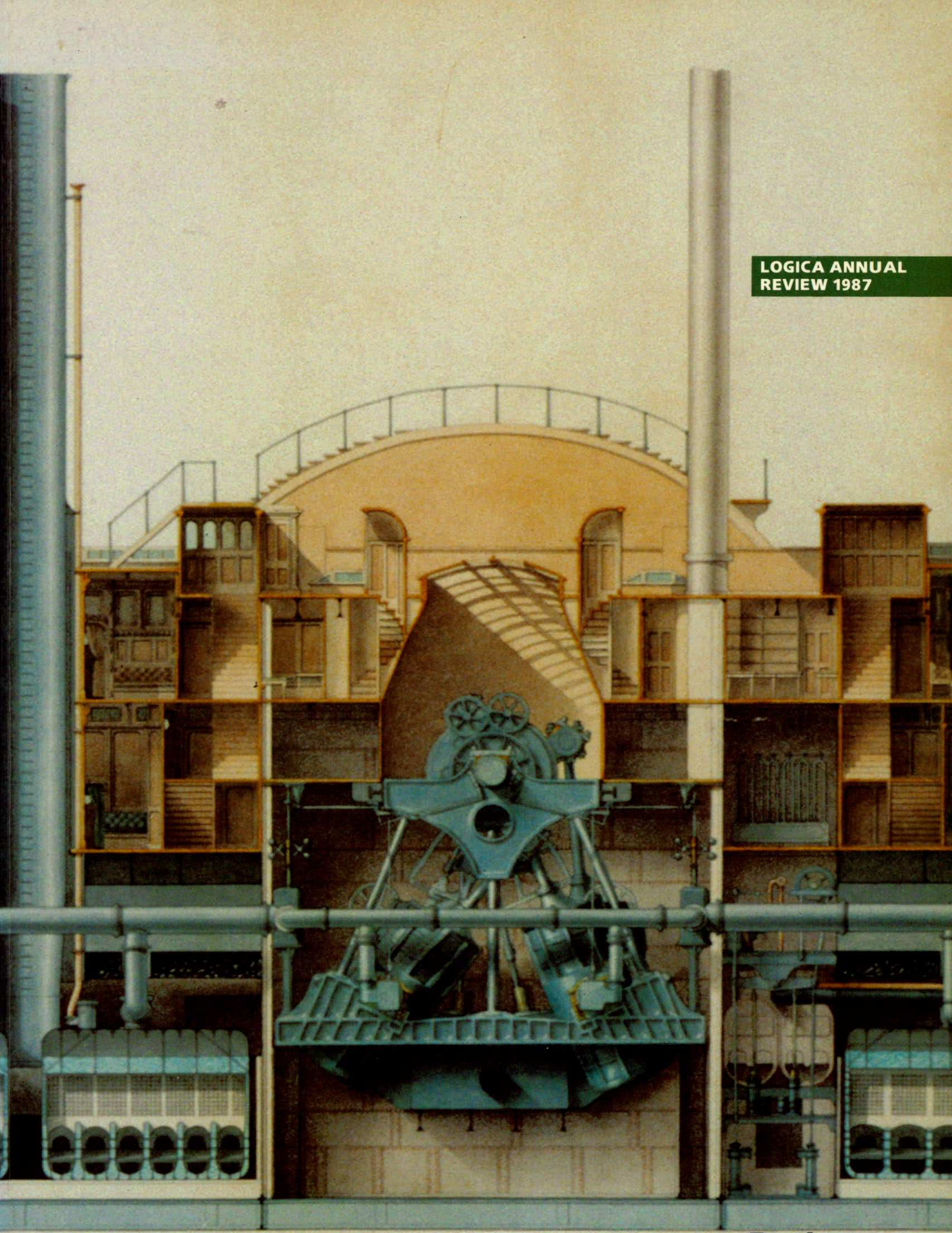
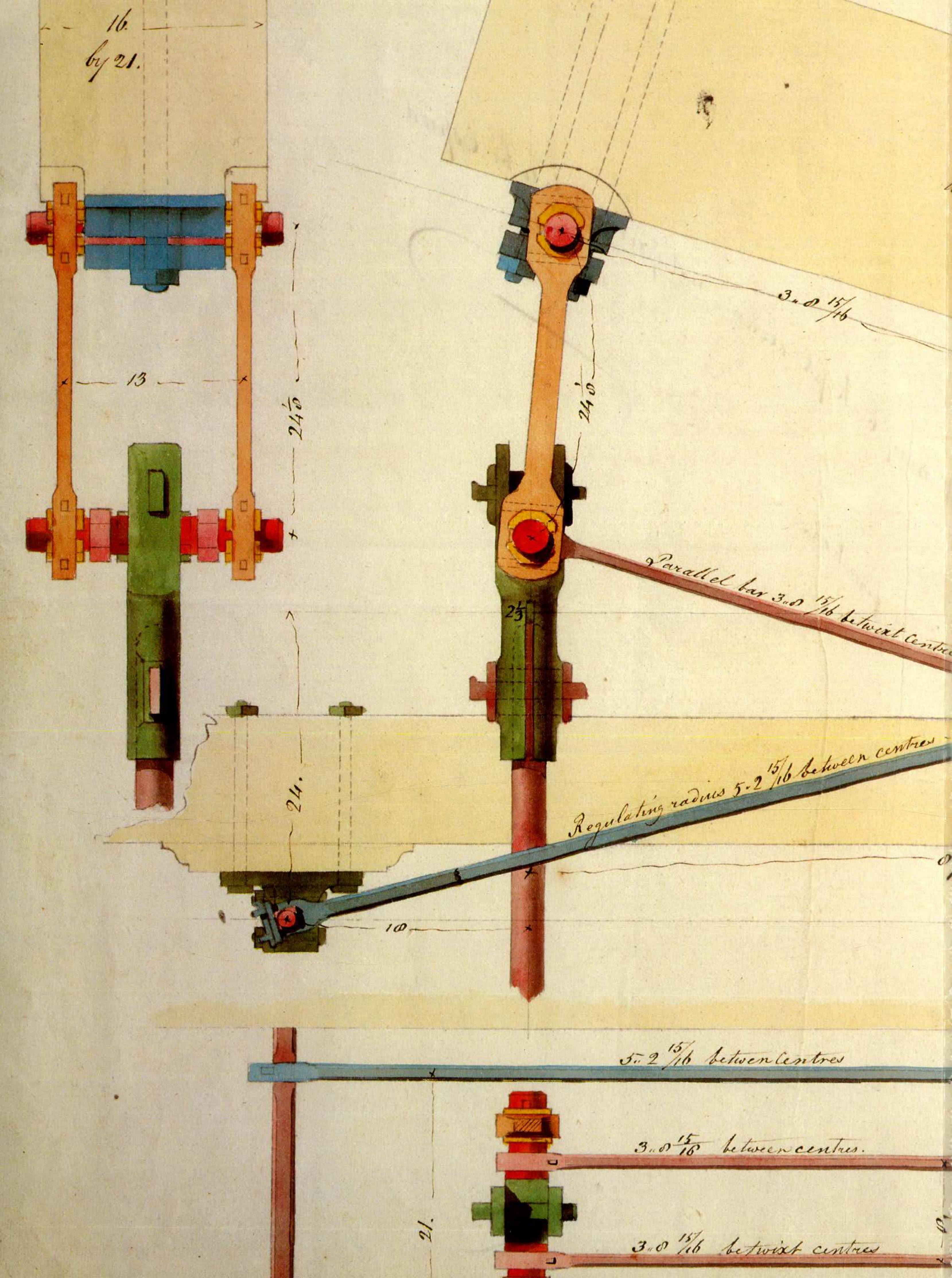


LOGICA ANNUAL REVIEW 1987

logica



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LOGICA ANNUAL REVIEW 1987

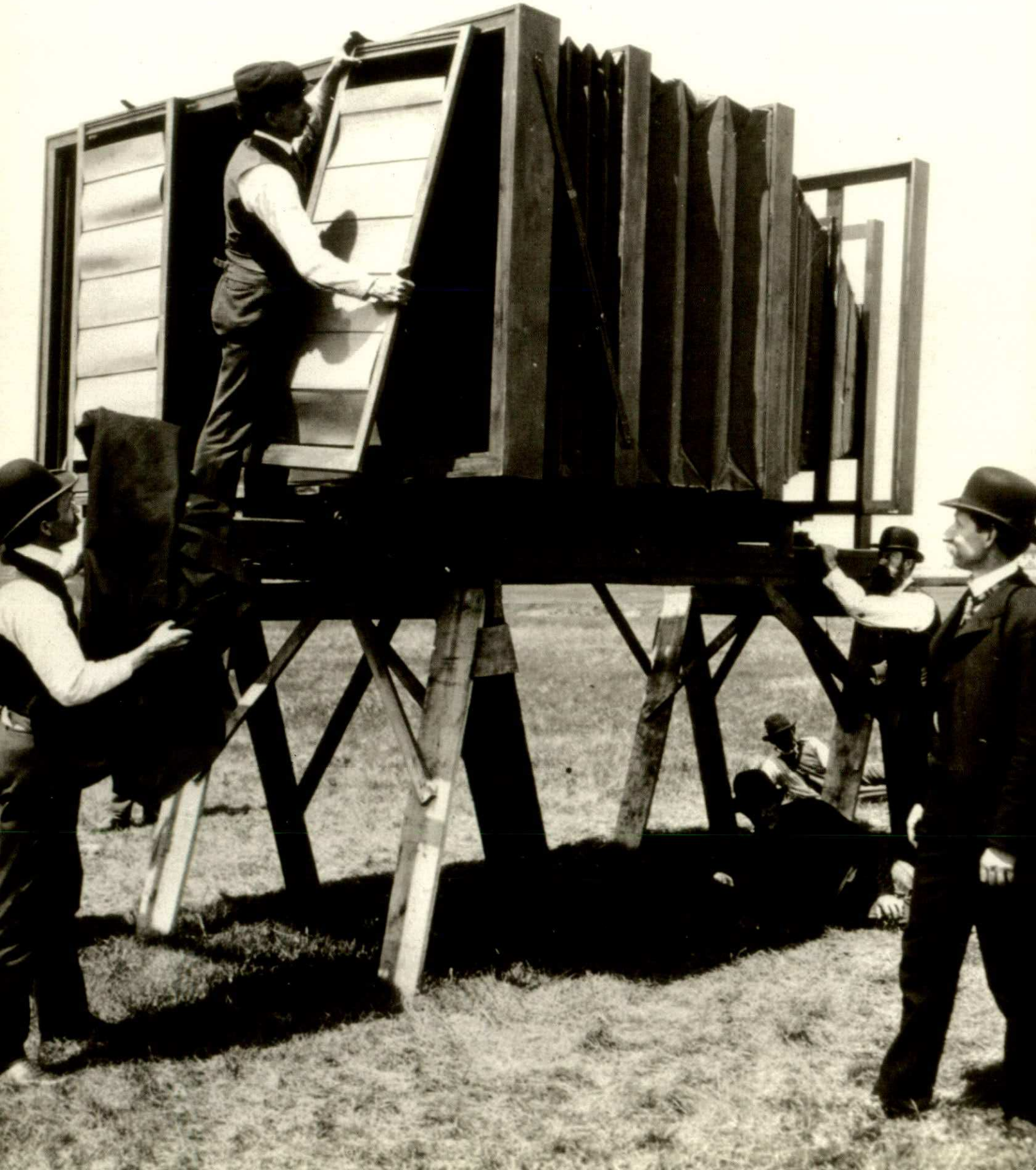
As leaders in the field of computer software and systems, Logica places considerable emphasis on quality – the quality of our staff and our work. At Logica, engineering methods and disciplines are the foundation for effective software solutions.

This year's Annual Review takes engineering as its visual theme. The engineer has made a significant contribution to many of the world's most important discoveries and inventions, and has had a substantial influence on the quality of life today.

We have tried to capture some of these moments in our review.

Front and Back Cover
The Great Eastern. Launched 1857. The ship's engineer, Isambard Kingdom Brunel, revolutionized ship design through technical advances which eventually led to the triumph of steam over sail.

◀ Coloured drawing for engine by Boulton and Watt. 1796. The appearance of engineering drawings as a fully fledged medium for communication in the engineering industry coincided with the establishment by Matthew Boulton and James Watt of the first factory in the world for the construction of stationary steam engines in 1773.



REVIEW OF THE YEAR

In a highly successful year, Logica achieved its objectives of strong organic growth, increased profit margins and investment in infrastructure, whilst maintaining good cash flow.

The year at a glance	
Turnover	£111 m + 27%
Pre-tax profit	£11.3 m + 66%
Post-tax profit	£7.1 m + 68%
Earnings per share	14.4p + 43%
Dividends per share	1.7p + 70%
Staff at year end	2,682+ 14%

Turnover was £111 million, up 27% from £87 million in the previous year. Pretax profit was £11.3 million, an increase of 66% over the 1986 figure of £6.8 million. The profit margin exceeded 10%, its highest level since Logica's early days. The number of staff employed, including those in related companies, grew 14% to 2,682.

Following a slightly reduced tax charge of 37%, profit after tax rose 68% to £7.1 million. Earnings per share, at 14.4p, were up 43% on an expanded share base.

The directors propose an increased final dividend of 1.2p net per share, making a dividend for the full year of 1.7p, compared with 1.0p last year.

Improved margins and good use of working capital resulted in net year end cash balances £1 million up on last year.

Operations

The split of turnover into categories showed much the same pattern as previous years: 29% in consultancy, 61% in custom-built systems (of which 9% is supply of hardware) and 10% in software products and systems kernels. In this latter category, it was decided to withdraw from the Xenix* operations which were sold to the Santa Cruz Operation. Logica's range of systems kernels continues to be supplied and enhanced. The year saw further development and excellent sales of GALLERY 2000™, the digital picture library. Major investments were started in two new systems kernels. FASTRADE™, the equities market-making system which has already been installed for three clients, is being extended to meet the requirements of dealers and traders across the whole spectrum of international securities and capital markets. The CPLEX.400™ communications software is being developed to handle the growing number of requirements to meet the emerging OSI standards.

Turnover split, 54% for UK clients and 46% for clients outside the UK, remained as before. Growth was evenly balanced between international and UK business.

A notable success in the year was the renewal of profitable growth in the US, with sales, revenue and profit targets exceeded. The Massachusetts-based division was constituted as a separate company, Logica Technology Systems Inc., a subsidiary of Logica Systems Inc. With its separate board and reporting structure, it is qualified to undertake a wide range of federal and defence projects, and work in this area has already started. In another important move, IBM has decided to market the Hogan Integrated Banking Systems, and this is generating increased support work for our specialist division based in southern California.

In Australia, there was continued rapid expansion and diversification. Work neared completion on the important BITS network for the four leading Australian banks. This and subsequent contracts have significantly increased our business in the finance sector. In a recent restructuring, the head office was moved to Melbourne and a new group established to develop work in the space and defence sector.

In Hong Kong, Jardine Logica won further extensions for the extremely successful Stock Exchange system, and obtained a range of new clients. Important sales of ON/2, the retail financial transaction processing system, were made in Thailand and in the Philippines. The new Jardine Logica operations were officially opened in Taiwan.

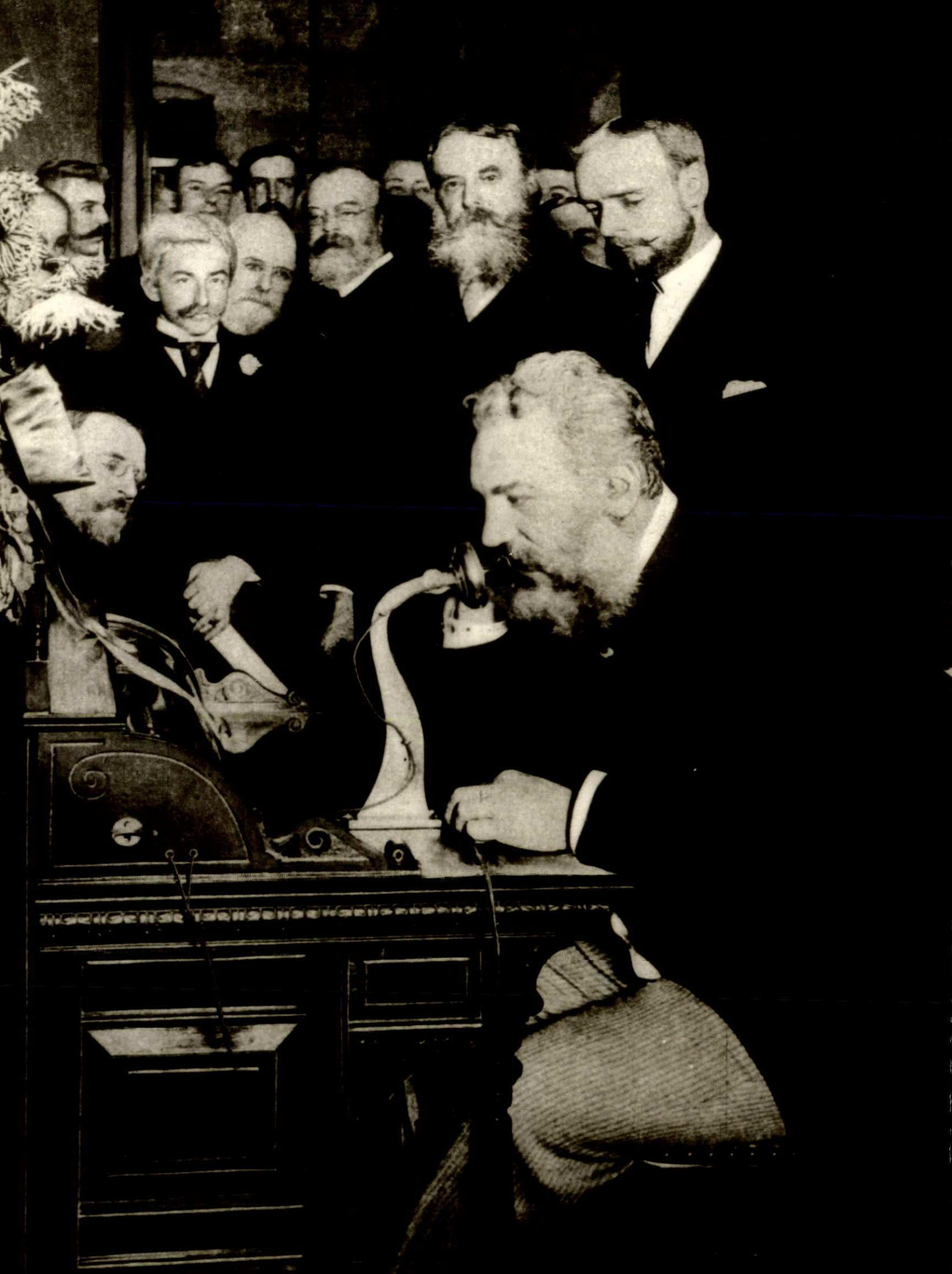
Work for clients in continental Europe expanded to reach 30% of Logica's worldwide turnover. In the largest operation, Logica BV in the Netherlands, expansion in the government and banking sectors compensated for slower sales in the traditional control systems area. We moved into a new purpose designed office in central Rotterdam and opened the first regional office in Groningen.

