A Serendipity of Mavericks

The Ratio Club and the British Experience of Cybernetics from 1949 to 1959

ANNEX



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Annex to a thesis submitted for the degree of
Doctor of Philosophy
Hilary 2024

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Annex 1: Tables

Table 1: Army OR Sections, 1940-1945[1]

Section 1(a)	Ack-Ack & Field Army Radar
Section 1(b)	Ack-Ack Operations & Searchlights
Section 2(a)	Coast Defence & Coast Artillery Radar
Section 2(b)	Analysis of Coast Artillery Shoots & Trials
Section 3	Signals
Section 4(a)	Armour & Mobility of Tanks, & Tank Gunnery
Section 4(b)	Anti-Tank & Field Gunnery
Section 5	Airborne Forces Operations & Equipment
Section 6	Infantry Weapons & Tactics
Section 7(a)	General Mathematical Problems, Fragmentation Fuses
Section 7(b)	Accuracy & Lethality of Artillery Fire, Field Trials
Section 8(a)	Mines & Obstacles
Section 8(b)	Special Optical Aids & Visual Problems
Section 8(c)	Flame Throwers & Smoke
Section 9	Time & Motion Studies of Drill & Uses of Equipment
Section 10	Analysis of Battle Records

Table 2: Servo Panel Talks, 1942-1945[2]

1942		
13 May	Hartree, D. Porter, A.	The Differential Analyser & its Application to Servo-Problems
12 June	Bedford, L. H.	Servo-Motor Developed at Cossors'
	Taylor, L. K.	Servomechanisms Developed at Ferranti's
24 July	Oxford, A. J. G.	The Automatic Ranging Unit for S.L.C.
	Jofeh, L.	An Electrical Method of Analysis of Servomechanisms
21 August	Tustin, A. Morris, D. G. O.	Talk & Demonstration Dealing with the Stability of Cyclic Systems & the Application & Construction of the Metadyne
2 October	Ludbrook, L.C.	Practical Problems Involved in Servo-Systems with Special Reference to the Ward-Leonard System in Position Control Servos
30 October	Warren, N. Bell, J.	The A.R.L. Hydraulic Servo-System with Magslip Control
4 December	Williams, F. C.	Low Power Split Field Servos

1943		
8 January	Whiteley, A. H.	Some Servo Developments in the U.S.A.
29 January	Inglis, C. C.	Tank Gun Stabilisation
	Tustin, A.	Gyro-Electrical Control Systems
	Somerville, T. B.	Polarised Twin Vibrator Regulator
	Barnett, P. S.	Brief Description of a Hydraulic Method of Stabilisation
19 February	Ashdown, G. L.	An Electro-Hydraulic Remote Control System
19 March	Robinson, B. W.	Some Aircraft Servomechanisms
16 April	Williams, R. R.	The Servo Selsyn & D.C. Impulse Control Systems
	Tustin, A.	Short Talk on the Vernier Selsyn

[1] From Kirby, M. W., *Operational Research in War and Peace:*, pp. 117-18, (Imperial College Press, London, 2003).
[2] From Bennet, S., *A History of Control Engineering*, (Peter Peregrinus/IEE, London, 1993).

1943		
21 May	Uttley, A.	Servomechanisms Used in R.A.F. Synthetic Trainers & the Human Link in the Cyclic Control System
25 June	Daniell, P. J.	The Interpretation & Use of Harmonic Response Diagrams (Nyquist Diagrams) with Particular Reference to Servomechanisms
23 July	*Symposium on "The Technique of Testing of Servomechanisms"*	
	Bell, J.	Methods of Measuring (A) Sensitivity, (B) Dead Sector, (C) Running Lag, (D) Power or Torque Ratio, (E) Stability, (F) the Ratio of Rate of Doing Work to Stored Energy
	Whiteley, A. L.	Testing Techniques Used by BTH
	Morris, D. G. O.	Methods of Harmonic Response Testing Used at Metro-Vick
27 August	Jofeh, L.	Electrical Models in Servomechanism Design
17 September	Hamon, B. V.	Servomechanism Development in Australia
15 October		Discussion of "Interim Report of The Nomenclature Committee"
26 November	*Meeting Held at C of M.S. Bury*	
	Hayes, K. A.	Use of Servos in Fire Control
	Hyde, A. D.	A New Method of Analysing Servomechanisms

1944		
7 January	Marchant, E. W.	The Testing Laboratory at Liverpool University for Small Servomechanisms
4 February	Craik, K. J. W.	Some Characteristics of the Human Operator in Control Systems
3 March	North, J. D.	The Electro-Hydraulic System Used in Boulton-Paul Gun Turrets
24 March	Brown, G. S.	Some Activities of the Servomechanism Laboratory, MIT
4 May	van Leeuwen, J. S.	Some General Aspects of Stabilisation
9 June	Hartree, D.R.	The Differential Analyser & its Applications to Control Problems
7 July	Porter, A.	A Study of the Performance of a Fire Control with Special Reference to Smoothing
18 August		Discussion of "Glossary of Terms Used in Control Systems'"
29 September	Spraule, C. O.	The Holmes Repeater Compass & the Four Pen Recorder
10 November	*Symposium on "Some Industrial Control (Servo) Problems"*	
	Donald, M. B.	Control & Measurement in the Chemical Industry
	Callender, A.	Industrial Control Problems
	Griffiths, J. B.	Circuit Interlocking
	Forster, E. W.	Electronic Industrial Servos
N/K	Caldwell, S. H.	U.S. Developments in Fire Control Systems

1945		
9 February	Hayes, K. A.	The Specification of a Servomechanism
	Holland, E.	The 1939 G.E. Searchlight Remote Control
23 March	Ludbrook, L. C.	Searchlight Control Gear Mark VIII
	Ovens, O.	
20 April	*Symposium on "Servo Testing Instruments & Testing Techniques"*	
	Tustin, A.	Method of Deriving Harmonic Responses From Unit Function Responses & Vice-Versa
	Brailsford	Instrument for Obtaining the Harmonic Response of Equipments
	Hayes, K. A.	Response Characteristics of the Hughes 4 Pen Recorder
	Braddick, H. J.	Instruments Developed By R.A.E.
	Sutton, O. G.	The Cambridge Instrument Co. Gyrograph
29 June	*Symposium on "Backlash"*	
	Tustin, A.	The Effect of Backlash in Servo-Systems
	Belsey, F. H.	Effects of Backlash & Resilience Between Motor & Load on the Stability of a Servo-System
24 August	Sudworth, J.	Control Systems of the German Pilotless Missiles V1 & V2

Table 3: Ratio Club Educational Backgrounds

Secondary School				First Undergraduate Degree						
Public	**Grammar**	**State**	**Overseas**	**Cambridge**	**Oxford**	**London**	**Manchester**	**Durham**	**St Andrews**	**Glasgow**
Ashby	*Hick*	*MacKay*	*Gold*	*Ashby*	*Woodward*	*Little*	*Dawson*	*Hick*	*MacKay*	*McLardy*
Barlow	*Little*	*Shipton*		*Barlow*		*Sholl*				
Bates	*Sholl*			*Bates*		*Uttley*				
Dawson	*Uttley*			*Gold*		*Westcott*				
Good	*Westcott*			*Good*						
McLardy				*Merton*						
Merton				*Pringle*						
Pringle				*Rushton*						
Rushton				*Slater*						
Slater				*Turing*						
Turing				*Walter*						
Walter										
Woodward										

Table 4: Ratio Club Primary Training

Life Sciences		Mathematically Based			
Medicine	**Biology**	**Mathematics**	**Physics**	**Electrical Engineering**	**Mechanical Engineering**
Ashby	*Pringle*	*Good*	*Little*	*Shipton*	*Gold*
Barlow	*Walter*	*Sholl*	*MacKay*	*Westcott*	
Bates	*(Sholl)*	*Turing*			
Dawson	*(Uttley)*	*Uttley*			
Hick		*Woodward*			
McLardy					
Merton					
Rushton					
Slater					

Table 5: Ratio Club Comparative Ages September 1939

TEENS		TWENTIES		THIRTIES	
MacKay	**17**	*Bates*	**21**	*Uttley*	**33**
Barlow	**17**	*Good*	**22**	*Slater*	**35**
Merton	**18**	*McLardy*	**25**	*Ashby*	**35**
Shipton	**18**	*Dawson*	**27**	*Sholl*	**36**
Westcott	**18**	*Hick*	**27**	*Rushton*	**37**
Gold	**19**	*Pringle*	**27**		
Little	**19**	*Turing*	**27**		
Woodward	**19**	*Walter*	**29**		

Table 6: Ratio Club War Work

Radar	Personnel Research	Medical Research	GC&CS Bletchley	Military Medicine (until)	Civilian Medicine/EEG	Medical Teaching	Undergraduate (until)
Gold *Little* *MacKay* *Pringle* *Shipton* *Uttley* *Westcott* *Woodward*	*Barlow* *Bates* *Hick* *Uttley*	*Sholl*	*Good* *Turing*	*(Ashby)* (45-47) *Dawson* (1941) *Hick* (1944) *McLardy* (duration)	*Ashby* *Dawson* *Slater* *Walter*	*Rushton*	*Barlow* (excl. 43-44) *Bates* (1942) *Gold* (1942) *Good* (1941) *Little* (1941) *MacKay* (1943) *Merton* (1946) *Woodward* (1941)

Table 7: Ratio Club Meetings, 1949-1958

1949		
1	**14 September; National Hospital, London**	
	Talk(s)	Warren McCulloch, "Finality & Form in Nervous Activity" *[guest talk]*
	Known RC Attendees	Ashby, Barlow, Bates, Dawson, Gold, Hick, Little, MacKay, McLardy, Merton, Pringle, Shipton, Sholl, Slater, Uttley, Westcott
	Costs & Funds	Beer & Wine: £7-0s-0d. Food: £4-0s-0d. Collected: £7-0s-0d.
2	**18 October; National Hospital, London**	
	Talk(s)	Dawson, "Introduction"
		McKay, "Introduction"
		Sholl, "Introduction"
		Uttley, "Introduction"
	Known RC Attendees	Bates, Dawson, MacKay, Sholl, Uttley
	Costs & Funds	Beer & Wine: £4-0s-0d. Food: £1-4s-0d. Collected: £7-10s-0d.
3	**17 November; National Hospital, London**	
	Talk(s)	Bates, "Introduction"
		Gold, "Introduction"
		McLardy, "Introduction"
	Known RC Attendees	Bates, Gold, McLardy, Walter
	Costs & Funds	Beer & Wine: £4-5s-4d. Food: £1-12s-0d. Collected: £8-0s-0d.
4	**15 December; National Hospital, London**	
	Talk(s)	Hick, "Introduction"
		Little, "Introduction"
		Merton, "Introduction"
		Pringle, "Introduction"
		Walter, "Introduction"
	Known RC Attendees	Bates, Hick, Little, Merton, Pringle, Turing
	Costs & Funds	Beer & Wine: £3-10s-4d. Food: £1-12s-0d. Collected: £2-15s-0d.

1950		
5	**19 January; National Hospital, London** *[12 January?]*	
	Talk(s)	Slater, "Paradoxes are Hogwash"
		MacKay, "Why is the Visual World Stable?"
	Known RC Attendees	Bates, MacKay, Slater
	Costs & Funds	Beer & Wine: £2-11s-8d. Food: £1-12s-0d. Collected: £5-0s-0d.
6	**16 February; National Hospital, London**	
	Talk(s)	Shipton, "Introduction"
		Slater, "Introduction"
		Woodward, "Introduction"
	Known RC Attendees	Bates, Shipton, Slater
	Costs & Funds	Beer & Wine: £3-12s-8d. Food: £1-12s-0d. Collected: £4-15s-0d.
7	**16 March; National Hospital, London**	
	Talk(s)	Ashby, "Introduction"
		Barlow, "Introduction"
	Known RC Attendees	Barlow, Bates, Sholl
	Known Guests	A. Bowdler (Sholl)
	Costs & Funds	Beer & Wine: £3-6s-4d. Food: £1-12s-0d. Collected: £6-0s-0d.
8	**21 April; National Hospital, London**	
	Talk(s)	Turing, "Introduction"
		Westcott, "Introduction"
		L. Allen (BNI) "Half the Extra-Pyramidal System" *[guest talk]*
	Known RC Attendees	Bates, Turing, Walter, Westcott
	Known Guests	L. Allen (Walter)
	Costs & Funds	Beer & Wine: £3-6s-4d. Food: £1-12s-0d. Collected: £6-0s-0d.
9	**18 May; National Hospital, London**	
	Talk(s)	Barlow, "Pattern Recognition"
		Bates, "Pattern Recognition"
		MacKay, "Pattern Recognition"
		Uttley, "Pattern Recognition"
		Walter, "Pattern Recognition"
	Known RC Attendees	Barlow, Bates, MacKay, Uttley
	Costs & Funds	Beer & Wine: £3-5s-4d. Food: £1-12s-0d. Collected: £4-0s-0d.
10	**22 June; National Hospital, London**	
	Talk(s)	Woodward, "Elementary Basis of Information Theory"
	Known RC Attendees	Bates, Woodward
	Costs & Funds	Beer & Wine: £3-6s-4d. Food: £1-12s-0d. Collected: £7-0s-0d.
11	**18 July; National Hospital, London**	
	Talk(s)	Gold, "Concept of Probability"
		MacKay, "Concept of Probability"
		Sholl, "Concept of Probability"
	Known RC Attendees	Bates, Gold, MacKay, Sholl
	Costs & Funds	Beer & Wine: £1-18s-0d. Food: £1-12s-0d. Collected: £2-15s-0d.
12	**21 September; National Hospital, London**	
	Talk(s)	Pringle, "Noise in the Nervous System"
	Known RC Attendees	Bates, Pringle

1950		
13	**2 October; National Hospital, London**	
	Talk(s)	*[After London Symposium on Information Theory, 26-29 September. Where Bates, Gold, Hick, Rushton, Slater, Uttley, Walter, Westcott, & Woodward spoke.]*
	Known RC Attendees	Ashby, Barlow, Bates, Dawson, Gold, Little, MacKay, Merton, Pringle, Rushton, Shipton, Sholl, Slater, Uttley, Westcott, Woodward
14	**7 December; National Hospital, London**	
	Talk(s)	Turing, "Educating a Digital Computer"
	Known RC Attendees	Bates, Turing
	Known Guests	Jack Good, J. Z. Young

1951		
15	**22 February; National Hospital, London**	
	Talk(s)	Walter, "Adaptive Behaviour" *[demonstration of tortoise robot]*
	Known RC Attendees	Bates, Walter
16	**5 April; National Hospital, London**	
	Talk(s)	Rushton, "Shape & Size of Nerve Fibres"
	Known RC Attendees	Bates, Rushton
	Known Guests	J. Z. Young
17	**31 May; National Hospital, London**	
	Talk(s)	Ashby, "Statistical Machinery"
	Known RC Attendees	Ashby, Bates
	Known Guests	Jack Good
18	**26 July; National Hospital, London**	
	Talk(s)	Bates, "Telepathy"
	Known RC Attendees	Bates, Woodward
	Known Guests	Jack Good, Parsons (Psychical Research Soc.), Salvan (Magic Circle)
19	**1 November; National Hospital, London** *[8 November?]*	
	Talk(s)	Gold, "On Popper: What is Happening to the Universe"
	Known RC Attendees	Bates, Gold
20	**21 December; National Hospital, London**	
	Talk(s)	Sholl, "A Quantitative Approach to Brain Cell Counts"
		Slater, "The Possibility of a Scientific Basis of Ethics"
		All, Discussion on the future of the Ratio Club
	Known RC Attendees	Bates

1952		
21	**8 February; National Hospital, London**	
	Talk(s)	Turing, "The Chemical Origin of Biological Form"
		Woodward, "The Theory of Observation"
	Known RC Attendees	Bates, Turing, Woodward
22	**20 March; National Hospital, London**	
	Talk(s)	MacKay, "Pattern Recognition"
		Uttley, "Meaning in Information Theory"
	Known RC Attendees	Bates, MacKay, Uttley

1952		
23	**2–3 May; Peterhouse College, Cambridge University**	
	Talk(s)	Pringle (host), "Processes Involved in the Origin of Life"
		Barlow, laboratory equipment demonstration
		Hick, laboratory equipment demonstration
		Rushton, laboratory equipment demonstration
	Known RC Attendees	Ashby, Barlow, Bates, Dawson, Gold, Hick, MacKay, McLardy, Pringle, Rushton, Shipton, Sholl, Turing, Uttley, Westcott
	Known Guests	Giles Brindley (London Hospital), Gurney Sutton (Peterhouse Cambridge)
	Costs & Funds	Expended: £17-11s-8d. Collected: £24-10s-0d
24	**19 June; National Hospital, London**	
	Talk(s)	Bates, "Memory"
		Westcott, "The Logic of Discrimination"
	Known RC Attendees	Ashby, Bates, Dawson, Gold, Little, MacKay, Rushton, Shipton, Slater, Uttley, Walter, Westcott
25	**31 July; National Hospital, London**	
	Talk(s)	Barlow, "The Size of Eyes"
		Sholl, "American Interests in Brain Structure"
	Known RC Attendees	Barlow, Bates, Dawson, MacKay, Pringle, Sholl, Slater, Uttley, Woodward
26	**24–25 October; Burden Neurological Institute, Bristol**	
	Talk(s)	*[cancelled, although Bates retained the numbering]*
	Known RC Attendees	
27	**6 November; National Hospital, London**	
	Talk(s)	Hick, "Design of Randomizing Devices"
		Walter, "On Ashby's Design for a Brain"
	Known RC Attendees	Bates, Hick, Walter
28	**11 December; National Hospital, London**	
	Talk(s)	Mackay, "Perils of Self Awareness in Machines"
		Merton, "Sorting Afferent from Efferent Messages in Nerves"
	Known RC Attendees	Bates, MacKay, Merton

1953		
29	**19 February; National Hospital, London**	
	Talk(s)	Sholl, "Pattern Discrimination in the Visual Cortex"
		Uttley, "Pattern Discrimination in the Visual Cortex"
	Known RC Attendees	Bates, Sholl, Uttley
30	**7 May; National Hospital, London**	
	Talk(s)	Dawson, "The Signal-to-Noise Problem"
		Little, "Absorption of Radio Frequencies by Ionic Materials"
	Known RC Attendees	Bates, Dawson, Little
31	**2 July; National Hospital, London**	
	Talk(s)	Warren McCulloch, *[discussion of McCulloch's prior lecture at UCL]*
	Known RC Attendees	Bates
	Known Guests	Warren McCulloch
32	**22 October; National Hospital, London**	
	Talk(s)	Good, "Principles of Rational Judgement"
		Shipton, "Demonstration & Discussion of the Toposcope"
	Known RC Attendees	Bates, Good, Shipton

1954		
33	**11 February; National Hospital, London**	
	Talk(s)	All, "How Does the Nervous System Carry Information?"
		I. C. Whitfield, "Observations on Hearing Mechanisms" *[guest talk]*
		J. T. Allanson, Observations on Hearing Mechanisms" *[guest talk]*
	Known RC Attendees	Bates
	Known Guests	I. C. Whitfield, J. T. Allanson (both Birmingham University)
34	**17 June; National Hospital, London**	
	Talk(s)	Merton, "Servo Control of Muscular Movements"
		Woodward, "Introduction to Group Theory"
	Known RC Attendees	Bates, Merton, Woodward
35	**25 November; National Hospital, London**	
	Talk(s)	Slater, "Negative Information in Relation to Data on Blood Grouping in the Selection of Identical Twins."
		Woodward, (possibly jointly with Slater)
		C. H. Waddington, "Development as a Cybernetic Process"
	Known RC Attendees	Bates, Slater, Woodward
	Known Guests	C. H. Waddington (Edinburgh University)

1955		
36	**6–7 May; Radar Research Establishment, Malvern; BNI & Barnwood House, Bristol**	
	Talk(s)	Demonstrations
		Ad-hoc conversations
	Known RC Attendees	Ashby, Bates, Uttley, Walter, Woodward
37	**15 September; National Hospital, London**	
	Talk(s)	*[in the margin of the third London Symposium on Information Theory]*
	Known RC Attendees	Bates
	Known Guests	J. T. Allanson (Birmingham University), G. Spencer Brown (Oxford University), Colin Cherry (Imperial), Peter Elias (MIT), J. C. R. Licklider (MIT), Benoît Mandelbrot (Geneva University), Warren McCulloch (MIT), J. D. North (Boulton Paul Aircraft), Henry Quastler (Illinois University), Oliver Selfridge (MIT), P. D. Wall (MIT), J. C. Whitfield (Birmingham University)

1958		
38	**27 November; National Hospital, London**	
	Talk(s)	*[in the margin of the 1958 NPL Symposium]*
	Known RC Attendees	Barlow, Bates, Dawson, Hick, MacKay, Sholl, Slater, Uttley, Woodward
	Apologies	Merton, Walter, Westcott
	Indifference	Ashby, McLardy
	No Reply	Good, Little, Pringle, Rushton
	Emigrated	Gold, Shipton

Table 8: Ashby's List–V1, 18 February 1950[3]

1. "Noise" in machines and brains.
2. Stochastic processes.
3. Physical processes which are independent of exact localisation.
4. Transformations of informations and their invariants.
5. Behavior of mechanisms defined only statistically.
6. The latest news on what the big computing machines are doing.
7. Methods of analogue computing.
8. Discontinuous servo-mechanisms.
9. Modern mechanical memories.
10. Pattern-recognition in machines and brains.
11. The uses of unstable equilibrium.
12. Rhythmic processes in machines and their relation to the alpha rhythm.
13. The statistical mechanics of systems freely supplied with energy.
14. Randomly assembled systems.
15. New possible applications of mathematics to biology.
16. Mechanisms showing conditioned reflexes.
17. The transmission of information through sense organs.
18. Telepathy, extra-sensory perception, and telekinesis.
19. Imitating life: what has been achieved.
20. Principles and designs for a chess-playing machine.
21. Free-will.
22. The study of systems only partly accessible to observation.
23. Dialectical materialism and cybernetics.
24. "Activity is the only road to knowledge" says the Revolutionist's Handbook. Do we agree?
25. Systems which necessarily include the observer.
26. The diagnosis and treatment of insanity in machines.
27. Cybernetic principles and the behaviours of primitive organisms.
28. Ecological dynamic systems.
29. The cybernetics of Great Britain and the bee-hive
30. Communism and Capitalism viewed cybernetically.
31. Cybernetic faults of the Civil Service.
32. The next General Election is going to be won by the Cybernetic Party. What should be our first legislative Act?

Table 9: Ashby's List–V2, 15 May 1950[4]

1. What is known of 'machines' that are defined only statistically? To what extent is this knowledge applicable to the brain?
2. What evidence is there that 'noise' (a) does, (b) does not, play a part in brain function?
3. To what extent can the abnormalities of brains and machines be reduced to common terms?
4. The brain shows some indifference to the exact localisation of some of its processes: to what extent can this indifference be paralleled in physical systems? Can any general principle be deduced from them, suitable for application to the brain?
5. From what is known about present-day mechanical memories can any principle be deduced to which the brain must be subject?
6. To what extent do the sense-organs' known properties illustrate the principles of information-theory?
7. Consider the various well known optical illusions: what can information-theory deduce from them?
8. What are the general effects, in machines and brains, of delay in the transmission of information?

[3] Bates Archive, GC/179/B.5/Box 12.
[4] Bates Archive, GC/179/B.5/Box 12.

9. Can the members agree on definitions, applicable equally to all systems – biological, physiological, physical, sociological of: feedback, stability, servo-mechanism?
10. The physiologist observing the brain and the physicist observing an atomic system are each observing a system only partly accessible to observation: to what extent can they use common principles?
11. The two observers of 10. above are also alike in that each can observe his system only by interfering with it: to what extent can they use common principles?
12. Is 'mind' a physical 'unobservable'? If so, what corollaries may be drawn?
13. What are the applications, to cerebral processes, of the thermodynamics of open systems?
14. To what extent can the phenomena of life be imitated by present-day machines?
15. To what extent have mechanisms been successful in imitating the conditioned reflex? What features of the C.R. have conspicuously not yet been imitated?
16. What principles must govern the design of a machine which, like the brain, has to work out its own formulae for prediction?
17. What cerebral processes are recognisably (a) analogical, (b) digital, in nature?
18. What conditions are necessary and sufficient that a machine built of many integrated parts should be able, like the brain, to perform an action either quickly or slowly without becoming incoordinated?
19. Steady states in economic systems.
20. What general methods are available for making systems stable, and what are their applications to physiology?
21. To what extent can information-theory be applied to communication in insect and similar communities?
22. To what extent are the principles of discontinuous servo-mechanisms applicable to the brain?
23. What re-organisation of the Civil Service would improve it cybernetically?
24. What economic 'vicious circles' can be explained cybernetically?
25. What re-organisation of the present economic system would improve it cybernetically?
26. To what extent can information-theory be applied to the control exerted genetically by one generation over the next?
27. Can the members agree on a conclusion about extra-sensory perception?
28. What would be the properties of a machine whose 'time' was not real but a complex variable? Has such a system any application to certain obscure, i.e. spiritualistic, properties of the brain?

