



# Rochester Avionic Archives Newsletter

From the Curator.

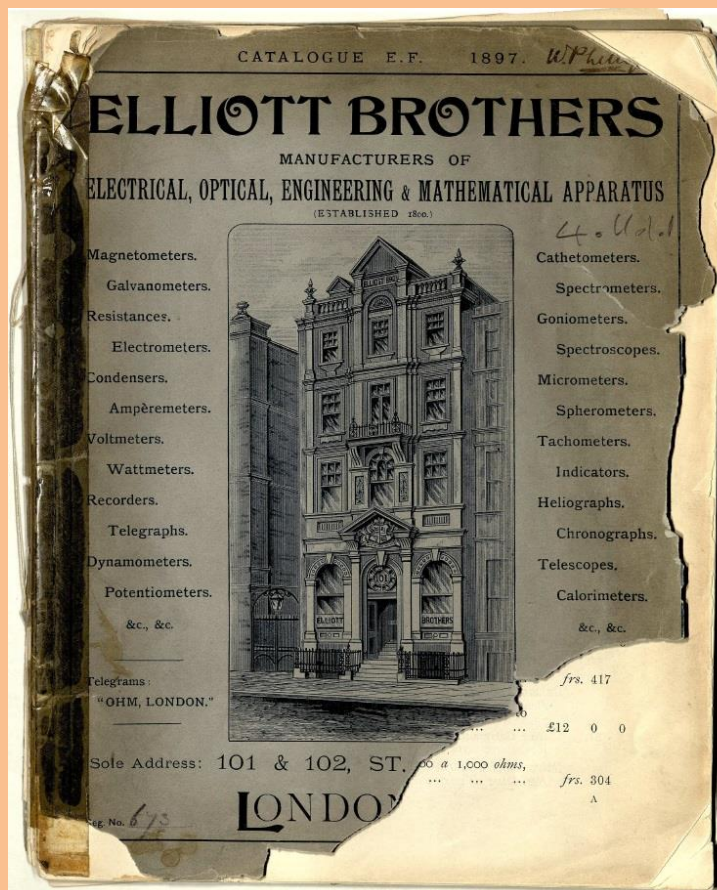
We are still not able to have the team back in the RAA. However, one individual can now visit on an occasional basis so at least we can sort out a few of the many queries we have been building up.

Howard Mason has been in the role of BAE Systems Heritage Manager since his formal retirement but his contract will not be renewed beyond the end of October. Thank you, Howard, for all your efforts and enthusiasm over the years.

A welcome to Jonathan Harmer from the Events and Exhibitions Team who will be taking on the Heritage role.

Chris Bartlett, Curator

## A few items from the Bodleian Library at Oxford



Elliott Brothers Catalogue from 1897  
A Wheatstone Bridge is £75.00

Scanned and supplied by the Bodleian Library with much appreciation. (Ed)



EARSHOT was the Journal of Marconi Elliott Avionics and this is the Summer 1977 edition.  
The smiley face on the radar is a nice touch!

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1		2	
Assets		Liabilities	
<b>Capital Accounts</b>		<b>Sundry Accounts</b>	
W.C. Fund	45,000 - 0 - 0	Land & Buildings, Contingencies	23,270 - 15 - 6
W.F. Fund	24,000 - 0 - 0	Less Estimated Fund of Profits transferred to	
S.A.B. Reserve	15,000 - 0 - 0	Share Account on Long Account	177 - 2 - 6
	90,000 - 0 - 0		23,270 - 15 - 2
<b>General Reserve Fund</b>		<b>Loans</b>	
	25,270 - 15 - 7	Plant, Tools, etc.	4,610 - 10 - 0
<b>Drawing Accounts (Page 15)</b>		Less Reserve for Provision	26,200 - 0 - 0
W.C. Fund	47 - 11 - 2		16,584 - 10 - 0
W.F. Fund	33 - 10 - 7		
S.A.B. Reserve	35 - 6 - 9		26,200 - 0 - 0
	121 - 18 - 7		
		<b>Provisions (Page 15)</b>	
		Provision for Provision	300 - 0 - 0
		Less Profit & Loss	250 - 0 - 0
			50 - 0 - 0
		<b>Experimental Work</b>	
		Annual reserve provided	200 - 0 - 0
		<b>Reserve Accounts (Account based on advance)</b>	
		<b>Technical &amp; Experimental Accounts</b>	
		£ of Exp. 1 - 0	57 - 10 - 0
		Less Insurance Contingencies & Contingency exp.	
		£ of Exp. 1 - 0	57 - 10 - 0
		Less of Insurance Expense & Cont. Account exp.	21 - 10 - 0
		Balance	36 - 0 - 0
		Less of Contingency Fund	41 - 0 - 0
		Balance	1 - 10 - 0
			157 - 1 - 0
		<b>Investments (Page 14)</b>	
			2,000 - 0 - 0
		<b>Total</b>	
			97,720 - 17 - 1