In Germany, Logica obtained by far its largest contract to date – for the ports of Bremen and Bremerhaven. The technology being developed for the management and control of the container port is already being considered by port operators elsewhere in the world. Logica Svenska made excellent progress, with sales of new business particularly strong towards year end. The work on the SMART reservations network for the Scandinavian airlines is highly relevant to other international airline and travel companies. In Brussels, Logica SA/NV continued to expand its already wide client base, particularly in the banking sector, and gained further work on the European space programme. In Italy, Logica General Systems played an increasingly important role in the Logica group. The company maintained its strong presence in the important manufacturing sector. Close cooperation between Italy and the UK has led to important contracts in broadcasting and banking.

Many major projects were undertaken in countries where Logica does not yet have operating companies. In France, a large contract was obtained for EUTELSAT to control the new generation of communications satellites, and telecommunications software development was carried out for CIT Alcatel. In Austria, two networks are being developed for the country's leading banks: an EFTPOS network; and a secure interbank clearing and communications system. Extensive teletext systems were supplied in Switzerland. And in Denmark, Logica has a permanent staff of a dozen and we expect to move soon to establish a full operating company. Conditions in the Gulf area forced us to withdraw from a major banking project; the associated costs have been fully provided for.

In the UK, all six operating companies showed good growth, reflecting both the overall strength of the market and Logica's leadership in a number of sectors.

◀ The Mammoth. 1900. During the early decades of photography if you wanted big pictures, you used a big camera! The Mammoth, the largest camera of them all, was designed to take a single picture of a luxury express train. The picture won the Grand Prize of the World at the 1900 Paris Exposition.



Logica Communications and Electronic Systems dramatically exceeded sales targets. Highlights in the rapidly expanding broadcasting and media sectors included sales of GALLERY 2000 and the development of picture handling systems for Reuters. Major turnkey projects were won for the UK government in Northern Ireland, and AT&T and Philips Telecommunications. Work for the transport sector widened to add projects for the airlines to those in urban transport and shipping.

Logica Energy and Industry Systems further strengthened its position in the supply of data acquisition and control systems to the UK water industry. The very large British Gas control system neared completion. Of great future importance was the rapid growth in automation work for the manufacturing industry. Major projects were undertaken for Ford and Jaguar Cars.

Logica Financial Systems had an excellent year, both in the UK and in exports. Many commentators felt that after the hectic rush before the so-called Big Bang in October 1986, demand in the finance market would be lower. This has not been our experience. Requirements for automation and new services are so demanding that banks and the securities industry are increasingly turning to Logica for assistance, both for entirely new systems, and for the redevelopment of previous systems.

Our defence business continued to grow profitably, despite pressures on the defence market in the UK. Funding in a number of specialist areas is on the up and Logica is very well placed in a good proportion of these. Logica Space and Defence Systems expects to obtain a good share of the large, and very competitive, UK and NATO programmes. Work in space expanded rapidly with our leadership in the software part of the design studies for the proposed Columbus Space Station.

Logica Consultancy expanded very profitably. Many of its projects are highlighted in a separate section on consultancy, an activity that spans all of Logica's markets.

Logica Cambridge added a VLSI custom design capability to its work in software engineering, knowledge-based systems and voice and image recognition. The pay off from research undertaken in previous years was demonstrated by the winning of commissioned projects for the systems companies.

The continuing growth of the UK operations has led in the past year to major office expansion. An opportunity arose to purchase our office at Cobham Park. Whilst it is not normally our intention to purchase offices, the circumstances at Cobham convinced us that the £2 million investment was most worthwhile. Logica Financial Systems moved into large new premises in central London and Logica Energy and Industry Systems made a move outside London, transferring most of its operations to Leatherhead in Surrey. We opened a new office to serve finance, computing, communications, government, industry and energy clients in the Manchester region. Further plans are being drawn up both in and out of London.

Software engineering

For many years it has been recognized that software development needed to change from a science or an art into an engineering discipline. The broad sense of direction for the necessary evolution has been clear, but progress on the establishment and application of practical standards, tools and methodologies has until recently been painfully slow.

Logica has a high reputation for project management-based systems refined through many years of experience. To complement these, we have for several years run an internal programme called Sesame. Sesame has identified, evaluated and promoted standards, tools and methodologies that have been successfully applied to software development both inside and outside Logica.

With the current state of technology it has now been possible for us, even with our wide range of work, to define a policy on what methods, tools and techniques are preferred in Logica. We are supporting the implementation of this policy by training courses, reports and consultancy to all the operating companies.

Successful application of formal methods still depends on the skill and experience of our individual members of staff. However, it will be increasingly appropriate for those involved in our software development activities to be formally recognized for what they are – amongst the foremost professional engineers in the industry, with a sense of responsibility to society as well as to our customers and shareholders.

Staff

The number of staff employed by Logica worldwide has increased by 14%, from 2,348 to 2,682.

Logica attracts and retains high quality staff by providing stimulating work and challenging career opportunities. During the past year, approximately two thirds of the company's intake of fee earning staff were skill and application specialists recruited from elsewhere in the industry. The other third came to Logica through our graduate recruitment programme which continues to prove extremely successful in providing highly motivated entrants for our own staff development programme.

To sustain both individual career and company development, Logica continues to build a comprehensive training programme for all levels of staff, covering technical, interpersonal and management skills, quality standards, software engineering methodologies and project management and control procedures.

A company is only truly international when staff are able to move to responsible positions worldwide. In Logica we place an increasing emphasis on facilitating staff movement in order to enhance both career development and the transfer of technology and management expertise. At any one time about 5% of Logica staff are working on assignments or on longer term secondment with a Logica company in another country. Of Logica's more experienced staff, about a third have worked for Logica in two or more countries.

Directors

After the end of the financial year, Len Taylor, the Managing Director and Chief Executive, announced his intention to step down. The company and its shareholders owe him a very great debt for his leadership throughout the life of Logica. We are all very pleased that he has agreed to remain involved with Logica as a non-executive director. The position of Managing Director and Chief Executive has been filled by David Mann, who was previously Head of Operations. David Mann has been with Logica from the company's earliest days and has been a board member since 1976.

During the year, Steve Stevenson who has successfully headed operations in both the Netherlands and the US, was appointed to the board. He continues as President of Logica Systems Inc.

The future

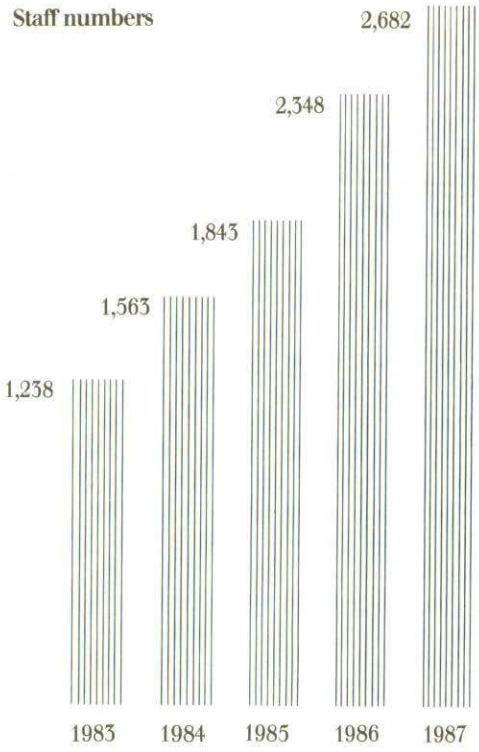
Last year, and in years previous, we have pointed to the rapid expansion of the computer software and systems industry around the world. We went on to say we saw no sign of this slackening. This still holds true.

While our industry is now very well established, with worldwide software revenues in excess of US$ 50 billion, great developments lie ahead. The world majors in this industry will expand to positions where the scale and importance of projects undertaken dramatically exceeds that at present.

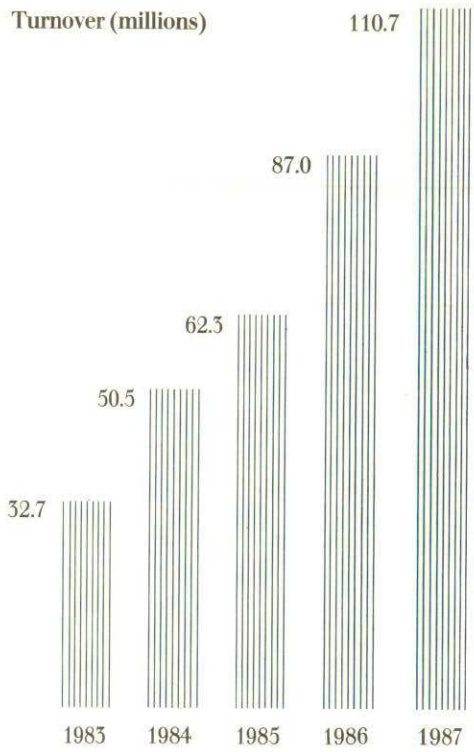
In Logica, we believe we are positioned to be one of these world majors. That is our goal. A great deal has to be achieved to establish this, but we have in our eighteen years built up the capability, the reputation and the staff to achieve our goal. The year ahead, and the years beyond, promise well.

◀ Alexander Graham Bell, the inventor of the telephone, making the first telephone call between New York and Chicago on 18 October 1892.

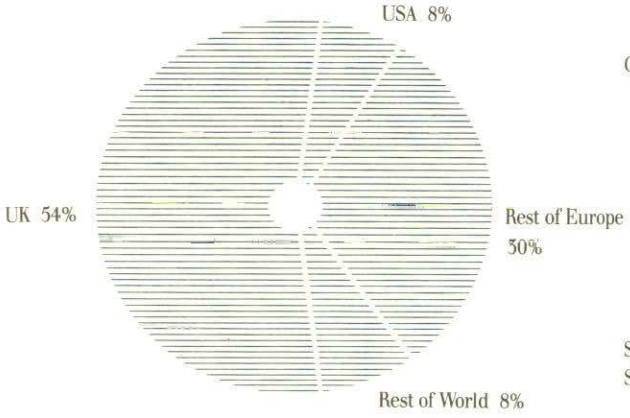
Staff numbers



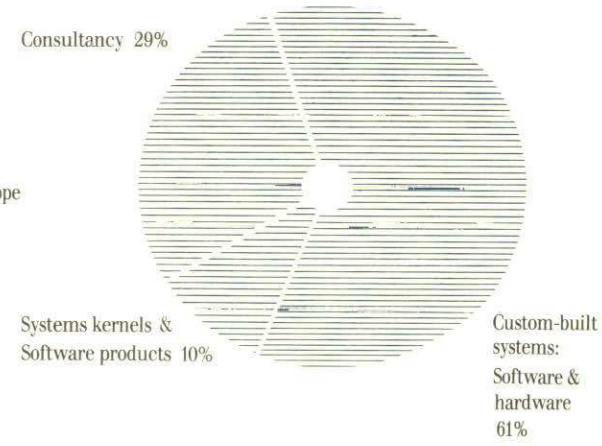
Turnover (millions)



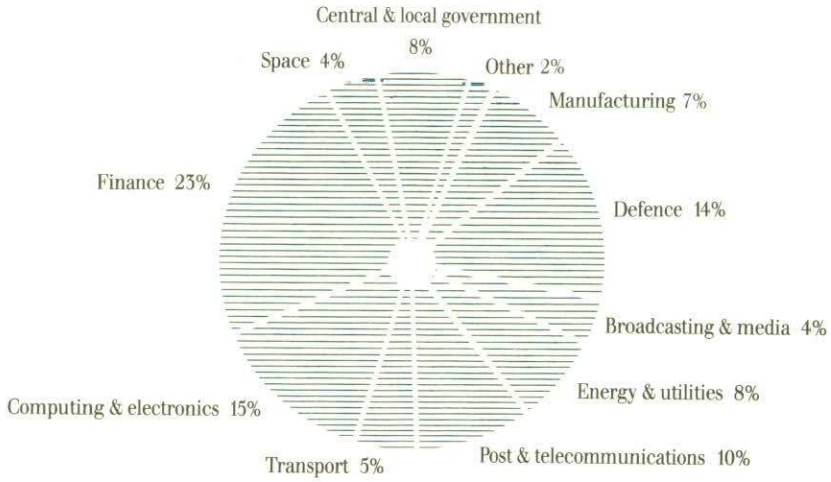
Analysis of turnover by client location



Analysis of turnover by activity



Analysis of turnover by market sector



Grinding a locomotive wheel. Symbol of the archetype of engineering invention.

FINANCE

Logica's services are directed at three of the major streams in the financial market: retail finance, corporate finance and investment systems.

In retail finance, redevelopment of core systems is an important part of our work, although much of it is confidential. Demand continues for our ON/2 software product used for handling point-of-sale and automatic teller machine transactions. ON/2 sales made during the year include one to the SIAMNET network in Thailand and one to Postbank in the Netherlands.

Logica is well positioned for growth in the corporate finance area, which includes interbank services and international systems as well as commercial banking services for large organizations. Demand continues for Logica's FASTWIRE™ product, developed in the US for funds transfer and message switching and sold worldwide.

Demand for investment systems is growing fast and Logica has built up considerable expertise in this area. We have recently worked on a design specification for future communications systems for the Copenhagen Stock Exchange and have developed a new trading system product, called FASTRADE.

There is increasing international interest in building high performance interbank networks. Logica has established a strong position in this area, following the successful implementation of the Clearing House Automated Payment System (CHAPS) in the UK.

Logica is currently working for the four major trading banks in Australia who are developing an electronic system exchanging high value payments for same day value. As the main software contractor, Logica is developing the control part of the system to run on Tandem hardware. The Bank Interchange and Transfer System (BITS) will be one of the most advanced systems of its kind in the world, enabling the financial community to move high value funds quickly, easily and in a highly secure environment.

A rapidly growing area of Logica's activity in retail banking is in our support to users of Hogan Systems' Integrated Banking System. This is a complex software package which runs on IBM mainframe equipment and provides functionality for managing a customer information file, and for processing consumer, commercial and mortgage loans as well as demand and time deposits, while supporting other core banking systems.

Logica has built up considerable expertise providing users with comprehensive support throughout the systems development life cycle, from planning to implementation and training. We have developed a special product, the Logica Conversion System, which automatically converts customers' loan and deposit data to the corresponding Hogan database formats while providing fast loading capability for customer information records.

Demand for Hogan consulting is high, not only in the US but worldwide. In the US, Logica is working for several organizations who are implementing the Hogan system, including *Gibraltar Savings* and *Great Western Bank*. In the UK, Logica is currently working with *Lombard North Central*, for whom we have developed a Hogan-based product called the Business Information System. BIS serves as the basis for an entire management reporting subsystem, providing a repository between the transaction and decision support systems.

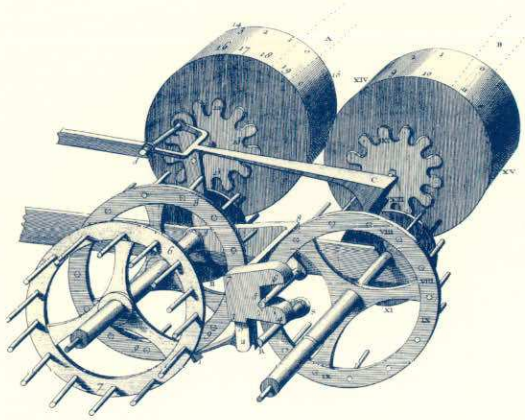
Logica has added another system to its FAST family of wholesale financial products which are marketed worldwide. FASTRADE, as it is called, is a front-office system which supports trading in UK and international equities, futures, options and currency markets.