Table 10: Post Ratio Club Cybernetics Symposia Suggestions

Barlow:

[A.] M. Andrew	*NPL*	*London*
J. T. Allanson	*Electrical Engineering Department*	*Birmingham*
P. A. G. Scheuer	*Cavendish Laboratory*	*Cambridge*
F. W. Campbell	*Physiology Laboratory*	
Peter Donaldson		
John Robson		
R. L. Gregory	*Psychology Laboratory*	
K. E. Machinow (?)	*Zoological Laboratory*	

Hick:

F. W. Campbell	*Physiology Laboratory*	*Cambridge*
R. L. Gregory	*Psychology Laboratory*	
D. Gabor	*Imperial*	*London*
W. K. Taylor	*Anatomy Department*	*UCL*
R. Audley	*Psychology Laboratory*	
A. R. Jonkheere		

Pringle:

B. M. H. Bush	*Zoological Laboratory*	*Cambridge*
C. J. Pennycuick		
Adrian Horridge	*Zoological Laboratory*	*St Andrews*

Uttley:

A. M. Andrew	*NPL*	*London*
E. R. F. Carmen (?)	*Psychology Department*	*Reading*
John Brown	*Psychology Department*	*Birkbeck*
J. T. Allanson	*Electrical Engineering Department*	*Birmingham*
R. L. Gregory	*Psychology Laboratory*	*Cambridge*
J. Watson		

Walter:

R. Cooper	*BNI*	*Bristol*
H. Crow		
Frank George	*Psychology Department*	
Gordon Pask	*Solartron*	*Farnborough*
Gene Bernard	*Psychology Department*	*Leeds*
Stafford Beer	*United Steel*	*Sheffield*

Woodward:

D. P. Jenkins	*RRE*	*Malvern*
T. Pearcey		

Table 11: Events Regarding: Cybernetics, Computing, Information Theory, 1946-61

1946		
March 8-9	**Macy 1: Feedback Mechanisms & Circular Causal Systems, Biological & Social Systems**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
July 8-August 31	**Theory & Techniques for Design of Electronic Digital Computers/Moore School Lectures**	
	Organiser(s)	US Navy, US, Pennsylvania University
	Venue	Pennsylvania University, Moore School
September 20	**Teleological Mechanisms in Society *[Macy 'Cybernetics' Sociological Sub-Conference]***	
	Organiser(s)	Josiah Macy Jr. Foundation/New York Science Academy
	Venue	New York Science Academy
October	**Macy 2: Teleological Mechanisms & Circular Causal Systems**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
October 21-22	**Teleological Mechanisms Conference**	
	Organiser(s)	New York Science Academy
	Venue	New York Science Academy

1946		
December 12	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
December 19	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel

1947		
January 2	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
January 7–10	**Symposium on Large-Scale-Digital Calculating Machinery**	
	Organiser(s)	US Navy Department Bureau of Ordnance, Harvard University
	Venue	Harvard, Computation Laboratory
January 9	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
January 16	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
January 23	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
January 30	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
February 6	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
February 13	**Turing/Wilkinson A.C.E. Lecture**	
	Organiser(s)	NPL
	Venue	London, MoS, Adelphi Hotel
February 20	**Turing's London Mathematical Society Lecture**	
	Organiser(s)	London Mathematical Society
	Venue	London Mathematical Society, Burlington House
March	**Macy 3: Teleological Mechanisms & Circular Causal Systems**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
May 19-22	**Convention on Automatic Regulators & Servo Mechanisms**	
	Organiser(s)	Institution of Electrical Engineers, MoS
	Venue	London
October 23 24	**Macy 4: Circular Causal & Feedback Mechanisms in Biological & Social Systems**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue

1948		
Spring 1948	**Macy 5: Circular Causal & Feedback Mechanisms in Biological & Social Systems**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
September 20-25	**Cerebral Mechanisms in Behavior *[Hixon Symposium]***	
	Organiser(s)	Hixon Fund Committee
	Venue	California Institute of Technology

1949		
March 24-25	**Macy 6: Circular Causal & Feedback Mechanisms in Biological & Social Systems**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
May 7	**Discussion on Control Mechanisms in Machines, Animals & Communities**	
	Organiser(s)	Association of Scientific Workers, Bristol General Branch
	Venue	Bristol, BNI
June 22–25	**Conference on High Speed Automatic Calculating-Machines**	
	Organiser(s)	Cambridge University Mathematical Laboratory & MoS
	Venue	Cambridge University Mathematical Laboratory
July	**Physiological Mechanisms in Animal Behaviour**	
	Organiser(s)	Animal Behavior Study Assoc. & Experimental Biology Soc.
	Venue	Cambridge University
September 13-16	**Second Symposium on Large-Scale-Digital Calculating Machinery**	
	Organiser(s)	US Navy Department Bureau of Ordnance, Harvard Univ.
	Venue	Harvard, Computation Laboratory
September 14	**Ratio Club *[1/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
October 18	**Ratio Club *[2/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
October 27	**Manchester University Philosophy Seminar: The Mind & the Computing Machine**	
	Organiser(s)	Dorothy Emmett
	Venue	Manchester University
November 17	**Ratio Club *[3/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
December 15	**Ratio Club *[4/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1950		
January 19	**Ratio Club** ***[5/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
February 16	**Ratio Club** ***[6/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
March 16	**Ratio Club** ***[7/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
March 23–24	**Macy 7: Cybernetics**[5]	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
April 21	**Ratio Club** ***[8/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
May 18	**Ratio Club** ***[9/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
June 22	**Ratio Club** ***[10/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
July 18	**Ratio Club** ***[11/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
September 21	**Ratio Club** ***[12/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
September 26–29	**Symposium on Information Theory** ***[1/3]***	
	Organiser(s)	Imperial College, B.B.C., MoS, Royal Society
	Venue	London, Royal Society, Burlington House
October 2	**Ratio Club** ***[13/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
December 7	**Ratio Club** ***[14/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

[5] After Macy 6, the conferences adopted Wiener's neologism as their working title. The full title became: "Cybernetics: Circular Causal and Feedback Mechanisms in Biological and Social Systems".

1951		
January 8–13	**Colloque International: Les Machines a Calculer et la Pensee Humaine**	
	Organiser(s)	Institut Blaise Pascal, Rockefeller Foundation
	Venue	Paris, Centre National de Documentation Pédagogique
February 22	**Ratio Club *[15/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
March 15–16	**Macy 8: Cybernetics**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
April 5	**Ratio Club *[16/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
April 18-20	**Symposium on Human Factors in Equipment Design**	
	Organiser(s)	Ergonomics Research Society
	Venue	Birmingham University
May 31	**Ratio Club *[17/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
July 9–12	**Manchester University Computer Inaugural Conference**	
	Organiser(s)	Manchester University, Ferranti
	Venue	Manchester University
July 16-21	**Conference on Automatic Control**	
	Organiser(s)	DSIR, Inst. Electrical Engineers, Inst. Mechanical Engineers
	Venue	Cranfield, College of Aeronautics
July 26	**Ratio Club *[18/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
November 1	**Ratio Club *[19/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
December 21	**Ratio Club *[20/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1952		
February 8	**Ratio Club *[21/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
March 20	**Ratio Club *[22/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
March 20–21	**Macy 9: Cybernetics**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	New York, Beekman Hotel, 575 Park Avenue
May 2–3	**Ratio Club *[23/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
June 19	**Ratio Club *[24/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1952		
July 31	**Ratio Club *[25/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
September 22–26	**Symposium on Applications of Communication Theory *[2/3]***	
	Organiser(s)	Imperial College, B.B.C., MoS
	Venue	London, Institution of Electrical Engineers, Savoy Place
October 24–25	**Ratio Club *[26/38 - cancelled]***	
	Organiser(s)	John Bates, Grey Walter
	Venue	Bristol, BNI
November 6	**Ratio Club *[27/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
December 11	**Ratio Club *[28/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1953		
February 19	**Ratio Club *[29/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
March 25–28	**International Symposium on Automatic Digital Computation**	
	Organiser(s)	NPL
	Venue	Teddington, NPL
April 22–24	**Macy 10: Cybernetics**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	Princeton, Nassau Inn, Palmer Square
May 7	**Ratio Club *[30/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
July 2	**Ratio Club *[31/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
October 22	**Ratio Club *[32/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1954		
February 11	**Ratio Club *[33/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
June 17	**Ratio Club *[34/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
November 25	**Ratio Club *[35/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1955		
May 6–7	**Ratio Club *[36/38]***	
	Organiser(s)	Ross Ashby, John Bates, Grey Walter, Albert Uttley
	Venue	Bristol & Malvern. Barnwood House, BNI, RRE
June 16-19	**The Automatic Factory-What Does It Mean?**	
	Organiser(s)	Institution of Production Engineers
	Venue	Margate.
September 12–16	**Symposium on Information Theory *[3/3]***	
	Organiser(s)	Imperial College
	Venue	London, Royal Institution, Albemarle Street
September 15	**Ratio Club *[37/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases

1956		
April 9–14	**Convention on Digital Computer Techniques**	
	Organiser(s)	Institution of Electrical Engineers
	Venue	London, Institution of Electrical Engineers, Savoy Place
June 18-August 17	**Dartmouth Summer Research Project on Artificial Intelligence**	
	Organiser(s)	Rockefeller Foundation
	Venue	Hanover. Mathematics Department, Dartmouth College
June 26–29	**First International Congress on Cybernetics**	
	Organiser(s)	Belgian Ministry of Education, UNSECO, Governor Namur Province
	Venue	Belgium, Namur
October 29-31	**Symposium on Information Theory in Biology**	
	Organiser(s)	Oak Ridge National Laboratory
	Venue	Gatlinburg

1957		
June 30-July 3	**Automatic Production-Change & Control**	
	Organiser(s)	Institution of Production Engineers
	Venue	Harrogate. Royal Hall
September 2-6	**First International Conference on Operational Research**	
	Organiser(s)	OR Society UK, OR Society USA. Institute Management Sciences
	Venue	Oxford.
October 13-16	**Fourth Conference on Group Processes**	
	Organiser(s)	Josiah Macy Jr. Foundation
	Venue	Princeton.

1958		
September 3–10	**Second International Congress on Cybernetics**	
	Organiser(s)	Belgian Gov't., Brussels World's Fair, Governor Namur Province
	Venue	Belgium, Namur
November 24–27	**Mechanisation of Thought Processes: NPL Symposium No. 10**	
	Organiser(s)	NPL
	Venue	Teddington, NPL
November 27	**Ratio Club *[38/38]***	
	Organiser(s)	John Bates
	Venue	London, Nat. Hosp. Nervous Diseases
Nov. 28–Dec. 4	**Electronic Computer Exhibition & Business Computer Symposium**	
	Organiser(s)	Office Appliance & Business Equipment Trades Association
	Venue	London, Olympia

1959		
June 15-20	**International Conference on Information Processing**	
	Organiser(s)	UNESCO
	Venue	Paris
July 19–August 1	**Symposium on Principles of Sensory Communication**	
	Organiser(s)	MIT Electronics Research Laboratory, US Air Force Scientific Research Office
	Venue	MIT, Endicott House, Dedham, Boston

1961		
June 8–9	**Symposium on Principles of Self Organisation**	
	Organiser(s)	Illinois University
	Venue	Monticello, Robert Allerton Park
September 5-8	**Int. Conference on Machine Translation of Languages & Applied Language Analysis**	
	Organiser(s)	NPL
	Venue	Teddington, NPL
September 11–15	**Third International Congress on Cybernetics**	
	Organiser(s)	Belgian Ministry of Education & Culture, Governor Namur Province
	Venue	Belgium, Namur

Table 12: Seven British Events, 1949-1958

[1/7] 1949	June 22-25	**Cambridge University High Speed Automatic Calculating Machines Conference**	
		Organiser(s)	M. Wilkes/Cambridge Mathematical Laboratory, MoS
		Venue	Cambridge University Mathematical Laboratory
[2/7] 1950	September 26-29	**Information Theory Symposium** *[London 1]*	
		Organiser(s)	W. Jackson/Imperial College, BBC, MoS, Royal Society
		Venue	Royal Society, Burlington House, London
[3/7] 1951	July 9-12	**Manchester University Inaugural Computer Conference**	
		Organiser(s)	F. C. Williams/Manchester Computing Machine Laboratory, Ferranti
		Venue	Manchester University
[4/7] 1952	September 22-26	**Applications of Communication Theory Symposium** *[London 2]*	
		Organiser(s)	W. Jackson/Imperial College, BBC, MoS
		Venue	Institution of Electrical Engineers, Savoy Place, London
[5/7] 1953	March 25-28	**NPL Automatic Digital Computation International Symposium**	
		Organiser(s)	F. M. Colebrook/NPL
		Venue	Teddington, NPL
[6/7] 1955	September 12-16	**Information Theory Symposium** *[London 3]*	
		Organiser(s)	C. Cherry/Imperial College
		Venue	Royal Institution Albemarle Street
[7/7] 1958	November 24-27	**NPL Mechanisation of Thought Processes Symposium**	
		Organiser(s)	A. M. Uttley/Control Mechanisms & Electronics Division, NPL
		Venue	Teddington, NPL

Table 13: Papers at British Events

High Speed Automatic Calculating Machines

June 22–25 1949, Mathematical Laboratory, Cambridge University

Day 1/4	
M. V. Wilkes *Cambridge University*	Welcome
D. R. Hartree *Cambridge University*	General Introduction
M. V. Wilkes *Cambridge University*	The E.D.S.A.C
W. Renwick *Cambridge University*	Demonstration of the E.D.S.A.C. (prepared by Miss B. H. Worsley)

Day 2/4	
A. D. Booth *Birkbeck College, London*	Relay Computers (presented by Miss K. Britten)
F. C. Williams *Manchester University*	Cathode Ray Tube Storage
Programming & Coding	
J. H. Wilkinson *National Physical Laboratory*	Coding on Automatic Digital Computing Machines
D. J. Wheeler *Cambridge University*	Planning the Use of a Paper Library
T. J. Rey *E.M.I.*	Sign Correction in Modulus Convention
H. Eggink *Royal Aircraft Establishment*	The Programming of a Supersonic Nozzle Flow
B. Noble *Anglo Iranian Oil Co.*	The Control of Magnitude of Numbers in Digital Computing Machines with a Fixed Binary Point
L. Couffignal *Institut Blaise Pascal, France*	French Computing Machine Projects: The Institute Blaise Pascal Machine

Day 3/4	
A. Turing *Manchester University*	Checking a Large Routine
M. H. A. Newman *Manchester University*	Some Routines Involving Large Integers
E. N. Mutch *Cambridge University*	Permanent & Semi-permanent Storage Facilities for Binary Digital Computers
G. E. Thomas *Manchester University*	Magnetic Storage
A. Tutchings *TRE*	Magnetic Recording for a Digital Computer
W. S. Elliott *Elliott Bros.*	Photographic Storage for a Series Working Machine
D. W. Willis *Cambridge University*	A Proposed Magnetic Wire Auxiliary Store for the E.D.S.A.C.
A. M. Uttley *TRE*	Checking Procedures & Circuits
D. J. Wheeler *Cambridge University*	Checking Facilities
R. H. A. Carter *TRE*	Checkable Addition Circuits

Day 3/4	
S. W. Noble *TRE*	Electronic Trigger Circuits Having Several States of Stable Equilibrium
J. C. P. Miller *Scientific Computing Service*	Remarks on Checking
Harry D. Huskey *USA*	Electronic Digital Computing in the United States (presented by J. M. Bennett)
D. R. Hartree *Cambridge University*	Comment
A. van Wijngaarden *Mathematisch Centrum, Holland*	Computing Machine Projects in Holland
L. Kosten *Posterijen Telegrafie en Telefonie, Holland*	Fictitious Traffic Machines
G. Kjellberg *Kungliga Tekniska Högskolan, Sweden*	Computing Machine Projects in Sweden

Day 4/4	
T. Kilburn *Manchester University*	The University of Manchester Digital Computing Machine
A. M. Uttley *TRE*	Preliminary Plans for the T.R.E. Electronic Digital Computer

First London Information Theory Symposium
September 26–29 1950, Royal Society, Burlington House, Mayfair, London

Day 1/4	
Session 1	
Sir David Brunt *Meteorology Prof., Imperial, Sec. Royal Soc.*	Chair
E. Colin Cherry *Imperial College*	A History of the Theory of Information
C. E. Shannon *Bell Labs, USA*	Communication Theory - Exposition of Fundamentals
Session 2	
H. M Massey *UK*	Chair
D. Gabor *Imperial College*	Communication Theory & Physics
D. M. MacKay *King's College, London*	Quantal Aspects of Scientific Information

Day 2/4	
Session 3	
R. A. Fisher *Genetics Professor, Cambridge*	Chair
M. S. Bartlett *Manchester*	The Statistical Approach to the Analysis of Time-Series
C. E. Shannon *Bell Labs, USA*	General Treatment of the Problem of Coding
C. E. Shannon *Bell Labs, USA*	The Lattice Theory of Information
Session 4	
R. Cockburn *Scientific Adviser Air Ministry*	Chair
P. M. Woodward *TRE*	Theory of Radar Information
D. K. C. MacDonald *Clarendon Laboratory Oxford*	Fluctuations & Theory of Noise

Day 3/4	
Application of Information Theory to a Study of the Sense Organs & Central Nervous System	
Session 5	
Le Gros Clarke *Professor of Anatomy, Oxford*	Chair
D. B. Fry *UCL*	Communication Theory & Linguistic Theory
T. Gold *Cavendish Laboratory, Cambridge*	Hearing
W. A. H. Rushton *Physiological Laboratory, Cambridge*	The Problem of the Information which the Brain Receives from the Eye
W. E. Hick *Psychology Laboratory, Cambridge*	Information Theory in Psychology
Session 6	
Professor E. G. Adrian *Professor of Physiology, Cambridge*	Chair
W. Grey Walter *Burden Neurological Institute*	Possible Features of Brain Function & Their Imitation
J. A. V. Bates *National Hospital for Nervous Diseases, London*	Significance of Information Theory to Neurophysiology
A. M. Uttley *TRE*	Information, Machines & Brains
Eliot Slater *National Hospital for Nervous Diseases, London*	Statistics for the Chess Computer & the Factor of Mobility

Day 4/4	
Session 7	
J. L. van Soest *Prof. Elect. Eng, Technische Hogeschool, Delft, NL*	Chair
J. H. Westcott *Electrical Engineering, Imperial College*	Criteria of Prediction & Discrimination
D. M. MacKay *King's College, London*	Entropy, Time & Information
Session 8	
Willis Jackson *Electrical Engineering Prof., Imperial College*	Chair
J. B. Wiesner *MIT Electronics Laboratory, USA*	The work of the Electronics Laboratory of the Massachusetts Institute of Technology

Nature, Scope & Terminology of Information Theory, (in Proceedings as Introductory Material)	
D. Gabor *Imperial College*	Communications Theory, Past, Present & Prospective
J. A. V. Bates *National Hospital for Nervous Diseases, London*	Glossary of Physiological Terms
D. M. MacKay *King's College, London*	The Nomenclature of Information Theory

Manchester Computer Conference
July 9-12 1951, Royal Society Computing Machine Laboratory, Manchester University

F. C. Williams *Manchester University*	The University of Manchester Computing Machine
T. Kilburn *Manchester University*	
A. Turing *Manchester University*	Local Programming Methods & Conventions
M. H. A. Newman *Manchester University*	The Influence of Automatic Computers on Mathematical Methods
J. C. P. Miller *Cambridge University*	The Search for Large Primes
M. V. Wilkes *Cambridge University*	The Best Way to Design an Automatic Calculating Machine
M. Woodger *National Physical Laboratory*	A Comparison of One & Three Address Codes
E. A. Newman *National Physical Laboratory*	The Pilot Model of the A.C.E.
J. C. P. Miller *Cambridge University*	Comparison of Coding on S.E.A.C. & E.D.S.A.C.
Civil Ing. G. Neovius *Swedish Board for Computing Machinery, Sweden*	Activity in Sweden in Digital Computer Field
A. P. Speiser *Swiss Federal Institute of Technology, Switzerland*	A Brief Account of the Work Done at the Zurich Institute of Applied Mathematics
M. J. Lighthill *Manchester University*	General Topics
G. C. Tootill *Military College of Science*	General Topics

J. C. P. Miller *Cambridge University*	General Topics
A. Turing *Manchester University*	General Topics
E. A. Newman *National Physical Laboratory*	General Topics
B. V. Bowden *Ferranti*	The Application of Calculating Machines to Business & Commerce
A. A. Robinson *Ferranti*	The Reliability of High-Speed Digital Computing Machines
J. M. Bennett *Ferranti*	The Computation of Fourier Synthesis with a Digital Electronic Calculating Machine
J. C. Kendrew *Cavendish Laboratory, Cambridge University*	

Applications of Communication Theory, (Second London Information Theory Symposium)
September 22-26 1952, Institution of Electrical Engineers, Savoy Place, London

Opening	
Willis Jackson *Electrical Engineering, Imperial College*	Opening Address
D. Gabor *Electrical Engineering, Imperial College*	A Summary of Communication Theory

Transmission Systems & Coding	
P. H. Blundell *Radar Research & Development Establishment*	The Definition of Rate of Information in the Presence of Noise
Z. Jelonek *Polish University College, London*	A Comparison of Transmission Systems
S. Goldman *Syracuse University, USA*	Information Theory of Noise Reduction in Modulation Systems
D. M. MacKay *Wheatstone Physics Laboratory, King's College, London*	The Effects of Relaxation Time on the Relative Efficiency of Binary PCM, PIM, & PPM
D. A. Huffman *MIT, USA*	A Method for the Construction of Minimum Redundancy Codes
A. E. Laemmel *Microwave Research Inst., Brooklyn Polytechnic, USA*	Efficiency of Noise-Reducing Codes
F. de Jager *Philips Research Laboratory, Eindhoven, Holland*	Deltamodulation-A Method of PCM Transmission Using the One-Unit Code
C. W. Earp *Standard Telephones & Cables*	A Recent Development in Communication Technique
H. W. F. van't Groenewout *Technische Hogeschool, Delft, Holland*	Non-Linear Distortion in Pulse Code Modulation Systems

Transmission in the Presence of Noise-Signal Discrimination	
D. E. Hampton *Royal Aircraft Establishment*	A Theoretical Comparison Between Auto-Corelation & Square Law Types of Detection
R. M. Fano *MIT Electronics Research Laboratory, USA*	Communication in the Presence of Additive Gaussian Noise
W. Myer-Eppler *Bonn University, Germany*	Exhaustion Methods of Selecting Signals from Noisy Backgrounds
R. A. Johnson *Cruft Laboratory, Harvard University, USA*	Measurement of Correlation Functions of Modulated Carriers & Noise Following a Non-Linear Device
D. Middleton *Cruft Laboratory, Harvard University, USA*	
A. E. Bailey *Radar Research & Development Establishment*	Integration in Pulse Radar Systems
R. L. Beurle *TRE*	Video Signal Integration Using Acoustic Delay Lines & Dynamic Magnetic Storage
P. L. Waters *TRE*	Video Signal Integration Using a Storage Tube
D. Middleton *Cruft Laboratory, Harvard University, USA*	Statistical Methods for the Detection of Pulsed Radar in Noise

Characteristics of Transmission Channels	
R. H. Barker *Signals Research & Development Establishment*	Group Synchronizing of Binary Digital Systems
M. Cotte *Faculty of Science, Poitiers University, France*	Relationship Between the Distortion & the Characteristics of a Transmission System & its Application to Television
K. Küpfmüller *Technische Hochschule, Darmstadt, Germany*	Channel Capacity & Propagation Time
T. Laurent *Royal Institute of Technology, Sweden*	Delay Time & Transient Time in Electrical Filters with Phase Distortion

Application to Television	
J. Loeb *Ctre. Nat. d'Etudes des Télécommunications, France*	Communication Theory of Transmission of Simple Drawings
E. C. Cherry *Electrical Engineering, Imperial College*	Some Possibilities for the Compression of Television Signals by Recording
G. G. Gouriet *BBC*	
G. Valensi *C.C.I.F., Switzerland*	Note on a Method of Coded Colour Television Transmission, (presented by J. Lalou)

Hearing	
W. H. Huggins *MIT Electronics Research Laboratory, USA*	A Theory of Hearing

Transmission & Analysis of Speech	
D. A. Bell *Electrical Eng., Birmingham University*	The 'Internal Information' of English Words
J. Berry *Post Office Research Station, Dollis Hill*	Some Statistical Aspects of Conversational Speech
G. E. Peterson *Bell Telephone Laboratories, USA*	The Information-Bearing Elements of Speech
D. B. Fry *UCL*	Mechanical Speech Recognition
P. Denes *UCL*	Mechanical Speech Recognition
K. H. Davis *Bell Telephone Laboratories, USA*	Automatic Recognition of Spoken Digits (presented by G. Raisbeck)
R. Biddulph *Bell Telephone Laboratories, USA*	
D. L. Richards *Post Office Research Station, Dollis Hill*	Some Aspects of the Behaviour of Telephone Users as Affected by the Physical Properties of the Circuit
D. L. Richards *Post Office Research Station, Dollis Hill*	Measurement of the Communication Rate of a Speech Link-A Preliminary Appraisal of the Problem
J. Swaffield *Post Office Research Station, Dollis Hill*	
W. Lawrence *Signals Research & Development Establishment*	The Synthesis of Speech from Signals Which Have a Low Information Rate

Concluding Discussion	
A. M Andrews *Glasgow University*	Discussant
I. J. Good *GCHQ*	Discussant
P. M Woodward *TRE*	Discussant

Associated Studies	
D. M. MacKay *Wheatstone Physics Laboratory., King's College, London*	Generators of Information
B. Mandelbrot *Lab. d'Electronique et de Physique Appliquées, France*	An Informational Theory of the Statistical Structure of Language
Y. Bar-Hillel *MIT Electronics Research Laboratory, USA*	Semantic Information
R. Carnap *Chicago University, USA*	Semantic Information
A. Blanc-Lapierre *Faculty of Science, Algiers University, Algeria*	Application to Optics of Certain Results & Methods of Information Theory

Automatic Digital Computation Symposium
March 25-28 1953, NPL, Teddington, London

Opening	
F. M. Colebrook *NPL*	Symposium Chair
D. R. Hartree *Cambridge University, Cavendish Laboratory*	Automatic Digital Computation

