



Rochester Avionic Archives Newsletter

From the Curator.

We are awaiting news that we can return to the RAA at last; I was getting fed up with the perpetual lockdown!. Meanwhile the team have been busy preparing Procedures to record the processes we follow when managing what is becoming quite a big Collection and Archive. This Quarter's newsletter has the usual dig into Company history but the piece about Sir Leon Bagrit training members of Parliament about computers was a real find. The Perpetual Motion device was also a fascinating discovery.

Chris Bartlett, Curator

The Mirage Milan

At the end of 1967, in response to the Swiss Air Force's call for a tactical support aircraft even more manoeuvrable than the Mirage III, Dassault and the Fabrique fédérale d'Avions at Emmen decided to build small retractable canards into the nose cone of the Mirage. A Mirage 5J No. 2, christened "Asterix" for that cartoon's character famous moustache, made its first flight at Melun-Villaroche on September 27, 1968.

The Milan was a type of Duck and 'Canard' is French for Duck hence the humour in the naming.

In the mid-70s Jim Machin and I (*Editor*) made frequent journeys to Melun-Villaroche with Chris Wattle to work on the flight trials of the Mirage Milan. We regularly had to rebuild the HUD Electronics Unit. The problem was that in the A-4 Electronics Unit used for this system a number of 28VDC lines ran through the wiring (all the Card sockets were wired, there was no Motherboard) and it was very easy to short these across to the other wiring. This event was fairly catastrophic and with limited spares at times small Flatpack devices were glued upside down onto the top of the failed chips and wired in place! Jim Machin would replace these chips logically according to the program, but Chris Wattle did so randomly with equal success.

We travelled in the company aircraft and the French made much of the fact that Machin translated meant a 'contraption' or a 'rubbish item' (another translation is 'thingy' or 'thingummyjig', apparently). We arrived in an aircraft registered as G-ASHI which our French colleagues also found amusing but never explained why.

Unfortunately, a contract for Marconi-Elliott did not appear. The Company was never again to have an opportunity of fitting a HUD into a French aircraft operated by the Armée de l'Air but did fit HUDWACS to export aircraft operated by other countries.



The Mirage Milan. ©Dassault Aviation



Chris Wattle (background) and Jim Machin at Melun-Villaroche working on the HUD (*Editor's photo*)

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Computer lessons for politicians!

'On Monday 13th October 1965 some 75 MPs, peers, and party official began a three-day course on computer appreciation and introductory programming organised by Elliott Automation. During the three-day course the 75 politicians, split into groups of six under a tutor, will be told what computers do and will be taught programming. On Monday they will write a programme on the cost of buying and running a car, hire purchase expenses included. On Tuesday they will write a programme from statistics on wages. The last day they will work out the percentage poll from figures for 50 constituencies and place the percentages in ascending order.

No one at Elliott Automation pretends that the politicians will become experts, but they should gain an understanding of computers, which, as Mr RE Giles, head of the company's education department, says, "are at the heart of automation."

Their instructors, all aged between 18 and 30, are members of the booming second generation of computer experts. Elliott Automation is not releasing the names of the politicians attending the course or their political affiliations but hopefully, Mr Marples (Opposition spokesman on technology) and Mr Cousins the Minister of Technology attended. All, lords and commoners, Liberals, Conservatives, and Socialists, are being requested to arrive punctually on Monday morning and to bring their own pen or pencil with them.' The Guardian



Sir Leon Bagrit, chairman of Elliott-Automation Ltd, arrives at the House of Commons in London, carrying one of his company's 920M miniature computer models, June 1965. Photograph: ©John Waterman/Getty Images



Thanks to Erik Baigar for spotting this article in 'The Guardian' from 1965

A National-Elliott 803 computer being loaded onto a customised Austin 32 cwt van at the Boreham Wood factory of Elliott-Automation, bound for Moscow. Compare the 920M with the 803 being pushed into the truck - almost the same computational power, but "slightly" different size.

Photograph:© Fox Photos/Getty Images

Perpetual Motion

In the mid-1800s, Robert Walker, a physics professor at the University of Oxford, acquired an interesting device. It was a battery designed to propel a hanging metal ball quickly back and forth, between two small bells. Today, 181 years after it was manufactured, the Oxford Electric Bell, as it is often referred to, is still ringing—in fact, it is said to have rung over 10 billion times.