FASTRADE was originally developed in conjunction with stockbrokers *Phillips & Drew* in time for last October's deregulation in the City of London. It provides a secure and responsive solution to the varied needs of traders, sales staff and management.

FASTRADE has also been implemented at the international investment bank, *Drexel Burnham Lambert*, who are using it for trading on the UK and international equity markets. The system runs on Stratus and IBM fault tolerant hardware and is designed for growth and fast response times.

G*ABE* (Geldausgabeautomaten GmbH), the Austrian bank services company, has awarded Logica a contract to develop a communications system for clearing for the Austrian banks. The Electronic Banking Communications System (EBK) will allow banks to receive instructions from their customers, pass payments to one another and report settlement figures and make account enquiries to the Austrian National Bank. EBK forms a common interface between banks and their customers so that customers may use more than one bank if they wish.

Clients in this sector include:
ABN · Access · American Express · Bank of England · Barclays Bank · Barclays De Zoete Wedd · Chicago Board of Trade · Citibank · Commonwealth Bank · Den Danske Bank · Drexel Burnham Lambert · Equitable Banking Corporation (Philippines) · eurocheque International · European Payment System Services · Funds Transfer Sharing · GABE · Hong Kong and Shanghai Bank · Inter-American · Istituto Bancario San Paolo Di Torino · ITEC Bank · J Henry Schroder Wagg · Kredietbank · Lloyds Bank · Lombard North Central · Marine Midland · Midland Bank · Midland Montagu · Morgan Grenfell · National Australia Bank · National Westminster Bank · Oslo Stock Exchange · Phillips & Drew · Postbank (Netherlands) · Savory Milln · Sparekassernes Datacenter · Stock Exchange of Hong Kong · Toro Assicurazioni · World Bank



◄ Banknote printing room at the Bank of England. 1854.

The digital counting machine was built by the French mathematician and physicist Blaise Pascal in 1642 when he was 19 years old. ►

POST AND TELE-COMMUNICATIONS

Fierce competition following the liberalization of telecommunications services in both the US and UK means that a high level of attention is given to cost and efficiency. New technologies, such as integrated services digital networks, are being increasingly applied and Logica's expertise in this field puts us in a strong position to gain new business. Moves are now underway in many European countries for deregulation, giving Logica added opportunities for further penetration of the international markets.

In addition, telecommunications and postal services are facing public demand for new facilities and better service, encouraging them to look for new, market-oriented, approaches. Logica is carrying out work for a number of post and telecommunications organizations worldwide, on projects ranging from real-time control and exchange level systems to work on data processing for large operational and administrative tasks.

For *Télic-Alcatel* in France, Logica is developing a system application for use by customers of their 2600 PABX. The system, named Système d'Annuaire et de Gestion d'Enterprise (SAGE), can be accessed by users via videotex terminals or through VDUs switched via the PABX.

Logica's SAGE system will provide Télic-Alcatel's customers with automatic cost calculation of calls, on-line data retrieval and update of telephone directories, file transfer in between different sites and various statistical reports on PABX usage. The system allows customization of the user interfaces and the structure of the directories.

Logica has been selected to lead a multi-million pound project for *EUTELSAT*, the European Telecommunications Satellite Organization. Working in collaboration with its main subcontractor, the French company, Alcatel Espace, Logica is responsible for the supply of a system for the in-orbit control of a number of Eutelsat's second generation satellites. The satellites are to meet telecommunications requirements in the areas of television, telephony and business services within Europe.

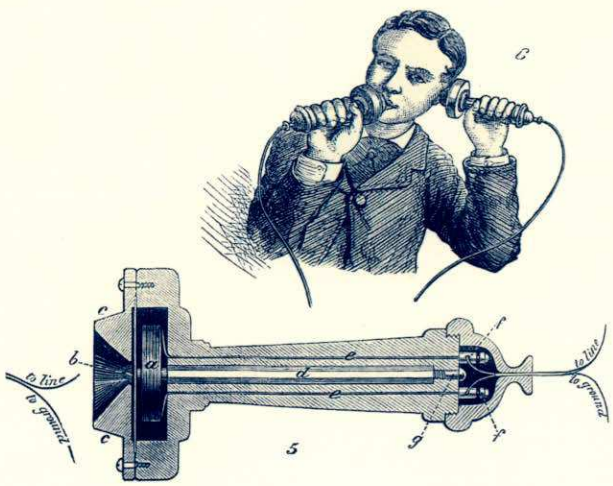
Alcatel Espace is to supply the entire telemetry, command and ranging (TCR) baseband equipment while Logica is to supply the Satellite Control Centre in Paris, the relevant central system software and the TCR station computers and software.

The control centre software to be developed by Logica will be based on the latest generation of the Multi-Satellite Support System originally developed for the European Space Agency.

Since 1985, Logica has been involved in a number of roles in the development and implementation of *Australia Post's* public electronic mail system, E-Post. This is an enormous project which has enabled Australia Post to supplement its physical mail services with a nationwide and international electronic text messaging service. Considerable extension of the range of services and system capacity has been planned to occur over the next few years.

Logica's involvement began when we carried out the initial functional requirements analysis for the E-Post system. More recently, an important part of Logica's work has been on software acceptance and quality assurance of the software. In addition, Logica has carried out network dimensioning and currently has responsibility for the requirements and design specifications for enhancements to the communication and E-Post software.

Clients in this sector include:
ATEA · British Post Office · British Telecom · CNET (France) · Dutch PTT · Eutelsat · Finnish PTT · GEC Telecommunications · Inmarsat · ITT · Philips Telesoft International · Postverket (Sweden) · Siemens Belgium · SIP (Italy) Télic-Alcatel · Telindus



◀ The field installation of Marconi's wireless. In 1885, Marconi transmitted morse code messages by wireless telegraphy over a distance of a mile near Bologna and two years later formed a company for its commercial exploitation.

Professor Alexander Graham Bell's portable telephone. ▶

BROADCASTING AND MEDIA

The recent and radical changes in the media scene, including the introduction of new printing methods, electronic publishing and electronic transmission of text and images, are beginning to provide new and exciting opportunities for Logica. In the broadcasting area, Logica's teletext system, PAVANE™, continues to be attractive, with new orders from the *Italian Broadcasting Authority (RAI)* and from the *Swiss Teletext Corporation*. The increase in satellite broadcasting around the world is providing new developments in the market, particularly in the field of one-way data transmission. Demand for Logica's television still picture library, GALLERY 2000, is growing fast, with several sales already made, including *TVS* and *Thames TV* in the UK and *TV Ontario* in Canada.

Logica's GALLERY 2000, which was launched in Summer 1986, is a digital library system for the long term and secure storage of still pictures. The first customer was *Television South (TVS)*, the independent broadcaster for the South of England, who bought two systems for their production centres at Maidstone and Southampton. The main advantages of GALLERY 2000 to a television station such as TVS are the ability to maintain the quality of pictures stored and broadcast, and the speed and ease of access and picture manipulation.

The system works by converting a picture from an analogue television form to digital form and then storing it to be called up as needed. The problem of storing large amounts of data was solved by using the new technology of optical disks, which are resilient, easy to access and compact. Each GALLERY 2000 system supplied to TVS is capable of handling up to 35,000 pictures.

With the GALLERY systems, TVS can select pictures from their central libraries and automatically transfer them to a number of stills stores in their studios. They can then sequence and manipulate the pictures for use on a particular programme. All transfer and processing is in digital form thereby eliminating any degredation in picture quality.

Logica has contributed to the development of a news picture terminal for *Reuters* which will be supplied to clients of Reuters' worldwide news picture services. Based on standard Reuters equipment, the new Reuters News Picture Terminal (RNPT) can receive pictures from three incoming channels and store up to 120 shots on disk. The system provides facilities for the selection and processing of pictures using a high-quality video screen. Only the required images, sized, cropped and ready for paste-up, are output to the wirephoto receiver for hard copy.

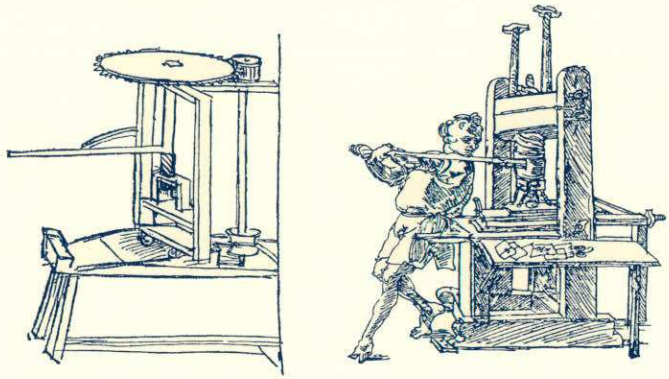
To convert Reuters' standard equipment into such a powerful image capture system, Logica had to develop special input/output boards and fit a large 260 MB Winchester disk. To accommodate the large amount of logic required within the confines of a PC, Logica adopted the use of the latest programmable array logic elements, together with multilayer printed circuit boards.

In November 1986, 900 years after William the Conqueror's original Domesday Book, the *British Broadcasting Corporation (BBC)* launched the twentieth century Domesday project – a study of Britain in the 1980s. The modern Domesday Book is not a book at all but a pair of interactive videodiscs accessible by microcomputer. The whole project is an important milestone in the application of advanced interactive video, a technology which allows a combination of moving and still pictures, sound and data, and computer programs.

The initial challenge for the BBC was to gather data from a huge variety of sources, including 15,500 schools and community groups. The data then had to be prepared for mastering on the videodiscs. Logica designed a database system to keep track of all the entries from volunteer groups around the country and translated information from many different data sources to a common format.

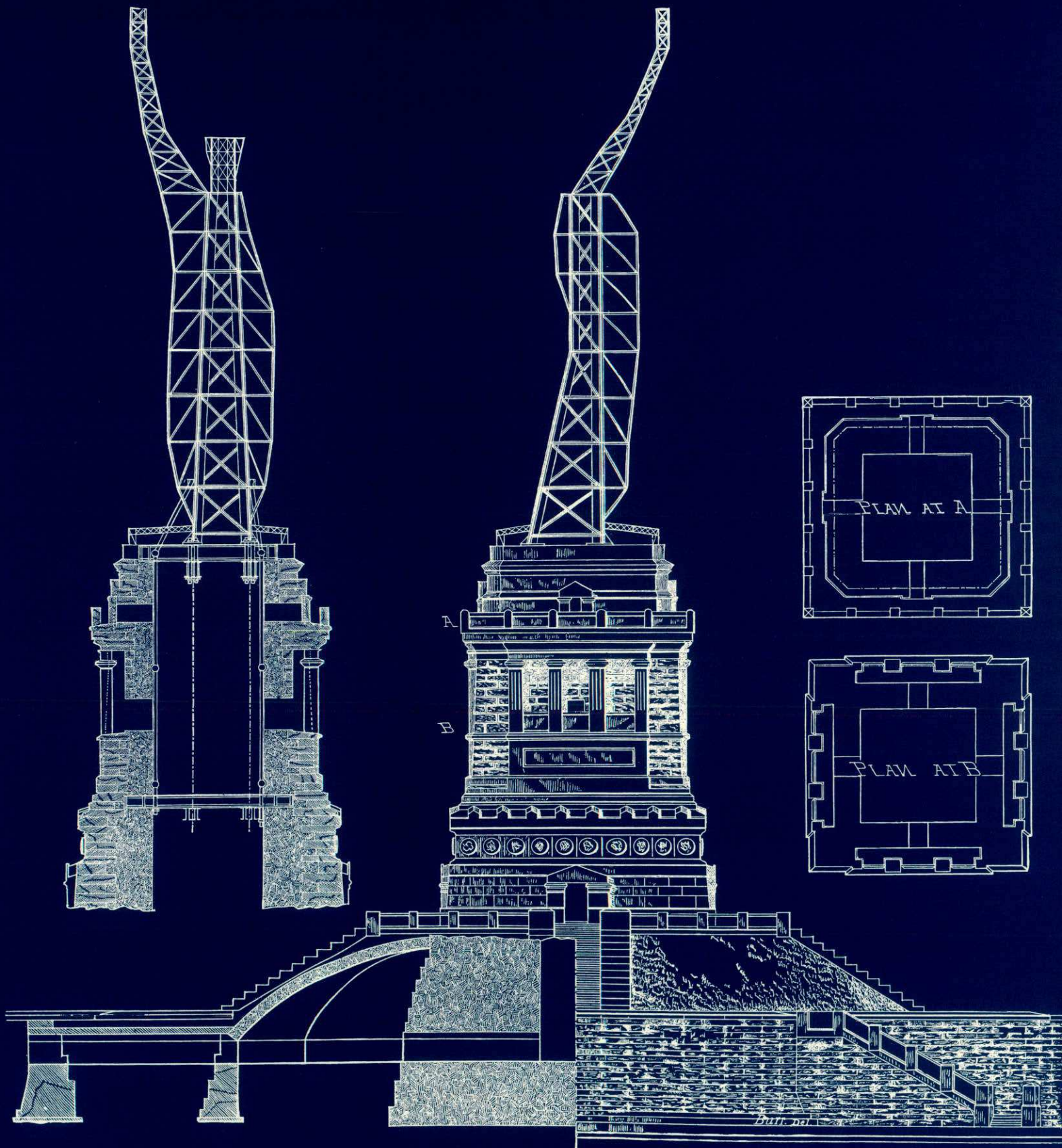
Logica's role has also been to implement the retrieval software. A great strength of the system is the ease with which the non computer literate user can move around the Domesday discs, freely changing from map to photograph to text to data display. The software had to be highly structured and written in modular form to make it as reusable and transportable as possible.

Clients in this sector include:
British Broadcasting Corporation (BBC) · Central TV · Elsevier Science Publishers · Esselte Pay-TV · Fininvest · L'espresso · La Stampa · ORF (Austria) · RAI (Italy) · RCS (Italy) · Reuters · Sender Freies Berlin · Swiss Teletext Corporation · Television South (TVS) · TV Ontario · Vlaamse Uitgeversmaatschappij



◄ Filming the famous Metro-Goldwyn-Mayer lion. 1929. A number of pioneers, notably Muybridge, Marey and Edison, contributed to the development of cinematography, but it was the Lumière brothers who projected the moving picture on to a screen in Paris in 1895. This event marked the beginning of the cinema as we know it today.

Images of early printing presses by Leonardo da Vinci (left) and Albrecht Dürer. ►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PLAN AT A
PLAN AT B

CENTRAL AND LOCAL GOVERNMENT

Logica provides consultancy software and turnkey systems for local and central government administration, as well as specialized systems for police and other government services. Our work for police forces in a number of countries this year included command, control and communications, fingerprinting and criminal record systems. Part of Logica's government work is in the development of secure systems and we have now built up considerable expertise in this important field.

Logica is winning an increasing number of important contracts in the government sector, particularly in the UK, the Netherlands, Australia and Hong Kong. Procurement cycles continue to be relatively long but the projects now tend to be larger, as governments seek total solutions from single suppliers.

In the UK, about 24 million people have over £1,900 million invested in the Government's Premium Bond Savings Scheme, run by the *Department of National Savings*. Interest earned on this money is used to fund weekly and monthly prize draws. The winning Premium Bond numbers are generated and processed by Electronic Random Number Indicator Equipment, known more affectionately as ERNIE.

In 1985, Logica was asked to design and develop a new generation ERNIE to replace the existing fourteen year old system. Key considerations in developing the new ERNIE have been to ensure security, reliability and the completely random generation of the prize winning numbers.

The new random number generation is performed by a hardware device, custom designed and built by Logica, and based on the existing technology of noise-emitting diodes. It is the speed and improved security of the prize draw software which most distinguishes Logica's ERNIE system from its predecessors. It is designed to perform stringent corruption and consistency checks on numbers taken from the random number generator and checks for malfunction before transferring them to tape. Logica's design target was to generate and validate 180,000 bond numbers per hour – the system, which will be launched in late 1987, can in fact generate and validate 250,000 per hour.

In early 1986, Logica was awarded a major contract by the UK Government to establish a specialized computer security evaluation facility. This facility was set up under contract to the *Communications-Electronics Security Group (CESG)* to assist in its responsibility of ensuring the security of computer products and systems for handling classified material throughout Government departments. Logica's work, which is continuing, involves consultant support, the establishment of methods and tools for evaluation (including development where necessary) and undertaking evaluations tasked by the CESG.

Government procedures for the handling of classified data are extensive so that only those staff who "need to know" information may have access to it. The application of these procedures to information held on computer systems is very complex. Evaluation has to be applied to operating systems, networks, switches and terminals, and many architectures, varying from single central systems to multi-processor distributed systems. It is a technology which is rapidly developing, and has many uses in government and civil organizations. Logica is using its skills in software engineering, computer security, quality assurance and systems implementation to support the CESG in the advancement of this most important field.

Other contracts exist between CESG and Logica, including the development of some special computer devices.

Logica is working on a programme undertaken by the *Dutch Ministry of Social Affairs and Employment* to provide a nationwide information system for employment offices. The new system will enable job centres throughout the Netherlands to match requirements for job vacancies with the details of those looking for jobs.

Logica has played a central role in this programme since its inception and will continue to do so in all stages of development and implementation. Logica first became involved in 1985, when we conducted a study of the existing information system and found it would not meet future needs. Logica's recommendations for a new approach were accepted. We developed a prototype to define user requirements and defined the technical infrastructure of the system.