British Machines	
J. H. Wilkinson *NPL*	The Pilot Ace
M. V. Wilkes *Cambridge University, Mathematical Lab.*	The EDSAC
J. M. M. Pinkerton *J. Lyons & Co.*	Operating & Engineering Experience Gained with LEO
F. C. Williams *Manchester University*	MADAM
A. W. M. Coombs *Post Office Research Station*	The 'Ministry of Supply Automatic Computer'
N. D. Hill *Elliott Bros., Research Laboratories*	NICHOLAS
E. J. Petherick *Royal Aircraft Establishment*	Advance Notes on Rascal
R. H. A. Carter *TRE*	The TRE High-Speed Digital Computer

Programming	
G. G. Alway *NPL*	Optimum Coding
J. E. Stringer *Cambridge University, Mathematical Lab.*	Microprogramming & the Choice of Order Code
E. N. Mutch *Cambridge University, Mathematical Lab.*	Conversion Routines
S. Gill *Cambridge University, Mathematical Lab.*	Conversion Routines
S. Gill *Cambridge University, Mathematical Lab.*	Getting Programmes Right

Design	
T. R. Tompson *J. Lyons & Co.*	Special Requirements for Commercial or Administrative Requirements
D. W. Davies *NPL*	Input & Output
D. O. Claydon *NPL*	Echelon Storage Systems
R. Townsend *British Tabulating Machine Co.*	Serial Digital Adders for a Variable Radix of Notation

The Utilization of Computing Machines - I	
A. van Wijngaarden *Mathematisch Centrum, Amsterdam, Holland*	Mathematics & Computing
J. H. Wilkinson *NPL*	Linear Algebra on the Pilot Ace
L. Fox *NPL*	The Numerical Solution of Ordinary Differential Equations
H. H. Robertson *NPL*	
N. E. Hoskin *Manchester University*	The Solution of Partial Differential Equations

The Utilization of Computing Machines - II	
E. T. Goodwin *NPL*	Mathematical Tables
J. C. P. Miller *Cambridge University, Mathematical Lab.*	Applications of Electronic Machines in Pure Mathematics
K. D. Tocher *Imperial College*	The Application of Automatic Computing Machines to Statistics
	General Discussion on Machine Utilization

Circuitry & Hardware	
W. W. Chadler *Post Office Research Station, Dollis Hill*	Gates & Trigger Circuits
J. Garcia Santesmases *Consejo Superior de Investigaciones Cientificas, Spain*	Parallel Ferroresonant Triggers
M. A. Wright *NPL*	Mercury Delay Line Storage
R. C. Robbins *Elliott Bros., Research Laboratories*	Applications of Magnetostriction Delay Lines
R. Millership *Elliott Bros., Research Laboratories*	
T. Kilburn *Manchester University*	Cathode Ray Tube Storage
Ralph J. Slutz *National Standards Bureau, USA*	Memory Studies & Other Developments at the National Standards Bureau

Servicing & Maintenance	
E. A. Newman *NPL*	Preventive or Curative Maintenance
M. V. Wilkes *Cambridge University, Mathematical Lab.*	Experience with Marginal Checking & Automatic Routing of the EDSAC
M. Phister Jnr. *Cambridge University, Mathematical Lab.*	
S. A. Barton *Cambridge University, Mathematical Lab.*	
R. L. Grimsdale *Ferranti*	Diagnostic Programmes
A. A. Robinson *Ferranti*	Component Reliability in a Computing Machine at University of Manchester

Medium Size Digital Computing Machines	
E. H. Cooke-Yarborough *Atomic Energy Research Establishment, Harwell*	The Harwell Computer
A. D. Booth *Birkbeck College Electronic Computation Lab.*	The APE (X) C: A Low-Cost Electronic Calculator
W. S. Elliott *Elliott Bros., Research Laboratories*	The Elliott-NRDC Computer 401 - A Demonstration of Computer Engineering by Packaged Unit Construction
H. G. Carpenter *Elliott Bros., Research Laboratories*	
A. St. Johnston *Elliott Bros., Research Laboratories*	
N. Kitz *Inst. Nazionale per le Applicazione del Calcolo, Italy*	Medium-Size Decimal Computing Machine
K. D. Tocher *Imperial College*	The Design Requirements of a Low Cost Computing Machine

Third London Information Theory Symposium
September 12-16 1955, Royal Institution, Albemarle Street, London

Opening	
Colin Cherry *Imperial College*	Opening Remarks

Fundamentals	
J. L. van Soest *Technische Hogeschool, Delft, Holland*	Some Consequences of the Finiteness of Information
G. Spencer Brown *Christ Church, Oxford*	Chance & Control: Some Implications of Randomization
M. P. Schützenberger *Paris*	On Some Measures of Information Used in Statistics
D. Gabor *Imperial College*	Optical Transmission
W. Meyer-Eppler *Universität Bonn, Germany*	Two-Dimensional Photographic Autocorrelation of Pictures & Alphabet Letters
G. Darius *Universität Bonn, Germany*	
J. F. Schouten *Philips Telecommunication, Holland*	Ignorance, Knowledge & Information
Robin Farquharson *Nuffield College, Oxford*	Strategic Information in Games & Voting

Coding, Taxonomy Etc.	
Arthur E. Laemmel *Microwave Research Inst., Brooklyn Polytechnic, USA*	A General Class of Codes & Their Physical Realisation
Peter Elias *MIT Electronics Research Laboratory, USA*	Coding for Two Noisy Channels
D. A. Huffman *MIT Electronics Research Laboratory, USA*	The Synthesis of Linear Sequential Coding Networks
G. A. Barnard *Imperial College*	Simple Proofs of Simple Cases of the Coding Theorem
Lars-Henning Zetterberg *Stockholm, Sweden*	A Comparative Study of Delta & Pulse Code Modulation
R. A. Fairthorne *Royal Aircraft Establishment*	Some Clerical Operations & Languages
Calvin N. Mooers *Zator Co., Boston, Mass., USA*	Information Retrieval on Structured Content
Benoît Mandelbrot *Geneva University, Switzerland*	On the Language of Taxonomy: An Outline of a 'Thermo-Statistical' Theory of Systems of Categories with Willis (Natural) Structure

Language Analysis & Mechanical Translation	
D. A. Bell *Birmingham University*	Negative Entropy of Welsh Words
Alan S. C. Ross *Birmingham University*	
Wilhelm Fucks *Physics Inst., Technology Univ., Aachen, Germany*	Mathematical Theory of Word Formation
Silvio Ceccato *Italian Operational School, Italy*	Suggestions for Mechanical Translation
Enrico Maretti *Italian Operational School, Italy*	
A. D. Booth *Birkbeck College*	Influence of Context in Translation
J. P. Cleave *Birkbeck College*	A Programme for Braille Translation
Victor H. Yngve *MIT Electronic Research Laboratory, USA*	The Translation of Language by Machine
D. B. Fry *UCL*	Experiments in Mechanical Speech Recognition
P. Denes *UCL*	

Meaning & the Human Senses	
D. M. MacKay *King's College, London*	The Place of 'Meaning' in the Theory of Information
Vittorio Somenzi *Rome University, Italy*	Can Induction be Mechanized
P. Marcou *Ctre. Nat. d'Etudes des Télécommunications, France*	New Methods of Speech Transmission
J. Daguet *Ctre. Nat. d'Etudes des Télécommunications, France*	New Methods of Speech Transmission
D. J. Bruce *Psychology Department, Reading University*	Effects of Context Upon Intelligibility of Heard Speech
J. C. R. Licklider *MIT Electronics Research Laboratory, USA*	Auditory Frequency Analysis
J. T. Allanson *Birmingham University*	The Cochlear Nucleus & its Relation to Theories of Hearing
I. C. Whitfield *Birmingham University*	
R. L. Gregory *Experimental Psychology, Cambridge University*	An Experimental Treatment of Vision as an Information Source & Noisy Channel

Behaviour & its Mechanism	
J. T. Allanson *Birmingham University*	Some Properties of a Randomly Connected Neural Network
W. K. Taylor *Department of Anatomy, UCL*	Electrical Stimulation of Some Nervous System Functional Activities
P.D. Wall *MIT Electronics Research Laboratory, USA*	Factors Limiting the Maximum Impulse Transmitting Ability of an Afferent System of Nerve Fibres
J. Y. Lettvin *MIT Electronics Research Laboratory, USA*	
W. S. McCulloch *MIT Electronics Research Laboratory, USA*	
W. H. Pitts *MIT Electronics Research Laboratory, USA*	
Oliver G. Selfridge *MIT, USA*	Pattern Recognition & Learning
D. E. Broadbent *Applied Psychology, Cambridge University,*	The Concept of Capacity & the Theory of Behaviour
Henry Quastler *Control Systems Laboratory, Illinois University, USA*	Studies of Human Channel Capacity
J. D. North *Boulton Paul Aircraft*	Application of Communication Theory to the Human Operator
S. K. Zaremba *Boulton Paul Aircraft*	Remarks on Feedback & Open-Chain Following *[appendix to previous paper]*

Presented in Summary (not read)	
Balth van der Pol *C.C.I.R. Palais Wilson, Geneva, Switzerland*	An Iterative Translation Test
David Slepian *Bell Telephone Laboratories, USA*	A Class of Binary Signalling Alphabets
J. W, Cohen *N. V. Philips' Telecommunicatie, Holland*	Some Calculations on a Method for Signal Testing
M. M. Jung *N. V. Philips' Telecommunicatie, Holland*	
J. Koefoed *Copenhagen University, Denmark*	A Neuronic Model of the Inner Ear

Discussion	
I. J. Good *GCHQ*	Discussant
P.A. Merton *National Hospital for Nervous Diseases*	Discussant

NPL Mechanisation of Thought Processes
November 24-27 1958, NPL, Teddington, London

Day 1/4	
G. B. B. M. Sutherland, Director *NPL*	Opening Address
Session 1: General Principles	
A. M. Uttley *NPL,*	Chair
M. L. Minsky *MIT, USA*	Some Methods of Artificial Intelligence & Heuristic Programming
W. S. McCulloch *MIT, USA*	Discussion Chair *[On Minsky's paper]*
D. M. MacKay *King's College, London*	Operational Aspects of Intellect
J. McCarthy *MIT, USA*	Programs with Common Sense
W. Ross Ashby *Barnwood House*	The Mechanism of Habituation
A. M. Uttley *NPL*	Conditional Probability Computing in a Nervous System

Day 2/4	
Session 2: Automatic Programming	
E. T. Goodwin *NPL*	Chair
Grace Hopper *Remington Rand Univac, USA*	Automatic Programming: Present Status & Future Trends
R. A. Brooker *Manchester University*	Some Technical Features of the Manchester Mercury Autocode Programme
B. S. Sotskov *Science Academy, USSR*	Discussion Chair *[On Brooker's paper]*
J Backus *IBM, USA*	Automatic Programming: Properties & Performance of FORTRAN Systems I & II
A. P. Ershov *Science Academy, USSR*	The Work of the Computing Center of the Academy of Sciences of the USSR in the Field of Automatic Programming

Session 2: Mechanical Language Translation	
L. Mehl *Ecole Nationale d'Administration, Paris*	Chair
R. H. Richens *Cambridge Language Research Group*	Tigris & Euphrates - A Comparison Between Human & Machine Translation
L. Brandwood *Classics, Manchester University*	Pronoun Reference in German
A. P. Ershov *Science Academy, USSR*	Automatic Translation in the USSR
Technical Visits (1730)	
British Tabulating Machines *17 Park Lane, London*	"The use of a HEC [Hollerith Electronic Computer] electronic computer on production control in operation at one of the Company's factories, including material breakdown, stores control, plant loading & feedback of achievement."
English Electric *Marconi House, Strand, London*	"Engineering design, including the use of automatic coding."
Ferranti *36 Kingsway, London*	"Preparation of punched tape as a biproduct of clerical work: transmission of data over Telex lines with checking: data processing on Pegasus computer."
LEO Computers *Cadby Hall, London*	"Automatic office work in operation."
National Cash Register *206 Marylebone Rd., London*	"Application of computers to commercial data processing."

Day 3/4	
Session 3: Speech Recognition	
Colin Cherry *Imperial College*	Chair
I. C. Whitfield *Saint Elizabeth's Hospital, Washington D.C., USA*	Sensory Mechanisms & Sensation
D. B. Fry *UCL*	An Analogue of the Speech Recognition Process
P. Denes *UCL*	
P. Ladefoged *Edinburgh University, UK*	The Perception of Speech
Session 3: Learning in Machines	
J. F. Coales *Cambridge University, UK*	Chair
F. Rosenblatt *Cornell Aeronautical Laboratory, USA*	Two Theorems of Statistical Separability in the Perceptron
A. M. Andrew *NPL*	Learning Machines
O. G, Selfridge *MIT, USA*	Pandemonium: A Paradigm for Learning
Technical Visit (1730)	
Mullard *Mullard House*	*[evening reception in the new Mullard head office building, opened in 1957]*

Day 4/4	
Session 4A: Implications for Biology	
J. Z. Young *UCL*	Chair
H. B. Barlow *Physiology Laboratory, Cambridge University*	Sensory Mechanisms, the Reduction of Redundancy & Intelligence
N. S. Sutherland *Inst. Experimental Psychology, Oxford University*	Stimulus Analysing Mechanisms
W. S. McCulloch *MIT, USA*	Agathe Tyche: of Nervous Nets - The Lucky Reckoners
F. Paycha *Paris*	Medical Diagnosis & Cybernetics
Sir Frederick Bartlett *Applied Psychology, Cambridge University*	Discussion Chair *[On Paycha's paper]*
R. L. Gregory *Psychological Laboratory, Cambridge University*	Models & the Localisation of Function in the Central Nervous System
A. J. Watson *Psychological Laboratory, Cambridge University*	Some Questions Concerning the Explanation of Learning in Animals
John Brown *Birkbeck College*	Information, Redundancy & Decay of the Memory Trace
Session 4B: Implications for Industry	
The Rt. Hon. The Earl of Halsbury *NRDC*	Chair
L. Mehl *Ecole Nationale d'Administration, Paris*	Automation in the Legal World
Y. Bar-Hillel *Hebrew University, Jerusalem, Israel*	The Mechanisation of Literature Searching
J. H. H. Merriman *H.M. Treasury*	To What Extent Can Administration be Mechanized?
D. W. G. Wass *H.M. Treasury*	
S. Gill *Ferranti, London*	Possibilities for the Practical Application of Learning Processes
J. H. H. Merriman *H.M. Treasury, London*	Discussion Chair *[On Gill's paper]*
W. K. Taylor *University College, London*	Automatic Control by Visual Signals
E. A. Newman *NPL*	An Analysis of Non-Mathematical Data-Processing
G. Pask *System Research*	Physical Analogues to the Growth of a Concept

Lecture Demonstrations, Duplex Tunnel Building, 1400-1430 Daily	
A. J. Angyan *Physiological Inst., Budapest, Hungary*	Machina Reproducatrix
G. Pask *System Research*	The Growth of Concepts & their Physical Analogues
A. M. Andrew *NPL*	Conditional Probability Computer
W. Ross Ashby *Barnwood House*	A Simple Computer for Demonstrating Behaviour

Lecture Demonstrations, Duplex Tunnel Building, 1400-1430 Daily	
W. K. Taylor *UCL*	Automatic Pattern Recognition
D. B. Fry *UCL*	Automatic Speech Recognition
P. Denes *UCL*	
S. Whelan *Royal Radar Establishment*	Royal Radar Establishment Library Retrieval System
[Various] *NPL*	DEUCE: Experiments Relating to Visual Perception & Simple Self-Modifying Programmes
[Various] *NPL*	ACE: Automatic Computing Engine
P. E. Donaldson *Physiology Dept., Cambridge University*	Optimal Coding Device
H. B. Barlow *Physiology Laboratory, Cambridge University*	
F. A. Nash *Western Hospital, London*	The Grouped Symbol Associator (an Aid to Medical Diagnosis)

Table 14: Ratio Club at British Events

	Ashby	Barlow	Bates	Dawson	Gold	Good	Hick	Little	MacKay	McLardy	Merton	Pringle	Rushton	Shipton	Sholl	Slater	Turing	Uttley	Walter	Westcott	Woodwar
1949: Cambridge Computer					X	X			X								X	X		X	X
1950: Information Theory (1)	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X
1951: Manchester Computer						X											X	X			
1952: London Communication Theory (2)						X			X												X
1953: NPL Computer																	X	X			
1955: Information Theory (3)							X		X		X										
1958: Mechanisation of Thought	X	X	X						X									X	X		X

Table 15: Ratio Club & Other British Protagonists at British Events

1949 Cambridge Computer Conference	Ratio Club	Gold, T.
		Good, I. J.
		MacKay, D. M.
		Turing, A. M.
		Uttley, A. M.
		Westcott, J. H.
		Woodward, P. M.
	Fellow Travelers	Cherry, E. C.
	British Computer Developers	Kilburn, T.
		Wilkes, M. V.
		Williams, F. C.

1950 London Inf. Theory Symposium 1	Ratio Club	Ashby, W. R.
		Barlow, H. B.
		Bates, J. A. V.
		Dawson, G. D.
		Gold, T.
		Good, I. J.
		Hick, W. E.
		MacKay, D. M.
		Merton, P. A.
		Pringle, J. W. S.
		Rushton, W. A. H.
		Shipton, H. W.
		Sholl, D. A.
		Slater, E.
		Turing, A. M.
		Uttley, A. M.
		Walter, W. G.
		Westcott, J. H.
		Woodward, P. M.
	Fellow Travelers	Cherry, E. C.
		Gabor, D.

1951 Manchester Computer Conference	Ratio Club	Good, I. J.
		Turing, A. M.
		Uttley, A. M.
	British Computer Developers	Kilburn, T.
		Wilkes, M. V.
		Williams, F. C.

1952 London Inf. Theory Symposium 2	Ratio Club	Good, I. J.
		MacKay, D. M.
		Woodward, P. M.
	Fellow Travellers	Cherry, E. C.
		Gabor, D.
	Other British Cyberneticians	Andrew, A. M.

1953 NPL Computer Symposium	Ratio Club	Turing, A. M.
		Uttley, A. M.
	Fellow Travellers	Strachey, C.
	British Computer Developers	Booth, A. D.
		Kilburn, T.
		Wilkes, M. V.
		Williams, F. C.

1955 London Inf. Theory Symposium 3	Ratio Club	Good, I. J.
		MacKay, D. M.
		Merton, P. A.
	Fellow Travellers	Cherry, E. C.
		Gabor, D.
	British Computer Developers	Booth, A. D.

1958 NPL Mechanisation of Thought Symp.	Ratio Club	Ashby, W. R.
		Barlow, H. B.
		Bates, J. A. V.
		MacKay, D. M.
		Uttley, A. M.
		Walter, W. G.
		Woodward, P. M.
	Fellow Travellers	Cherry, E. C.
		Gabor, D.
		Strachey, C.
		Young, J. Z.
	Other British Cyberneticians	Andrew, A. M.
		Beer, S.
		Pask, G. A.

Table 16: All British Delegates at British Events

Academic		
Battersea Technology College		
	Ream, N.	*1958 NPL Mechanisation of Thought*

Academic		
Birkbeck College		
Electronic Computer Project	Booth, A. D.	*1953 NPL Automatic Computation*
		1955 Information Theory
	Kitz, N.	*1949 Cambridge Computer*
Research Laboratory	Cleave, J. P.	*1955 Information Theory*
	Brown, J.	*1958 NPL Mechanisation of Thought*

Academic		
Imperial College		
Electrical Engineering	Boothroyd, A. H.	*1950 Information Theory*
	Cherry, E. C.	*1949 Cambridge Computer*
		1950 Information Theory
		1952 Applications of Comm's. Theory
		1955 Information Theory
		1958 NPL Mechanisation of Thought
	Gabor, D.	*1950 Information Theory*
		1952 Applications of Comm's. Theory
		1955 Information Theory
		1958 NPL Mechanisation of Thought
	Humphrey Davies, M. W.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Jackson, W.	*1950 Information Theory*
		1952 Applications of Comm's. Theory
	Westcott, J. H.	*1949 Cambridge Computer*
		1950 Information Theory
Mathematics	Barnard, G. A.	*1950 Information Theory*
		1955 Information Theory
	Tocher, K. D.	*1949 Cambridge Computer*
		1950 Information Theory

Academic		
Imperial College		
Meteorology	Brunt, D.	*1950 Information Theory*
		1951 Manchester Computer
	Bickley, W. G.	*1953 NPL Automatic Computation*
	Brewer, R. C.	*1958 NPL Mechanisation of Thought*
	Brooker, R. A.	*1949 Cambridge Computer*
	Eady, J.	*1949 Cambridge Computer*
	Lehman, M.	*1953 NPL Automatic Computation*
	Michelson, S.	*1953 NPL Automatic Computation*

Academic		
King's College, London		
Chemistry	Barnett, M. P.	*1953 NPL Automatic Computation*
Wheatstone Physics Laboratory	MacKay, D. M.	*1949 Cambridge Computer*
		1950 Information Theory
		1952 Applications of Comm's. Theory
		1955 Information Theory
		1958 NPL Mechanisation of Thought
	Todd, J.	*1949 Cambridge Computer*

Academic		
LSE		
Statistics	Kendall, M. G.	*1950 Information Theory*
	Tizard, R. H.	*1958 NPL Mechanisation of Thought*

Academic		
Manchester College, Science & Technology		
	Nicoll, G. R.	*1958 NPL Mechanisation of Thought*

Academic		
Northampton Polytechnic		
	Bridger, M.	*1953 NPL Automatic Computation*
	Harrison, L. H. R.	*1953 NPL Automatic Computation*

Academic		
Polish University College, London		
	Jelonek, Z.	*1950 Information Theory*
		1952 Applications of Comm's. Theory

Academic		
Royal Technical College, Glasgow		
	Lord, R. D.	*1951 Manchester Computer*

Academic		
UCL		
Anatomy	Muntz, W. R. A.	*1958 NPL Mechanisation of Thought*
	Roberts, F.	*1950 Information Theory*
		1953 NPL Automatic Computation
	Sholl, D. A.	*1950 Information Theory*
	Taylor, W. K.	*1955 Information Theory*
		1958 NPL Mechanisation of Thought
	Young, J. Z.	*1958 NPL Mechanisation of Thought*
Biophysics	Hill, A. V.	*1950 Information Theory*
Computing Laboratory	Buckingham, R. A.	*1958 NPL Mechanisation of Thought*
Mathematical Statistics	Hartley, H. O.	*1953 NPL Automatic Computation*
Medical Research Council	Wason, P. C.	*1958 NPL Mechanisation of Thought*
Phonetics	Denes, P.	*1950 Information Theory*
		1952 Applications of Comm's. Theory
		1955 Information Theory
		1958 NPL Mechanisation of Thought
	Fry, D. B.	*1950 Information Theory*
		1952 Applications of Comm's. Theory
		1955 Information Theory
		1958 NPL Mechanisation of Thought
	Goldman-Eisler, F.	*1958 NPL Mechanisation of Thought*
Photogrammetry & Surveying	Thompson, E. H.	*1953 NPL Automatic Computation*
Physics	Buckingham, R. A.	*1953 NPL Automatic Computation*
	Massey, H. M.	*1950 Information Theory*
		1953 NPL Automatic Computation
	Erskine, G. A.	*1953 NPL Automatic Computation*

Academic		
University College, Wales		
Engineering	MacMillan, R. H.	*1958 NPL Mechanisation of Thought*
	Rees, N. W.	*1958 NPL Mechanisation of Thought*

Academic		
University of Birmingham		
Civil Engineering	Redshaw, S. C.	*1953 NPL Automatic Computation*
Electrical Engineering	Allanson, J. T.	*1955 Information Theory*
		1958 NPL Mechanisation of Thought
	Bell, D. A.	*1952 Applications of Comm's. Theory*
		1955 Information Theory
Linguistics	Ross, A. S. C.	*1955 Information Theory*
Physiology	Whitfield, I. C.	*1955 Information Theory*

Academic		
University of Bristol		
Psychology	Chapman, B. L. M.	*1958 NPL Mechanisation of Thought*

Academic		
University of Cambridge		
Applied Economics	Brown, J. A. C.	*1953 NPL Automatic Computation*
	Paris, S. J.	*1953 NPL Automatic Computation*
	Stone, J. R. N.	*1951 Manchester Computer*
Applied Psychology	Bartlett, F.	*1958 NPL Mechanisation of Thought*
	Broadbent, D. E.	*1955 Information Theory*
Cavendish Laboratory	Bowhill, S. A.	*1949 Cambridge Computer*
	Budden, K. G.	*1950 Information Theory*
	Curling, C. D.	*1949 Cambridge Computer*
	Frisch, O. R.	*1949 Cambridge Computer*
	Gold, T.	*1950 Information Theory*
	Hartree, D. R.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Johnson, K. C.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Kendrew, J. C	*1951 Manchester Computer*
	Machin, K. E.	*1949 Cambridge Computer*
	Selmer, E. S.	*1949 Cambridge Computer*
	Shinn, D. H.	*1949 Cambridge Computer*
Chemical Laboratory	Pye, H.	*1949 Cambridge Computer*
Emmanuel College	Pizer, H.	*1949 Cambridge Computer*
Engineering Laboratory	Baker, J. F.	*1949 Cambridge Computer*
	Coales, J. F.	*1958 NPL Mechanisation of Thought*
	Lubbock, J. K.	*1958 NPL Mechanisation of Thought*
	Phillips, F.	*1949 Cambridge Computer*
Genetics	Fisher, R. A.	*1950 Information Theory*
Jesus College	Pennington, W. B.	*1949 Cambridge Computer*