Elliott Brothers (London) Ltd Balance Sheet from 1911

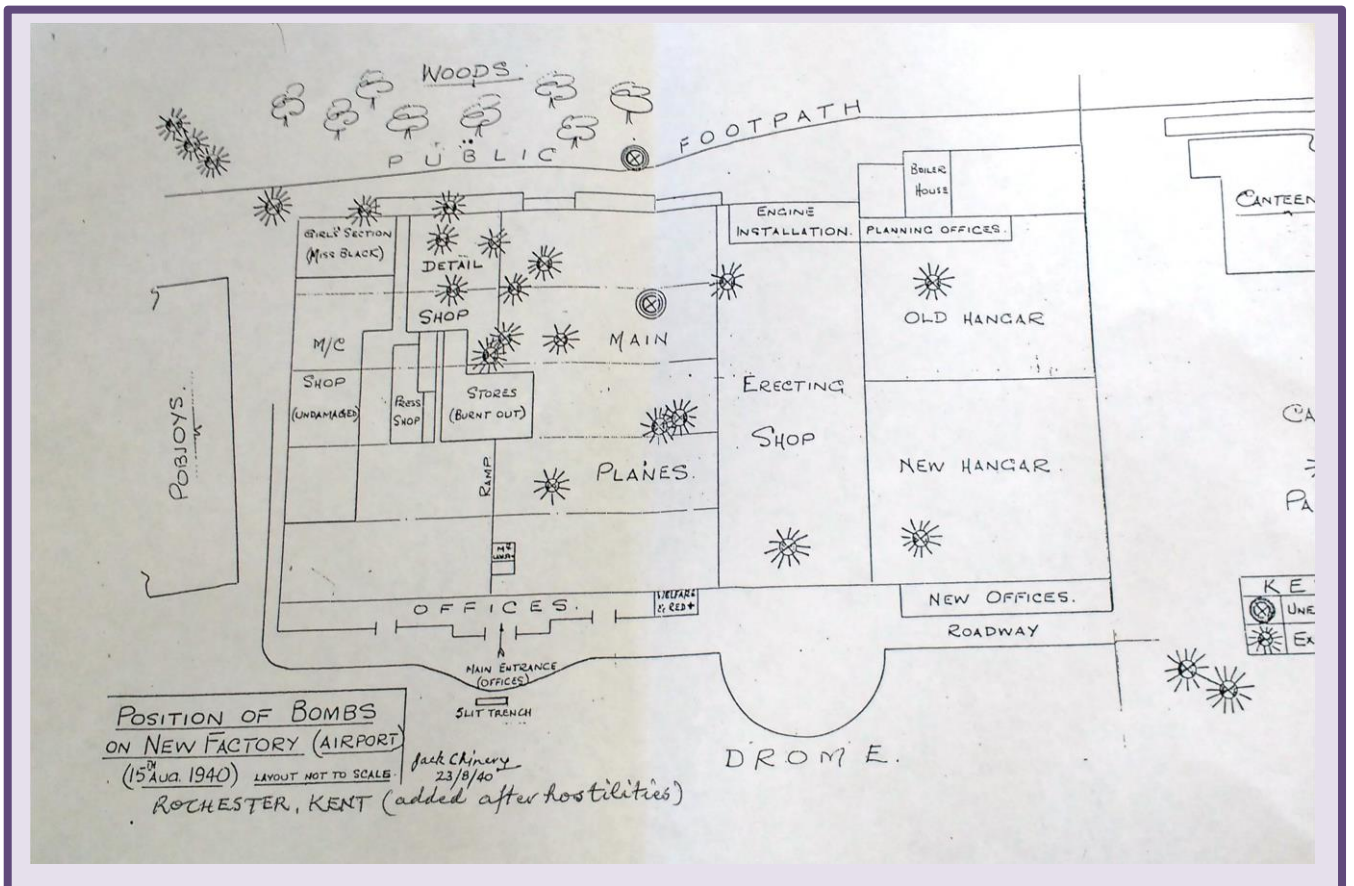
**Could be true!**  
The Rochester factory was a Russian target during the Cold War era. *Chatham News*

