

**ELLIOTT**

**APPRENTICESHIPS**  
and TRAINING COURSES



**ELLIOTT BROTHERS (LONDON) LIMITED**  
AIRPORT WORKS, ROCHESTER, KENT



A MEMBER OF THE ELLIOTT-AUTOMATION GROUP

[www.rochesteravionicarchives.co.uk](http://www.rochesteravionicarchives.co.uk)

## INTRODUCTION

Elliott Brothers (London) Limited is an old established company with a long tradition of pioneering in new fields of instrumentation and a reputation for outstanding craftsmanship. Its founder, William Elliott, was himself an apprentice whose master died before Elliott had served his full term of apprenticeship. He set up as a drawing instrument maker in Gray's Inn in 1800 and gradually extended his range of products to include, first, surveying and mathematical instruments, and later, instruments for the new steam power equipment of the first industrial revolution. Subsequently, the Company played a prominent part in developing instruments for use with new sources of power—electricity and the internal combustion engine. It made instruments for Faraday and built a calculating machine for Charles Babbage which was, in fact, the first computer.

Elliott Brothers is now one of the principal companies of the Elliott-Automation Group in which there are sixty companies and divisions, each concerned with a particular aspect of instrumentation and control engineering and together covering virtually the whole field of automation technology. Recent projects which serve to illustrate the scope of its activities include the complete instrumentation of new oil refineries in many parts of the world, integrated control systems in lead and zinc smelting, roadstone blending and biscuit making plants, fuel-blending at a new Ocean Terminal, fuelling and ballasting valves for fast modern liners, information and computing systems for the fully automated control of complex industrial processes, instrumentation and control equipment for nuclear power stations, electronic computers for scientific work and large scale data processing installations (including air traffic control) and comprehensive flight control systems, navigation and communications equipment for the latest types of modern aircraft.

Airport Works, Rochester, accommodates eight divisions of Elliott Brothers (London) Limited in addition to seven other members of the Group. It provides over 400,000 square feet of floor area and now employs nearly 3,000 people. A new factory alongside the existing buildings will double the floor area when complete and will bring the payroll to 5,000 people.

There are other Elliott-Automation factories at Lewisham, Borehamwood, Willesden, Stanmore, Park Royal, Slough, Aldermaston, Maryport, Croydon and Corsham. The Group has subsidiary companies in South Africa, Australia, Germany, Switzerland, Sweden and Holland and is closely associated with Manufacture de Machines du Haut-Rhin in France.

Each year several of the companies in the Group offer a number of apprenticeships to boys between 15½ and 17 years of age, either in General Engineering or as Specialised Craftsmen. Graduates between 20 and 25 years old are offered Technical or Commercial Traineeships. The following pages explain the various training schemes in operation at Airport Works, Rochester.



General Engineering Apprenticeships are open to boys between 15½ and 17 years of age on September 1st in the year of entry. A Grammar or Technical School education is required, with General Certificate of Education at Ordinary level.

Specialised Engineering courses are open to boys between 15½ and 17 years of age on September 1st in the year of entry. These courses are intended for those with Technical or Secondary Modern School education who have reached the school leaving age and possess a good general standard of education, including, if possible, a pass at Ordinary level Mathematics.

Applications for both types of course should be made in writing during June, July, and August each year. They should be addressed to:—The Personnel Manager, Elliott Brothers (London) Limited, Airport Works, Rochester, Kent.

*Pointing out the final details of the scheme.*



All applicants are invited to attend a preliminary interview at Airport Works. They are asked to fill in a form giving an outline of their educational background and details of their interests, hobbies and aim in life.

Suitable applicants are invited to a further interview at which the final selection is made. Each candidate discusses his ideas with a member of the Apprentices Management Committee, assisted by the Apprentice Supervisor, and the Training Officer. The atmosphere is friendly and informal, the aim being to choose well set-up, keen and intelligent boys who will derive the maximum benefit from five years education and training in a progressive engineering company.

## TRAINING FOR THE GENERAL ENGINEERING COURSE

Boys taking this course are required to attend the local Technical College one full day each week to qualify for Ordinary and Higher National Certificates in Mechanical, Electrical or Production Engineering. Wages for time spent at the Technical College are fully paid by the Company.

The practical training during this course starts with basic instruction in use of hand tools. Each apprentice completes a filing exercise to accustom him to hand work and the use of measuring instruments and is given an introduction to Sheet Metal work during which he makes for himself a tool box of modern design and appearance.