Academic		
University of Cambridge		
Mathematical Laboratory	Barron, D. W.	*1958 NPL Mechanisation of Thought*
	Barton, S. A.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Bennett, J. M.	*1949 Cambridge Computer*
	Bonham Carter, R. B.	*1949 Cambridge Computer*
	Chamberlain, P.	*1949 Cambridge Computer*
	Douglas, A. S.	*1953 NPL Automatic Computation*
	Farmer, P. J.	*1949 Cambridge Computer*
	Friedman	*1953 NPL Automatic Computation*
	Gill, S.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Leigh, D. C. F.	*1953 NPL Automatic Computation*
	McKee, E. E.	*1949 Cambridge Computer*
	Miller, J. C. P.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Munford, C. M.	*1949 Cambridge Computer*
	Mutch, E. N.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Phister, M.	*1953 NPL Automatic Computation*
	Renwick, W.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Stanley, J. P.	*1949 Cambridge Computer*
	Stevens, G. J.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Stringer, J. B.	*1953 NPL Automatic Computation*
	Wheeler, D. J.	*1949 Cambridge Computer*
	Wilkes, M. V.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Willis, D. W.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Worsley, B. H.	*1949 Cambridge Computer*
Neurophysiology	Pringle, J. W. S.	*1950 Information Theory*
Nuffield Research Unit Psychological Laboratory	Welford, N. T.	*1951 Manchester Computer*
Observatory	Wolf, E.	*1949 Cambridge Computer*
Physiological Laboratory	Adrian, E. G.	*1950 Information Theory*
	Barlow, H. B.	*1950 Information Theory*
		1958 NPL Mechanisation of Thought
	Campbell, F. W.	*1958 NPL Mechanisation of Thought*
	Donaldson, P. E. K.	*1958 NPL Mechanisation of Thought*
	Rushton, W. A. H.	*1950 Information Theory*
Psychological Laboratory	Gregory, R. L.	*1955 Information Theory*
		1958 NPL Mechanisation of Thought
	Hick, W. E.	*1950 Information Theory*
	Watson, A. J.	*1958 NPL Mechanisation of Thought*
School of Agriculture	Richens, R. H.	*1958 NPL Mechanisation of Thought*

Academic		
University of Cambridge		
Selwyn College	Hunter, D. G. N.	*1949 Cambridge Computer*
St. John's College	Gill, S.	*1949 Cambridge Computer*
	Hall, G. G.	*1949 Cambridge Computer*
	Smithies, F.	*1949 Cambridge Computer*
Statistical Laboratory	Anscombe, F. I.	*1949 Cambridge Computer*
Theoretical Chemistry	Dresel, L. A. G.	*1949 Cambridge Computer*
	Price, V. E.	*1949 Cambridge Computer*
Trinity College	Hale, V. W. D.	*1949 Cambridge Computer*
Zoology Laboratory	Gold, T.	*1949 Cambridge Computer*
	Moore, C. H.	*1949 Cambridge Computer*

Academic		
University of Edinburgh		
Institute of Animal Genetics	Goodwin, B.	*1958 NPL Mechanisation of Thought*
Phonetics	Ladefoged, P.	*1958 NPL Mechanisation of Thought*

Academic		
University of Glasgow		
	Andrew, A. M.	*1952 Applications of Comm's. Theory*

Academic		
University of Leeds		
Electronic Computing Lab.	Douglas, A. S.	*1958 NPL Mechanisation of Thought*
Mathematics	Kalicki, J.	*1951 Manchester Computer*
Psychology	Jeeves, M. A.	*1958 NPL Mechanisation of Thought*

Academic		
University of Liverpool		
Mathematics Institute	Young, A.	*1951 Manchester Computer*
	Jones, C. W.	*1953 NPL Automatic Computation*
	Rosenhead, L.	*1953 NPL Automatic Computation*

Academic		
University of Manchester		
Classics	Brandwood, L.	*1958 NPL Mechanisation of Thought*
Computing Machine Laboratory, Electrical Engineering	Brooker, R. A.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
	Chaplin, G. B. B.	*1953 NPL Automatic Computation*
	Edwards, D. B. G.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Glennie, A. E.	*1951 Manchester Computer*
	Grimsdale, R. L.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
	Hoskin, N. E.	*1953 NPL Automatic Computation*
	Kilburn, T.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Laithwaite, R. E.	*1951 Manchester Computer*
	Livesey, R. K.	*1953 NPL Automatic Computation*
	Robinson, A. A.	*1949 Cambridge Computer*
	Sumner, F. H.	*1958 NPL Mechanisation of Thought*
	Thomas, G. E.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Tootill, G. C.	*1949 Cambridge Computer*
	West, J. C.	*1951 Manchester Computer*
	Williams, F. C.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
Mathematics	Bartlett, M. S.	*1950 Information Theory*
	Lighthill, M. J.	*1951 Manchester Computer*
	Newman, M. H. A.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
	Popplewell, C.	*1951 Manchester Computer*
	Turing, A. M.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
		1953 NPL Automatic Computation
Mechanical Engineering	Matheson, J. L.	*1951 Manchester Computer*
Physics	Blackett, P. M. S.	*1951 Manchester Computer*
	Dodds, K. N.	*1951 Manchester Computer*
	Melville, S.	*1951 Manchester Computer*

Academic		
University of Oxford		
Anatomy	Clarke, Le Gros	*1950 Information Theory*
Christ Church	Spencer Brown, G.	*1955 Information Theory*
Clarendon Laboratory	Kompfner, R.	*1950 Information Theory*
	MacDonald, D. K. C.	*1950 Information Theory*
Institute of Experimental Psychology	Oldfield, R. C.	*1950 Information Theory*
	Sutherland, N. S.	*1958 NPL Mechanisation of Thought*
Institute of Statistics	Moran, P. A.	*1950 Information Theory*
Magdalen College	Kendall, D. G.	*1950 Information Theory*
Mathematics	Foster, F.	*1950 Information Theory*
Nuffield College	Farquharson, R.	*1955 Information Theory*

Academic		
University of Reading		
Psychology	Bruce, D. J.	*1955 Information Theory*
		1958 NPL Mechanisation of Thought
	Crossman, E. R. F.	*1958 NPL Mechanisation of Thought*
	Morton, J.	*1958 NPL Mechanisation of Thought*
	Vowles, D. M.	*1958 NPL Mechanisation of Thought*

Academic		
University of Southampton		
	Cleave, J. P.	*1958 NPL Mechanisation of Thought*

Academic		
University of St Andrews		
	Crossland, J.	*1958 NPL Mechanisation of Thought*

Broadcasting		
BBC		
Research	Beresford-Cooke, A. M.	*1950 Information Theory*
	Bevan, P. A. T.	*1950 Information Theory*
	Gouriet, G. G.	*1952 Applications of Comm's. Theory*
	Kirke, H. L.	*1950 Information Theory*
	Padel, S. H.	*1950 Information Theory*
	Wilson, W. P.	*1950 Information Theory*

Charity		
St Dunstan's, London ***[blind military veterans]***		
	Beurle, R. L.	*1950 Information Theory*

Commercial		
A. C. Cossor ***[electronics mfr., esp. valves & CRTs]***		
	Batty, N. G.	*1953 NPL Automatic Computation*

Commercial		
A. C. Nielsen ***[market research services]***		
	Danson, D. A.	*1951 Manchester Computer*
	Harris, E. W. P.	*1951 Manchester Computer*

Commercial		
A. V. Roe ***[aircraft manufacturer]***		
	Arrowsmith, J.	*1951 Manchester Computer*
	Oddy, H. D.	*1951 Manchester Computer*
	Shercliff, G. A.	*1951 Manchester Computer*

Commercial		
Acoustic Products		
	Connelly, F. C.	*1953 NPL Automatic Computation*

Commercial		
Air Trainers Link		
	Shaw, G. L.	*1958 NPL Mechanisation of Thought*

Commercial		
Albright & Wilson *[chemical manufacturer]*		
	Masham, F. W.	*1950 Information Theory*

Commercial		
All-Power Transformers		
	Rubach, A.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation

Commercial		
Anglo-Iranian Oil		
	Noble, B.	*1949 Cambridge Computer*

Commercial		
Artorga Research Group		
	Wells, O. D.	*1958 NPL Mechanisation of Thought*

Commercial		
Associated Electrical Industries *[BTH/Metro-Vick parent]*		
	Lyon, G.	*1951 Manchester Computer*

Commercial		
Bell Punch *[public transport ticket machine mfr.]*		
	Kitz, N.	*1958 NPL Mechanisation of Thought*

Commercial		
Boulton Paul Aircraft *[aircraft manufacturer]*		
	Bruce, A.	*1950 Information Theory*
	North, J. D.	*1955 Information Theory*
	Zaremba, S. K.	*1955 Information Theory*

Commercial		
Bristol Aeroplane *[aircraft manufacturer]*		
	Farrington, F.	*1951 Manchester Computer*
	Hahn, J. M.	*1953 NPL Automatic Computation*

Commercial		
British Iron & Steel Research Association		
	Massey, R. G.	*1958 NPL Mechanisation of Thought*

Commercial		
British Rubber Producers' Research Association		
	Britten, K. H. V.	*1949 Cambridge Computer*
	Sweeting, X. V.	*1949 Cambridge Computer*

Commercial		
British Tabulating Machine		
Letchworth	Bird, R.	*1953 NPL Automatic Computation*
	Cartwright, R.	*1953 NPL Automatic Computation*
	Dagnall, B.	*1953 NPL Automatic Computation*
	Dickens, C. D. C.	*1953 NPL Automatic Computation*
	Holland-Martin, C. G.	*1953 NPL Automatic Computation*
	Michaelson, R. L.	*1953 NPL Automatic Computation*
	Townsend, R.	*1953 NPL Automatic Computation*
	Womersley, J. R.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
London	Davies, J. A.	*1951 Manchester Computer*
	Holland Martin, C. G.	*1951 Manchester Computer*
	Michaelson, R. L.	*1951 Manchester Computer*

Commercial		
British Telecommunications Research *[private co.]*		
	Lawton, J.	*1950 Information Theory*

Commercial		
British Thomson-Houston *[heavy eng., electricity gen.]*		
Leicester	Allwright, E. A.	*1958 NPL Mechanisation of Thought*
Rugby	Mynall, D. J.	*1950 Information Theory*
	Stanworth, J. E.	*1958 NPL Mechanisation of Thought*

Commercial		
Courtaulds *[textile & chemical manufacturer]*		
Courtaulds Research Institute	Crank, J.	*1953 NPL Automatic Computation*

Commercial		
De Havilland Propellers		
	Chadwick, E. G.	*1953 NPL Automatic Computation*
	Copland, M. F.	*1953 NPL Automatic Computation*
	Evans, L. G.	*1953 NPL Automatic Computation*
	Hunt, P.	*1953 NPL Automatic Computation*
	MacMullan, J. S.	*1953 NPL Automatic Computation*
	Stonell, A. C.	*1953 NPL Automatic Computation*
	Swingler, J.	*1953 NPL Automatic Computation*
	Young, D. A.	*1958 NPL Mechanisation of Thought*

Commercial		
Decca Radar		
New Malden	Payne, L. C.	*1958 NPL Mechanisation of Thought*
Walton-on-Thames	Willis, D. W.	*1958 NPL Mechanisation of Thought*

Commercial		
Distillers		
	Twigg, G. H.	*1951 Manchester Computer*

Commercial		
E.M.I. ***[electronics manufacturer]***		
Central Research Labs., Hayes	Percival, W. J.	*1950 Information Theory*
	Rey, T. J.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
Eng. Development, Hayes	Spencer, R. E.	*1953 NPL Automatic Computation*
Research Labs., Hayes	Cork, E. C.	*1953 NPL Automatic Computation*
	Harker, M. G.	*1953 NPL Automatic Computation*
	Huntley, K. G.	*1953 NPL Automatic Computation*
	Scantlebury, G. S.	*1953 NPL Automatic Computation*
	Vanderlyn, P. B.	*1953 NPL Automatic Computation*
	White, E. L. C.	*1953 NPL Automatic Computation*
Feltham	Shackel, B.	*1958 NPL Mechanisation of Thought*
	Ingham, W. E.	*1958 NPL Mechanisation of Thought*

Commercial		
Elliott Bros. ***[electronics mfr.]***		
Research Laboratories	Barnborough, B.	*1951 Manchester Computer*
	Beer, A. E. de	*1953 NPL Automatic Computation*
	Carpenter, H. G.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Clarke, S. L. H.	*1958 NPL Mechanisation of Thought*
	Coales, J. F.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Devonald, C. H.	*1953 NPL Automatic Computation*
	Elliott, W. S.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Hersom, S. E.	*1953 NPL Automatic Computation*
	Hill, N. D.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Needham, M. V.	*1949 Cambridge Computer*
	Owen, C. E.	*1953 NPL Automatic Computation*
	Robbins, R. C.	*1953 NPL Automatic Computation*
	Shackleton, P.	*1958 NPL Mechanisation of Thought*
	St Johnston, A.	*1953 NPL Automatic Computation*
	Wykeham, W. A. P.	*1953 NPL Automatic Computation*

Commercial		
English Electric ***[electric plant, electronics, aircraft mfr.]***		
Nelson Research Laboratories, Stafford	Brown, J. K.	*1949 Cambridge Computer*
	Denison, S. J. M.	*1958 NPL Mechanisation of Thought*
	Duncan, F. G.	*1958 NPL Mechanisation of Thought*
	Haley, A. C. D.	*1953 NPL Automatic Computation*
	Hawkins, E. N.	*1958 NPL Mechanisation of Thought*
	Robinson, C.	*1953 NPL Automatic Computation*
		1958 NPL Mechanisation of Thought
	Scott, W. E.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
London	Davis, G. M.	*1958 NPL Mechanisation of Thought*

Commercial		
English Electric Valve ***[electronic equipment mfr.]***		
	Beurle, R. L.	*1958 NPL Mechanisation of Thought*

Commercial		
Fairey Aviation		
Research Division	ApSimon, H.	*1953 NPL Automatic Computation*
	Quinn, S.	*1953 NPL Automatic Computation*

Commercial		
Ferranti ***[electronics manufacturer]***		
Edinburgh	Smith, J. B.	*1950 Information Theory*
	Walker, D. F.	*1950 Information Theory*
London	Bass, W. G.	*1951 Manchester Computer*
	Gill, S.	*1958 NPL Mechanisation of Thought*
Manchester, Hollinwood	Ferranti, V. de	*1951 Manchester Computer*
Manchester, Moston	Bates, M. A.	*1951 Manchester Computer*
	Bennett, J. M.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Bowden, B. V.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Carter, J. D.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Gradwell, C. F.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Grundy, E.	*1951 Manchester Computer*
	Lonsdale, K.	*1951 Manchester Computer*
	Pollard, B. W.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Prinz, D. G.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Robinson, A. A.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Stewart-Williams, R.	*1951 Manchester Computer*
	Swann, B. B.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Thomas, G. I.	*1949 Cambridge Computer*
	Warburton, E.	*1951 Manchester Computer*
	Welby, B.	*1951 Manchester Computer*
	Yates, J. T.	*1949 Cambridge Computer*

Commercial		
General Electric *[electrical & electronic mfg.]*		
Hirst Research Ctre., Wembley	Bryden, J. E.	*1950 Information Theory*
	Hill, R. T.	*1951 Manchester Computer*
	Levy, M.	*1950 Information Theory*
	Moss, S. H.	*1950 Information Theory*
	Stenning, L.	*1950 Information Theory*
	Warren, G. W.	*1951 Manchester Computer*

Commercial		
General Reinsurance Company of Amsterdam, London		
	Monic, B.	*1953 NPL Automatic Computation*

Commercial		
Glaxo Laboratories *[pharmaceuticals]*		
	Brockbank, A. J.	*1958 NPL Mechanisation of Thought*

Commercial		
I.B.M. United Kingdom		
British Laboratories, London	Carpenter, H. G.	*1958 NPL Mechanisation of Thought*
	Merry, I. W.	*1958 NPL Mechanisation of Thought*
London	Elliott, W. S.	*1958 NPL Mechanisation of Thought*
	Hudson, T. C.	*1953 NPL Automatic Computation*
	Swann, E. D.	*1953 NPL Automatic Computation*

Commercial		
Imperial Chemical Industries		
Alkali Division, Northwich	Calldender, A.	*1951 Manchester Computer*
	Kitchener, Earl,	*1951 Manchester Computer*
	Thornton, C. A. M.	*1951 Manchester Computer*
Middlesborough	Bray, J. W.	*1958 NPL Mechanisation of Thought*
Reading	Young, A. J.	*1958 NPL Mechanisation of Thought*

Commercial		
International Computers & Tabulators		
Research Division, Whyteleaf	Guttridge, E. J.	*1958 NPL Mechanisation of Thought*
London	Aston, B. R.	*1958 NPL Mechanisation of Thought*
	Elbourne, K. B.	*1958 NPL Mechanisation of Thought*
Stevenage	Freedman, A. L.	*1958 NPL Mechanisation of Thought*
	Holland-Martin, G. G.	*1958 NPL Mechanisation of Thought*
	Woolner, A. D.	*1958 NPL Mechanisation of Thought*

Commercial		
J. Lyons *[bakers, retail caterers, high street cafés]*		
Cadby Hall	Caminer, D. T.	*1953 NPL Automatic Computation*
	Edwards, W. J.	*1949 Cambridge Computer*
	Hemy, D.	*1949 Cambridge Computer*
	Kaye, E. J.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Lenaerts, E. H.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Pinkerton, J. M. M.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Standingford, O. W.	*1949 Cambridge Computer*
	Thompson, T. R.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
LEO Computers	Gosden, J. A.	*1958 NPL Mechanisation of Thought*

Commercial		
Marconi *[telecommunications manufacturer]*		
Marconi Research Centre, Great Baddow	Colechester, C. D.	*1950 Information Theory*
	Eastwood, E.	*1950 Information Theory*
	Millington, S. G.	*1950 Information Theory*
Chelmsford	Bedford, L. H.	*1949 Cambridge Computer*

Commercial		
Marks & Spencer		
	Nellist, J. H.	*1951 Manchester Computer*

Commercial		
Metal Box *[industrial packaging manufacturer]*		
	Cawdron, B.	*1951 Manchester Computer*
	Gearing, M. W.	*1958 NPL Mechanisation of Thought*

Commercial		
Metropolitan Vickers *[heavy electrical engineering]*		
	Gladman, J. C.	*1958 NPL Mechanisation of Thought*

Commercial		
Mullards *[electronics manufacturer]*		
Mullard Research Laboratories, Redhill	Braybrook, C. H.	*1953 NPL Automatic Computation*
	Dell, H. A.	*1953 NPL Automatic Computation*
	Goldsmith, M. N.	*1953 NPL Automatic Computation*
	Trier, P. E.	*1953 NPL Automatic Computation*
Mullard Radio Valve, Southfields	Jones, F. E.	*1958 NPL Mechanisation of Thought*
	Richards, J. H.	*1958 NPL Mechanisation of Thought*
	Swift, P.	*1958 NPL Mechanisation of Thought*
	Trier, P. E.	*1958 NPL Mechanisation of Thought*

Commercial		
Murphy Radio		
	Lovelock, R. T.	*1953 NPL Automatic Computation*
	McMullin, T. A.	*1953 NPL Automatic Computation*

Commercial		
National Cash Register, *[electronic equipment mfr.]*		
	Cushing, G. W.	*1958 NPL Mechanisation of Thought*

Commercial		
Petrocarbon ***[chemical engineering consultancy]***		
	Charlton, H. E.	*1951 Manchester Computer*

Commercial		
Plessey ***[electronics & telecoms. manufacturer]***		
Croydon	Ringrose, J. W.	*1953 NPL Automatic Computation*
	Sabel, C.	*1953 NPL Automatic Computation*
Ilford	Howell, T. C.	*1958 NPL Mechanisation of Thought*
	Ringrose, J. W.	*1958 NPL Mechanisation of Thought*

Commercial		
Pollak, Mercer & Tench ***[patent agents]***		
	Maddox, H. F.	*1951 Manchester Computer*
		1953 NPL Automatic Computation

Commercial		
Powers Samas Accounting Machines		
	Johnson, W. E.	*1951 Manchester Computer*

Commercial		
Production Engineering ***[industrial mgmt. consultants]***		
	Eades, J. R.	*1958 NPL Mechanisation of Thought*

Commercial		
Prudential Assurance		
	Eddy, J.	*1951 Manchester Computer*
	Lawrence, R. C.	*1951 Manchester Computer*

Commercial		
Robson, Morrow & Co. ***[org. & methods consultancy]***		
	Paula, F. C. de	*1958 NPL Mechanisation of Thought*

Commercial		
Rolls Royce		
	Griffiths, L.	*1953 NPL Automatic Computation*

Commercial		
Royal Dutch Shell, London		
Shell Petroleum	Sears, G. W.	*1953 NPL Automatic Computation*

Commercial		
Scientific Computing Service		
	Gilles, D. C.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Miller, J. C. P.	*1949 Cambridge Computer*

Commercial		
Smith's Aircraft Instruments		
	Meredith, J. F.	*1958 NPL Mechanisation of Thought*
	Shelly, J. H.	*1958 NPL Mechanisation of Thought*

Commercial		
Solartron Electronic Group ***[electronic eqpmt. mfr.]***		
	Bailey, C. E. G.	*1958 NPL Mechanisation of Thought*
	Pask, G. A.	*1958 NPL Mechanisation of Thought*
	Scott, B.	*1958 NPL Mechanisation of Thought*

Commercial		
Standard Telephone & Cables ***[telecoms. mfr.]***		
Standard Telecommunications Labs.	Branch, M. C.	*1953 NPL Automatic Computation*
	Earp, C. W.	*1952 Applications of Comm's. Theory*
	Grayson, H.	*1951 Manchester Computer*
	Harrild, P. W. S.	*1953 NPL Automatic Computation*
	Hartley, G. C.	*1953 NPL Automatic Computation*
	Hodgson, K. G.	*1950 Information Theory*
	Hunter, D. G. N.	*1958 NPL Mechanisation of Thought*
	Pocock, L. C.	*1950 Information Theory*
	Reeves, A. H.	*1950 Information Theory*
	Rice, J.	*1953 NPL Automatic Computation*
	Schuhmann, W. S.	*1958 NPL Mechanisation of Thought*
	Starr, A. T.	*1951 Manchester Computer*
	Wright, E. P. G.	*1953 NPL Automatic Computation*

Commercial		
Tube Investments, ***[steel tube & bicycle manufacturers]***		
Technological Centre	Aldridge-Cox, D.	*1958 NPL Mechanisation of Thought*
	Huggins, P.	*1958 NPL Mechanisation of Thought*
	Whitehead, E. A. N.	*1958 NPL Mechanisation of Thought*

Commercial		
Ultra-Electric ***[consumer electronics manufacturer]***		
	Kerr, D.	*1958 NPL Mechanisation of Thought*

Commercial		
United Steel Companies		
OR & Cybernetics Dept.	Beer, S.	*1958 NPL Mechanisation of Thought*
	Tocher, K. D.	*1958 NPL Mechanisation of Thought*

Commercial		
Vickers-Armstrongs, ***[engineering conglomerate]***		
	Gutteridge, E. J.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Hitch, H. P. Y.	*1953 NPL Automatic Computation*
	Lucas, J. H.	*1953 NPL Automatic Computation*
	Yandell, R. P. B.	*1953 NPL Automatic Computation*

Commercial		
Vickers ***[group holding company]***		
Vickers Group Research Est.	McDonnell, D.	*1958 NPL Mechanisation of Thought*

Commercial		
Westminster Bank		
London	Hardstone, F. W.	*1951 Manchester Computer*
Manchester	Barnes, T.	*1951 Manchester Computer*

Government		
Atomic Energy Research Establishment, Harwell		
	Barnes, R. C. M.	*1953 NPL Automatic Computation*
	Cooke-Yarborough, E.H.	*1953 NPL Automatic Computation*
	Fossey, E. B.	*1953 NPL Automatic Computation*
	Howlett, J.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation

Government		
Board of Trade		
	Stafford, J.	*1951 Manchester Computer*

Government		
British Electricity Authority		
	Dubuis, H. F.	*1951 Manchester Computer*

Government		
Building Research Station		
	Vallance, F.	*1951 Manchester Computer*

Government		
Cabinet Office		
Central Statistical Office	Redfern, P.	*1958 NPL Mechanisation of Thought*

Government		
Dept. of Scientific & Industrial Research		
	Gerhard, D. J.	*1958 NPL Mechanisation of Thought*
	Greenall, P. D.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought

Government		
GCHQ		
	Good, I. J.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
		1952 Applications of Comm's. Theory
		1955 Information Theory
	Marshall, P. R.	*1958 NPL Mechanisation of Thought*
	Timms, G.	*1958 NPL Mechanisation of Thought*

Government		
General Register Office		
Somerset House	Joll, A. E.	*1951 Manchester Computer*

Government		
H.M. Treasury		
	Appleton, W. J.	*1958 NPL Mechanisation of Thought*
	Hancock, C.	*1958 NPL Mechanisation of Thought*
	Jenkins, L. E.	*1958 NPL Mechanisation of Thought*
	Jordan, G. H. S.	*1958 NPL Mechanisation of Thought*
	Merriman, J. H. H.	*1958 NPL Mechanisation of Thought*

Government		
Home Office		
Criminal Research Unit	Hammond, W. H.	*1958 NPL Mechanisation of Thought*
Establishment & Org. Div.	Heggie, W.	*1958 NPL Mechanisation of Thought*

Government		
Medical Research Council		
	Sherwood, S. L.	*1958 NPL Mechanisation of Thought*

Government		
Ministry of Transport & Civil Aviation		
	Johnson, M. H.	*1953 NPL Automatic Computation*