The Corsair Building sits on top of a number of WWII Air raid shelters.

The Executives 'Blue Room' Restaurant was shut in 1994.

One of the HR Directors was short in stature so had special office furniture made.

Ron Howard had a 9ft high door installed into the Board Room?



**Rochester bombing August 1940**

This is a plan of where the bombs fell on the Rochester factory of Short Brothers on the 15 Aug 1940. The plan was drawn, then updated by Jack Chinery on 23 Aug 1940. We have a blueprint of the site with the bomb falls, but this plan has not been seen before. Our thanks to Norma Crowe of Medway Archives for sending it to us. Note the way that the 'Girls Section' under the charge of Miss Black is tucked away in the top left-hand corner.

## Newsletter 25 That picture again

In Newsletter 25 I mentioned a negative found in the Lewisham Archives with four pictures. Two of these were the Elliott brothers, Charles and Frederick and the lady I believed to be Susan Elliott, the wife of Frederick Elliott.

While researching the catalogue of the Elliott Historic Collection and Archive held in the Museum of the History of Science at Oxford, I found a reference to a picture of Susan Elliott which frustratingly does not have an image attached.

*Inventory Number: 12627*

*Brief Description: Carte de visite (albumen print mounted on card).*

*Portrait of Susan Elliott, standing full length, turned and looking to left, her right arm supported on a carved chair back, wearing a white (or very light coloured) dress with a very wide skirt.*

However, in my picture she has a very dark dress. I am sure that this was a common pose.

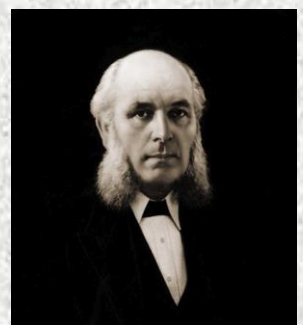
I could not identify the other top-hatted gentleman but now I can say with some certainty that it is Willoughby Smith who with Susan Elliott ran Elliott Bros after the death of the brothers. He became President of the Society of Telegraph Engineers and Electricians in 1883 (now part of the IET) and is credited with discovering the photoconductivity of selenium. His grave will be found in Highgate cemetery.

I believe the group of four were taken at Crystal Palace by the photographers Negretti and Zambra around 1860 to 1880. However, at the bottom of the picture of Willoughby Smith is written 'Scarboro'.



Willoughby Smith from the Lewisham Archives

Willoughby Smith plays an interesting part in the Head Up Display story. In 1873 he was a senior electrician with the Telegraph Construction and Maintenance Company of Britain and had the assignment to devise a system of continually testing a cable as it was being laid. For a test circuit to try out his ideas, Smith needed a material with very high resistance to electrical current, but not a complete insulator. So, in the course of his experiments he tried using bars of crystalline selenium, though he was aware that the substance seemed to have a curiously inconstant resistance. It was while Joseph May, one of his assistants, was testing these bars that it was discovered that the resistance of selenium seemed to depend on the amount of light falling on the circuit. Willoughby Smith wrote a note about this effect to the Society of Telegraph Engineers. Smith's letter, which conveniently forgot to mention May's involvement with the discovery, triggered a spark of inventions, all claiming to 'see by radio.' This was of course exactly the property that John Logie Baird needed to develop his primitive television system. Logie Baird developed high luminance CRTs for his projection TV and these were developed through his Company Cinema Television (Cintel) to be used in the early Head Up Displays.