Logica has responsibility for technically co-ordinating the project, for developing and implementing all the applications software and for setting up the computer centres and the network.

The system will have around 1600 workstations, connected to 64 Data General minicomputers linked via the Dutch public packet-switched network.

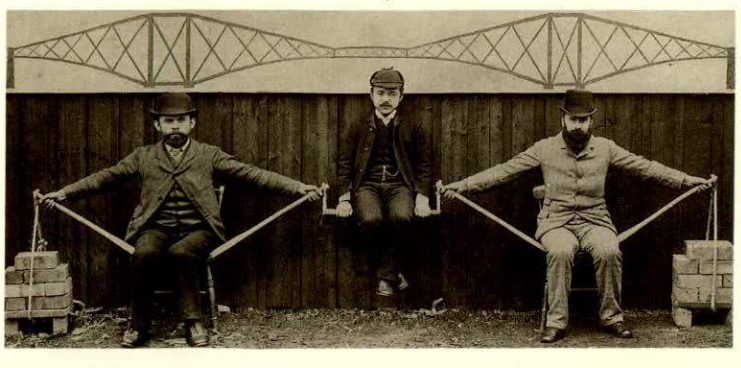
The *Department of Economic Development in Northern Ireland* has awarded Logica a contract for the supply of a turnkey management information system.

The system, which is to run on an ICL Series 39, will give management and operational staff at 29 jobmarkets and the youth training programme headquarters in Northern Ireland instant access to details of job vacancies and the kinds of training programmes and grants available.

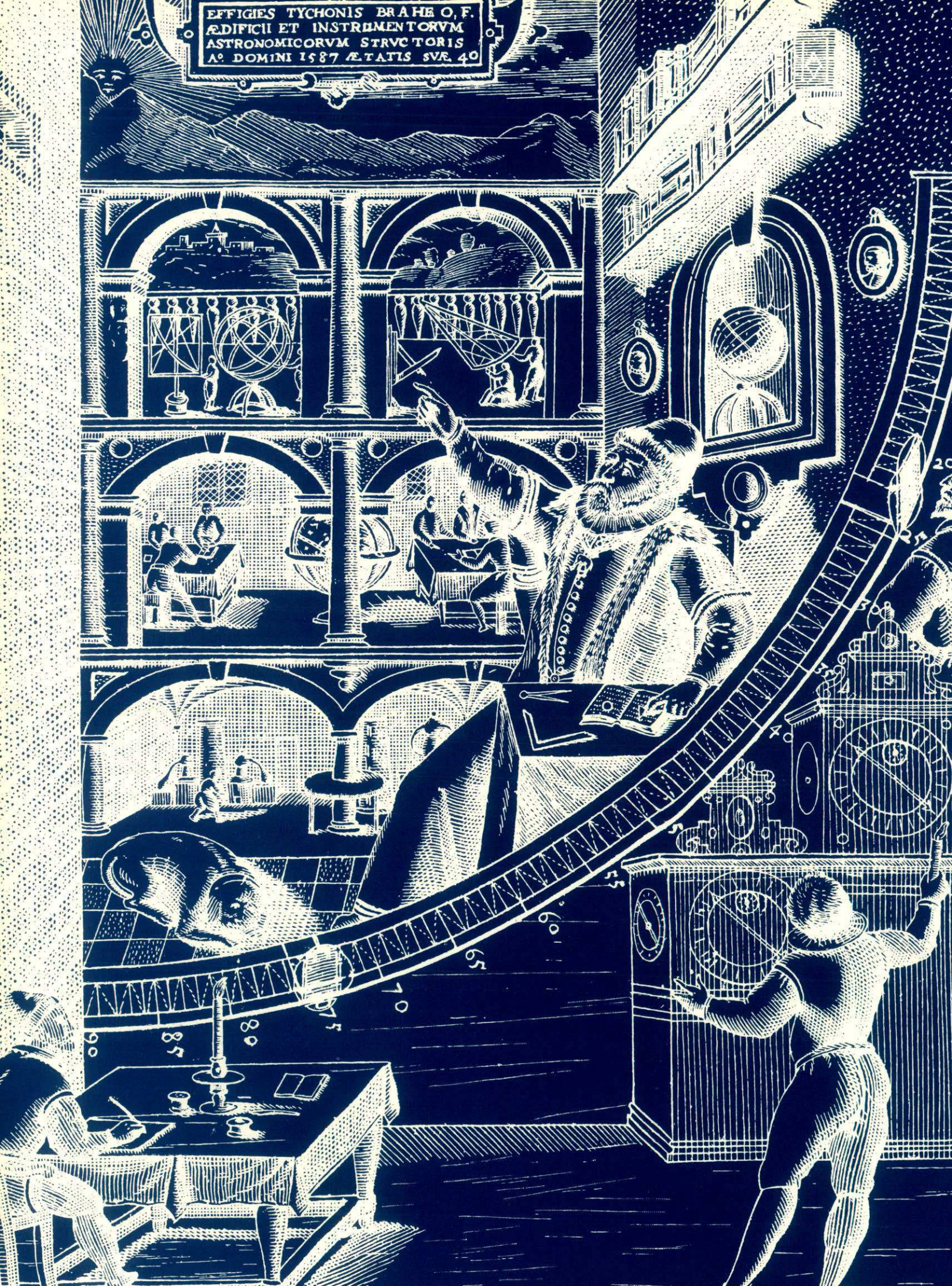
The new system will aid the department in offering a faster and vastly improved level of service to clients and employers. In addition it will reduce operational costs, eliminate much paperwork and allow for improved financial control due to availability of accurate information.

Clients in this sector include: Alvey Directorate · Belgian Gendarmerie · Belgian Ministry of Public Works · Building Research Establishment · Central Computer and Telecommunications Agency · Centrale Recherche Informatiedienst (Netherlands) · Dutch Ministry of Internal Affairs · Dutch Ministry of Justice · Dutch Ministry of Social Affairs and Employment · Government of Hong Kong · Greater Manchester Police · HM Coast Guard · Laboratory of the Government Chemist · Manpower Services Commission · Metropolitan Police · National Computing Centre · National Health Service · OFTEL · Projectbureau Schelderaddar (Netherlands) · Provincial Government Brabant (Belgium) · Rijksbelastingdienst (Netherlands) · Rijkswaterstaat (Netherlands) · UK Department of Economic Development in Northern Ireland · UK Department of Trade and Industry Radio Regulatory Department · UK Home Office

◄ The symbol of freedom. Elevations, plans and sections of pedestal showing the method of anchoring the Statue of Liberty.



Construction of the Forth Rail Bridge, 1883-1889. Demonstration of the cantilever principle. ►


EFFIGIES TYCHONIS BRAHE O. F.
ÆDIFICII ET INSTRUMENTORUM
ASTRONOMICORUM STRUCTORIS
Aº DOMINI 1587 ÆTATIS SUÆ. 40

SPACE

Logica continues to be a leading European supplier of information technology for space applications. We have experience of real-time systems providing high performance and reliability as well as a strong background in the planning and management of large and technically complex programmes.

Our involvement with the *European Space Agency (ESA)* has expanded, and we are now working in more programmes than ever before. Our work in space is broad and diverse, and not dependent on any one programme.

Logica's space work is also expanding in the field of satellite communications for commercial applications. We have now worked for an impressive range of space users, both private and international government-funded organizations. Our work for EUTELSAT is described in the Post and Telecommunications section of this report.

While much of Logica's work in space has been centred in one company, these skills are being expanded geographically and new areas of work are emerging.

Logica continues to work for the *European Space Agency* on several projects within the Columbus programme. Columbus is the European contribution to the international space station, the aim of which is to provide a permanent manned presence in earth orbit as a base for scientific and technological experiments and operations.

Logica's involvement has been increased by its appointment as manager of systems software across all elements of the programme. The Columbus programme is vast, involving over 50 companies from ten European countries working on a number of major elements. Great emphasis has to be placed, therefore, on commonality and standardization. Seven European software and space systems companies are subcontractors to Logica.

MBB-ERNO, the prime contractor for the main Columbus project, needed a contractor who could ensure a truly common approach in the design of software. Logica was chosen because of our recognized expertise in the design and development of software, for our international standing and for our experience in managing large projects. One of the roles of system software management involves analysing the software development requirements of the whole programme, reviewing the enormous range of software techniques available and making recommendations for the tools and techniques to be used by all the subcontractors involved.

As part of the Columbus programme, Logica is also assessing human factors and ergonomic design requirements for the crew workstations. The important interface between man and machine in the Columbus programme has been researched and a prototype of an adaptive user interface (AUI) developed for the British National Space Centre.

The AUI, based on intelligent knowledge based system technology, allows the interface to adapt to variables such as the individual characteristics of the user or the tasks to be performed. The information, feedback, or explanation provided to the user is then varied to suit the specific situation. Such a facility is particularly important in space as it can support a crew member in difficult and stressful situations.

Over the last year, Logica in Belgium has worked in a variety of roles on the Anthrorack project, part of *ESA*'s Spacelab utilization programme. In the Spacelab, which sits inside the Space Shuttle, are racks of electronic equipment and instrumentation for use by astronauts. Anthrorack consists of a double tier of instrumentation, designed to support research into human physiology under microgravity.

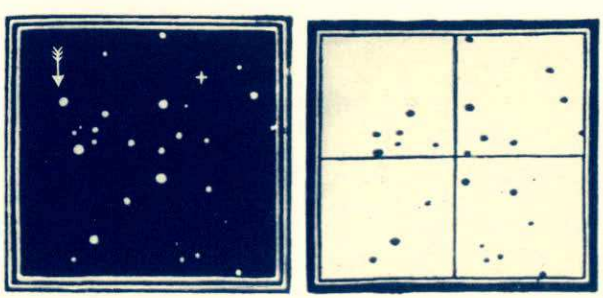
Logica has been involved in the software specification phase of the project, working for both Kayser-Threde and Aerospatiale. A particularly interesting part of Logica's work has been the development of a man machine interface prototype for Anthrorack. This included the design of a special high-level language called Experiment Description Language (EDL) which allows experiment definition to be entered in an English-like form. The result is that astronauts have far greater control over the progression of their work.

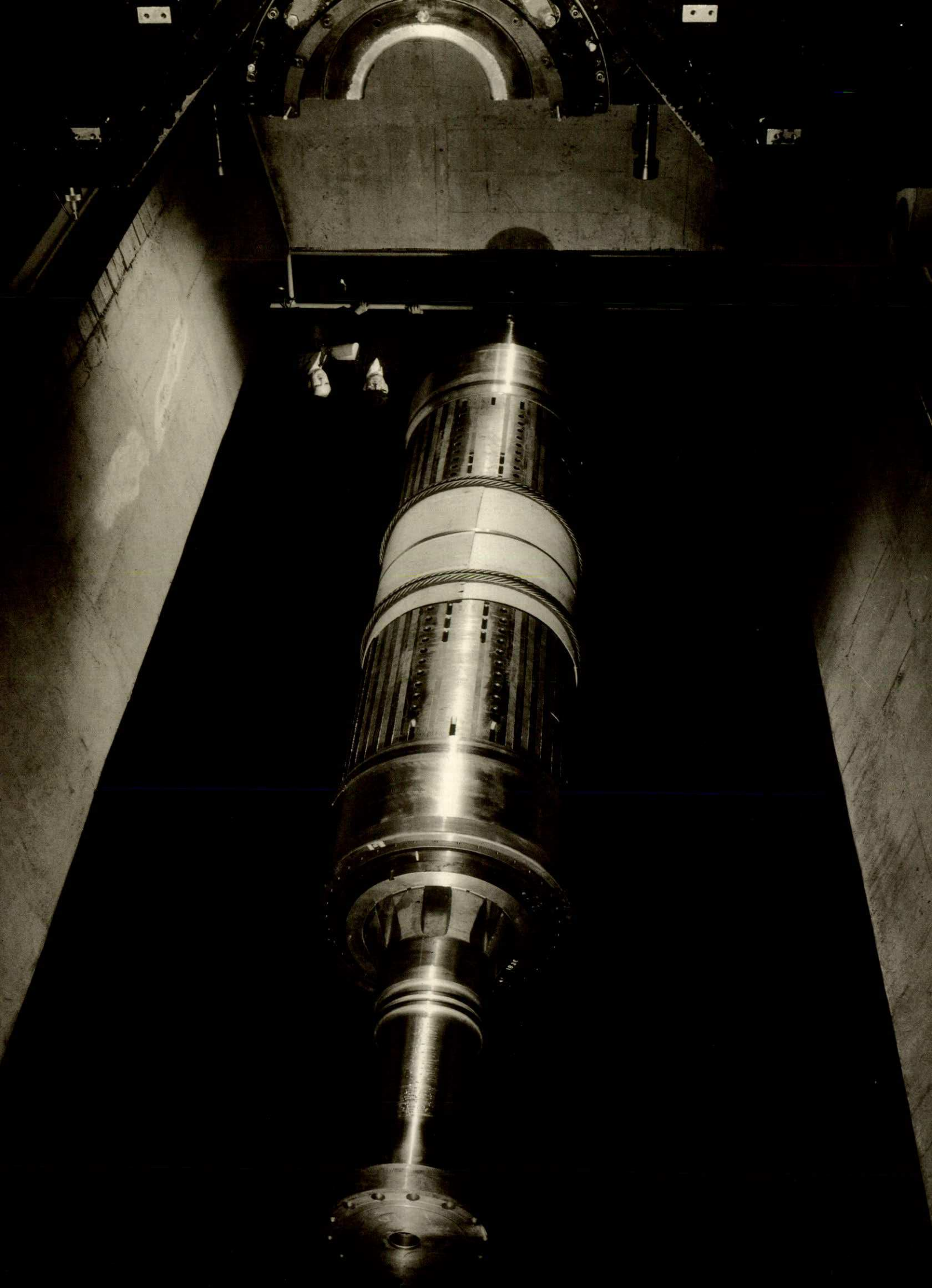
In addition, as a result of changes in the system concepts on the project, Logica has been contracted by MBB-ERNO to work on adapting the specification and architectural design of the in-flight software.

Clients in this sector include: Aeritalia · Aerospatiale · British Aerospace · British National Space Centre · DFVLR (Germany) · European Space Agency · European Space Operations Centre · Kayse-Threde · Matra · MBB-ERNO · UK Ministry of Defence

◀ Tycho Brahe (1546-1601) was a Danish astronomer whose planetary observations set new standards of accuracy. His assistant, Johannes Kepler, used the collected data in formulating his own laws of planetary motion.

The discovery of Neptune. 1846. When Galle and d'Arrest set out to look for Neptune, using calculations by Leverrier, they used a new star map of the area (right hand photo). The left hand photo shows the corresponding portion of the sky. Leverrier's estimated position for Neptune is shown by a cross; the arrow indicates the planet's actual position. ▶





ENERGY AND UTILITIES

There is increasing demand across this sector for the provision of operational management systems which offer the client an integrated solution to the manipulation of data and the workings of automated equipment. Logica's skills in systems integration, coupled with the development of our MASTER CONTROL™ supervisory control and data acquisition (SCADA) kernels, have won the company a leading position in the market. Logica has carried out work in several parts of the world on a number of important projects for oil, gas, electricity and water organizations.

In the oil industry, Logica's involvement has, for example, extended to scientific applications. For *Gearhart Geo Consultants* we have developed a palaeontological database system, called STRATS, which helps in the identification of rock stratification and the determination of geological history.

Logica was awarded a contract in 1985 to develop, install and commission the new National Gas Management System for *British Gas*. Development is now complete and the main system is undergoing rigorous factory trials this year. Installation and site testing of a number of the twelve satellite processors in the regions has already been completed.

The purpose of this system is to provide monitoring and control for the British Gas supply network which conveys natural gas from four coastal terminals through some 3,500 miles of high-pressure pipeline to over 100 offtakes where the gas then passes into the transmission systems of the twelve Gas Regions. The central supervisory system is based on Logica's MASTER CONTROL telemetry package running on a network of three Digital VAX 11/785 processors to provide a very high level of system availability in duty, standby and emergency development roles.

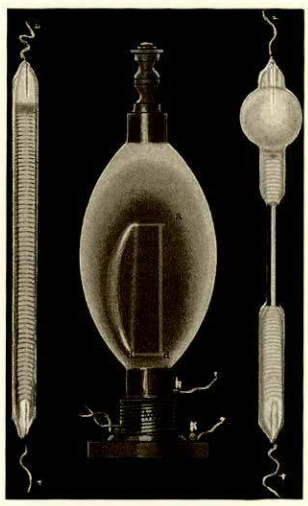
The new system is designed to meet British Gas's requirement for faster, more responsive and more reliable control of gas supply throughout Great Britain. Analysis and prediction of the gas network's performance, taking into account daily variation in consumer demand, facilitates more efficient management of pipeline operations.

Logica has also worked on the development and installation of the most advanced water management system in South East Asia. Logica has developed, in conjunction with contractor Bumi Kejuruteraan, a sophisticated remote monitoring and control system, based on our MASTER CONTROL package, for the *Selangor Water Works* in Malaysia. A central system supplied by Logica communicates with 103 remote telemetry stations, via narrow-band UHF radio, to monitor and control the operation of one major dam, 100 water reservoirs, 60 pumping stations and 13 treatment plants throughout the Klang Valley. These installations currently produce about 1,200 million litres of drinking water daily.