Government		
National Physical Laboratory		
	Allway, G. G.	*1953 NPL Automatic Computation*
	Andrew, A. M.	*1958 NPL Mechanisation of Thought*
	Barber, D. L. A.	*1958 NPL Mechanisation of Thought*
	Barrell, H.	*1958 NPL Mechanisation of Thought*
	Blake, D. V.	*1958 NPL Mechanisation of Thought*
	Bullard, E. C.	*1950 Information Theory*
	Clayden, D. O.	*1953 NPL Automatic Computation*
		1958 NPL Mechanisation of Thought
	Colebrook, F. M.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Davies, D. W.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
		1951 Manchester Computer
	Evans, J. C.	*1950 Information Theory*
	Fieller, R. R.	*1950 Information Theory*
	Fox, L.	*1953 NPL Automatic Computation*
	Froome, K. D.	*1958 NPL Mechanisation of Thought*
	Goodwin, E. T.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
	McDaniel, J.	*1958 NPL Mechanisation of Thought*
	Michel, J. E. L.	*1950 Information Theory*
	Newman, E. A.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
	Osborne, C. F.	*1958 NPL Mechanisation of Thought*
	Page, L. J.	*1958 NPL Mechanisation of Thought*
	Robertson, H. H.	*1953 NPL Automatic Computation*
		1958 NPL Mechanisation of Thought
	Sinnott, C. S.	*1958 NPL Mechanisation of Thought*
	Stuart, P. R.	*1958 NPL Mechanisation of Thought*
	Sutherland, G. B. B. M.	*1958 NPL Mechanisation of Thought*
	Uttley, A. M.	*1958 NPL Mechanisation of Thought*
	Vickers, T.	*1958 NPL Mechanisation of Thought*
	Wilkinson, J. H.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Wilson, W.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1958 NPL Mechanisation of Thought
	Woodger, M.	*1951 Manchester Computer*
		1958 NPL Mechanisation of Thought
	Woods, L. C.	*1953 NPL Automatic Computation*
	Wright, M. A.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought

Government		
National Research Development Corporation		
	Crawley, H. J.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
	Duncanson, J. M.	*1951 Manchester Computer*
	Halsbury, Lord	*1958 NPL Mechanisation of Thought*
	Hennessey, D.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Johnson, W. E. P.	*1951 Manchester Computer*
	Strachey, C.	*1953 NPL Automatic Computation*
		1958 NPL Mechanisation of Thought

Government		
Nature Conservancy, Edinburgh		
	Holt, S. J.	*1950 Information Theory*

Government		
North Western Electricity Board, Manchester		
	Howarth, O.	*1951 Manchester Computer*

Government		
Radio Research Station, Ditton Park		
	Burgess, R. E.	*1950 Information Theory*
	Piggott, W. R.	*1950 Information Theory*

Government		
Railway Executive		
	Gillespie, J.	*1951 Manchester Computer*

Institute		
British Rayon Research Association		
	Wilson, J.	*1951 Manchester Computer*

Institute		
Electrical Research Assoc. Labs., *[commercial consultancy]*		
Perivale	Michelson, S.	*1949 Cambridge Computer*
London	Whitehead, J.	*1951 Manchester Computer*

Institute		
Lawes Agricultural Trust		
Rothamstead Experimental Stn.	Healy, M. J. R.	*1953 NPL Automatic Computation*

Medical		
Barnwood House		
Research Department	Ashby, W. R.	*1950 Information Theory*
		1958 NPL Mechanisation of Thought

Medical		
Burden Neurological Institute		
Physiological Department	Shipton, H. W.	*1950 Information Theory*
	Walter, W. G.	*1950 Information Theory*
		1958 NPL Mechanisation of Thought

Medical		
National Hospital for Nervous Diseases		
MRC Neurological Research Unit	Bates, J. A. V.	*1950 Information Theory*
		1958 NPL Mechanisation of Thought
	Dawson, G. D.	*1950 Information Theory*
	Halliday, A. M.	*1958 NPL Mechanisation of Thought*
	Merton, P. A.	*1950 Information Theory*
		1955 Information Theory
Psychological Medicine Dept.	Slater, E.	*1950 Information Theory*
	Effron, R.	*1958 NPL Mechanisation of Thought*

Medical		
Royal Marsden Hospital		
	Newman, G. B.	*1958 NPL Mechanisation of Thought*

Medical		
Western Hospital, London		
	Nash, F. A.	*1958 NPL Mechanisation of Thought*

Medical		
Whitchurch Hospital, Cardiff		
Neuropsychiatric Research	McDermott, T. J.	*1958 NPL Mechanisation of Thought*

Military		
Admiralty		
Fanum House	Vajda, S.	*1949 Cambridge Computer*
Operational Research	Vajda, S.	*1951 Manchester Computer*
Portsdown	Benjamin, R.	*1958 NPL Mechanisation of Thought*
	Calpine, H. C.	*1950 Information Theory*
	Swaffield, J.	*1950 Information Theory*
	Vajda, S.	*1950 Information Theory*

Military		
Admiralty Research Laboratory, Teddington		
	Beale, E. M. L.	*1953 NPL Automatic Computation*
	Hobson, A.	*1953 NPL Automatic Computation*
	Humphreys, K.	*1951 Manchester Computer*
	Lee, E.	*1953 NPL Automatic Computation*
	Levin, N.	*1949 Cambridge Computer*
	Nichols, L. H. F.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Owen, G.	*1953 NPL Automatic Computation*
	Steel, F.	*1953 NPL Automatic Computation*
	Vajda, S.	*1953 NPL Automatic Computation*
		1958 NPL Mechanisation of Thought
	Wilson, E. M.	*1953 NPL Automatic Computation*

Military		
Admiralty Signal & Radar Establishment		
Portsdown	Anderson, W. P.	*1950 Information Theory*
		1951 Manchester Computer
	Pout, H. W.	*1951 Manchester Computer*
Witley	Benjamin, R.	*1951 Manchester Computer*
	Whitten, R. H.	*1949 Cambridge Computer*

Military		
Air Ministry		
	Cockburn, R.	*1950 Information Theory*

Military		
Air Research Establishment		
	Glennie, A. E.	*1953 NPL Automatic Computation*

Military		
Armament Research Establishment		
	Corner, J. R.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Dodd, K. N.	*1953 NPL Automatic Computation*
	Gawlik, H. J.	*1953 NPL Automatic Computation*
	MacColl, J. W.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Pike, H. M. M.	*1951 Manchester Computer*
	Thornhill, C. K.	*1951 Manchester Computer*
		1953 NPL Automatic Computation

Military		
Atomic Energy Authority		
Aldermaston	Glennie, A. E.	*1958 NPL Mechanisation of Thought*
Risley	Black, G.	*1958 NPL Mechanisation of Thought*
	Briam, M.	*1958 NPL Mechanisation of Thought*
	Pannell, A.	*1958 NPL Mechanisation of Thought*

Military		
Clothing & Stores Experimental Establishment		
	Stockbridge, H. C. W.	*1958 NPL Mechanisation of Thought*

Military		
H.M. Nautical Almanack Office		
Bath	Sadler, D. H.	*1949 Cambridge Computer*
Herstmonceux Castle	Sadler, D. H.	*1953 NPL Automatic Computation*

Military		
Military College of Science, Shrivenham		
	Holt-Smith, C.	*1953 NPL Automatic Computation*
	Lawden, D. F.	*1949 Cambridge Computer*
	Lee, A.	*1949 Cambridge Computer*
		1950 Information Theory
	Preston, G. B.	*1953 NPL Automatic Computation*
	Smith, C. H.	*1950 Information Theory*
		1951 Manchester Computer
	Tootill, G. C.	*1951 Manchester Computer*
		1953 NPL Automatic Computation

Military		
Ministry of Supply		
Old Queen Street	Hitch, F. A. N.	*1949 Cambridge Computer*
Patents Branch	Brown, T.	*1949 Cambridge Computer*
	Crawley, A. J.	*1949 Cambridge Computer*
Shell Mex House	Morris, F.	*1949 Cambridge Computer*
	Neate, A.	*1951 Manchester Computer*
	Taylor, W. A.	*1949 Cambridge Computer*
	Coppock, S. W.	*1958 NPL Mechanisation of Thought*
Statistical Advisory Unit	Fieller, R. R.	*1953 NPL Automatic Computation*
Thames House	Hancock, M.	*1949 Cambridge Computer*
	Hecht, N. F. S.	*1951 Manchester Computer*
	Patterson, H. M.	*1949 Cambridge Computer*
Weapons Research Directorate	Hinds, G. H.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
London	Denmark, E. J.	*1958 NPL Mechanisation of Thought*
Chessington	Marks, C. P.	*1958 NPL Mechanisation of Thought*

Military		
Ordnance Board, London		
	Boulton, N. V.	*1951 Manchester Computer*
	Forster, G. R.	*1949 Cambridge Computer*
	Rivett, B. H. P.	*1949 Cambridge Computer*

Military		
Radar Research & Development Establishment		
	Bailey, A. E.	*1950 Information Theory*
		1952 Applications of Comm's. Theory
	Blundell, P. H.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
		1952 Applications of Comm's. Theory
		1953 NPL Automatic Computation
	Brown, J.	*1950 Information Theory*
	Cunnold, F. A.	*1949 Cambridge Computer*
	Deighton, R.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Johnson, E. A.	*1949 Cambridge Computer*

Military		
Royal Aircraft Establishment		
	Cohen, A.	*1953 NPL Automatic Computation*
	Deegan, B. S.	*1949 Cambridge Computer*
	Hampton, D. E.	*1952 Applications of Comm's. Theory*
	Reid, D. G.	*1950 Information Theory*
	Palmer, E.	*1953 NPL Automatic Computation*
	Burt, E. G. C.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Petherick, E. J.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Cork, G.	*1953 NPL Automatic Computation*
	Tootill, G. C.	*1958 NPL Mechanisation of Thought*
	Rowley, G. E. C.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Clarke, G. F.	*1950 Information Theory*
	Eggink, H.	*1949 Cambridge Computer*
	Treweek, K. H.	*1958 NPL Mechanisation of Thought*
	Woollett, M. F. C.	*1949 Cambridge Computer*
	Routledge, N.	*1953 NPL Automatic Computation*
	Birchall, P. C.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Fairthorne, R. R.	*1950 Information Theory*
		1951 Manchester Computer
		1955 Information Theory
	Barlow, S. E.	*1949 Cambridge Computer*
	Hollingdale, S. H.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
		1958 NPL Mechanisation of Thought
	White, W. C. J.	*1949 Cambridge Computer*

Military		
Royal Electrical & Mechanical Engineers		
Radar Training Battalion	Jeffrey, E.	*1950 Information Theory*

Military		
Royal Naval College		
	Brown, B. M.	*1953 NPL Automatic Computation*
	Nicholson, G. F.	*1951 Manchester Computer*
		1953 NPL Automatic Computation
	Thomson, J.	*1950 Information Theory*

Military		
Royal Radar Establishment		
	Jenkins, D. P.	*1958 NPL Mechanisation of Thought*
	Pearcey, T.	*1958 NPL Mechanisation of Thought*
	Russell, G.	*1958 NPL Mechanisation of Thought*
	Sutton, G. G.	*1958 NPL Mechanisation of Thought*
	Taylor, P.	*1958 NPL Mechanisation of Thought*
	Whelan, S.	*1958 NPL Mechanisation of Thought*
	Woodward, P. M.	*1958 NPL Mechanisation of Thought*

Military

Royal Radar Research Establishment		
	Hammond, P. H.	*1958 NPL Mechanisation of Thought*

Military

Signals Research & Development Establishment		
	Barker, R. H.	*1949 Cambridge Computer*
		1950 Information Theory
	Fitch, E.	*1950 Information Theory*
	Fourcin, A.	*1958 NPL Mechanisation of Thought*
	Glazier, E. V.	*1950 Information Theory*
	Lawrence, W.	*1952 Applications of Comm's. Theory*
		1958 NPL Mechanisation of Thought
	Williams, D.	*1950 Information Theory*

Military

Telecommunications Research Establishment		
	Atherton, J. F.	*1950 Information Theory*
	Bannister, L. H.	*1949 Cambridge Computer*
	Barker, R. H.	*1952 Applications of Comm's. Theory*
	Beurle, R. L.	*1951 Manchester Computer*
		1952 Applications of Comm's. Theory
	Bridgeman, N. G.	*1949 Cambridge Computer*
	Carter, R. H. A.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Davies, G.	*1949 Cambridge Computer*
	Davies, I. L.	*1950 Information Theory*
	Hesketh, E. J. K.	*1949 Cambridge Computer*
	Jones, S.	*1950 Information Theory*
	Newsam, B.	*1950 Information Theory*
	Noble, S. W.	*1949 Cambridge Computer*
	Ord, G.	*1949 Cambridge Computer*
		1951 Manchester Computer
	Perry, G. H.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Pincherie, L.	*1953 NPL Automatic Computation*
	Sexton, D. A. J.	*1949 Cambridge Computer*
	Smith, R. A.	*1951 Manchester Computer*
	Taylor, P.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Tutchings, A.	*1949 Cambridge Computer*
	Uttley, A. M.	*1949 Cambridge Computer*
		1950 Information Theory
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Waters, P. L.	*1952 Applications of Comm's. Theory*
	Woodward, P. M.	*1949 Cambridge Computer*
		1950 Information Theory
		1952 Applications of Comm's. Theory

Military		
War Office		
	Bednall, C. N.	*1951 Manchester Computer*

Press		
"The Economist"		
	Deane, M.	*1951 Manchester Computer*

Telecommunications		
G.P.O.		
Automatic Data Processing Tech. Support	Freebody, J. W.	*1958 NPL Mechanisation of Thought*
London	Bray, W. J.	*1950 Information Theory*
	Halsey, R. J.	*1950 Information Theory*
	Lewis, N. W.	*1950 Information Theory*
	Radley, W. G.	*1950 Information Theory*
	Thomson, W. E.	*1950 Information Theory*
	Timms, G.	*1950 Information Theory*
Post Office Research Station, Dollis Hill	Berry, J.	*1952 Applications of Comm's. Theory*
	Chandler, W. W.	*1949 Cambridge Computer*
		1951 Manchester Computer
		1953 NPL Automatic Computation
	Coombs, A. W. M.	*1949 Cambridge Computer*
		1953 NPL Automatic Computation
	Flowers, M.	*1951 Manchester Computer*
	Richards, D. L.	*1952 Applications of Comm's. Theory*
	Swaffield, J.	*1952 Applications of Comm's. Theory*

Private		
Buckingham	Bruce, A.	*1951 Manchester Computer*
Cambridge	Blackman, P. F.	*1951 Manchester Computer*
	Southwell, R.	*1953 NPL Automatic Computation*
	Storey, V. R. O.	*1949 Cambridge Computer*
Egham	Williams, G. M. E.	*1958 NPL Mechanisation of Thought*
Fenny Compton	Booth, S. J.	*1949 Cambridge Computer*
Ickenham	Timms, G.	*1951 Manchester Computer*
London	Allinson, V.	*1951 Manchester Computer*
	Bailey, C. E. G.	*1953 NPL Automatic Computation*
	Black, G.	*1951 Manchester Computer*
	Goblick, T. J.	*1958 NPL Mechanisation of Thought*
	Harper, S. D.	*1951 Manchester Computer*
	Phelps, H. J.	*1951 Manchester Computer*
Pinner	Morgan, G. W.	*1951 Manchester Computer*

Table 17: International Delegates at British Events

1949: Cambridge Computer Conference		
France	Couffignal, L.	Ctre. National de la Recherche Scientifique, Laboratoire de Calcul Mécanique
Germany (West)	Walther, A.	Technische Hochschule Darmstadt, Institut für Praktische Mathematik
Netherlands	Scheen, W. L.	Mathematisch Centrum
	Wijngaarden, A. van	
	Kosten, L.	Posts Telegrafie en Telefoons
	Lisman, J. H. C.	
Sweden	Kjellberg, G.	Kungliga Tekniska Högskolan
USA	Wallman, H.	MIT, Experimental Study Group
	Crandall, S. H.	MIT, School of Engineering
	Taussky, O.	

1950: First London Information Theory Symposium		
France	Steinberg, M.	École Normale Supérieure
	Grivet, P.	Laboratoire de Radio-électricité
	Indjoudjian, M. D.	Postes Télégraphes et Téléphones, Service des Recherches et du Controle Technique
	Ville, J.	Societe Alsacienne de Constructions Mecaniques
	Fromageot, A.	Telecommunications Laboratoire Central
	Oswald, J. R. V.	
Germany (West)	Meyer-Eppler, W.	Bonn Universität, Institut für Phonetik und Kommunikationsforschung
	Fischer, F. A.	German Post Office, Central Laboratory
	Holzwarth, H.	Siemens Central Research Laboratories, Systems Development
Netherlands	Stumpers, F. L.	Philips' Gloeilampenfabrieken, Research Laboratories
	Rodenburg, N.	Philips' Telecommunicatie Industrie
	Schouten, J. F.	
	Bast, G. H.	Posts Telegrafie en Telefoons, Central Laboratorium
	Soest, J. L. van	Technische Hogeschool Delft, Electrical Engineering Department
Norway	Dahl, H.	Michelsens Institute
	Knudtzon, N.	Norwegian Defence Research Institute
Sweden	Aurell, C. G.	Ericsson
	Lundquist, N. H.	Research Institute of National Defence
	Haard, B.	Royal Institute of Technology
	Comet, S.	Swedish Defence Staff
Switzerland	Mao, Y. Y.	Consultative Committee on International Radio
	van der Pol, B.	
	Willi, K.	Swiss General Post Office
USA	Shannon, C. E.	Bell Telephone Laboratories
	Wiesner, J. B.	MIT, Electronics Research Laboratory
	Bell	U.S. Embassy, London, Scientific Liaison Office

1951 Manchester Computer Conference		
Australia	Allen-Ovenstone, J.	Commonwealth Scientific & Industrial Research Organisation, Department of Supply
	Gibbings, L. H.	Sydney University, Electrical Engineering Department
Canada	Taylor, M. K.	Ferranti Electric, Toronto
Denmark	Petersen, R.	Tekniske Hojskole Dannmarks, Anvendt Matematik Laboratoriet
France	Pelégrin, M.	
	Dayonnet, F. J. D.	Postes Télégraphes et Téléphones, Service des Recherches et du Controle Techniques
Germany (West)	Dreyer, H. J.	Technische Hochschule Darmstadt
Netherlands	Loopstra, B. J.	Mathematisch Centrum
	Wijngaarden, A. van:	
Spain	Rodino, G.	Istituto Nazionale per le Application del Calcolo
	Rodriguez-Vidal, G.	
Sweden	Hamos, L. V.	Royal Institute of Technology
Sweden	Neovius, G.	Swedish Board for Computing Machinery
Switzerland	Speiser, A. P.	Swiss Federal Institute of Technology
USA	Welchman, W. G.	
	Weyl, F. J.	American Embassy, London Office of the Army Attaché
	Leibler, R. A.	
	Travis, I.	Burroughs Adding Machine Co., Research Division
	Carr III, J. W.	MIT, PhD Student (mathematics)
	Munk, M. M.	U.S. Navy, Naval Ordnance Laboratory

1952 Second London Information Theory Symposium		
Algeria	Blanc-Lapierre, A.	Algiers University, Faculty of Science
France	Loeb, J.	Centre National d'Etudes des Télécommunications
	Mandelbrot, B.	Laboratoires d'Electronique et de Physique Appliquées
	Cotte, M.	Poitiers University, Faculty of Science
Germany (West)	Küpfmüller, K.	
	Meyer-Eppler, W.	
Netherlands	Jager, F. de.	Philips' Gloeilampenfabrieken, Research Laboratories
	Groenewout, H. van.	Technische Hogeschool Delft, Electrical Engineering Department
Sweden	Laurent, T.	Royal Institute of Technology
Switzerland	Valensi, G.	Consultative Committee on International Radio
USA	Biddulph, R.	Bell Telephone Laboratories
	Davis, K. H.	
	Peterson, G. E.	
	Carnap, R.	Chicago University
	Johnson, R. A.	Harvard, Cruft Laboratory
	Middleton, D.	
	Bar-Hillel, Y.	MIT, Electronics Research Laboratory
	Fano, R. M.	
	Huffman, D. A.	
	Huggins, W. H.	
	Laemmel, A. E.	Polytechnic Institute of Brooklyn, Microwave Research Institute
	Goldman, S.	Syracuse University

1953 NPL Computer Symposium		
Australia	Blunden, R.	Australian High Commission, Scientific Liaison Office
Belgium	Franckx, E.	
France	Bosset, J.	Directorate Armament Studies, Laboratoire Central de l'Armement
	Ceschino, F.	
	Jeanniot, J.	
	Sestier, A. L.	
	Ghertman, I.	I.B.M. France
	Albin, J.	Société d'Electronique et d'Automatisme Courbevoie
	Dussine, R.	
	Namian, P.	
India	Pasricha, C. L.	Indian High Commission, Scientific Liaison Office
Italy	Finetti, D. de.	Consiglio Nazionale delle Richerche, Istituto Nazionale Applicazione del Calcolo
	Kitz, N.	
	Rodino, G.	
	Insolera, D.	Olivetti
Netherlands	Loopstra, B. J.	Mathematisch Centrum
	Wijngaarden, A van.	
	Heyn, H.	Philips' Gloeilampenfabrieken, Research Laboratories
	Nijenhuis, W.	
	Lauwerier, H. A.	Royal Dutch Shell, Laboratorium
	Lunbeck, R. J.	
Spain	Santesmases, J. G.	Consejo Superior de Investigaciones Cientificas
	Vidal, M. R.	
Sweden	Agerberg, J.	Research Institute of National Defence
	Bergman, C. I.	
	Löfgren, L.	
	Olsson, M.	Svenska Flygmotor Aktiebolaget
	Dahlquist, G.	Swedish Board for Computing Machinery
USA	McPherson, J. C.	I.B.M. World Headquarters
	Hulsizer, R.	Illinois University, Urbana-Champaign, Control Systems Laboratory
	Blanch, G.	National Standards Bureau
	Slutz, R. J.	
	Kaufman, S.	Royal Dutch Shell, Houston, Shell Development Co.
	Weber, R. R.	U.S. Navy, London, U.S. Naval Activities

1955 Third London Information Theory Symposium		
Denmark	Koefoed, J.	Copenhagen University
France	Schützenberger, M.	
	Daguet, J.	Centre National d'Etudes des Télécommunications
	Marcou, P.	
Germany (West)	Fucks, W.	Technology University Aachen, Physics Institute
	Darius, G.	Universität Bonn, Institut für Phonetik und
	Meyer-Eppler, W.	Kommunikationsforschung
Italy	Ceccato, S.	Italian Operational School
	Maretti, E.	
	Somenzi, V.	Roma Università
Netherlands	Cohen, J. W.	
	Jung, M. M.	Philips' Telecommunicatie Industrie
	Schouten, J. F.	
	Soest, J. L van.	Technische Hogeschool Delft, Electrical Engineering Department
Sweden	Zetterberg, L. H.	
Switzerland	Pol, B. van der:	Consultative Committee on International Radio
	Mandelbrot, B.	Geneva University
USA	Slepian, D.	Bell Telephone Laboratories
	Quastler, H.	Illinois University, Urbana-Champaign, Control Systems Laboratory
	Selfridge, O. G.	MIT, Lincoln Laboratory
	Elias, P.	MIT, Electronics Research Laboratory
	Huffman, D. A.	
	Lettvin, J. Y.	
	Licklider, J. C. R.	
	McCulloch, W. S.	
	Pitts, W. H.	
	Wall, P. D.	
	Yngve, V. H.	
	Laemmel, A. E.	Polytechnic Institute of Brooklyn, Microwave Research Institute
	Mooers, C. N.	Zator Co. *[information retrieval]*

1958 NPL Mechanisation of Thought Symposium		
Belgium	Schlag, J.	Liège Université
France	David, A.	
	Paycha, F.	
	Mehl, M. L.	École Nationale d'Administration
	Rémond, A.	Hospital Saltpêtrière
Germany (West)	Varju, D.	Max-Planck-Institut für Biologie, Forschungsgruppe Kybernetik
Hungary	Angyan, A. J.	Budapest University Medical School
Israel	Bar-Hillel, Y.	Jerusalem Hebrew University, Philosophy Department
Italy	Biers, J. A.	Olivetti
	Morganti, I.	
	Sacerdoti, I.	
Netherlands	Kun, E. R.	
	Stumpers, F. L.	N. V. Philips' Gloeilampenfabrieken, Research Laboratories
	Bane, W. T.	NATO, SHAPE Air Defence Technical Centre
	Garwick, J. V.	
	Soest, J. L. van.	Technische Hogeschool Delft, Electrical Engineering Department
	Verbeek, L. A. M.	
South Africa	Duff, W.	Afra Industrial Export Corporation
Sweden	Comet, S.	Matematikmaskinnämnden

1958 NPL Mechanisation of Thought Symposium		
Switzerland	Richard, T.	
	Erskine, G.	CERN European Organisation for Nuclear Research
	Goldschmidt-Clermont, Y.	
	Kowarski, L.	
	Gurewitsch, A. M.	General Electric Co. Research Laboratory
	Hoffman, W.	I.B.M. Switzerland
	Patry, J.	Reaktor AG, Zurich
USA	Blair, C. R.	
	Marill, T.	Bolt Beranek & Newman Inc. *[became ARPANET prime contractor]*
	Haskins, C. P.	Carnegie Institution
	Rosenblatt, F.	Cornel University
	Stieber, A.	
	Buckingham, M. J.	Duke University
	Shuey, R. L.	General Electric Co., Research Laboratory
	Cooper, F. S.	Haskins Laboratories
	Backus, J. W.	IBM World Headquarters, Research Centre
	Bouricius, W. G.	
	Williams, T. M.	Itek Corp. *[defence camera manufacturer]*
	Spetner, L. M.	Johns Hopkins University
	McCarthy, J.	MIT, Lincoln Laboratory
	Minsky, M. L.	
	Selfridge, O. G.	
	Maling, K.	MIT, Electronics Research Laboratory
	McCulloch, W. S.	
	Stevens, M.	National Standards Bureau
	Smith, J. L.	National Standards Bureau, Data Processing Systems Division
	Hopper, G.	Remington Rand Univac,
	Whitfield, I. C.	St Elizabeth's Hospital, National Institute of Mental Health
	Yovits, M. C.	U.S. Naval Research Office, Washington DC
	Jeffery, S.	U.S. Air Force, Air R & D Command, Rome Air Dev. Centre
	Blachman, N. M.	U.S. Office of Naval Research, London Branch
UUSR	Tsypkin, Y. Z.	
	Aleksandrov, M. S.	Science Academy
	Ershov, A. P.	
	Il'in, V. A.	
	Komaritsky, N. R.	
	Sotskov, B. S.	
	Bielechi, C.	Interpreter
	Brix, V. H.	