Although the bell was set up in 1840, the original bell and battery were built by a firm called Watkins and Hill in 1825. Watkins and Hill were a London instrument-manufacturing and in about 1856 Elliott Bros took over their business. The Oxford Electric Bell is currently the world record holder for the longest ringing bell and oldest active battery.

The design of the bell experiment consists of 2 brass bells on top of a dry pile battery connected in a series circuit. In between the bells is a small brass ball that strikes them and rings them. The ball is charged by an electrostatic force which charges the brass ball every time it hits one of the two bells, causing it to continuously move and strike until the dry pile battery is depleted.

The dry pile battery is a predecessor of the modern dry cell battery, however, unlike other dry piles, the one running the Oxford Electric Bell was an experimental dry pile battery. Its composition is entirely unknown. The only thing absolutely known about the dry pile that it was coated in molten sulphur to insulate the battery. It is also assumed that the battery is made of Zamboni piles, which were an early type of electric battery developed in the early 19th century by priest and physicist Giuseppe Zamboni.

When viewing this bell, many ask or claim that it is an example of a perpetual motion machine. However, it is not. A perpetual motion machine is a machine that does not require energy and will continue infinitely at the same rate of efficiency.

The Oxford Electric Bell, however, will eventually stop. Once the dry pile runs out of charge and no longer supplies the bells with electric current the brass ball will be unable to collect an electrostatic charge, ultimately stopping the bell from sounding.

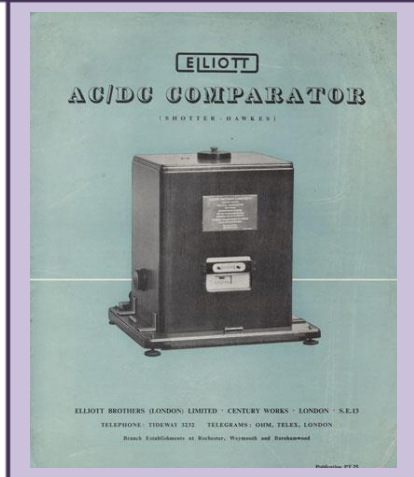
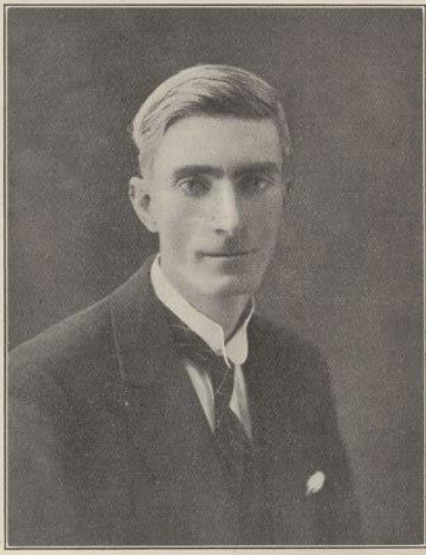
When the bell does stop however, researchers will be finally able to disassemble the machine and figure out the composition of the dry pile battery and what allowed it to run for so long.

From 'The Smithsonian Magazine' and also <https://hubpages.com/education/The-Forever-Ringing-Bell>



This is the Company Chauffeuse with the Rover TC2000 in 1973. Sadly, we have no information about her; does anyone have any information?

The G. F. Shotter Papers



The IET Archives recently received a donation of the technical and work papers of George F. Shotter FIEE (1886-1971), who was an electrical measuring instrumentation specialist.

The majority of the papers in the collection are related to George's numerous patents, his reports for ERA, and his published papers. Amongst his patent papers, it is fascinating to observe the amount of income that George earned over and above his Northmet Power Company salary from licensing his patents to other companies, particularly to Elliott Brothers. This was obviously permitted by his Northmet employee contract,

Royalty statements from Elliott Brothers are contained within the papers and these show for example that George earned £453 from the company for the half-year ended 31 December 1952 (the average UK house price at the end of 1952 was just under £1,900). Elliott Brothers even had a product that included Shotter's name, the AC/DC Comparator (Shotter-Hawkes). The product leaflet for this item is shown to the left.