During the year, Logica was awarded a major contract by the UK's *North West Water* for its new regional telemetry scheme. The initial order was for some eighteen DEC-based master stations running Logica's MASTER CONTROL package plus several hundred of our MEDINA outstations. This represents the first stage in North West's strategy for the introduction of an integrated operational management system throughout the region.

Logica has also won major new contracts from *Anglian Water's* Colchester and Oundle divisions for MASTER CONTROL systems. This confirms Anglian Water's decision to standardize on Logica telemetry systems in all five divisions and clears the way for the introduction of an integrated operational management system. A further step in this direction was the completion of the fully automated water treatment works at Alton, where control is now being performed by MEDINA outstations with a MASTER CONTROL system linked to the divisional telemetry system at Norwich. (The Alton scheme is one of the largest automated plants in Europe and was opened by HRH The Princess Royal early in July).

Clients in this sector include:
Anglian Water · ARCO British · BP · British Gas · Distrigas · DOWA · DSM Aardgas · Gasunie · Gearhart Geo Consultants · Hamilton Brothers · Kuwait Petroleum · Marathon Oil · Mobil Oil · North West Water · NOVA · Panhandle Eastern Pipe Line · Paktank · Petroleum Development Oman · PNEM (Netherlands) · Praxis (Netherlands) · Rotterdam-Antwerpen Pijpleiding Mij · Rotterdam-Rijn Pijpleiding Mij · Royal Shell Exploration and Production Laboratory · Selangor Water Works · Shell · Shell Pipeline Systems · Total Oil Marine · UK Atomic Energy Authority · Valero



◄ A rotor being lowered into a balancing pit.

Coloured discharges in Geissler tubes filled with rarified gas. Investigations of these phenomena led to discovery of cathode rays, x-rays and electrons. ►

MANUFACTURING

Manufacturing companies all over the world are having to operate in an increasingly competitive international market. They are therefore becoming more concerned with reducing the lead time of product development and their operating costs while increasing the quality of their products. The benefits of advanced computing and the effective use of information across the manufacturing enterprise are being increasingly accepted. Logica's experience in consultancy and in developing integrated solutions together with our ability to offer support on an international scale ensures us a strong presence in this sector.

In addition, Logica has experience in applying advanced technological expertise to specific manufacturing tasks. An example of this is the recent development of an expert system to support the formulation of industrial products.

Jaguar Cars and quality have become synonymous. In its most recent commitment to quality assurance, Jaguar has awarded Logica a contract to develop a quality surveillance centre at its car assembly plant in Coventry in the UK. Jaguar wanted a fast, reliable method for identifying and correcting faults and for identifying the source of quality problems.

The challenge in designing a system to meet Jaguar's requirements was in providing an interface with the inspectors, processing their findings and dealing with the information in real-time. The problem provided Logica with an opportunity to put into practice our knowledge and experience in the field of speech technology. According to Jaguar Cars, Logica's solution represents a well balanced blend of industrial business sense and expertise in the application of advanced technology.

The system changes the whole way in which a production line inspector works, replacing the traditional clipboard and quality report card with a radio headset. The computer synthesises human speech to direct the inspection process, and the inspector reports by speaking to the computer. Details of any faults found are rapidly fed back to the assembly lines warning workers of developing problems.

For the *Ford Motor Company*, Logica is assisting in the development of a system which will control new model launches, enabling Ford to meet its goal of bringing quality products to the market faster. This is the first phase of a project to develop integrated information systems to support Ford's European engineering and manufacturing operations. The systems will be based on an IBM mainframe using IMS database technology.

In the past, Ford has developed its own business systems software, but on a project as large as this, Ford needed the committed level of resource that Logica could offer.

Benefits of the new system include efficient scheduling and functioning of new part, standardization and coordination of part procurement and scheduling control of new vehicle launches. The first phase has been operational since October 1987 to support the introduction of a new model. The second phase of the system will be implemented in 1988. The system will also monitor and control the implemention of improvements to existing models.

Logica General Systems has supplied and installed the Tzar package for *Franco Tosi Industriale*, an Italian manufacturer of steam generators and turbines, hydraulic turbines, pumps and thermal cycle components. Tzar is a manufacturing resource planning package, distributed by Logica General Systems in Italy, which is of particularly benefit to manufacturers whose production is on a project basis against client orders. In addition, Logica General Systems provided extensive training, support and consultancy to Franco Tosi in an implementation process that has continued over the past year. It has involved both implementation of the package in the plant and integration with other client systems.

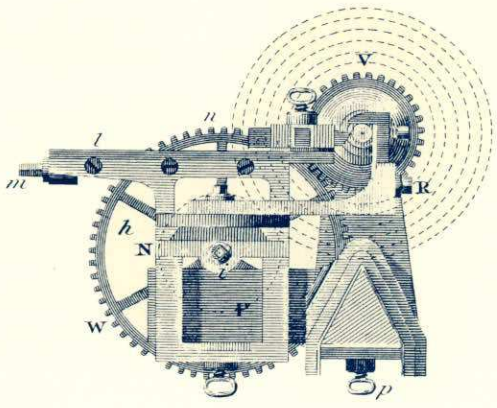
One of the main benefits to Franco Tosi of the new system is that by facilitating more efficient management of production resources and automatic handling of due dates, reductions in delivery times and production costs are achieved. At present, preparation is beginning for the next phase of implementation which is the installation of on-line shop floor data collection systems.

EMO, Europe's largest coal and ore handling centre, operates a transhipment terminal in the port of Rotterdam. Bulk cargoes are unloaded, stored, reloaded onto smaller vessels, barges or trains, or transported to a nearby power station. EMO uses a complex network of conveyor belts and transhipment equipment to handle the coal and ore.

Logica is currently working with EMO to introduce an integrated system to control all parts of its installation. A study recommended that the operational system should include systems for process control, production planning, maintenance planning and storage management and be implemented in phases. Logica is now working in close cooperation with EMO on the design and implementation of the process control and the planning systems.

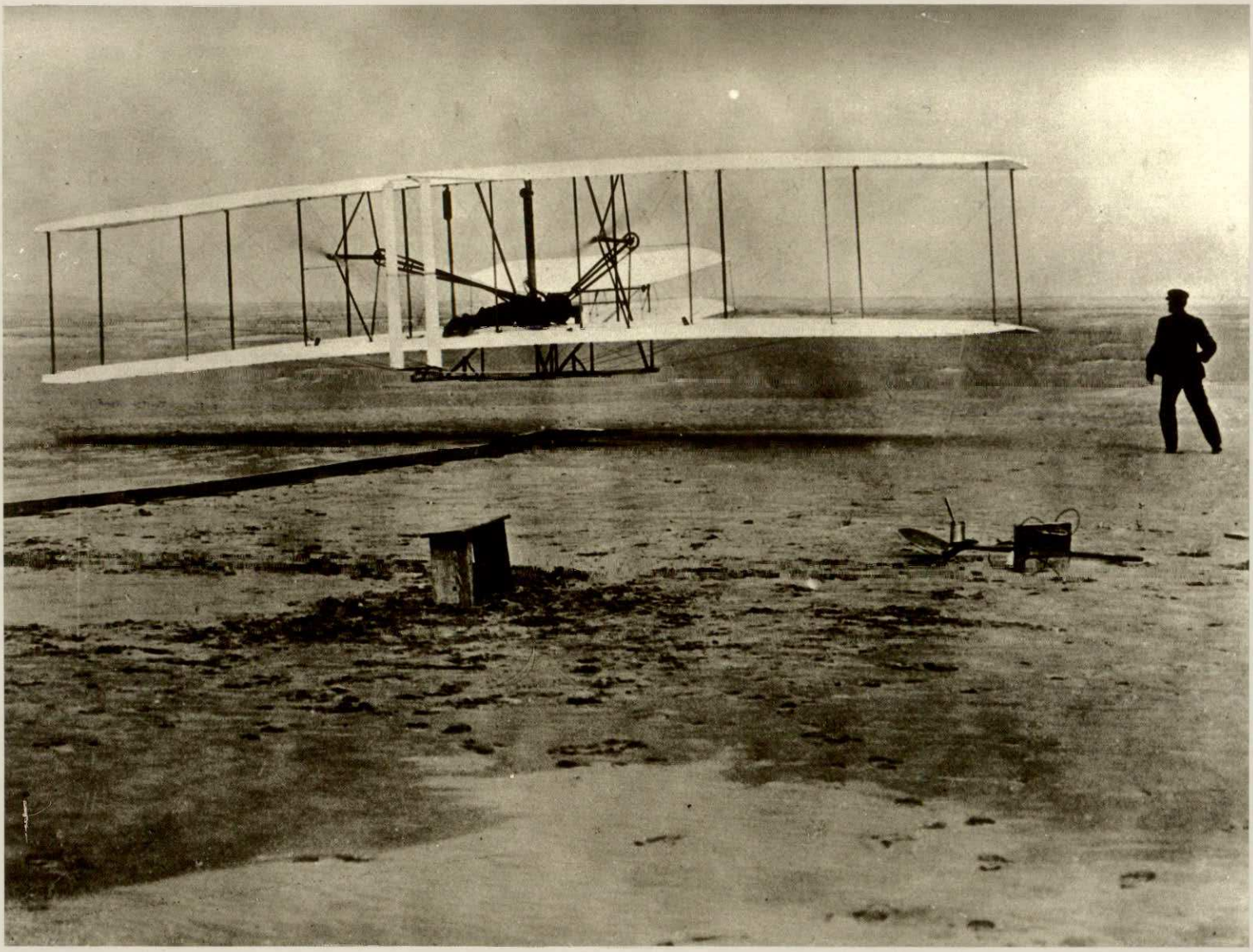
Logica has also developed a system which collects and integrates all information coming from weighing devices within the terminal. The system has been designed to integrate with the process control system at a later date.

Clients in this sector include:
Agfa Gevaert · Aldel · Braun · British Fermentation Products · Brown Boveri and Company · Caterpillar · Cleanaway · Dow Chemical · EMO · Fiat Aviazione · Ford Motor Company · Franco Tosi Industriale · Gist-Brocades · Hoechst · Holer · Hughes Aircraft · Interpharm · Jaguar Cars · Mannesman Demag · Nutricia · Picañol · Rolls Royce and Associates · Schering Agrochemicals · Scott · Sime-Montedison · SKF (Netherlands) · Sobemi · Solvay · Stöpler · Tecnomasio Brown Boveri · Thorn EMI Ferguson · TNO-TPD · Volvo Parts · Vredestein · Wellcome · Whitbread



◀ Model T Ford assembly line, Michigan. 1927. The Model T was first manufactured in 1908. Fifteen million cars were sold during 19 years of production. With the Model T, mass production could be said to have come of age.

Maudslay's lathe. In 1797, Henry Maudslay set up his own workshop and became famous for the use of lathes and other machines tools which he designed and constructed himself. ▶



TRANSPORT

More and more people, vehicles, aircraft and ships are travelling in a finite area of road, track, airspace and sea. Transport operators all over the world are therefore continually concerned with improving efficiency and ensuring optimum use of resources. This very often leads to investment in computer-based technology for streamlining the operation and control of transport. Logica's skills in advanced telecommunication and real-time control are being applied widely to develop systems for a number of land, sea and air transport organizations throughout the world.

In 1990, *London Underground Limited* (LUL) plans to begin a programme for the replacement of its rolling stock. In a radical review of the operation and design of the underground trains, LUL commissioned Logica to conduct a practical development study to investigate advanced techniques for fault diagnosis and performance analysis on the trains.

LUL wants to introduce a system whereby drivers, at the touch of a button, can call up information on the status of all equipment on their train and receive advice on what to do if the train fails in service. In the development study, Logica concentrated on fault diagnosis of the safety brake system and performance analysis of the traction control system. The Logica solution involved building an experimental microprocessor-based expert system. This provided a means of using problem-solving knowledge on board the train.

Increased competition between airlines means that advanced reservation systems and flexible data communication networks are playing an increasingly important role. *Scandinavian Airlines Systems* has decided, through its subsidiary *SMART (Scandinavian Multi-Access Reservations System for Travel Agents)*, to replace the existing SMART network with a new network based on modern computer technology.

SMART is a terminal network covering the whole of Scandinavia, enabling travel agents to make reservations through a large number of booking systems including air and train tickets, hire cars, hotels, theatres and other services for the traveller. The existing version of the SMART network is based on a technology which makes it difficult and costly to connect new booking systems and, consequently, limits the range of services which can be provided through travel agents.

To resolve this problem, SMART has contracted Logica to design and implement a general gateway between the terminals and the booking systems. The main purpose of the gateway is to switch the traffic from a terminal to the desired booking system when requested by the user and to adapt the protocol of the SMART terminals to the different protocols used by the booking systems.

In West Germany, Logica is working with *Bremer Lagerhaus-Gesellschaft (BLG)*, the operating company for the ports of Bremen and Bremerhaven, on the implementation of a management system for the container port.

The system helps in the planning of container storage and controls the day to day movement of handling equipment, including trailers, cranes and straddle carriers. It interfaces to the port's mainframe system and operates over a network of many terminals around the port. Colour display stations in the control tower are used for operations purposes. The new system eliminates the need for manually prepared worklists.

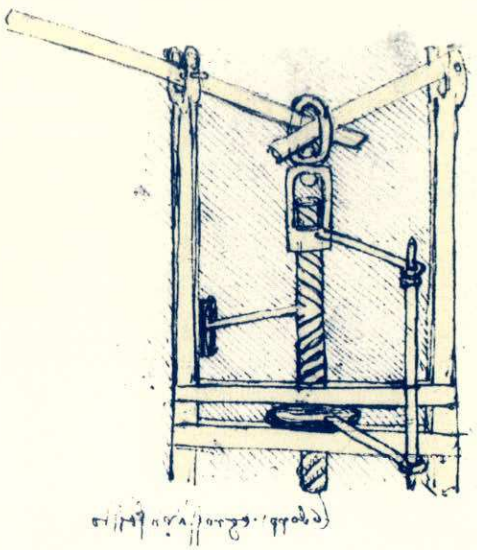
Logica has been commissioned by the San Francisco *Bay Area Rapid Transit District (BART)* to develop and implement a new Integrated Control System (ICS) for the control of BART's highly automated 72 miles, 34 station rail network. ICS is a complex real-time system which connects existing trackside plant with a new central computer system driving alpha-numeric and colour graphics displays and large central display boards for the traincontrollers. ICS will enable BART to increase the train capacity from the current 49 to 74, and ultimately to 115 trains.

Logica's involvement on this project started in 1983, providing assistance to BART in developing software for the central computer system of ICS. Since 1985, Logica has been responsible for the direction and implementation of the the entire project, which is being undertaken by a large team of Logica, BART and subcontractor staff.

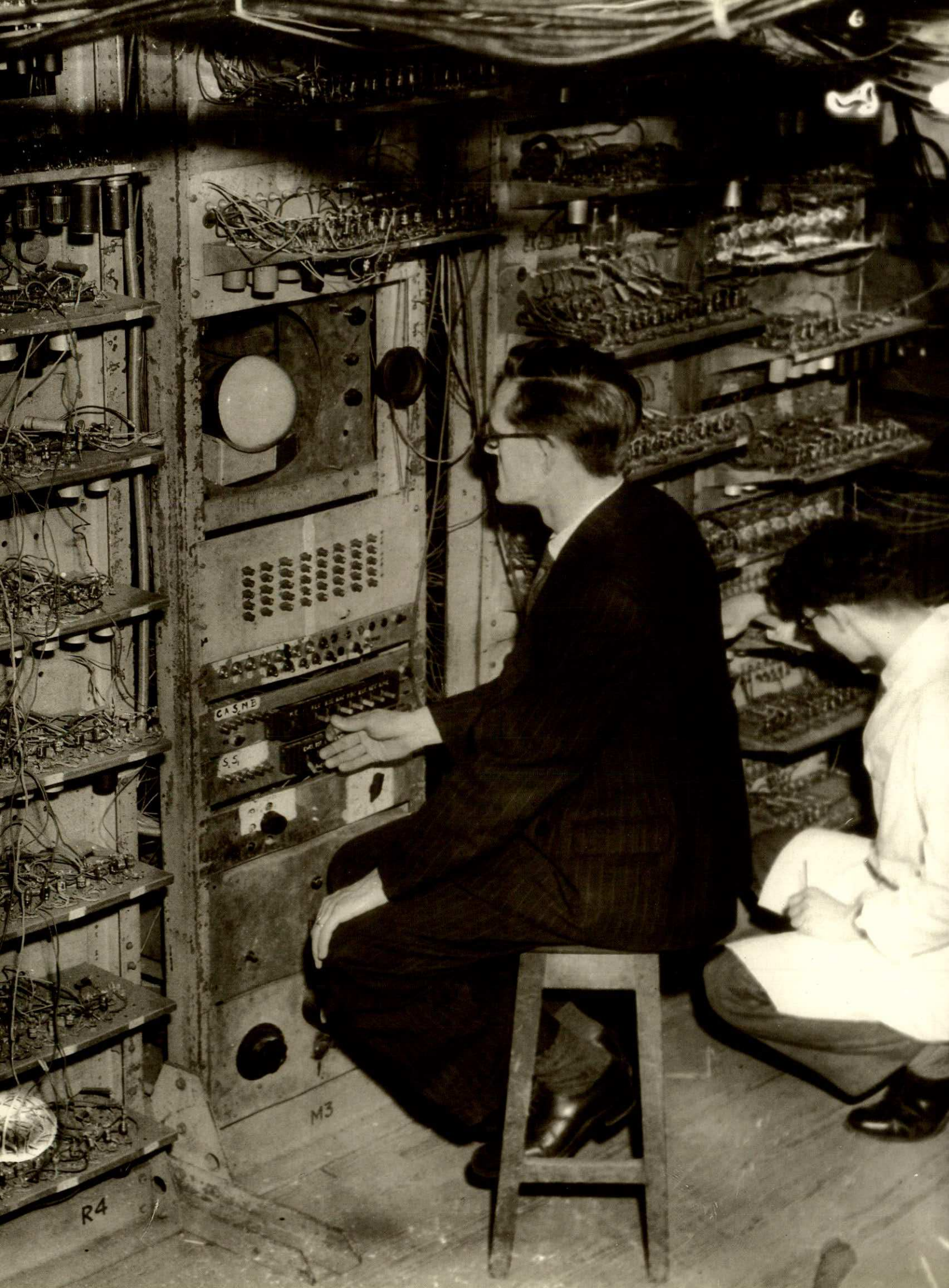
An interesting feature of the project is Logica's use of computer-aided software engineering techniques to control development of the system architecture. Development of ICS is due to be completed by mid-1989.