Table 18: British Delegates at Namur: 1956, 1958 & 1961

1956, 26 - 29 June: First International Congress	
Allanson, J. T.	Birmingham University, Electrical Engineering Department
Beer, S.	United Steel Companies, Department of OR & Cybernetics, Cybor House
Goldacre, R. J.	Royal Cancer Hospital, Chester Beatty Research Institute
Mays, W.	Manchester University, Philosophy Department
Meredith, J.	King's College, Newcastle, Electrical Engineering Department
Sargrove, J. A.	Automation Consultants & Associates Limited
Thomason, J. G.	Royal Radar Establishment
Uttley, A. M.	NPL
Walter, W. G.	Burden Neurological Institute, Physiological Department,

1958, 3 - 10 Sept. Second International Congress	
Ashby, W. R.	Barnwood House, Research Department
Bean, D.	Royal Cancer Hospital, Chester Beatty Research Institute
Beer, S.	United Steel Companies, OR & Cybernetics Department, Cybor House
Campbell, F. W.	Cambridge University, Physiological Laboratory,
Goldacre, R. J.	Royal Cancer Hospital, Chester Beatty Research Institute
Moles, A.	Royal Marsden Hospital
Pask, G. A.	Cybernetic Consultant, Research Worker on Organic Analogues
Robson, J.	Cambridge University, Physiological Laboratory
Stewart, D. J.	University College, North Wales
Westheimer, G.	Cambridge University, Physiological Laboratory,

1961, 11 – 15 Sept. Third International Congress	
Beer, S.	United Steel Companies, OR & Cybernetics Department, Cybor House
Beurle, R. L.	English Electric Valve Co.
Pask, G. A.	System Research *[cybernetics consultancy]*

Table 19: British Delegates at Paris, 1951

Academic	Booth, A. D.	Birkbeck College, London, Electronic Computer Project
	Hartree, D. R.	Cambridge University, Cavendish Laboratory
	Wilkes, M. V.	Cambridge University, Mathematical Laboratory
	Williams, F. C.	Manchester University, Computing Machine Laboratory, Electrical Eng.
Commercial	Michaelson, R. M.	British Tabulating Machine
	Womersley, J. R.	
	Coales, J. F.	Elliott Bros, Research Laboratories
	Elliott, W. S.	
	Bass, W. G.	Ferranti, Manchester
	Bennett, J. M.	
	Bowden, B. V.	
	Carter, J. D.	
	Grundy, E.	
	Lonsdale, K.	
	Pollard, B. W.	
	Robinson, A. A.	
	Finded, H. J.	Plessey
	Gutteridge, E. J.	Powers Samas Accounting Machines
	Johnson, W. E.	
Government	Howlett, J.	Atomic Energy Research Establishment, Harwell
	Waterfield, A.	Attaché Scientifique, British Embassy, Paris
	Morgan, C.	Commandant Ambassade, British Embassy, Paris
	Colebrook, F. M.	NPL
	Crawley, H. J.	NRDC
	Hartshorn, A. S.	Scientific Liaison Office, British Embassy, Paris
Medical	Ashby, W. R.	Barnwood House, Research Department
	Walter, W. G.	BNI, Physiological Department
Military	Glennie, A. E.	Air Research Establishment
	MacColl, J. W.	Armament Research Establishment
	Smith, C. H.	Military College of Science
	Hinds, G. H.	MoS, Weapons Research Directorate
	Burt, E. C. G.	Royal Aircraft Establishment
	Hollingdale, S. H.	
	Petherick, E. J.	
	Nicholson, G. F.	Royal Naval College
	Uttley, A. M.	TRE
Press	Pincher, C.	Daily Express
	Hennessey, D.	
	Tootill, G. C.	
	Vajda, S.	

Table 20: BBC Broadcasts: Cybernetics, Information Theory, Automation, 1946-59

1946					
February	16	21:20	Home		"R.U.R."
September	11	22:00	Home	W. E. Le Gros Clark	"*Science Survey*: 'Finding Out How the Brain Works'"
November	9		Home	Charles Darwin	"The Automatic Calculating Engine"
December	11	22:00	Home	D. R. Hartree	"*Science Survey*: 'Automatic Calculating Engine'"
	21	18:00	Home	E. D. Adrian	"*Science Survey*: 'Electrical Activity in Living Organisms'"

1948					
February	12	10:00	Light	C. E. M. Joad	"*Forces Edu. Broadcast*: 'Int. to Philosophy: Mind & Body-One Thing or Two?'"
	25	18:25	Home[6]	Grey Walter	"*Strange World*: 'Minds & Machines'"
March	4	20:30	TV		"R.U.R. (Rossum's Universal Robots)"
April	28	22:20	Third	Grey Walter	"'The Enchanted Loom'"
September	5	21:15	Home	Jack Wilson M.P.	"The Way I Look at It" *[assertion of humanism]*
	19	21:15	Home	C. D. Darlington	"Facing the Facts" *[British industrial civilisation]*
October	20	19:00	Third	C. D. Darlington	"The Conflict of Science & Society" *[1/2]*
	22	18:35	Third	C. D. Darlington	"The Conflict of Science & Society" *[2/2]*
November	6	23:05	Third	J. D. Bernal M. Polanyi	"The Organisation of Science & Scientists"
December	27	20:10	Third	Edward Chapman Geoffrey Jefferson Alexander Kennedy J. Z. Young	"The Silent Areas" *[brain physiology & personality]*

1949					
January	11	20:00	Home[7]		"Feature: 'The Mechanism of the Human Brain'"
March	8	20:30	Light	Henry Dale E. D. Adrian	"*New Horizons*: 'The Brain at Work'" *[EEG]*
	9	18:40	Third	Ross Ashby	"Imitating the Brain" *[Ashby's homeostat]*
	22	20:30	Light	Henry Dale D. R. Hartree	"*New Horizons*: 'Swifter than Thought'" *[computers]*
	29	21:30	TV	David Dimbleby Michael Henderson	"Struck by Lightning: A Visit to the NPL"

[6] West of England Service.
[7] Midland Service.

1949					
May	11	20:05	Third	Henry Dale Charles Sherrington E. D. Adrian	"*The Physical Basis of Mind*: 'Introductory Talks'" *[1/7]*
	14	18:30	Third	W. E. Le Gros Clark	"*The Physical Basis of Mind*: 'The Anatomical Background of Mental Processes'" *[2/7]*
	19	22:10	Third	S. Zuckerman	"*The Physical Basis of Mind*: 'Self-Organisation'" *[3/7]*
	21	21:30	Third	Eliot Slater	"*The Physical Basis of Mind*: 'Consciousness'" *[4/7]*
	26	19:45	Third	Russell Brain	"*The Physical Basis of Mind*: 'Speech & Thought'" *[5/7]*
	27	20:30	Third	Wilder Penfield	"*The Physical Basis of Mind*: 'Evidence from Brain Operations'" *[6/7]*
June	1	20:10	Third	Viscount Samuel A. J. Ayer Gilbert Ryle	"*The Physical Basis of Mind*: 'A Philosophers' Symposium'" *[7/7]*
August	15	21:30	Third	Gilbert Ryle	"Minds: Or Human Beings?" *[1/2]]* *[Descartes debunked]*
	16	19:05	Third	Gilbert Ryle	"Consciousness & the Inner Life" *[2/2]* *[as above]*
	24	21:55	Home	Thomas Radley Donald MacKay	"D M MacKay Discusses What Thinking May be Like in the Future with the Mechanical Brain"
September	14	21:15	Third	Geoffrey Jefferson	"The Mind of Mechanical Man" *[Lister Oration]*
November	7	20:35	Third	A. J. Ayer	"'Concept of Mind'" *[Ayer reviews Ryle's book]*

1950					
February	7	19:35	Third	A. H. Basson	"The Mechanisation of Thought"
May	4	22:30	Home	Grey Walter	"*Science Survey*: 'Brains: Electronic & Human'" *[cybernetics]*
	24	20:10	Third	E. D. Adrian Geoffrey Jefferson A. Kennedy	"The Temporal Area" *[neurophysiology & behaviour]*
June	10	18:00	Third	Donald MacKay	"Mind Like Behaviour in Machines" *[1/2]* *[mechanical brains]*
	12	18:00	Third	Erwin Schrödinger	"Do Electrons Think?" *[followed on from "What is Life?"]*
	16	20:20	Third	Donald MacKay	"Mind Like Behaviour in Machines" *[2/2]* *[Cartesian dualism]*
July	20	21:20	Third	Geoffrey Jefferson	"Descartes' Localisation of the Soul" *[Purser Lecture, Dublin]*
	25	19:05	Third	F. C. Copleston	"Descartes: The Choice between Spiritualism & Mechanism"
	26	20:00	TV		"Modern Robots"
August	5	19:55	Third	Herbert Hart Gilbert Ryle	"'The Concept of Mind'" *[Critical discussion of Ryle's book]*

1950					
November	2	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: The Biologists Approach to Man'" *[1/8]*
	6	19:25	Home	Cyril Burt	"The Study of the Mind: Body & Mind"
	9	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: Brains as Machines'" *[2/8]*
	13	21:30	TV	J. Z. Young J. T. Aitken Donald Sholl	"How the Brain Works" *[explaining Young's research]*
	16	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: The Human Calculating Machine'" *[3/8]*
	23	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: The Establishment of Certainty'" *[4/8]*
	30	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: How We Learn to Communicate'" *[5/8]*
December	7	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: The Changing Symbols of Science'" *[6/8]*
	14	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: The Mechanistic Interpretation of Nature'" *[7/8]*
	21	09:00	Home	J. Z. Young	"*The Reith Lectures*: 'Doubt & Certainty in Science: Made in What Image?'" *[8/8]*

1951					
February	13	18:55	Third	A Tustin	"Mechanisms of Control" *[servos & biology/economics]*
	14	15:30	Light	Alec Rodger	"*Science & Everyday Life: You & Your Mind*: 'What's Going On Outside'" *[1/6]*
	21	15:30	Light	V. W. Wilson	"*Science & Everyday Life: You & Your Mind*: 'What's Going On Inside'" *[2/6]*
	28	15:30	Light	H. F. Lock	"*Science & Everyday Life: You & Your Mind*: 'Remembering, or a Living Filing System?'" *[3/6]*
March	3	18:30	Third	Colin Cherry	"Communicating Information" *[information theory]*
	7	15:30	Light	J. M. Fraser	"*Science & Everyday Life*: *You & Your Mind*: 'The Body as a Machine'" *[4/6]*
	14	15:30	Light	V. W. Wilson	"*Science & Everyday Life: You & Your Mind*: 'Ways of Learning'" *[5/6]*
	21	15:30	Light	Alec Rodger	*"Science & Everyday Life: You & Your Mind*: 'Knowing Yourself'" *[6/6]*
April	2	19:20	Third	Donald MacKay	"Measuring Information" *[information theory]*
	30	20:05	Third	Norbert Wiener	'The New Industrial Revolution' *[cybernetic automation]*

1951					
May	5	20:45	Third	D. R. Hartree	"*Automatic Calculating Machines*: 'Automatic Calculating Machines'" *[1/5]*
	8	22:00	Third	M. H. A. Newman	"*Automatic Calculating Machines*: 'Automatic Calculating Machines'" *[2/5]*
	15	19:30	Third	Alan Turing	"*Automatic Calculating Machines*: 'Can Computers Think'" *[3/5]*
June	2	22:20	Third	F. C. Williams	"*Automatic Calculating Machines*: 'Automatic Calculating Machines'" *[4/5]*
	5	19:05	Third	M. V. Wilkes	"*Automatic Calculating Machines*: 'The Use of Automatic Calculating Machines for Scientific Calculation'" *[5/5]*
July	12	22:30	Home	E. D. Adrian	"*Science Survey*: 'The Nervous System'"
November	1	22:30	Home	Grey Walter	"*Science Survey*: 'Patterns in Your Head: Pattern-making & Pattern-seeking'" *[1/3]*
	8	22:30	Home	Grey Walter	"*Science Survey*: 'Patterns in Your Head: Patterns of Learning'" *[2/3]*
	15	22:30	Home	Grey Walter	"*Science Survey*: 'Patterns in Your Head: Patterns of Personality'" *[3/3]*
Nov./Dec.			Home[8]	Alan Turing	"*The Fifty-One Society*: 'Intelligent Machinery, A Heretical Theory'"

1952					
January	14	21:35	Third	M. H. A. Newman Alan Turing Geoffrey Jefferson R. B. Braithwaite	"Can Automatic Calculating Machines be Said to Think?"
April	15	22:00	Home[9]	J. Bronowski	"*The Fifty-One Society*: 'Science, Religion, & Human Values'"
May	1	22:30	Home	C. Strachey	"*Science Survey*: 'Control Without Men'" *[1/2] [cybernetics]*
	8	22:30	Home	C. Strachey	"*Science Survey*: 'Control Without Men'" *[2/2] [computers]*

1953					
February	12	22:30	Home	T. E. Ivall	"*Science Survey*: 'Information as a Commodity"'
June	28	21:15	Home	John Perret	"Science & Responsibility" *[science & society]*
November	6	20:45	TV	Grey Walter	"Your Brain at Work" *[EEG]*

1954					
February	24	16:45	Home	Kathleen Nott	"Robots as Pets"
April	16	20:10	TV	J. Bronowski Grey Walter	"*Science in the Making*: 'The Living Memory'"
May	25	18:15	Home	Earl of Halsbury	"*Industry Today*: 'Electronics in the Office'"
August	29	18:15	Home	RAdm A. Nicholl	"The Navy & the Future" *['push-button' warfare]*

[8] North service.
[9] North service.

1954					
September	1	21:00	TV	Richard Dimbleby David Martin E. D. Adrian W. R. Gowers Maurice Bowra	"British Association for the Advancement of Science Oxford 1954 Inaugural Meeting & Presidential Address" *[Adrian's address: 'Science & Human Nature']*
October	7	19:20	Third	Donald MacKay	"*On Comparing the Brain with Machines*: 'Motive & Methods'" *[1/2]*
	14	19:25	Third	Donald MacKay	"*On Comparing the Brain with Machines*: 'Progress & Perspective'" *[2/2]*
November	10	20:00	Third	Magnus Pyke	"Mechanised Speech: The Language of Tomorrow" *[computerised translation]*

1955					
February	11	20:45	TV	Grey Walter	"Living Machinery: Will Scientists Ever be Able to Make a Machine That Can Think?" *[Walter's tortoises]*
March	13	18:25	Third	R. H. Macmillan	Automatic Control: 1-Review of the History & Applications of Automatic Control *[1/3]*
	21	22:05	Third	R. H. Macmillan	Automatic Control: 2-Designing Automatic Controls *[2/3]*
	31	22:05	Third	R. H. Macmillan	Automatic Control: 3-The Present Impact & Future Prospects of Automatic Control *[3/3]*
May	27	13:10	Light	N/A	"Trends in the Results" *[computer analysis of election results]*
June	2	19:20	Home	M. G. Kendall W. E. Scott	"*Science Survey*: 'Electrons & Elections'" *[election results computer analysis discussed]*
October	27	22:30	Home[10]	Magnus Pyke	"*Science Review*: 'Automation'" *[1/3]*
November	1	19:25	Third	R. H. Macmillan	Automatic Production
	3	22:15	Home[11]	Magnus Pyke	"*Science Review*: 'Automation'" *[2/3]*
	10	22:30	Home[12]	Magnus Pyke	"*Science Review*. 'Automation'" *[3/3]*
	22	19:50	Third	J. Z. Young	"Memory Systems in the Brain" *[electronic brain analogues]*

1956					
January	4	22:00	Home	G. Vickers	"*Science & the Art of Living*: 'Man & Society'" *[1/3]* *[new science & human nature]*
	11	22:05	Home	G. Vickers	"*Science & the Art of Living*: 'Initiative & Control'" *[2/3]* *[new science & control in animals & machines]*
	18	22:15	Home	G. Vickers	"*Science & the Art of Living*: 'Decisions & Valuations'" [3/3] [*new science & human decision making*]
February	9	21:15	Home[13]	Leslie Stephens Ian Mikardo, M.P. Norman Hare, J.P. W. C. Morgan Harry Knight	"Automation: The Pros & Cons"
March	18	20:40	Third	R. H. Richens	"Problems of Mechanical Translation"

[10] Scotland service.
[11] Scotland service.
[12] Scotland service.
[13] Midland service.

1956					
April	19	21:30	Home[14]	Solly Zuckerman	"*The Fifty-One Society*: 'Science & Technology - Too Small a Share of Britain's Manpower & Money?'"
June	7	21:25	Home[15]	Ben Roberts	"*The Industrialists*: 'Discussion on Automation'"
July	4	19:50	TV	Joseph C. Harsch	"*Report from America*: Automation"
August	31	22:30	Home[16]	Tony Gibson	"Man & Auto-Man" *[forum on automation]*
October	1	20:00	Home[17]	David Bleakley	"Report on Automation"
November	11	09:00	Home	Edward Appleton	"*The Reith Lectures*: 'Science & the Nation: Our National Need of Science'" *[1/6]*
	18	09:00	Home	Edward Appleton	"*The Reith Lectures*: 'Science & the Nation: The Lessons of the War'" *[2/6]*
	24	09:00	Home	Edward Appleton	"*The Reith Lectures*: 'Science & the Nation: Science for its Own Sake'" *[3/6]*
December	2	09:00	Home	Edward Appleton	"*The Reith Lectures*: 'Science & the Nation: Government & Science'" *[4/6]*
	3	22:25	Third	Jeremy Sandford	"Robot Instrumentalists" *[1/2] [historical musical automata]*
	5	20:00	Third	W. Mays	"Machine Process & Thought Process" *[1/3] ['vitalism' -v- 'physicalism']*
	9	09:00	Home	Edward Appleton	"*The Reith Lectures*: 'Science & the Nation: Industrial Science'" *[5/6]*
	10	21:05	Third	Colin Cherry	"On the Present State of Brain Models" *[2/3] ['vitalism' -v- 'physicalism']*
	11	22:00	Third	Jeremy Sandford	"Robot Composers" *[2/2] [historical musical automata]*
	16	09:00	Home	Edward Appleton	"*The Reith Lectures*: 'Science & the Nation: Science & Education'" *[6/6]*
	21	19:00	Third	F. H. George	"Machines & Human Behaviour" *[3/3] ['vitalism' -v- 'physicalism']*

1957					
January	6	16:30	Light	Jack Longland Mel Dale John Coales J. A. Hunt	"*Question Time*" *[at Dagenham motor works; about automation]*
	9	19:30	Home	Asa Briggs D. C. Coleman	"'*Where We Came in: The Industrial Revolution Reconsidered*: The Idea of An Industrial Revolution" *[a second revolution?]*
February	20	19:30	Home	Bruce Miller	"*The Push-Button Age*: 'Automation in Factories'" *[1/3]*
	27	19:30	Home	Bruce Miller	"*The Push-Button Age*: 'Automation outside Factories'" *[2/3]*

[14] North service.
[15] Wales service.
[16] Midland service.
[17] Northern Ireland service.

1957					
March	1	22:15	Home[18]	Luke Fawcett	"Automation & the Labour Market: Four MPs Answer Questions"
	6	19:30	Home	Frank Pickstock Lord Halsbury Frederic Hooper Edwin Fletcher Bruce Miller	"*The Push-Button Age*: 'The Effects on People'" *[3/3]*
April	14	17:50	Home	Edward Holloway	"*Money Matters*: 'Automation: Way to Abundance'"
May	1	19:30	Third	Donald MacKay	"*Brain & Will*: 'If the Brain Were a Machine Would the Will be Free?'" *[1/2]*
	7	19:50	Third	Donald MacKay	"*Brain & Will*: 'I – Language & It – Language'" *[2/2]*
	10	11:40	Home	Donald MacKay	"*For the Schools: Talks for Sixth Forms*: 'Man & Machines: Machines that Guide Themselves'" *[1/4]*
	17	11:40	Home	Donald MacKay	"*For the Schools: Talks for Sixth Forms*: 'Man & Machines: Machines that Calculate'" *[2/4]*
	24	11:40	Home	Donald MacKay	"*For the Schools: Talks for Sixth Forms*: 'Man & Machines: Models of the Brain'" *[3/4]*
	31	11:40	Home	Donald MacKay	"*For the Schools: Talks for Sixth Forms*: 'Man & Machines: Is Man a Machine'" *[4/4]*
June	1	09:10	Light	Raymond Baxter	"Premium Savings Bonds: The First Draw for Prizes" *[ERNIE]*
August	14	20:15	Third	C. A. Coulson S. L. Altmann D. P. Craig M. J. S. Dewar	"*Research: A Discussion Among Scientists*: 'Chemistry by Computation'"
September	16	09:00	Home	Donald MacKay	"*Out of Term*: 'Man & Machines: Machines that Guide Themselves'" *[1/4]*
	17	09:00	Home	Donald MacKay	"*Out of Term*: 'Man & Machines: Machines that Calculate'" *[2/4]*
	18	09:00	Home	Donald MacKay	"*Out of Term*: 'Man & Machines: Models of the Brain'" *[3/4]*
	19	09:00	Home	Donald MacKay	"*Out of Term*: 'Man & Machines: Is Man a Machine'" *[4/4]*
October	16	21:20	Third	J. Z. Young Albert Uttley J. Brown R. L. Gregory W. K. Taylor A. Watson	"*Research: A Discussion Among Scientists*: 'Brains, Nerves, & Models'" *[electronic neurological analogues]*

[18] West service.

1957					
November	21	14:20	Home		"*For the Schools: Science & the Community*: 'Man & Machines: What is a Robot?'"
	27	18:15	Third	Janet Duffell	"*The Younger Generation: This Changing World*: 'Fresh Air in the Office'" *[electronic office computers]*
	28	14:20	Home		"*For the Schools: Science & the Community*: 'Man & Machines: Can Machines Really Think?'"
December	5	14:20	Home		"*For the Schools: Science & the Community*: 'Man & Machines: The One-Man Factory'"
	11	14:00	Light	Sheila Reid	"*Woman's Hour*: 'Put Skill in their Hands'" *[anti automation]*
	12	22:35	TV	Robert Reid Grey Walter	"*Eye on Research*: 'A Mind of Your Own?'"
	20	19:00	Third	Roy Hay Beatrix Havergal Frank Knight Denys Bullard	"*in Your Garden*" *[automation & gardening]*

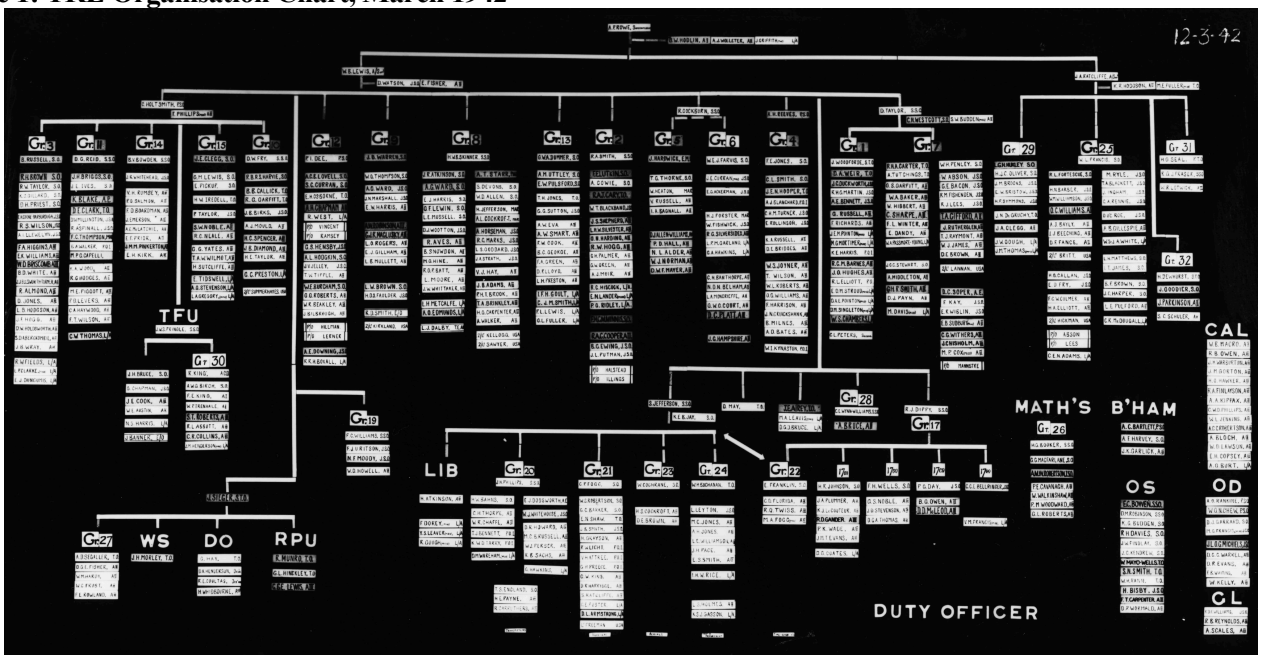
1958					
January	11	21:40	Third	Donald MacKay	"Towards a Science of Organisation" *[information theory]*
	28	21:30	TV	Robert Reid F. C. Williams	"*Eye on Research*: 'The Brain in the Box'" *[scientific computing]*
February	16	20:25	Third	F. H. George	"*Logical Hardware*: 'Neural Nets for Biologists'" *[1/2]*
	26	21:00	Third	F. H. George	"*Logical Hardware*: 'Models of Learning'" *[2/2]*
April	19	21:00	Third	Colin Cherry D. E. Broadbent R. L. Gregory P. T. Haskell W. H. Thorpe	"*Research: A Discussion Among Scientists*: 'Communication: Animal & Human'"
May	14	21:15	Home[19]	Cyril Darlington	"*The Fifty-One Society*: 'The Conflict of Science & Society'"
	16	18:30	Third	G. Edholm	"*Science Survey*: 'The Problem of Man & His Machines'"
September	7	20:15	Third	F. H. George	"Machines & Human Values" *[replicating human attributes]*
October	6	19:15	Third	A. F. Magri Henry Bentinck	"*A Listen & Learn Series*: 'Italian Journey'" *[automation]*
	30	22:10	Third	G. Patrick Meredith	"*Information & Skill*: 'The Nature of Information'" *[1/2]*
November	3	20:45	Third	G. Patrick Meredith	"*Information & Skill*: 'The Other Unconscious'" *[2/2]*
	6	21:50	Third	Reyner Banham	"Without Mercy or Metaphor" *[Asimov's sci-fi as automation parables]*
	28	18:45	Third	A. D. Booth	"*Science Survey*: 'The Future of Computers'"

[19] North service.