On completion of Basic Training the apprentice begins three years' training in the workshops of the various Divisions, spending from three to six months with each. The work covers electrical and electronic unit production for a range of jobs and projects varying from lighting, power and traction machinery to computer units and the latest developments in transistor and semi-conductor usage.

The work includes all aspects of assembly, wiring, inspection and test.

On the mechanical side, training is given in all forms of production work and the apprentice is taught to use machines for turning, milling, grinding, punching, cutting and pressing. All Divisions are engaged on high-precision work, and have the equipment necessary to achieve the accuracy required.



*First year apprentices examine an exhibition of work by last year's entrants.*



*Training on an  
Autopilot Test  
Console.*



The assembly, checking and calibration of items manufactured are part of the course, together with a period spent in the tool room making tools, jigs and fixtures for use in the shops. Training is also given in the production-service departments.

The final year is spent working in Production, Planning, Design and Drawing Offices or the Engineering Development Laboratories, which provide a thorough grounding in Production Control and Administration procedures.

The Company makes adequate provision for those apprentices able to benefit by advanced education. All apprentices attend the Technical College with a view to obtaining worth-while qualifications and those with the necessary ability to win themselves University places are encouraged by the Company to do so and are backed fully during their studies according to their needs.

On completion of the five years' course, or upon reaching the age of 21 years, each apprentice is presented with the original copy of his Apprenticeship Agreement (the present-day equivalent of 'Indentures').

## Specialised Training Courses

Boys taking this course also attend the local Technical College one full day each week to qualify for City and Guilds Certificate in their trade or specialisation. Wages for time spent at the College are fully paid by the Company.

The basic practical training for this course is the same as for the General Apprenticeship, no distinction being made in any way between these two grades of Apprenticeship until the third or fourth year. Each apprentice completes a filing exercise to acquaint him with the use of hand tools and measuring instruments. An introduction to sheet metal work enables the apprentice to make his own tool box (each box carries the owner's name on an engraved plate) the boxes being uniformly finished stove-enamelled in an attractive modern finish.

Opportunity is provided for the apprentice to make certain useful tools which he keeps. He is introduced to the use of machine tools for turning, milling, shaping, marking out-and drilling.

On completion of Basic Training, the apprentice moves out to Divisional Workshops to commence training for ultimate specialisation. Certain apprentices who by reason of family tradition or marked aptitude have asked for particular specialisation will be placed in the appropriate division directly after basic training.

All apprentices spend from three to six months in Divisional Workshops at one time, being moved periodically so that each may have the opportunity to learn all aspects of Engineering Production.



*Training to be a  
Toolmaker.*



*Electronic Wiring:  
An apprentice com-  
pletes the wiring  
cable-form for an  
air data computer.*



Craftsmen are employed in many trades and occupations throughout the Group: two examples only are given:—

### **Electronic Wiremen**

After Basic Training, four years are spent on the following types of work:—

Cable-form production and testing, including setting up cable-form boards, wiring, preparing connections and lacing.

Wiring completed cable-forms into units, making connections, anchoring cable-forms and preliminary testing.

Prototype wiring and cable-form design work.

Testing, selecting and matching electronic components, use of resistance, continuity, capacity, insulation and all forms of electrical and electronic measuring apparatus. Assembly of electro-mechanical mechanisms such as gyroscopes, resolving mechanisms and gear boxes with the associated functional vibration and environmental testing.

## Sheet Metal Worker

After Basic Training four years are spent on the following types of work :—

Bench fitting work—making and assembling details for cases, trays and chassis for all types of electronic units (amplifiers, computer trays, 'plug-in' units, aircraft auto-pilot units).

Press work—blanking, drawing, punching and forming parts in light alloy, steel and brass sheet, on a variety of presses, from hand-operated bench machines to 100-ton presses.

Welding—all forms of welding—gas, arc and argon-arc in all common metals.

Hand and bench sheet-metal beating and forming.

Sheet metal work in light alloys: Production of cases and structures for test apparatus, display consoles and complete assemblies for use in aircraft, missiles, airborne radar and ground-station equipment.

Sheet metal work in steel: Production of control and meter panels for all types of automation services; production and erection of specialised conveyor systems.

Fitting out, erection, painting and finishing of all items made



*The apprentice becomes a fully-fledged draughtsman.*

From the third year of training onwards the course of the apprentice's career is studied carefully to ensure that he is placed in a job which suits him and enables him to develop his capabilities to the full. It is hoped that the relationship between the Company and the apprentice, built up over five years of training, will continue to flourish when the apprenticeship is over.