Courtesy of the IET Archives

The first US Support facilities

With foresight in 1966 Jack Pateman set up a support establishment called E-A Industrial Corporation in Atlanta in Georgia U.S.A. The new factory was formally opened on June 27 1969 to support the production equipment sent over by Elliott Flight Automation. It was a tidy, windowless 10,000sq ft "facility", designed for extension ultimately to 30,000sq ft, and equipped with air-conditioning so essential in the mid-90s humid climate of the Georgian summer. The opening ceremony was memorable for the fiery 'sermon' given by the Georgian pastor! Later a Vendor Repair facility was set up in Dallas Texas under Ernie Harwood and Brian Sturdy with Jim Machin and Don Allchin from ADD in support. Another employee, John Norman had a tour of duty on the USS America on a work-up cruise into the Caribbean with squadrons of A-7Es. The Hangar deck level where repairs were done was officially the Avionics Intermediate Maintenance Department but better known as 'America's Impossible Mission Department'! Another employee posted to Dallas at this time was Robin Sleight who both supported the A-7 HUD and became the local marketing man for the display business.



Some of the Company's connections with the IET

Elliott Bros through to BAE Systems by the nature of its work with electronic systems has always had a close relationship with professional engineering organisations as was briefly mentioned in the last Newsletter. Here are a few of the people.

- **Willoughby Smith**

Frederick Elliott (one of the two Elliott brothers) died in 1873 and left the business to his wife Susan. She established a joint partnership with Willoughby Smith who was an electrical engineer particularly well known for his work on the first trans-Atlantic cable.

In 1883 Willoughby Smith was President of the Society of Telegraph Engineers and Electricians. He died on July 17, 1891, in Eastbourne, England and by the time of his death he was the sole proprietor of Elliott Bros (London) Ltd.

- **Sir Keith Elphinstone**

He had an interest in calculating equipment and created the elaborate electro-mechanical calculating tables used for naval gunnery. These tables saw application from about 1908 until the 1950s with the Royal Navy when they were eventually superseded by radar fire control systems. Naval systems also included the 'Forbes Log', the first underwater ships log in the UK, the Dumaresq calculator used to determine the enemy ships rate of change of position, the Battenberg Course Indicator and a Fall of Shot Indicator. Elliott Brothers manufactured the first gyro compass to be used by the Royal Navy and this expertise in gyro systems was to be used later in the avionics business. These were important products at Lewisham which continued as one of the main sites as the Company expanded into control, instrumentation and computing for every conceivable type of industry. Keith Elphinstone was a Member of the Institution of Electrical Engineers and very well connected especially with the Government.

- **Robert William Paul**

He was an instrument maker who initially trained at Elliotts in about 1885. He became a founder Fellow of the Institute of Physics and vice-president in 1927–31. He was a Council Member of the Institution of Electrical Engineers and served as a manager and vice-president of the Royal Institution, where he played an important role in the success of the Faraday Centenary Exhibition at the Royal Albert Hall in 1931.

- **Sir Arthur Percy Morris Fleming**

He trained and was a test-room assistant with Elliotts at Lewisham in around 1890. He went on to become President of the Institution of Electrical Engineers in 1938 and was knighted in 1945.

- **Professor John Flavell Coales**

He was a pioneer of industrial automation systems. His career began as a government scientist working on secret defence research. He then became director of an industrial research team, whose discoveries shaped early computer developments.

In 1946 he became research director for Elliott Brothers, the future heart of the Elliott Automation group, and took over a research laboratory carrying out defence development work.

John Coales was awarded an Order of the British Empire (OBE) for his work during WW II; and appointed a Commander of the Order of the British Empire (CBE) in 1976. He was elected a Fellow of the Royal Society in 1970 and received an honorary D.Sc. from the City University (London) in 1971. He had a very strong connection with the Institution of Electrical Engineers for most of his professional life and was elected President of the Institution, 1971-72

- **Elizabeth Laverick OBE FIEE FInstP**

A British engineer who became technical director of Elliott Automation Radar Systems. She was the first female deputy secretary of the Institution of Electrical Engineers and president of the Women's Engineering Society. She was the first woman to receive a PhD in a scientific curriculum at Durham University, and was appointed an OBE in 1993.

Elliotts Sports Day 1936

When the last event, the 1000 yards Championship had been won by W. F. West, there was a rush for the Pavilion where we found Mr. L. W. Smith, ably assisted by Lady Elphinstone, showing his versatility by judging the styles of hairdressing adopted by an alarming number of young ladies. Last year he judged their ankles; what will he be called upon to judge next year? (From 'The Centurion' company magazine, October 1936)