1959					
January	13	21:30	TV	Raymond Baxter	"*Eye on Research*: 'Food for Thought'" *[animal behaviour, human brains & computers]*
February	21	17:00	Home		"*Children's Hour*: 'I want to be …'" *[careers in automation]*
February	22	20:05	Third	Walter Puckey	"*The World of Industry*: 'The Second Industrial Revolution'" *[cybernetic automation]*
May	29	18:45	Third	O. R. Frisch	"*Science Survey*: 'This Age of Magnetism'" *[magnetic computer memory]*
May	31	18:45	TV	Paul Cherrington F. H. George Rev. E. Robertson	"*Meeting Point*: 'Body, Mind, & Spirit'" *[Cartesian duality & thinking machines]*
June	14	17:50	Home	Edward Leader	"*Money Matters*: 'Employment & Automation'" *[1/2]*
June	21	17:50	Home	Edward Leader	"*Money Matters*: 'Employment & Automation'" *[2/2]*
October	1	18:45	Third	W. Ritchie Russel	"*Science Survey*: 'Ideas on the Brain'" *[neuroscience]*
November	27	14:00	Light	Teresa McGonagle Gerald Ash	"*Woman's Hour*: 'Automation & Computers'"

Annex 2: Figures

Figure 1: TRE Organisation Chart, March 1942



Wall mounted metal sheet & magnetic name plates, in the office of TRE Superintendent, A. P. Rowe, "Purbeck Radar", http://www.purbeckradar.org.uk/people/directors-chart.htm

Figure 2: A Sunday Soviet, TRE, Malvern



PLATE XXXII Participators in a Sunday Soviet at the Telecommunications Research Establishment, Malvern.

Sitting : A/Cdr. W. C. Cooper, A/Cdr. C. S. Cadell, A/Cdr. W. P. G. Pretty, Sir Robert Renwick, Lord Cherwell, A. V. M. Sir Victor Tait, Mr. A. P. Rowe, Mr. D. W. Fry, A/Cdr. C. P. Brown, A.V.M. W. E. Theak, G/Cpt. E. C. Passmore, Dr. F. C. Williams, Mr. C. Holt Smith, A/Cdr. M. K. Porter, Dr. W. B. Lewis.

Standing : A.V.M. O. G. W. G. Lywood, A/Cdr. G. P. Chamberlain, G/Cpt. J. Shepherd-Smith, G/Cpt. G. N. Hancock, G/Cpt. C. A. Bell, Prof. D. M. Robinson, Mr. C. J. Carter, S/Ldr. W. H. Thompson, G/Cpt. C. C. Morton, Mr. J. C. Duckworth, Mr. E. H. Cook-Yarborough, Dr. R. A. Smith, Mr. A. B. Jones, Mr. J. Stewart, Dr. A. T. Starr, Dr. T. C. Keeley, Dr. A. H. Cooke, G/Cpt. J. A. Macdonald, Mr. R. J. Dippy, Dr. D. A. Jackson.

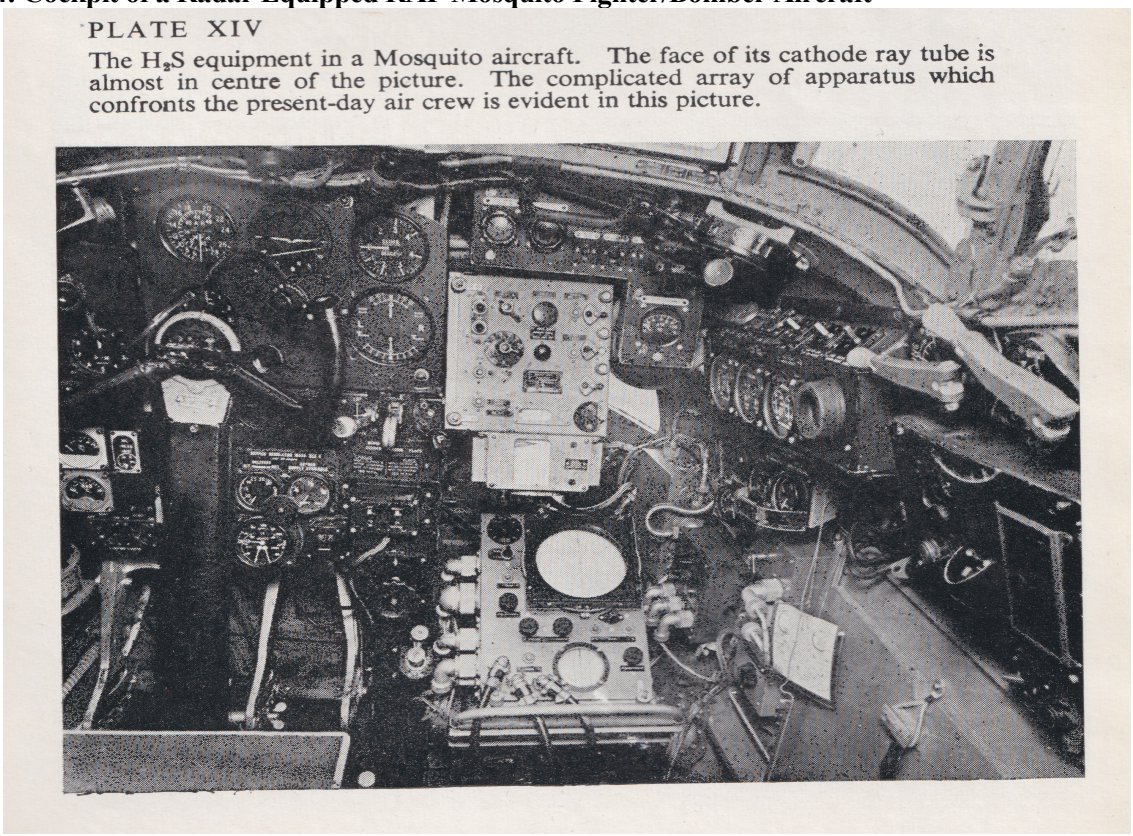
J. G. Crowther, R. Whiddington, *Science at War*, (HMSO, London, 1947), between pp. 82-83

Figure 3: Research Laboratory, TRE, Malvern



J. G. Crowther, R. Whiddington, *Science at War*, (HMSO, London, 1947), between pp. 82-83

Figure 4: Cockpit of a Radar Equipped RAF Mosquito Fighter/Bomber Aircraft



J. G. Crowther, R. Whiddington, *Science at War*, (HMSO, London, 1947), between pp. 50-51

Figure 5: Women of the ATS Crewing Radar Controlled Anti-Aircraft Predictor



PLATE XXVI
An A.T.S. detachment at action stations on an Anti-Aircraft radar predictor.

Figure 6: OR in Practice - Tracer Tank Shot at Night

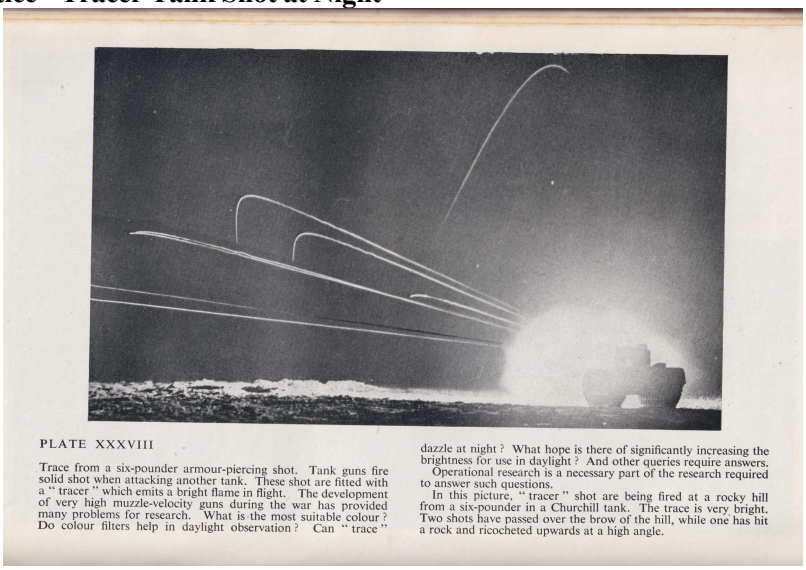


PLATE XXXVIII

Trace from a six-pounder armour-piercing shot. Tank guns fire solid shot when attacking another tank. These shot are fitted with a " tracer " which emits a bright flame in flight. The development of very high muzzle-velocity guns during the war has provided many problems for research. What is the most suitable colour? Do colour filters help in daylight observation? Can " trace " dazzle at night? What hope is there of significantly increasing the brightness for use in daylight? And other queries require answers.

Operational research is a necessary part of the research required to answer such questions.

In this picture, " tracer " shot are being fired at a rocky hill from a six-pounder in a Churchill tank. The trace is very bright. Two shots have passed over the brow of the hill, while one has hit a rock and ricocheted upwards at a high angle.

Figure 7: OR in Practice – Observational Analysis of Anti-Aircraft Fire

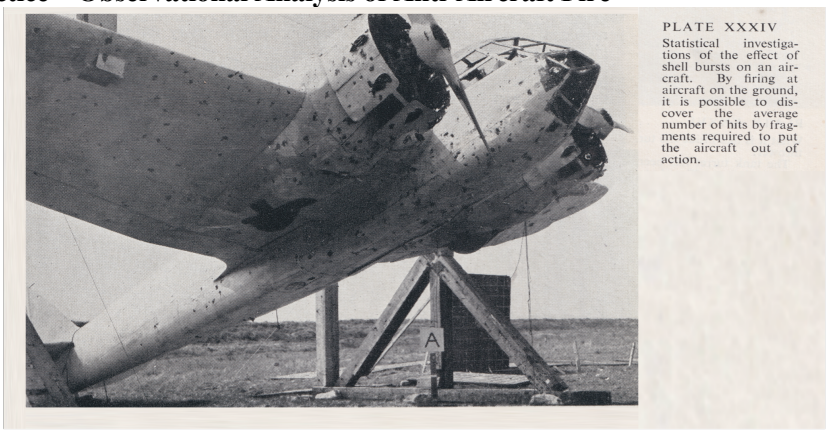
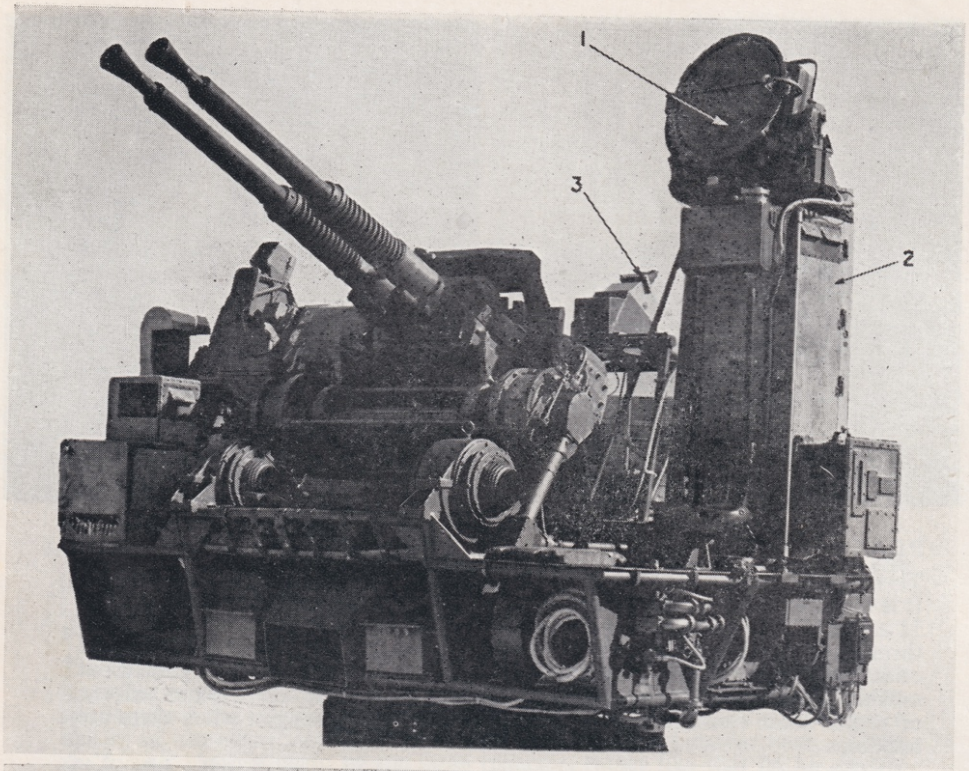


PLATE XXXIV

Statistical investigations of the effect of shell bursts on an aircraft. By firing at aircraft on the ground, it is possible to discover the average number of hits by fragments required to put the aircraft out of action.

Fig's 5, 6,7, in J. G. Crowther, R. Whiddington, *Science at War*, (HMSO, London, 1947), between pp. 74-75, 98-99

Figure 8: Radar Controlled Searchlight & Automatic Anti-Aircraft Gun



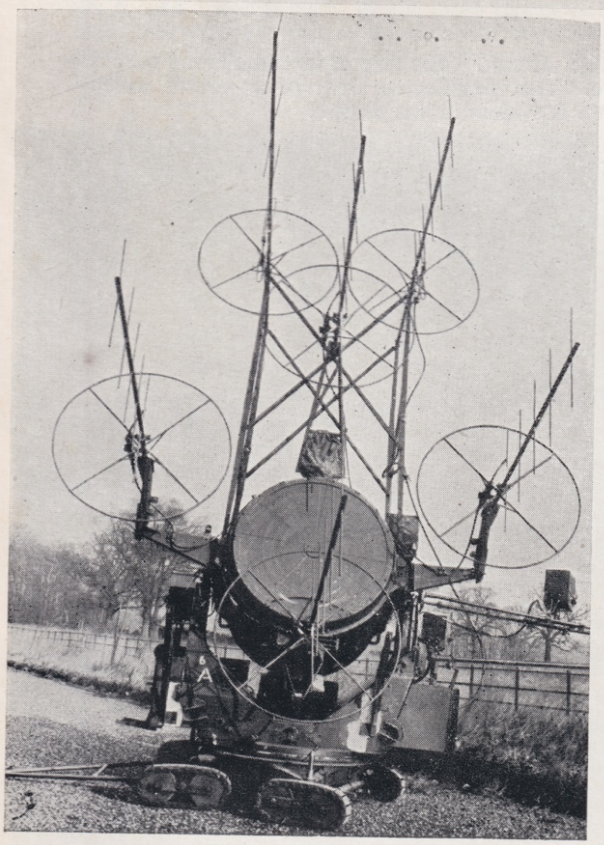


PLATE XV

A centimetre-wave radar, mounted on a twin Böfors gun-mounting. The dish-like aerial (1) is fixed to the top of the water-tight cubicle (2) which houses the radar gear. When a target has been found, the radar set follows the target automatically. The movements of the aerial are communicated to a predictor which moves the guns so that when fired the shells and the target will arrive at the same point in the sky.

PLATE XVI

An early example of a searchlight directed by radar equipment for spotting enemy bombers at night and revealing them to anti-aircraft gunners and R.A.F. fighters. The Yagi aerials (*see* Fig. 11) serve for transmitting and receiving. Two operators are needed, one for elevation, the other for bearing. The whole arrangement was named "Elsie."

J. G. Crowther, R. Whiddington, *Science at War*, (HMSO, London, 1947), between pp. 50-51

Figure 9: Tommy Gold at the Heart of EDSAC



16
A posed group photograph taken late in 1947. From left to right: L. J. Foreman (kneeling), G. J. Stevens, T. Gold, myself, W. Renwick, P. J. Farmer, and S. A. Barton

M. V. Wilkes, *Memoirs of a Computer Pioneer*, (MIT Press, Cambridge, 1985), between pp. 89-90

Figure 10: Nimrod: The First Computer Game, Festival of Britain 1951

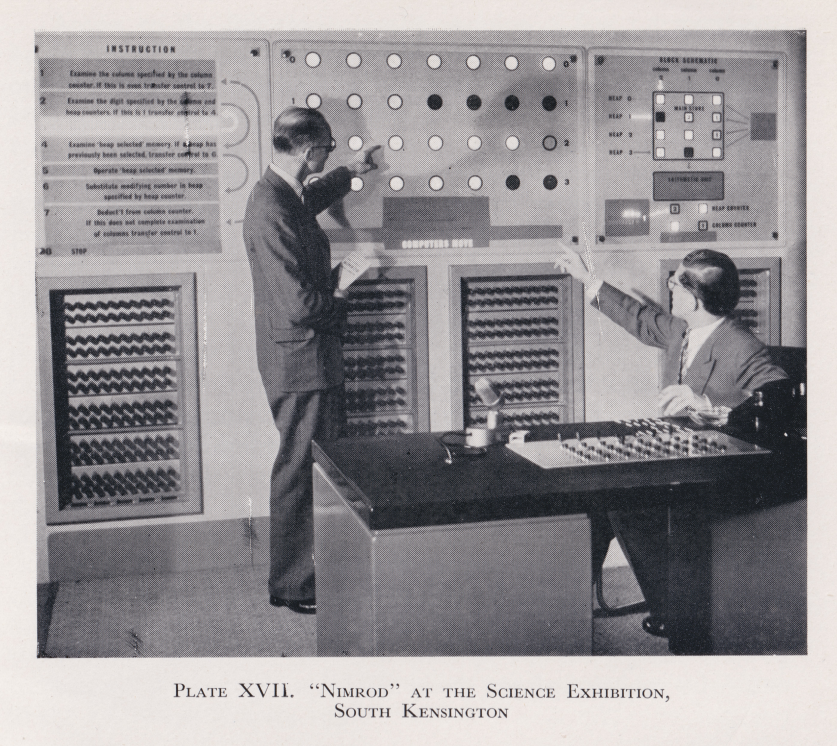


PLATE XVII. "NIMROD" AT THE SCIENCE EXHIBITION, SOUTH KENSINGTON

B. V. Bowden (ed.), *Faster Than Thought: A Symposium on Digital Computing Machines*, (Pitman, London, 1953), facing p. 200

Figure 11: ENIAC Arrives in Britain

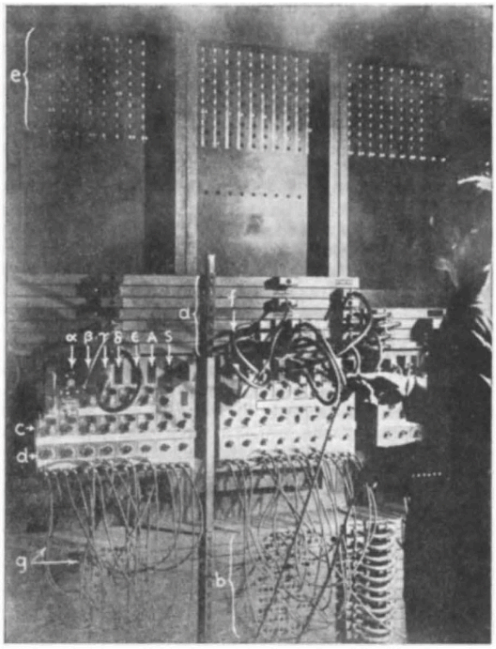
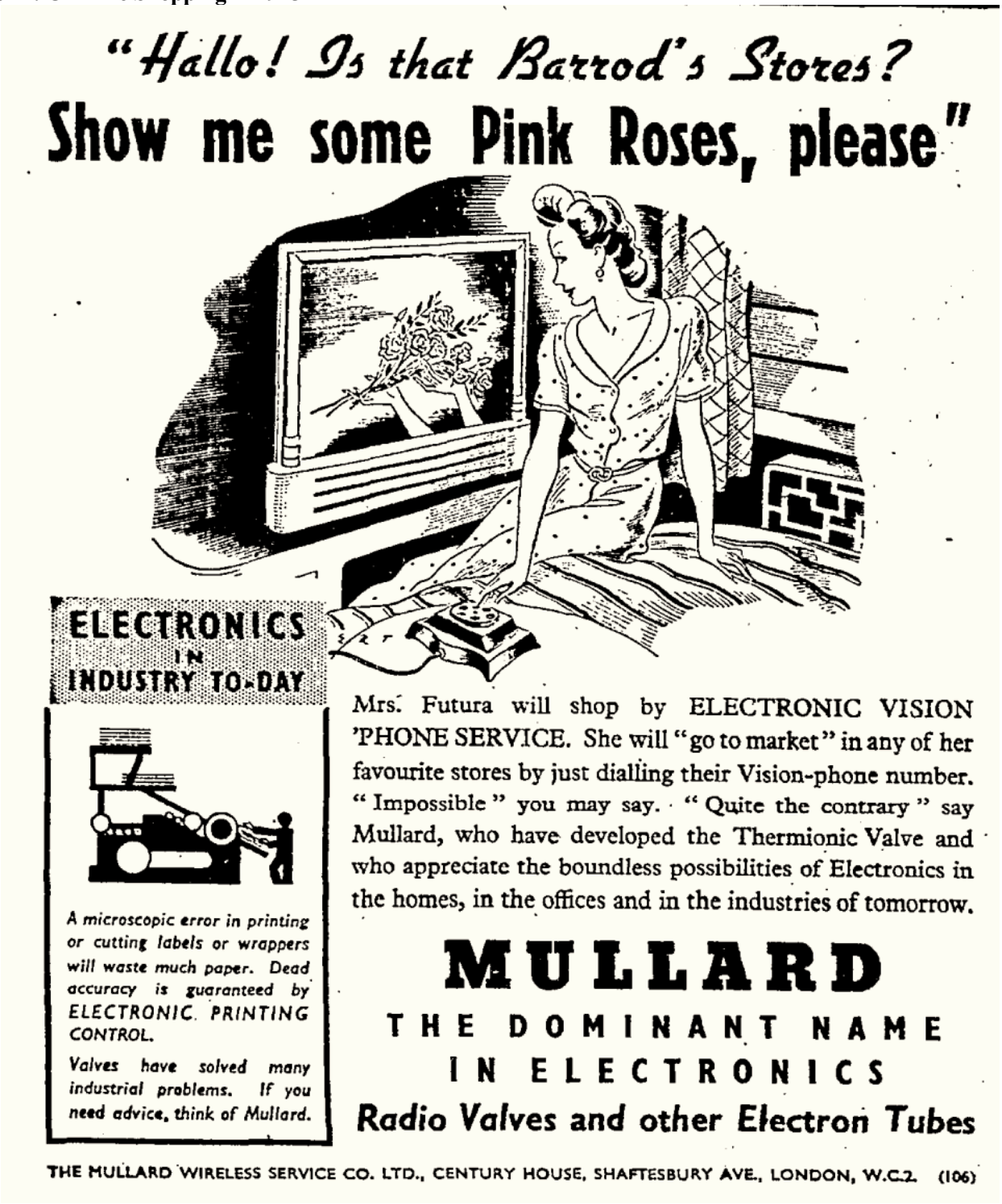


Fig. 3. FRONT VIEW OF ACCUMULATORS. *a*, DIGIT TRAYS; *b*, PROGRAM TRAYS; *c*, OPERATION SWITCHES; *d*, REPEAT SWITCHES; *e*, INDICATOR LAMPS; *f*, CONNECTING CABLES BETWEEN DIGIT TRAYS AND ACCUMULATORS; *g*, CONNECTING CABLES BETWEEN PROGRAM TRAYS AND ACCUMULATORS. α, β, γ, δ, ε, TERMINALS OF ACCUMULATOR CHANNELS FOR RECEPTION OF NUMERICAL INFORMATION; *A*, *S*, TERMINALS OF ACCUMULATOR CHANNELS FOR TRANSMISSION OF NUMERICAL INFORMATION

D. R. Hartree, "The ENIAC, An Electronic Computing Machine", *Nature*, Vol. 158, No. 4015, October1946, pp. 500-06

Figure 12: On-Line Shopping in 1945



Times, 22 August 1945, p. 2, [Alongside an article about radar research at TRE]

Figure 13: Thinking Machines



Gordon Watkins (words), R. Kleboe (pictures), "Can the Electronic Brain Really 'think'?", *Picture Post*, Vol. 66, No. 9, 26 February 1955, pp. 30-31.