# PAY AND CONDITIONS DURING APPRENTICESHIP TRAINING

## Pay

Throughout his training the apprentice is paid according to his age, at rates agreed between the Engineering Employers' Federation and the Trade Unions. At present the rates are as follows:—

15 years of age	Wages per 42 hour week	£2 13 6
16 years of age		£3 4 11
17 years of age		£3 17 9
18 years of age		£5 7 6
19 years of age		£6 7 1
20 years of age		£7 10 7

These rates are liable to adjustment by agreement at National level.

## Progress Awards

In addition apprentices are eligible for a Progress Award applicable only during the period of apprenticeship. The amount is decided by the Training Officer by reference to reports from College and Training Supervisors in the department where the apprentice is employed.

These awards are in the form of hourly rates as follows:—

Age 16 to 17	2d. per hour maximum
„ 17 to 18	3d. per hour maximum
„ 18 to 19	4d. per hour maximum
„ 19 to 20	5d. per hour maximum
„ 20 and above	6d. per hour maximum

## Piecework

In shops where piecework is available apprentices are permitted to work at piecework provided they have reached the age of 19 and are capable of benefitting by such work. The Progress Award is not included in piecework rate calculations.

## Hours of Work

Apprentices start and finish at Works' hours which are:—

Start 7.30 a.m. until 12.30 p.m. (one hour for lunch)

Start 1.30 p.m. finish 5.00 p.m.

Monday to Thursday; Fridays finish at 4.30 p.m.

This provides a working week of 42 hours, including one full day at school.

Apprentices under 18 years do not work overtime or night shift. Apprentices over 18 years may work up to 5 hours' overtime per week if so desired and if approved by the Training Officer.

Senior apprentices working for examinations or registered as external students of a University spend a greater proportion of their working time at College depending on their course of study.

There is a 10-minute tea-break morning and afternoon. Apprentices get tea free of charge.

## Overalls and Protective Clothing

Each apprentice is supplied with an overall coat made to measure and exchanged for a clean coat each week. The coats are of distinctive colour to ensure that the wearer can be recognised as an apprentice.

## CANTEEN AND RECREATIONAL FACILITIES

### Canteen

The work's canteen provides a set lunch. There is always a choice of food, and the menu is varied daily. Apprentices are offered lunch at a reduced price.

There is also a Snack Bar which sells tea, coffee, minerals and light refreshments, and caters for people who want to bring their own lunch.

Apprentices who live an inconvenient distance from the college at which they are attending night school can get a free meal in the canteen before they leave.



*Tea and buns in the Snack-bar.*

### Social Activities

The Social Club provides a wide variety of entertainment and is open to everyone employed at the Rochester factory.

Membership costs 3d. a week, which is deducted from the wages of all who agree to join.

The club is administered by a Management Committee which consists of a Chairman, Treasurer and Secretary, nominated by the Company, and a minimum of twelve representatives elected by the Club members.

The President is the Managing Director of Elliott Brothers (London) Limited.

### Sporting Facilities

The 2,500 members of the Social Club have formed football, cricket, netball, angling, auto, amateur radio, tennis, bat and trap, horticulture, arts and crafts, badminton, judo, weight-lifting, small-bore shooting, athletics, swimming and diving sections. Each section has its own controlling committee and endeavours to remain self-supporting, but is assisted by the Social Club in every way.

The new Elliott Sports Ground is situated at Featherby Road, Gillingham. It is for the use of members and their families, and has football and cricket pitches and tennis courts. A new pavilion is being built there.



# TECHNICAL AND COMMERCIAL TRAINEESHIPS

## General

Technical Traineeships are open to University Graduates between 20 and 25 years of age. A degree in Science, with Mathematics or Physics as subjects, or a Degree in Engineering, Electrical or Mechanical, is required. The course lasts for 3 years.

Commercial Traineeships are offered to University Graduates, between 20 and 25 years of age, who have a degree in either Arts or Science, with Economics or Law subjects as part of the qualification. This course also lasts for 3 years.

Applications for interview should be made through the Secretary of the appropriate University Appointments Board or the Chief Personnel Executive of Elliott Brothers (London) Limited, whose address is 70 Dudden Hill Lane, Willesden, London, N.W.10.

## Pay and Conditions

For trainees the rate of pay will vary according to educational attainments and industrial experience. An idea can be gained from the following example:—

A University Graduate, with little or no experience, aged 22 and employed as monthly staff would receive £650 per annum. A man with similar qualifications, but with experience in industry, might receive £850.