Clients in this sector include: Bremer Lagerhaus-Gesellschaft · British Airways · Civil Aviation Authority · Hong Kong International Terminals · INTIS · London Underground · San Francisco Bay Area Rapid Transit (BART) · Schipperswal · SMART (Sweden) · Travel Industry Automated Systems

◀ The Wright Brothers making the first powered flight on 17 December 1903. Orville Wright at the controls. Wilbur on foot.



Drawing of flying machine by Leonardo da Vinci (1452-1519). His famous notebooks (published long after his death) show that many of his ideas were far ahead of his time, being quite incapable of realization by the available technology of his day. ▶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COMPUTING AND ELECTRONICS

Logica maintains a strong position in this sector, working for the industry of which it is part. We advise suppliers on their product strategy and provide market forecasts for computers, electronics and communications equipment.

A significant portion of our work is for computer manufacturers who depend increasingly on software sales to provide them with revenue and profit growth. While most of them have their own in-house software development teams, they often call on the experience and expertise of specialist outside resources to assist them in developing software either for their standard systems or for their applications catalogue. One particularly interesting project for Logica is our continuing work for *IBM UK Laboratories Limited* on a graphics software product.

In addition, the fact that Logica can give international support in the development of software for computer manufacturers places us in a strong position in this market.

In West Germany, Logica is working for *Olivetti* to develop a point-of-sale (POS) product for supermarket checkouts. The Olivetti Food Package, as it is called, is a cash register system using all the latest hardware, including barcode readers, magnetic card readers and electronic scales.

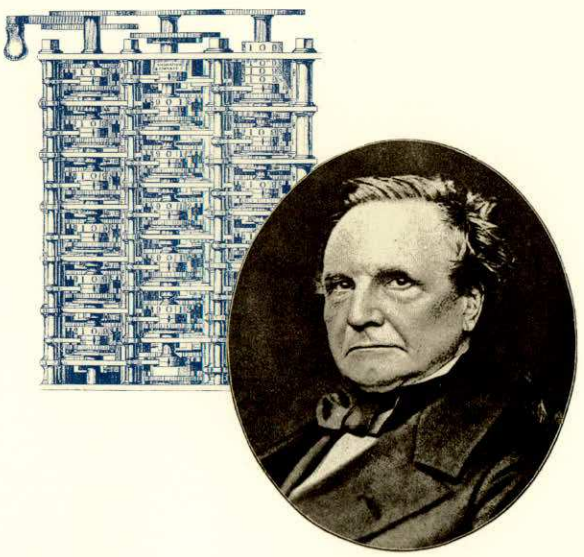
Aimed at the international retail market, the product has to be highly flexible, allowing adaptation for different national languages and customs. To cope with this requirement, Logica developed a generic suite of software packages which Olivetti can use to generate user specific packages. In addition, users can write their own programmes which can communicate with the food package, enabling them to tailor the system to their own specific needs. For example, as the package runs they can change data to alter the content and layout of information shown on the displays.

The data files are also specially designed for flexibility. Records on data, such as methods of payment and type of foodstuff, can be extended for user specific purposes and can be accessed by the user at any time.

In the US, Logica is working for a newly formed company, *VADRAQ Inc*, which develops and leases end-user systems applications on a custom basis. An unusual feature of VADRAQ's business approach is that it charges its clients on a per transaction basis. In addition, in order to relieve its management of the concerns of establishing a large technical staff, VADRAQ has appointed Logica as its sole source of software development and systems integration services.

VADRAQ's initial commitments involve the application of speech processing technologies and parallel processing architectures for high speed database access. The first three projects under the agreement were begun during the year. The first concerns the application of speech recognition for a credit card authorization processing system, resulting in substantial labour savings for the end user. The second is the development of a system to support a new cheque cashing service at a number of shops across the US. The service, which is self financing for the client, enables registered customers to cash wage, welfare and personal cheques. The third project, for a large County Sheriff department, is to provide high speed enquiry support into their crime events database. The system will allow police officers to access vital information in a matter of seconds.

Clients in this sector include: Acorn Computers · AT&T Philips Telecommunications · Data General · Digital Equipment Corporation · Ericsson Information Systems · Ferranti Computer Systems · GEC-Marconi · Hollandse Signaalapparaten · Honeywell Bull · IBM · ICL · Information Technology Limited · Inter Innovation Bank Systems · Koppens · Krupp · Meiko · NCR · Nixdorf · Olivetti · Philips · Philips Radio Communication Systems · Plessey Telecommunications · Racal · Rank Xerox · Reuters · Siemens · Telettra · Teli · Unisys · VADRAQ · VG Electronics · Wang · Wormald



◄ Early computer. The Mechanical Brain being worked by Doctor T Kilburn. 1948. The Brain could arrive at an answer in three weeks – it would have taken three mathematicians, working several hours a day, 25 years to arrive at the answer.

Charles Babbage's analytical engine. 1833. A forerunner of modern digital computers, the engine was designed to compute and print mathematical and astronomical tables. ►

CONSULTANCY

For Logica's clients, one of the key elements in the development of their business is their approach to information management and information technology and this means that demand for high level consultancy is increasing. In general, Logica's work is directed at the information technology area of the management consultancy business. However, we are also active in other areas, such as marketing and technology management.

Although the international finance and central government sectors are particularly important, Logica undertakes consultancy projects across all our market sectors. The range of projects includes strategic policy, equipment evaluation and procurement, and project and system audit. In addition, we provide market reports and multi-client studies for the suppliers of services and products in various industries – such as broadcasting and communications – where Logica's expertise is internationally recognized.

For the Hong Kong operations of the *7-Eleven* retail chain, Logica has performed an information management study to identify the computing facilities and systems required to support the company's rapidly expanding business.

In 1986, when the UK's *Daily Telegraph* came under new management, Logica was chosen to undertake an information technology study. Taking into account the newspaper's short and long term requirements, the study covered printing, production, administration and financial processes in all parts of their organization. Following the study, Logica was retained to help implement package-based solutions for its financial systems.

Logica has assisted the *South Australian Government* to develop a five year communications plan for 37 departments and statutory authorities. Logica identified a cost effective approach to the management and development of diverse communications requirements, including voice, data, facsimile, telex, video, graphics, radio and microwave operations.

In the US, Logica conducted a study for a *major computer manufacturer* on the quality of the service its head office provided to its European subsidiaries. Logica's report included recommendations for remedying the difficulties found.

When a *US bank* migrated from one make of mainframe computer system to another, Logica provided consultancy on application-to-application communications and terminal access flexibility.

Just after year end, Logica issued a new publication which reviews the current market situation and assesses market trends in the expanding field of mobile communications. The report covers all established services and facilities including cellular radiotelephony services, cordless telephones and radiopaging systems. It provides an analysis of developments, including technological advances, regulations and standards, and of supplier strategies.

Telematica, Logica's multi-client study of telecommunications markets, continues to be in high demand and has further expanded the product areas it covers. Aimed at suppliers of information technology products and services in Western Europe, the Telematica service provides market forecasts and analyses of market trends and developments. The 1987 report covers the markets for electronic mail, public and private networks, data connection devices, PBXs and business telephones.

Logica assisted a major *regional US bank* in choosing a communications architecture to integrate and optimize the various separate data networks that had evolved as a result of bank mergers and growth.

For *Lloyds Bank* in the UK, Logica has helped validate the technical approach to the redevelopment of its core systems. This has involved carrying out a comprehensive strategic study of the user requirements. Similar consultancy work has also been undertaken for a Swedish bank.

For the UK *Royal Navy*, Logica is undertaking a communications network study. Based on identified requirements, Logica will produce a network design and implementation plan covering the current and planned data communications needs of the service.

For the *University of Ulster*, a single academic institution operating on four campus sites in Northern Ireland, Logica undertook a strategic review of telecommunications needs. Logica identified a number of strategies each covering voice, data, text and video communications and helped the University to select the one which most closely matched its requirements. The University has accepted Logica's recommendations and proposes to implement them.

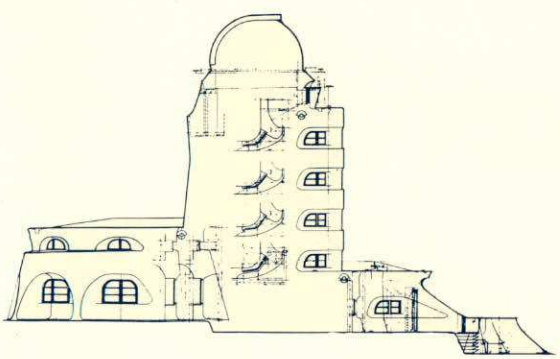
For the public transport authority in Rotterdam, the *RET*, Logica has completed a strategy study for a new communications infrastructure to support their plans to integrate systems for the control and administration of bus, tram and underground services.

Logica is conducting a study to provide improved office automation and information handling facilities for the UK Cabinet Office. The study has involved complementary system and organizational solutions and the development of different options for evaluation and decision at the midpoint of the project.

Clients in this sector include:
Bank of England · Barclays Bank · BP International · British Aerospace · British Airways · British National Space Centre · British Post Office · BUPA · Central Computer and Telecommunications Agency · Credit Suisse First Boston · Daily Telegraph · Elcom Collieries · European Space Agency · GDI (Netherlands) · Heerema · Hoare Govett · ICL · London Borough of Bexley · London Underground · Nedlloyd · New Zealand Treasury · Plessey · Rotterdam Public Transport Authority · South Australia Public Service Board · State Bank of Victoria · UK Department of Health and Social Security · UK Department of Industry · UK Ministry of Defence · University of Ulster

◀ John Logie Baird and The Televisor. 1926. Baird successfully demonstrates television, the "Electronic Eye". This demonstration in the studio was seen instantaneously on screen at the receiving station.

The Einstein Tower at Potsdam, East Germany, was designed by Erich Mendelsohn, 1919-1921, to symbolize, in architectural terms, Einstein's Theory of Relativity and to be the workshop in which Einstein tested the theory practically. ▶



RESEARCH AND DEVELOPMENT

Logica has an extensive programme of research and development which covers work in three different categories. The first of these is research covering the exploration, assessment and demonstration of possible new techniques. Most of this basic research is focused at Cambridge, where we have an advanced group working in fields such as speech technology, human computer interaction and knowledge-based systems. Much of the work is undertaken as part of the Alvey and Esprit part-funded programmes and often leads to exploitation for client systems, such as ARIES and Jaguar Cars

The second category of our R&D work is the development of tools and methodologies which enable us to conduct business more efficiently or undertake different types of work in the future. Sesame and the gate array design service are fine examples of this type of work.

The third category encompasses our development of kernels or products, covering investment in the development of hardware and/or software which can subsequently be delivered to a client on a product basis. CPLEX.400 is described on this page, while other examples can be found throughout this report (for example FASTRADE, MASTER CONTROL, GALLERY 2000). In addition, we have further developed our software product for fingerprint recognition (FOCUS™) as well as our image processing (LUCID™) and speech recognition (LOGOS™) products, which have wider applicability.

◀ Marie Curie in her laboratory. With her husband, Pierre, Marie Curie discovered radium and the nature of radioactivity.

Chronophotography. EJ Marey's study of waves.1884. By 1890, Marey had evolved all the essential features of modern cinematography, but his main interest was in the scientific investigation of natural phenomena. ▶

The the field of computer architecture has become a scene of active change and progress, particularly in the development of parallel architectures and the application of transputers. In this field, Logica is coordinating an Alvey-supported team of seven collaborators on ParSiFal, a project to develop a facility which evaluates parallel architectures by both simulation and measurement. It centres on the design of a powerful, flexibly interconnected array of transputers and includes significant work on software tools to assist in the development, debugging and performance analysis of large programs. It is a test-bed for research into performance issues in parallel systems, particularly those factors (such as interconnection topology) which are important in exploiting the power of transputers.

Logica has considerable experience in the development of advanced networks and real-time systems and during the year has been involved in several projects in this field. As part of the UK's Alvey programme, Logica has worked with British Telecom Research Laboratories in developing one of the first ever implementations of the CCITT's (Comité Consultatif International Télégraphique et Téléphonique) ISDN (Integrated Services Digital Network) primary rate interface recommendations. Known as the Alvey High Speed Network (AHSN), it provides a simple, switched connection service and is intended to meet the needs of the UNISON and Admiral research projects being supported by the Alvey programme.

Logica's role on the project has been to develop a part of the AHSN software and hardware, involving design of the circuit switch.

During the past year, ARIES, a project jointly funded by the Alvey Directorate and a club of UK insurance companies, has led research into the use of advanced technologies for applications in the insurance market. As prime contractor for ARIES (Alvey Research into Insurance Expert Systems), Logica has developed two prototype expert systems: one for fire risk assessment in the area of general insurance and one for equity selection for investment decisions.

The prototype systems have been so successful that a new consortium, Taurus, is now being established with plans to apply the R&D work to provide an advanced architecture for expert systems and other decision support systems to assist investment managers and traders. Taurus includes members of both ARIES and ALFEX (Alvey Research into Financial Expert Systems), with Logica again working as prime contractor.

Logica's internal software engineering programme, Sesame, has completed its fourth successful year of operation. During that time, Sesame has ensured that Logica continues to take advantage of the rapid improvements now occurring in software methods and tools, allowing us to achieve the highest standards of software quality and productivity.

Building on Sesame's success, we have now decided to define a Core Software Methods Policy. With the active support of Logica's operating companies, we have identified a core set of methods and tools for requirements analysis, system design, project estimating, planning and control. We have also identified sets of tools for coding, testing and project administration for our most frequently used software development environments. We aim to use these methods and tools as widely as possible, and to build on them. We shall of course retain our flexibility to adapt to other methods where the situation demands it.

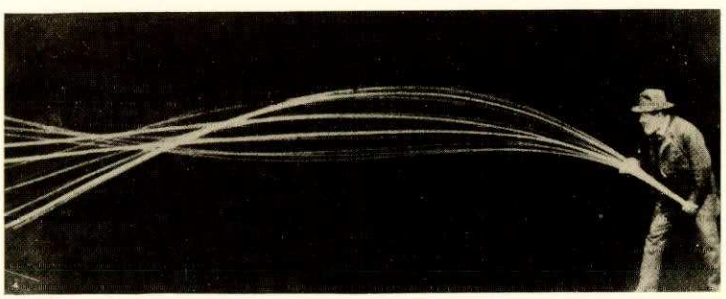
The CCITT's X.400 recommendations on message handling and electronic mail are emerging as a worldwide standard. The standard is being adopted by public carriers for the sending of messages between organizations and for interconnecting a variety of computers within an organization. The message facilities handled by X.400 already include a wide range of message types, including facsimile, telex, teletex and digitized voice.