Willoughby Smith from the IET Archives



The Aviation Division New Year Party 1955. (I recognise the Lightning but not sure what the duck is all about!)

### The Aviation Division

During 1953 three Divisions were set up at Borehamwood; the most important for the Rochester site was the Aero Division which was moved from Lewisham and established as the Aviation Division under Jack Pateman (the other two were Guided Weapons and Computing). When the Aviation Division was established, the first manager was W. H. Pearse and one of the small team of 10 was a new graduate named Dick Collinson who was yet another to be influential in the work at Rochester. Staff Ellis became Chief Designer and went on to design mechanical, hydraulic and eventually HUD optical systems for many of the most successful products and over 50 patents to his name.



An Elliott 405 Computer being delivered in Norwich in 1957

## More about Marine instruments

By 1910 Elliott Bros at Lewisham had begun to produce naval equipment in a newly created department. Electric signalling systems were introduced for ships' steering and engine room telegraphs on naval and mercantile ships. There were systems for passing rangefinder data to guns and others for monitoring propeller speed and a very accurate ships' electrical log, known as Forbes' pattern, which was the first reliable type for submarines.

W.O. Smith, jointly with Metcalf who was a Royal Navy engineer, patented the speed indicator which carried Metcalf's name in Elliott catalogues for many years. Gyros were produced for torpedoes and other applications. Elphinstone licensed the Anschutz gyro-compass from Germany and himself wrote or translated the instruction book on it; a number of these gyro-compasses were made before the Great War. Prince Louis of Battenberg, whilst serving in the Royal Navy in 1892, devised a mechanical calculator for solving the problems of ships' manoeuvres previously solved with a "Mooring Board." It was a mechanical analogue computer, it was adopted by the Navy and most were produced by Elliotts. Until after the Second World War every Naval ship would have had at least one Battenberg Course Indicator.

A similar calculator was designed by Lieut. Dumaresq in 1902 to calculate the rate of change of range and deflection of an enemy ship. It too was produced by Elliotts. It became a standard Naval item and made long-range naval gunnery possible, but its real significance was as the basis of a fire control system conceived by a naval gunnery expert, Commander Dreyer. With information on time, range, bearings, wind and other factors this Naval Fire Control System (NFCS), actually a mechanical analogue computer, could produce very accurate gun-laying. The first NFCS was produced in 1911 and was fitted in HMS Prince of Wales. By the time of the Great War Elliotts were fitting NFCS to the largest ships and a large part of the Lewisham factory, further extended and now employing four or five hundred people, was occupied with its production. Some of the ships in the Battle of Jutland were equipped with NFCS. Working with Dreyer, Elliotts were responsible for continuous development of these systems which became increasingly sophisticated and automatic. Dreyer became Admiral and Director of Naval Ordnance and, for his work on naval fire control systems, Elphinstone was knighted at the end of WW1.

Precision engineers Elliott Brothers were important contractors to the Admiralty for fire control equipment. Staff in the Admiralty Assembly Shop at their Century Works in Lewisham, London are seen here in the mid 1920s making equipment for Nelson and Rodney and cruisers.

*Ref: The Battleship Builders: Constructing and Arming British Capital Ships*

*By Ian Johnston, Ian Buxton*



### Quotes from Sir Leon Bagrit

Sir Leon Bagrit was MD and then Chairman of Elliott Bros from 1947. He is generally recognised as being extraordinarily prescient in his thinking. For instance, in his 1964 book 'The Age of Automation' he predicted:

*'It is now possible to envisage personal computers, small enough to be taken around in one's car, or even one's pocket. They could be plugged into a national computer grid, to provide individual enquirers with almost unlimited information.'*

*'Perhaps the most far-reaching use of the new generation of computers will be in the retention and communication of information of all sorts within a national, possibly a world-wide, information system.'*

*'In many industrial and commercial applications we are moving steadily away from large, centralized computers towards much simpler decentralized units, systems of small, cheap, special-purpose units, rather like building bricks.'*

*'Car drivers could be told immediately about traffic hold-ups and road works and given alternative routes....'*

And finally, a quote from Arnold Weinstock

*"Dreams have their place in managerial activity, but they need to be kept severely under control."*