Students doing 'sandwich' courses, six months in the Works and six months at University or College, are usually paid about £6 weekly. Vacation students are usually paid about £8 per week of 42 hours.

These rates may sometimes be adjusted to suit the special circumstances of individuals.

Trainees work the hours of the department in which they are training. The usual hours for staff employees are:—

8.30 a.m. - 12.30 p.m.  
1.30 p.m. - 5.15 p.m. (Fridays, 5 p.m.)

This provides a working week of  $38\frac{1}{2}$  hours.

There is a 10-minute tea-break, morning and afternoon.

THE FOLLOWING ARE THE PRINCIPAL COMPANIES AND DIVISIONS  
WHICH COMPRISE THE ELLIOTT-AUTOMATION GROUP

**COMPANIES**

Elliott Brothers (London) Ltd.  
Electroflo Meters Company Ltd.  
Associated Automation Ltd.  
The Rheostatic Company Ltd.

Black Automatic Controls Ltd.  
Bristol's Instrument Company Ltd.  
C. P. Clare Ltd.  
Elliott Brothers Sales Agencies Ltd.  
Elliott-Litton Ltd.  
Elliott Nucleonics Ltd.  
Farris Engineering Ltd.  
Fisher Governor Company Ltd.  
Gilmour Control Systems Ltd.  
Hallikainen Instruments Ltd.  
Hall Telephone Accessories Ltd.  
Isotope Developments Ltd.  
James Gordon & Co. Ltd.  
James Gordon Valves Ltd.  
Leybold-Elliott Ltd.  
Mechanical Automation Ltd.  
National Automatic Machines Ltd.  
Panellit Ltd.  
Rotron Controls Ltd.  
Rotameter Manufacturing Company Ltd.  
Satchwell Controls Ltd.  
Sauter Controls Ltd.  
The Swartwout Company Ltd.  
B. & P. Swift Ltd.  
Webb Conveyors and Automation Ltd.

E-A Automation Systems Ltd.  
E-A Automation Services Ltd.  
E-A Technical Services Ltd.

*Subsidiaries Overseas*

Contactar (Pty.) Ltd. (South Africa).  
Electroflo Metres (Africa) (Pty.) Ltd.  
Elliott-Automation (Pty.) Ltd. (Australia).  
Elliott-Automation A.G. (Switzerland).  
Elliott-Automation G.m.b.H. (Germany).  
Elliott-Automation A.B. (Sweden).  
Fisher Governor Amsterdam N.V.  
(Holland).  
Swartwout N.V. (Holland).  
A.B. Termostatik (Sweden).  
La Thermostatique F.A. (France).

*Associated Company*

Manufacture de Machines du Haut-Rhin  
(Manurhin).

**DIVISIONS**

**Automatic Control Valves Group** Ballast and Cargo Valves  
Butterfly Valves  
Diaphragm Motor Valves  
Flex Valves  
Safety Relief Valves  
Solenoid Operated Valves  
Special Purpose Valves

**Automatic Data Processing Group** Analogue Computers  
Automation Accessories  
Data Logging  
Digital Computers  
Industrial Information Systems  
Special-Purpose Computers

**Automation Components Group** High Duty Relays  
Precision Gears  
Servo Components

**Guided Flight Group** Aircraft Engine Instruments  
Aircraft Instruments Service and Repairs  
Automatic Test Equipment  
Inertial Navigation  
Military Aircraft Controls  
Precision Gyros  
Transport Aircraft Controls  
Weapons

**Mechanical Automation Group** Automatic Vending Equipment  
Conveyor Systems  
Machine Tool Control Systems  
Mechanical Automation  
Mechanical Computers  
Office Machinery  
Postal Equipment  
Telephone Accessories  
Analytical Instruments

**Process Automation Group** Electrical Control Instruments  
Electrical Measuring Instruments  
Electrical Recording Instruments  
Electronic Control Instruments  
High Vacuum Equipment  
Industrial Weighing  
Nucleonics  
Process Control Divisions:—  
Chemical and Oil  
Food and Marine  
Gas and Water  
Heating and Ventilating  
Paper and Pulp  
Public Utilities  
Rubber and Plastics  
Steam Raising and Power Generation  
Steel  
Quality Control

**Radar and Communications Group** Airborne Radio and Radar  
Electronic Valves  
Microwave and Electronic Instruments  
Radar  
Telecommunications

**Specialised Research Laboratories** Data Processing Research  
Fluid Dynamics Research  
Gyro Research  
Radar and Microwave Research  
Vacuum Physics Research