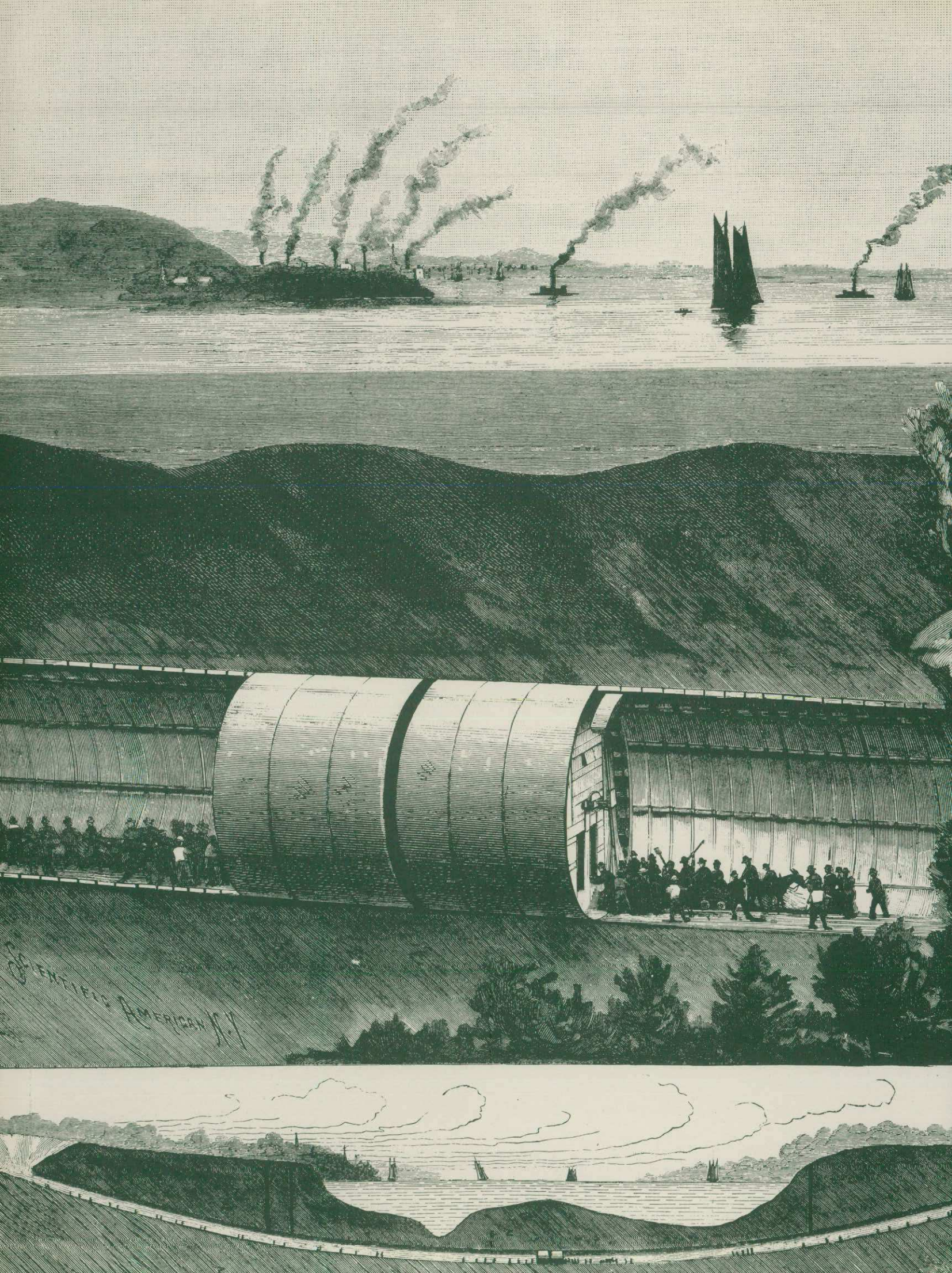
Logica is developing a set of four modular portable kernels which implement the X.400 recommendations and is now well placed to respond to Open Systems Interconnection (OSI) networks and office automation procurements across most of our industry sectors. Logica's products, known as CPLEX.400, consist of building blocks, or kernels, which fully implement the various features of X.400. They are designed for flexibility, resilience and portability, and are suitable for applications where a standard product would be too limited. They follow the layered architecture defined for OSI and will operate in conjunction with other OSI products.

As part of our strategy to develop a VLSI capability, Logica has acquired specialist CAD workstations and has launched a silicon chip design service, initially concentrating on gate array design.

Gate arrays are the most mature form of application specific integrated circuits (ASICs). They use a mass produced array of transistors customized to a user-defined application by further processing of layers of metal on the chip. The service offered by Logica, both within the company and to external clients, spans all stages from functional specification to the point of manufacture.

The advanced technology from this development has since been applied to the custom design of a chip which forms a key component of a new financial dealing terminal being developed by Logica. Using a gate array will save on component cost, board space and power requirements and will give improved performance by implementing some functions in hardware rather than in microprocessor software.




SCIENTIFIC AMERICAN N.Y.

COMPANY INFORMATION

DIRECTORS

P A B Hughes	(Chairman)
L A Taylor	(Managing Director)
A L Karney	
I Macleod	
D W Mann	(Deputy Managing Director)
B V Martin	
G G Moore	
C G Rowland	
P D C Stevenson	
P G Bosonnet	(non-executive)
C J F Böttcher	(non-executive)

SECRETARY
G G Moore

REGISTERED OFFICE
64 Newman Street
London W1A 4SE

REGISTRARS
Close Registrars Limited
Arthur House
803 High Road
Leyton
London
E10 7AA

The meeting of the Great Shields of the St. Clair river railway tunnel. Canada. 1890. Two great 21-foot shields, which excavated the tunnel, were pushed together and made to meet edge to edge, thus entirely finishing the work of excavation.

REPORT OF THE DIRECTORS

The Directors present their report together with the accounts of the Company and its subsidiaries for the year ended 30 June 1987. These will be laid before the shareholders at the Annual General Meeting to be held on 10 November 1987.

PRINCIPAL ACTIVITIES

The business undertaken by Logica companies throughout the year included:

the marketing, design, production and maintenance of custom built software and associated hardware systems

consultancy and project management in the field of information technology

the design, development, implementation and marketing of software products and the re-usable elements of applications software, called systems kernels.

RESULTS AND DIVIDENDS

Turnover was £111 million, up 27% from £87 million in the previous year. Pretax profit was £11.3 million, an increase of 66% over the 1986 figure of £6.8 million. The profit margin exceeded 10%, its highest level since Logica's early days. The number of staff employed, including those in related companies, grew 14% to 2682.

Following a slightly reduced tax charge of 37%, profit after tax rose 68% to £7.1 million. Earnings per share, at 14.4p, were up 43%, on an expanded share base.

The directors propose an increased final dividend of 1.2p net per share, making a dividend for the full year of 1.7p, compared with 1.0p last year.

Improved margins and good use of working capital resulted in net year end cash balances £1 million up on last year.

BUSINESS REVIEW

A review of the development of the business during the year is given on pages 3 to 31. Included in the review are references to research and development activities and the Company's future prospects.

DIRECTORS

During the year there were the following changes in the composition of the board:

D J Stanley resigned on 15 August 1986.
P D C Stevenson was appointed to the board on 20 March 1987.

On 15 July 1987, L A Taylor announced his intention to resign his position as Managing Director and Chief Executive with effect from 30 September 1987. He will remain a non-executive director. D W Mann will become Managing Director and Chief Executive as from that date.

The interests of the directors in the shares of the company are shown below. On 23 July 1987, I Macleod sold 2,000 shares; there were no other changes in the period 1 July to 24 September.

	30 June 1987			30 June 1986 or date of appointment		
	Beneficial	Non-Beneficial	Options	Beneficial	Non-Beneficial	Options
P A B Hughes	2,000,000	786,375	0	2,771,287	215,088	0
L A Taylor	1,700,296	230,001	4,966	2,043,296	230,001	4,966
A L Karney	49,696	0	29,966	53,696	0	29,966
I Macleod	22,345	0	25,000	22,345	0	25,000
D W Mann	465,000	128,912	39,966	500,000	93,912	39,966
B V Martin	37,850	0	25,000	47,850	0	25,000
G G Moore	10,000	0	25,000	0	0	25,000
C G Rowland	110,960	128,912	34,966	112,560	93,912	34,966
P D C Stevenson	125,500	0	29,808	125,500	0	29,808
C J F Böttcher	25,000	0	0	50,793	0	0
P G Bosonnet	0	0	0	0	0	0
Employee Shareholder Trusts	0	119,482	0	0	128,921	0

The Employee Shareholder Trusts' shares are held by P A B Hughes, L A Taylor and D W Mann acting as trustees.

None of the directors had a material interest in any contract of significance to which the parent Company or a subsidiary was a party during the financial year.

SUBSTANTIAL HOLDINGS
The directors' interests are described above. In addition the Company has been notified that funds managed or advised by Scottish Amicable Investments Managers Limited hold 6.55 per cent of the Company's ordinary share capital.

DISABLED PERSONS
It is the Company's policy to give full and careful consideration to applications for employment from disabled persons, to continue wherever possible the employment of members of staff who become disabled, and to ensure that their training and career development are encouraged.

EMPLOYEE PARTICIPATION
It is Company policy regularly to hold meetings with staff when matters concerning them and their area of business are discussed. All staff receive the annual report and accounts.

FIXED ASSETS
The changes in the fixed assets of the Company and its subsidiaries are disclosed in Notes 10 and 11 to the accounts.

TAXATION
The Company is not a close company within the provisions of the Income and Corporation Taxes Act 1970.

AUDITORS
Price Waterhouse have expressed their willingness to continue in office. A resolution will be proposed at the Annual General Meeting for their re-appointment as auditors and authorising the directors to fix their remuneration.

AUTHORITY TO ALLOT SECURITIES
Under Section 89 of the Companies Act 1985 equity securities in the Company may not be allotted for cash (otherwise than in respect of an employee share scheme) without first being offered pro rata to existing shareholders, unless the prior approval of the shareholders in General Meeting is given. The Directors consider that it is in the best interests of the Company that the relevant authority given at the Annual General Meeting in 1986 should be renewed in similar terms. Accordingly a Special Resolution to this effect is proposed as Resolution No. 7 in the Notice of the forthcoming Annual General Meeting. The proposed authority expires at the date of the 1988 Annual General Meeting and permits the Directors during this period to issue equity securities up to 2.5% of the authorised share capital without first offering them to existing shareholders.

By order of the Board

G G Moore
Secretary
24 September 1987

CONSOLIDATED PROFIT AND LOSS ACCOUNT

For Year
Ended 30 June

	Note	1987 £'000	1986 £'000
Turnover	1	**110774**	**87042**
less adjustment to exclude turnover of related companies		9281	7379
Consolidated turnover		101493	79663
Operating profit	2	**10545**	**7457**
Interest receivable/(payable)	4	778	(649)
Profit on ordinary activities before taxation		**11323**	**6808**
Taxation on ordinary activities	5	4210	2574
Profit on ordinary activities after taxation		**7113**	**4234**
Extraordinary charges	6	0	(12175)
Profit/(loss) after taxation and extraordinary charges		7113	(7941)
Dividends paid and proposed	7	842	495
Transfer to/(from) reserves		6271	(8436)
Earnings per share on ordinary activities	9	14.4p	10.1p
Dividends per share		1.7p	1.0p

CONSOLIDATED BALANCE SHEET

At 30 June

	Note		1987 £'000		1986 £'000
Fixed assets					
Tangible assets	10	10636		7443	
Investments	11	1258		895	
			11894		8338
Current assets					
Stocks	13	4321		5861	
Debtors	14	27430		19457	
Cash and bank balances		9588		8628	
		41339		33946	
Creditors due within one year					
Bank loans and overdrafts		(195)		(308)	
Other	15	(23251)		(17763)	
		(23446)		(18071)	
Net current assets			**17893**		**15875**
Total assets less current liabilities			**29787**		**24213**
Creditors due after more than one year	16	(623)		(1477)	
Deferred taxation	17	(151)		(178)	
			(774)		(1655)
Net assets of ordinary activities			**29013**		**22558**
Net assets of discontinued activities			0		273
			29013		22831
Capital and reserves					
Share capital	19		4950		4950
Share premium account	20		8905		8905
Other reserves	20		2140		2117
Profit and loss account	20		13018		6859
			29013		22831

P A B Hughes
L A Taylor

Directors
24 September 1987

CONSOLIDATED SOURCE AND APPLICATION OF FUNDS

For Year
Ended 30 June

		1987		1986
		£'000		£'000
Profit on ordinary activities before taxation		11323		6808
Extraordinary charges before taxation, other than closure costs of discontinued activities charged below		0		(1983)
Adjustments for items not involving the movement of funds				
Depreciation and amortisation	1891		1728	
Loss/(profit) on sale of fixed assets	65		(3)	
Translation differences	(309)		756	
Share of related companies' profit	(232)		(357)	
		1415		2124
Funds generated by operations		12738		6949
Funds from other sources				
Taxation refunded	3		153	
Sale of fixed assets	428		186	
Dividends received from related companies	36		0	
		467		339
		13205		7288
Application of funds				
Purchase of fixed assets	(5474)		(2385)	
Purchase of shares in trade investments	(263)		0	
Taxation paid	(1431)		(1355)	
Payment of group tax relief	0		(2070)	
Acquisition of minority interests	0		(8)	
Dividends paid	(742)		0	
		(7910)		(5818)
		5295		1470
(Increase)/decrease in working capital				
Stocks	1540		(574)	
Debtors	(7535)		(3092)	
Creditors	1500		2741	
		(4495)		(925)
Increase in net liquid funds from ordinary activities		800		545
Funds generated on closure of discontinued activities		273		4552
		1073		5097
Issue of new shares		0		15100
Increase in net liquid funds		1073		20197

COMPANY BALANCE SHEET

At 30 June

	Note		1987 £'000		1986 £'000
Fixed assets - Investments	11		**18075**		**14574**
Current assets					
Debtors	14	5427		2772	
Cash and bank balances		262		716	
		5689		3488	
Creditors due within one year	15	**(5078)**		**(2206)**	
Net current assets			**611**		**1282**
Total assets less current liabilities			**18686**		**15856**
Creditors due after more than one year			**0**		**1000**
			18686		14856
Capital and reserves					
Called up share capital	19		4950		4950
Share premium account	20		8905		8905
Profit and loss account	20		4831		1001
			18686		14856

P A B Hughes
L A Taylor

Directors
24 September 1987

		1987 £'000	1986 £'000
1	**TURNOVER**		
	Turnover by location of client was as follows:		
	United Kingdom	59631	47639
	Netherlands	9791	8144
	Rest of Europe	23324	14576
	USA	8375	8733
	Asia and Australia	9653	7950
		110774	87042
	Less adjustment to exclude turnover of related companies	9281	7379
	Consolidated turnover	101493	79663
2	**OPERATING PROFIT**		
	Consolidated turnover	101493	79663
	Change in stocks of finished goods and work in progress	(1407)	610
	Revenue	100086	80273
	Raw materials and consumables	983	923
	Other external charges	17703	15724
	Staff costs	50739	40209
	Depreciation and other amounts written off tangible and intangible assets	1891	1728
	Auditors' remuneration and expenses	152	130
	Hire of plant and machinery	48	73
	Operating lease rentals	5214	4059
	Other operating charges	13043	10327
	Operating charges	89773	73173
		10313	7100
	Share of profit of related companies	232	357
	Operating profit	10545	7457
3	**STAFF**		
	STAFF NUMBERS		
	Staff employed at 30 June were based as follows:		
		Number	Number
	United Kingdom	1690	1464
	Netherlands	233	212
	Rest of Europe	385	321
	USA	166	148
	Asia and Australia	208	203
	Total including related companies	2682	2348
	Less employed in related companies	230	218
	Total excluding related companies	2452	2130
	The average number of staff employed in the UK during the year was 1569 (1986 – 1402)		
	STAFF COSTS	£'000	£'000
	Wages and salaries	44670	35805
	Social security costs	4602	3444
	Other pension costs	1467	960
		50739	40209

There are voluntary pension schemes in the UK, Netherlands and Australia funded by fixed percentage and voluntary contributions. There are no unfunded liabilities in these schemes.

	1987 £	1986 £
DIRECTORS		
Directors' emoluments including employer's pension contributions and benefits in kind	693650	460255
Included in the above are the emoluments of:		
the chairman	83659	71489
the highest paid director	111107	83113

The table shows the number of directors, other than the chairman and the highest paid director, and higher paid employees in the United Kingdom whose remuneration excluding pension contributions were within the bands stated.

	Directors		Higher paid employees	
	1987	1986	1987	1986
£ 0-£ 5000	0	2		
£ 5001-£10000	3	5		
£20001-£25000	0	1		
£25001-£30000	1	0		
£30001-£35000	0	0	28	8
£35001-£40000	0	0	19	11
£40001-£45000	0	1	6	1
£45001-£50000	0	0	2	1
£50001-£55000	0	2	0	0
£55001-£60000	1	0	0	0
£60001-£65000	4	0	0	0
£65001-£70000	0	1	0	0
£80001-£85000	1	0	0	0

A loan was outstanding to an employee at the time of his appointment during the year as a director; it was repaid following his appointment to the Board.

	1987 £'000	1986 £'000
4 INTEREST		
Receivable	844	418
Payable	(66)	(1067)
	778	(649)
5 TAXATION		
Charge to UK corporation tax 35% (1986 – 38.75%)	3703	2066
Overseas taxation	267	28
Foreign tax in respect of overseas subsidiaries	299	684
Relief for overseas taxation	(186)	(28)
Deferred taxation	61	47
	4144	2797
Overprovision in respect of prior years	(39)	(355)
Related companies	105	132
	4210	2574

There are unutilised tax losses in the Group amounting to approximately £3 million which may be available for the relief of the profits of certain subsidiaries in future years.

6 EXTRAORDINARY CHARGES		
Costs including closure costs of the Office Automation business and capital restructuring	0	14912
Attributable taxation	0	(2737)
	0	12175
7 DIVIDENDS		
Interim dividend of 0.5p (1986 – nil)	248	0
Final dividend of 1.2p (1986 – 1.0p)	594	495
Total net dividend	842	495
8 PROFIT/(LOSS) ATTRIBUTABLE TO MEMBERS OF THE HOLDING COMPANY		
Dealt with in the Accounts of the Company	931	(16783)

As allowed by Section 228 (7) of the Companies Act 1985, the Company has not presented its own profit and loss account.

9 EARNINGS PER SHARE

Earnings per share of 14.4p are based on the profit after tax of £7,113,000 and on the capital of 49,500,000 shares. Last year's earnings per share of 10.1p were based on the profit after tax before extraordinary charges which amounted to £4,234,000 and on the weighted average of 42,060,986 shares.

10 TANGIBLE ASSETS

	Short Leaseholds	Equipment and Plant	Freehold Land and Buildings	Total
	£'000	£'000	£'000	£'000
Owned assets				
Cost				
1 July 1986	2760	9033	0	11793
Translation differences	14	167	0	181
Additions	848	2400	1983	5231
Disposals	(116)	(949)	0	(1065)
Reclassification	(939)	0	939	0
30 June 1987	2567	10651	2922	16140
Depreciation				
1 July 1986	1069	3794	0	4863
Translation differences	7	65	0	72
Provided	230	1492	0	1722
Released on disposals	(79)	(528)	0	(607)
Reclassification	(265)	0	265	0
30 June 1987	962	4823	265	6050
Net book value 30 June 1987	1605	5828	2657	10090
Assets under finance leases				
Net book value 30 June 1987	0	546	0	546
Net book value all assets 30 June 1987	1605	6374	2657	10636
Net book value at 30 June 1986				
Owned assets	1691	5239	0	6930
Assets under finance leases	0	513	0	513
	1691	5752	0	7443

11 INVESTMENTS IN RELATED COMPANIES AND TRADE INVESTMENTS

Consolidated	Related companies			Trade	Total
	Shares at cost	Retained profits	Total	Investments	
	£'000	£'000	£'000	£'000	£'000
1 July 1986	624	242	866	29	895
Currency translation	0	13	13	0	13
Additions	0	0	0	263	263
Share of retained profit for the year	0	87	87	0	87
30 June 1987	624	342	966	292	1258

The Group's share of the retained profits of related companies is stated after deducting dividends received of £36,000.
All investments are unlisted.

The Company	Investments in group companies			Related companies	Total
	Shares	Loans	Total		
	£'000	£'000	£'000	£'000	£'000
Cost					
1 July 1986	14245	8961	23206	624	23830
Additions	0	3718	3718	0	3718
Reductions	0	(2578)	(2578)	0	(2578)
30 June 1987	14245	10101	24346	624	24970
Provisions					
1 July 1986	(787)	(8469)	(9256)	0	(9256)
Provided in the year	0	2361	2361	0	2361
30 June 1987	(787)	(6108)	(6895)	0	(6895)
Net book value at 30 June 1987	13458	3993	17451	624	18075
Net book value at 30 June 1986	13458	492	13950	624	14574

	1987	1986
	£'000	£'000
12 CAPITAL COMMITMENTS		
Capital expenditure authorised and contracted	474	617
Capital expenditure authorised but not contracted	7	0
13 STOCKS		
Work in progress:		
at cost or net realisable value	29503	24944
attributable profit	869	2124
Progress payments on account	(26051)	(21355)
	4321	5713
Other stocks	0	148
	4321	5861

	1987 £'000	1986 £'000
14 DEBTORS		
Consolidated		
Trade debtors	22167	14462
Amounts owed by related companies	612	182
Other debtors	1071	677
Investment in finance leases:		
due within one year	26	70
due after more than one year	0	27
Prepayments and accrued income	1157	1752
Taxation recoverable	1079	952
Advance corporation tax	664	352
Client contract deposits	654	983
	27430	19457
The Company		
Amounts owed by subsidiary companies	4459	2298
Other debtors	304	122
Advance corporation tax	664	352
	5427	2772
15 CREDITORS		
Amounts falling due within one year		
Consolidated		
Payments received on account	3971	2427
Trade creditors	3236	3189
Amounts owed to related companies	160	2
Other creditors	4241	3511
Taxation and other state creditors	8273	4251
Advance corporation tax	312	202
Accruals	2317	3551
Finance lease liabilities	147	135
Dividends proposed	594	495
	23251	17763
The Company		
Amounts owed to subsidiary companies	2892	685
Other creditors	1016	681
Taxation and other state creditors	256	143
Advance corporation tax	312	202
Accruals	8	0
Dividends proposed	594	495
	5078	2206

The Company supports the banking facilities of certain overseas subsidiaries by either direct guarantee (amount drawn at 30 June 1987 £141,000 – 1986 £270,000) or by indemnifying its bankers in respect of their guarantees (amount drawn at 30 June 1987 £nil – 1986 £263,000). An overseas subsidiary has provided its bankers with a charge on certain of its assets but had no relevant indebtedness at the end of the financial periods covered by this report.

16 CREDITORS		
Amounts due after more than one year		
Bank loans repayable between two and five years	74	0
Finance lease liabilities		
second to fifth years	392	386
more than five years	6	5
Other creditors	151	1086
	623	1477

17 DEFERRED TAXATION		
Provision is made in the accounts for deferred taxation at the full potential liability as follows:		
Accelerated capital allowances	588	666
Other short term timing differences	(395)	(476)
Trading losses	0	0
Foreign subsidiaries	(42)	(12)
	151	178
1 July 1986	178	983
Translation difference	(1)	(6)
Provision in respect of current year	61	(322)
Overprovision for prior years	(87)	(127)
Extraordinary item	0	(350)
	151	178

18 OTHER FINANCIAL COMMITMENTS

There were annual commitments under operating leases as follows:

	1987		1986	
	Land and Buildings £'000	Other £'000	Land and Buildings £'000	Other £'000
Expiring within one year	192	374	440	373
Expiring in the second to fifth year	1505	1615	1126	862
Expiring after five years	2605	0	2113	0
	4302	1989	3679	1235

19 CALLED UP SHARE CAPITAL

	1987 £'000	1986 £'000
Authorised share capital		
66,000,000 ordinary shares of 10p each	6600	5200
Called up share capital		
49,500,000 ordinary shares of 10p each	4950	4950

At 30 June 1987 options granted under share option schemes were outstanding as follows:

Number of shares	Price	Normal dates of exercise
18,884	365	1987-1990
67,988	405	1987-1994
588,617	149	1988-1991
204,851	165	1988-1995
640,000	155	1989-1996
249,798	186	1989-1996
200,000	206	1989-1996
177,378	207	1989-1996
18,584	279	1990-1997
232,000	310	1990-1997

20 SHARE PREMIUM ACCOUNT AND RESERVES

	Share premium account	Other reserves	Profit and loss account
Consolidated	£'000	£'000	£'000
1 July 1986	8905	2117	6859
Exchange difference on translation of net assets at 1 July 1986	–	17	(106)
Retained profit for the year	–	–	6271
Transfers to other reserves	–	6	(6)
30 June 1987	8905	2140	13018
The Company			
1 July 1986	8905		1001
Retained profit for the year	–		3830
30 June 1987	8905		4831

21 CONTINGENT LIABILITIES

Subsidiaries have provided indemnities to their bankers in support of performance bonds and guarantees amounting to £3,011,503

22 PRINCIPAL OPERATING SUBSIDIARIES

Logica UK Limited (Great Britain)
Logica Space and Defence Systems Limited (Great Britain)
Logica Consultancy Limited (Great Britain)
Logica Financial Systems Limited (Great Britain)
Logica Cambridge Limited (Great Britain)
Logica Communications and Electronic Systems Limited (Great Britain)
Logica Energy and Industry Systems Limited (Great Britain)
Logica BV (Netherlands)
Logica SA (Belgium)
Logica GmbH (West Germany)
Logica Svenska AB (Sweden)
Logica Systems Inc (USA)
Logica Technology Systems Inc (USA)
Logica Pty Limited (Australia)

At 30 June 1987 these companies were all wholly owned.
During the year the name of Logica Inc was changed to Logica Systems Inc.

23 RELATED COMPANIES

Jardine Logica Limited (Hong Kong)
During the year the name of Jardine Logica Systems Limited was changed to Jardine Logica Limited. The Company holds 50% of the 4 ordinary shares of HK$ 1 each of Jardine Logica Limited.

Logica General Systems Spa (Italy)
The Company holds 49.8% of the 793,550 ordinary shares of 1,000 lire each and 51.3% of the 204,350 preference shares of 1,000 lire each of Logica General Systems Spa.

The business activities of these companies are similar to those undertaken by the other Logica companies.

ACCOUNTING POLICIES

1 BASIS OF ACCOUNTING AND CONSOLIDATION

The accounts are prepared under the historical cost convention in accordance with the Companies Act 1985. They are the result of the consolidation of the accounts of the Company and its subsidiaries and also include the relevant share of the results of related companies. The Group accounting policies conform with UK accounting standards and when necessary, adjustment is made to the statutory accounts of overseas subsidiaries in order to present the Group accounts on a consistent basis.

2 TURNOVER

Turnover represents amounts invoiced to clients net of amounts billed in advance and excluding VAT.

3 RECOGNITION OF PROFITS

Profit on contracts for the supply of professional services at pre-determined rates is taken as and when the work is billed irrespective of the duration of the contract.

Profit is taken on fixed price contracts whilst the contract is in progress, having regard to the proportion of the total contract which has been completed at the balance sheet date. Provision is made for all foreseeable future losses.

4 STOCK AND WORK IN PROGRESS

Physical stock and work in progress is valued at the lower of cost and net realisable value.

The valuation of work in progress on fixed price contracts is adjusted to take up profit to date or foreseeable losses in accordance with paragraph 3 above. The inclusion of this attributable profit supercedes the statutory valuation rules for current assets to enable the accounts to give a true and fair view.

Other work in progress is valued at cost or at estimated net realisable value if lower. Cost comprises:

- professional work in progress valued at the cost of salaries and associated payroll expenses of employees engaged on assignments and a proportion of attributable overheads.
- unbilled expenses incurred and equipment purchased for clients in connection with specific contracts.

5 RESEARCH AND DEVELOPMENT

Research costs are written off in the year in which they are incurred unless they are to be reimbursed by third parties. Development costs are also written off in the year in which they are incurred unless they are to be reimbursed by third parties or they result in the production of an identifiable, saleable product.

6 DEPRECIATION

Depreciation is provided at rates calculated to write down the cost of all tangible fixed assets over their estimated useful lives on a straight-line basis. The annual rates of depreciation used are as follows:

Office equipment	10%
Computer equipment	20%
Motor cars	25%
Plant	20%
Leaseholds	equally over life of lease

7 FOREIGN CURRENCY TRANSLATION

The assets, liabilities and trading results of foreign subsidiaries are translated into sterling at the rate of exchange ruling at the date of the balance sheet.

Differences arising on restatement of the net investment in foreign subsidiaries and related net foreign currency borrowings are dealt with as adjustments to reserves.

All other differences on exchange arising in the year are taken to the profit and loss account.

8 DEFERRED TAXATION

Provision is made for deferred taxation to take account of timing differences between the treatment of certain items for accounts purposes and their treatment for tax purposes. The provision is maintained to the extent that it is probable that an asset or liability will crystalise in the foreseeable future.

9 TANGIBLE FIXED ASSETS

Tangible fixed assets are shown at cost. Cost in this context includes the initial capitalised values of assets funded by finance leases.

Assets financed by leasing agreements that give rights approximating to ownership are treated as if they had been purchased outright. The amount capitalised is the present value of the minimum lease payments payable during the lease term. The corresponding leasing commitments are shown as obligations to the lessor. Lease payments are treated as consisting of capital and interest elements and the interest is charged to the profit and loss account on a constant periodic rate of charge basis.

10 RELATED COMPANIES

A related company is a legal entity, not being a subsidiary, in which the Group has an interest of between 20 per cent and 50 per cent and over whose commercial and financial policy decisions the Group exercises significant influence. The Group's share of the profits less losses of all significant related companies is included in the Group's profit and loss account on the equity accounting basis. The results are calculated from the latest available audited accounts adjusted to incorporate unaudited results for more recent periods.

REPORT OF THE AUDITORS

Report of the Auditors to the Members of Logica plc

We have audited the accounts set out on pages 36 to 45 in accordance with approved Auditing Standards.

In our opinion the accounts give a true and fair view of the state of affairs of the company and the group at 30 June 1987, and of the profit and source and application of funds of the group for the year then ended, and comply with the Companies Act 1985.

Price Waterhouse
Chartered Accountants
London

24 September 1987

THREE YEAR RECORD

	1987 £'000	1986 £'000	1985 £'000
Turnover	**110774**	**87042**	**62284**
Operating profit	10545	7457	4529
Interest	778	(649)	487
Profit on ordinary activities before tax	**11323**	**6808**	**5016**
Taxation on ordinary activities	4210	2574	2717
Profit on ordinary activities after tax	**7113**	**4234**	**2299**
Shareholders' funds	29013	22831	18794
Earnings per ordinary share	**14.4p**	**10.1p**	**7.0p**
Dividends per share (net)	1.7p	1.0p	0.35p
Staff numbers at year end	2682	2348	1843

New glimpses of the steel industry. Homestead Steel Works, the Carnegie plant of the United States Steel Corporation. A view of the shears at the 140" plate mill. ►

OFFICE ADDRESSES AROUND THE WORLD

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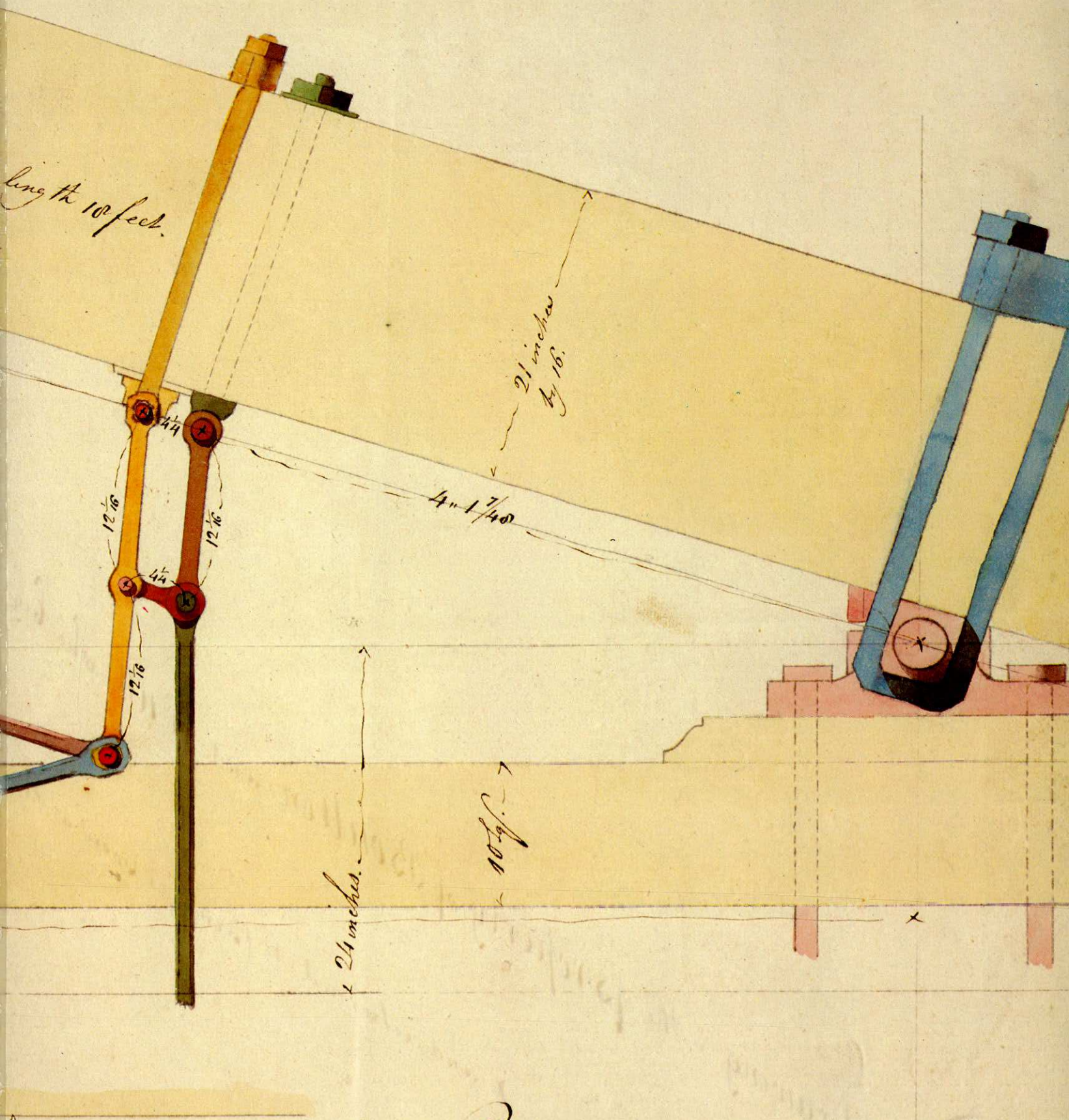

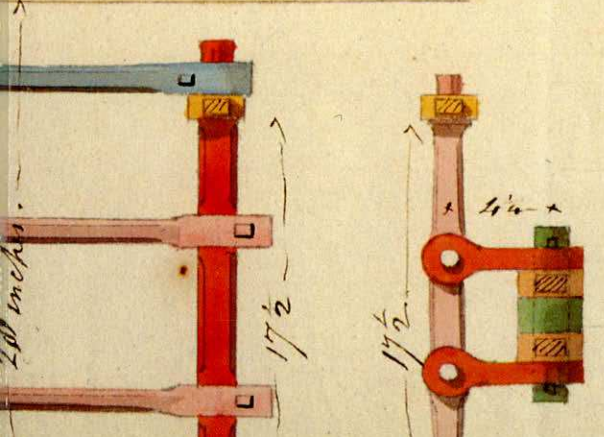

Parallel Motion for Sherrif Hill.

To Inch to the Inch

Jan 7 6th 1796