Figure 14: Uttley's NPL Conditional Probability Computer

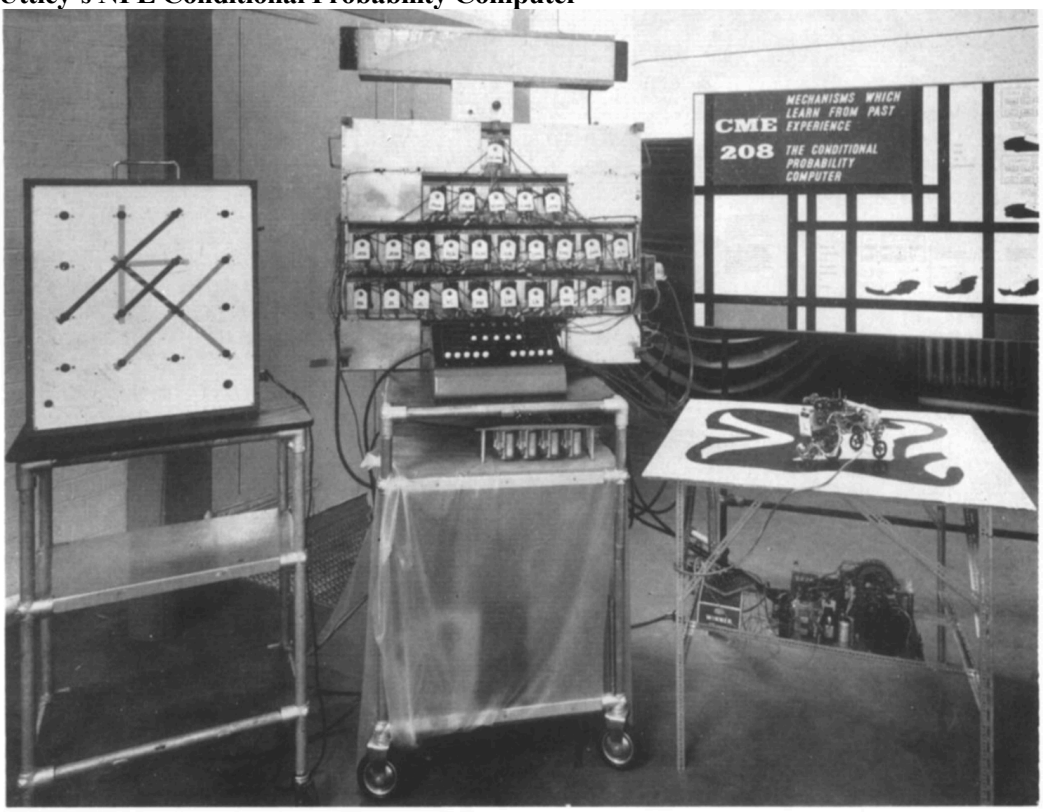


FIG. 3. A conditional probability computer, built at the National Physical Laboratory, capable of pattern recognition and trial-and-error learning. On the left is a model "retina" of photo cells to receive T-shaped shadow patterns. On the right is an electrically driven "vehicle" that learns, with the help of its computer "brain" which is shown in the center of the picture, to move efficiently along the black-white border of its "highway."

A. M. Uttley, "Imitation of Pattern Recognition and Trial-and-Error Learning in a Conditional Probability Computer", *Reviews of Modern Physics,* Vol. 31, Iss. 2, April 1959, pp. 546-48

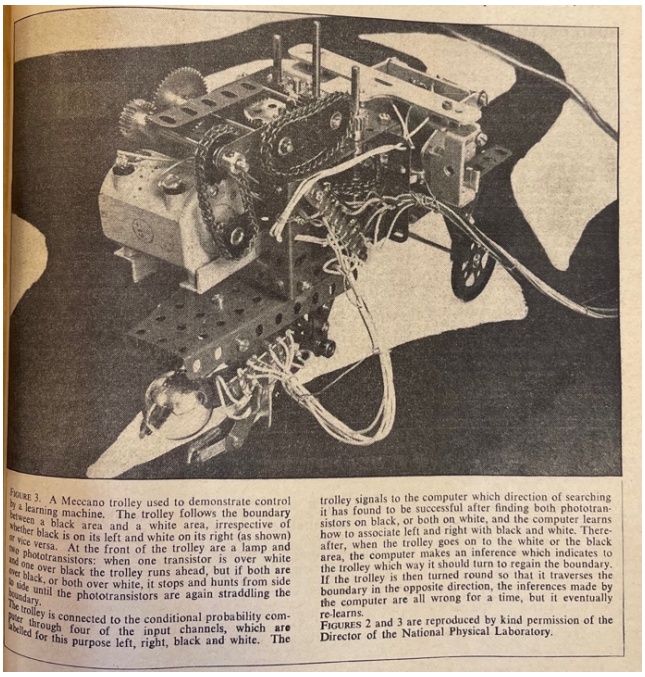
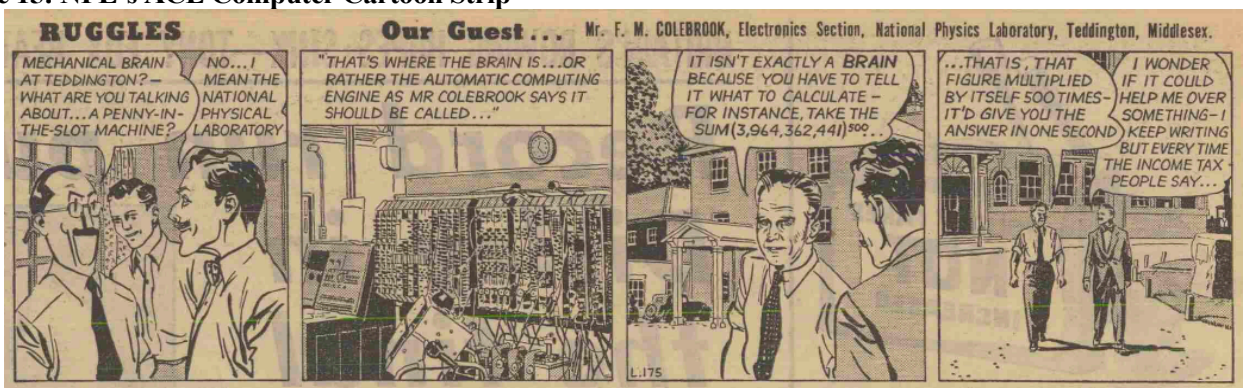


FIGURE 3. A Meccano trolley used to demonstrate control by a learning machine. The trolley follows the boundary between a black area and a white area, irrespective of whether black is on its left and white on its right (as shown) or vice versa. At the front of the trolley are a lamp and two phototransistors: when one transistor is over white and one over black the trolley runs ahead, but if both are over black, or both over white, it stops and hunts from side to side until the phototransistors are again straddling the boundary. The trolley is connected to the conditional probability computer through four of the input channels, which are labelled for this purpose left, right, black and white. The trolley signals to the computer which direction of searching it has found to be successful after finding both phototransistors on black, or both on white, and the computer learns how to associate left and right with black and white. Thereafter, when the trolley goes on to the white or the black area, the computer makes an inference which indicates to the trolley which way it should turn to regain the boundary. If the trolley is then turned round so that it traverses the boundary in the opposite direction, the inferences made by the computer are all wrong for a time, but it eventually re-learns.

FIGURES 2 and 3 are reproduced by kind permission of the Director of the National Physical Laboratory.

A. M. Andrew, "Machines Which Learn", *New Scientist* , Vol. 4, No. 106, 27 November 1958, pp. 1390-91

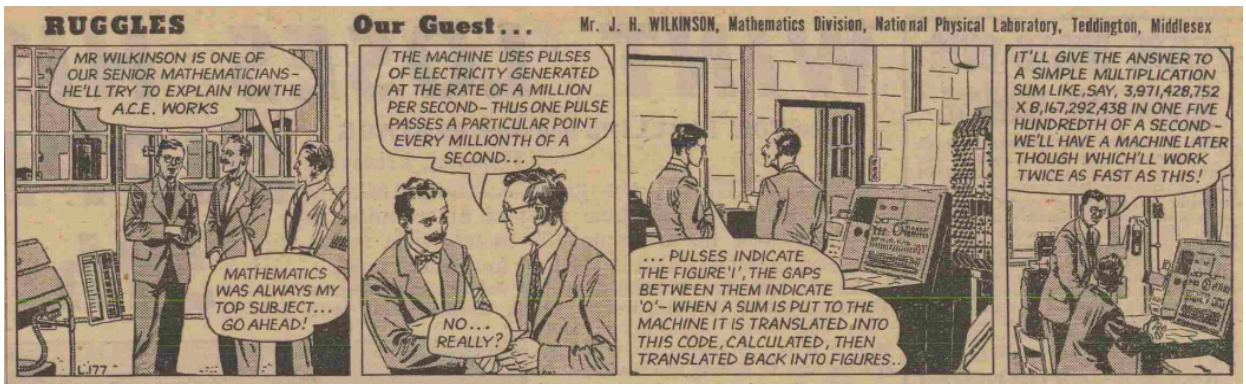
Figure 15: NPL's ACE Computer Cartoon Strip



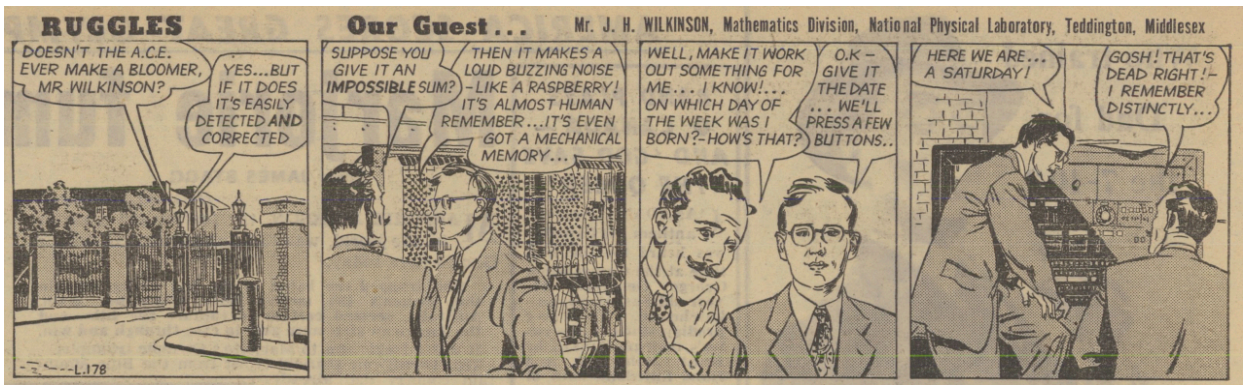
Daily Mirror, 24 July 1952, p. 9



Daily Mirror, 25 July 1952, p. 9



Daily Mirror, 26 July 1952, p. 9



Daily Mirror, 28 July 1952, p. 9

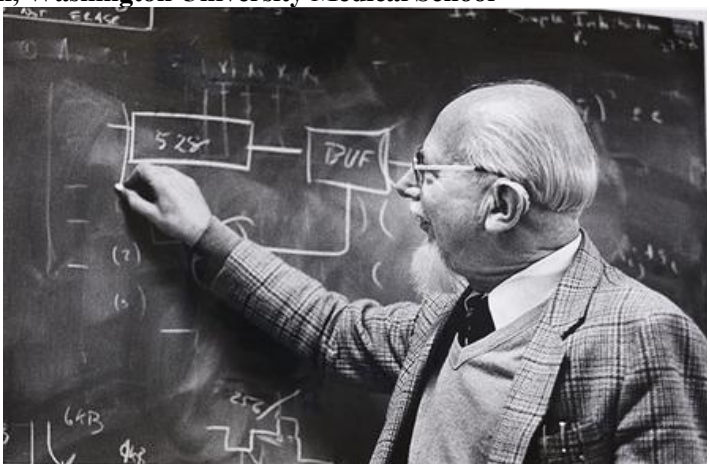
Figure 16: The Good Brothers

(Arthur left, Jack right)



"Mathematician Whose Work Decrypting German Ciphers Heralded the Modern Computer Age", *Daily Telegraph*, 10 April 2009, p. 35.

Figure 17: Harold Shipton, Washington University Medical School



Bernard Becker Medical Library, Becker Archives Database, Washington University, St. Louis, VC266-S07-B01-i01, https://beckerarchives.wustl.edu/VC266-S07-B01-i01

Figure 18: A.R. Mitchell, Mardol & Claremont Street, Shrewsbury. 1953



"Blog: In a Digital Daze But Tuning in to Nostalgia", *Shropshire Star*, 7 November 2003, https://www.shropshirestar.com/blogs/2013/11/07/blog-in-a-digital-daze-but-tuning-in-to-nostalgia/

Figure 19: The Atlee-Shipton Wedding



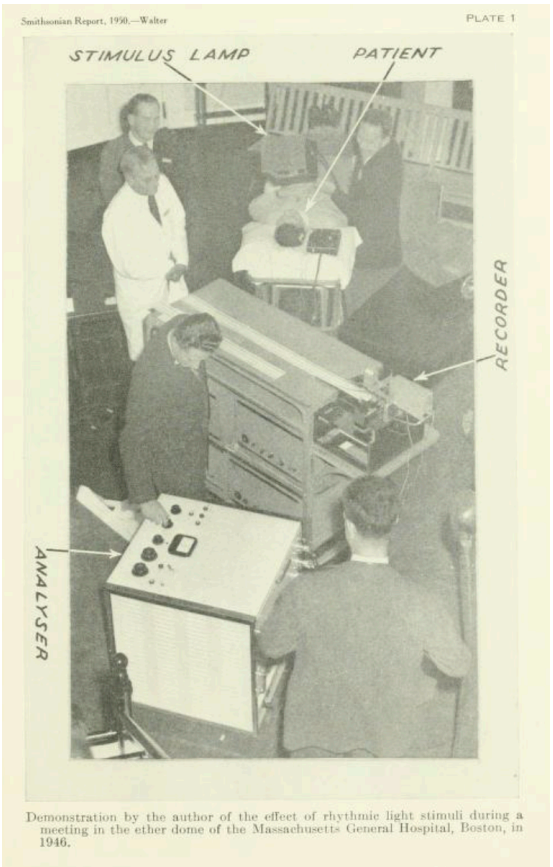
Shropshire Star, 23 March 2015, https://www.shropshirestar.com/news/2015/03/23/1945-churchill-gets-boot-by-wind-of-change/

Figure 20: W. Grey Walter & His EEG Frequency Analyser, America 1946

Walter at the Eastern Association of Electroencephalographers Conference, Ether Dome, Massachusetts General Hospital, by Mary Brazier



J.S. Barlow, "The Early History of EEG Data-Processing at the Massachusetts Institute of Technology and the Massachusetts General Hospital", *International Journal of Psychophysiology*, 26, 1997, pp. 443-54



W. G. Walter, "Electroencephalography", *Annual Report of the Board of Regents of the Smithsonian Institution … For the Year Ended June 30 1950*, Pub. 4025, 1951, pp. 243-53

Figure 21: 'Topsy Goes to Norway', Oslo 1957

(L to R, Harry Crow, Grey Walter, Duggie Phillips, Bunny Warren, by Ray Cooper)



K. Barrett, "Topsy Goes to Norway", 2017, https://irp-cdn.multiscreensite.com/f89ff536/files/uploaded/TOPSY%20GOES%20TO%20NORWAY%20essay.pdf

Figure 22: The Walters at Home with Elsie



IN THEIR COUNTRY HOME NEAR BRISTOL, THESE PARENTS HAVE TWO CHILDREN: ONE IS ELECTRONIC.
Vivian Dovey and Grey Walter have two offspring: Timothy, a human baby and Elsie, the tortoise, of coils and electronic valves. Timothy is very friendly with his mechanized sister.

Pierre de Latil, *Thinking by Machine: A Study of Cybernetics*, (Houghton Mifflin, Boston, 1957), facing p. 35

Figure 23: The Famous Grey Walter

FEBRUARY
11 FRIDAY

Television Programmes



LIVING MACHINERY

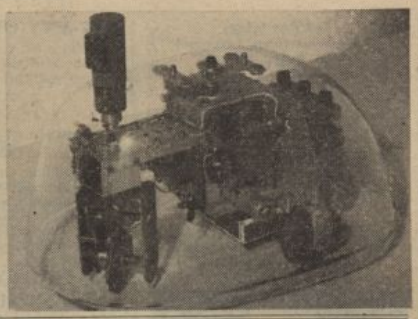
★

Dr. Grey Walter

the distinguished physiologist, talks with Max Robertson about some of the scientific 'toys' he has made which, in a rudimentary fashion, can think for themselves

★

AT 8.45



8.45 LIVING MACHINERY
Will scientists ever be able to make a machine that can think? Dr. Grey Walter, physiologist at the Burden Neurological Institute, Bristol, shows Max Robertson some of the electro mechanical models he has made.

These scientific 'toys' possess the simplest form of thought mechanism; they are used to imitate the behaviour of living creatures and to suggest ideas about the working of the human brain

Produced by Nicholas Crocker
See page 14

3.0 I'M THE LAW
'Death on the Waterfront'
Another film in this series

3.30-4.0 SPORTSVIEW
Introduced by Peter Dimmock
(A BBC Telerecording of yesterday's programme)

★ ★ ★

5.0-5.45 CHILDREN'S TELEVISION
For Older Children
'The Cisco Kid'
Another film in this series

'Alias Troubles'
An American film about the adventures of a young boy and his dog 'Troubles'

★ ★ ★

6.45-7.15 WENVOE, HOLME MOSS AND SUTTON COLDFIELD ONLY

MCR 12
Dyna enw'r uned deledu sy'n gwasanaethu Cymru. Heno, yn ile gweld ffrwyth ei llafur mewn rhaglen arbennig, gwahoddwn chwi i weld yr uned ei hun ar waith.
Bydd Alun Williams yn cyflwyno rhai o'r cynhyrchwyr a'r peirianwyr i chwi, a chewch eu gwylio wrthi yn trin y gêr a'r offer sy'n gwneud gwasanaeth teledu'n bosibl
Y teledîad o dan ofal
David J. Thomas a Dafydd Gruffydd
Paratöwyd y rhaglen
gan Lorraine Davies
(Welsh feature)
(Telerecording of the broadcast of December 20)

7.25 WEATHER CHART

7.30 NEWS and NEWSREEL

7.45 'THE GROVE FAMILY'
by Michael and Roland Pertwee
'Be My Valentine'

Mr. Grove	Edward Evans
Mrs. Grove	Ruth Dunning
Pat	Sheila Sweet
Jack	Peter Bryant
Daphne	Margaret Downs
Lennie	Christopher Beeny
Gran	Nancy Roberts
Mr. Dean	Elliot Makeham

Produced by John Warrington

8.0 Wilfred Pickles
invites you to
ASK PICKLES
for the things
you would like to see
on your television screen
Orchestra directed by Eric Robinson
Special Investigators,
Pauline and Larry Forrester
Produced by Brian Tesler

9.15 PROFESSIONAL BOXING
The principal contest of Johnny Best's weekly promotion at the Blackpool Tower boxing ring
Commentator, Harry Carpenter
Presented by William Cave

10.0 PRESS CONFERENCE
People who make the news face questions from the people who write the news
Presented by Huw Wheldon

10.30 app. **NEWS** (sound only)

Don't buy a T.V.
until you've seen
EKCOVISION
T231—at 79 gns.

Don't be too hasty when buying a television receiver. Make sure that you see the superb quality of Ekcovision Table Model T231 before you make your final choice. Its picture—crystal clear. Its sound—quite outstanding. Its life—longer than most. And its value—unsurpassed. Visit your Ekco dealer, there is a great demand for Model T231, but he will make every effort to meet your needs.



EKCOVISION Model T231
features a 17" Aluminised Tube with an Optical Filter, 13-Channel Turret Tuning, the famous Ekco 'Spot-wobble,' Automatic Sound and Picture Control and a fine Walnut Veneer Cabinet.

Please send me illustrated details of Model T231.
Name _____
Address _____
R.T.74
E. K. Cole Ltd., Southend-on-Sea, Essex

VIEWERS' VIEWS

Too Late?

I AM sure that lots of young people like myself are interested in Peter Scott's television programmes. As these are often broadcast very late in the evening, we are not allowed to see them. Would you please consider putting them on earlier in the evenings?—*G. M. McKay (aged 10) Maryport, Cumberland.*

Solo Turn

I WOULD like to make a suggestion for *What's My Line?* In future editions, what about having a member of the panel, each week, doing a 'solo turn,' as in sound radio's *Twenty Questions*? It would make an interesting variation to the game. —*Hugh Mackie, Glasgow, S.2.*

Parents Cowed

IN Children's Television recently there was a programme explaining the technique and equipment of Outside Broadcasting, since which my ego has suffered a considerable blow! Instead of being counsellor and adviser to my two sons, I am now in the position where I do the asking, and the lads proudly say: 'No, Dad, it's not a bit like you think.' Please, oh please, repeat the programme for evening viewers, so that I and doubtless thousands in like circumstances, may once more regain our status as knowledgeable parents.—*J. M. Hargest, Andoversford, Glos.*

Figures in Vision

THANK you for the most ingeniously presented and informative programmes in the *Facts and Figures* series. The New Year's Eve edition was a specially good one. The illustrations make the statistics 'sink in.' —*(Mrs.) Marjorie H. Gee, Wirral, Cheshire.*

Baby Patterns

THE playful antics of Snowy the kitten must be quite the most popular interlude film, for it delights all ages. May I suggest another idea for an interlude?—a baby, playing with its toes or weaving magical patterns in the air with its hands?—*(Mrs.) W. Head, London, S.E.6.*

Letters for publication should be addressed to the Editor, 'Radio Times,' 35 Marylebone High Street, London, W.1



"I'm never quite warm until I've had my
WELGAR
SHREDDED WHEAT AND *HOT* MILK"

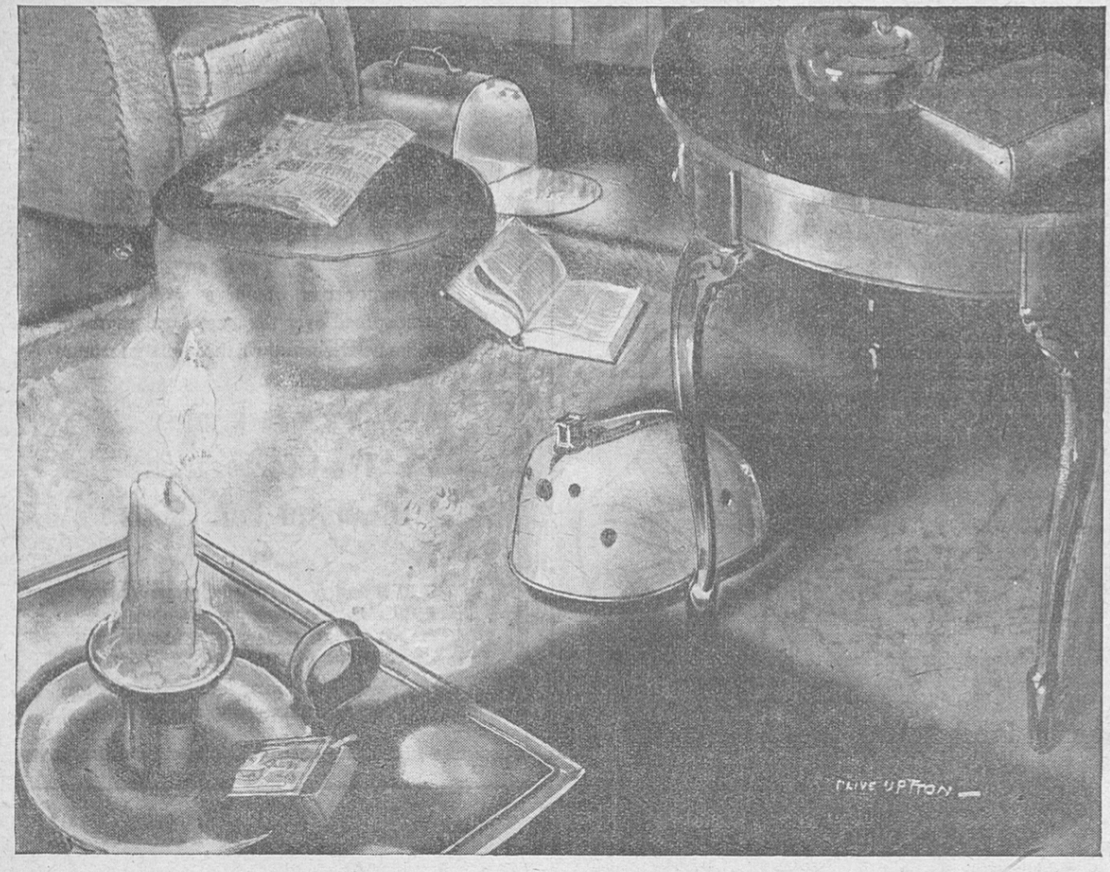
Let the appetizing goodness of Welgar Shredded Wheat and hot milk warm you up for a cheery morning. It's wonderful natural food—100% whole wheat, packed full of wholesome nourishment—protein, wheat germ, health-giving bran and calories galore! Get a packet for the family right away.



Buy the Big-Value packet—only 1/-

Radio Times, 4 February 1955

Figure 24: The Famous Tortoise



We've solved some problems in our time!

WANTED: two 6 volt batteries to power a pair of electronic tortoises. Queerest, perhaps, of all the demands that the Chloride Company has met in more than 50 years of pioneering new uses for the electric storage battery. But not, as it proved, a difficult problem. Elmer and Elsie, brain children of Cybernetics research worker Dr. W. Grey Walter, asked nothing of us but a reliable battery apiece. We fitted each with an Exide.

¶ You will meet the robot tortoises at the Festival Exhibition of Science in the South Kensington Science Museum. You'll see how Elsie leaves her hutch to investigate any extraneous source of light. How she gently, persistently butts her way past every obstacle that intervenes. How, when her output of energy leaves her feeling a little run-down, she returns of her own accord to her hutch, hitches up to her trickle charger and can't be coaxed out again until she has fully recuperated. Sensible Elsie! An Exide type, we like to think. A really *reliable* little tortoise.

* * *

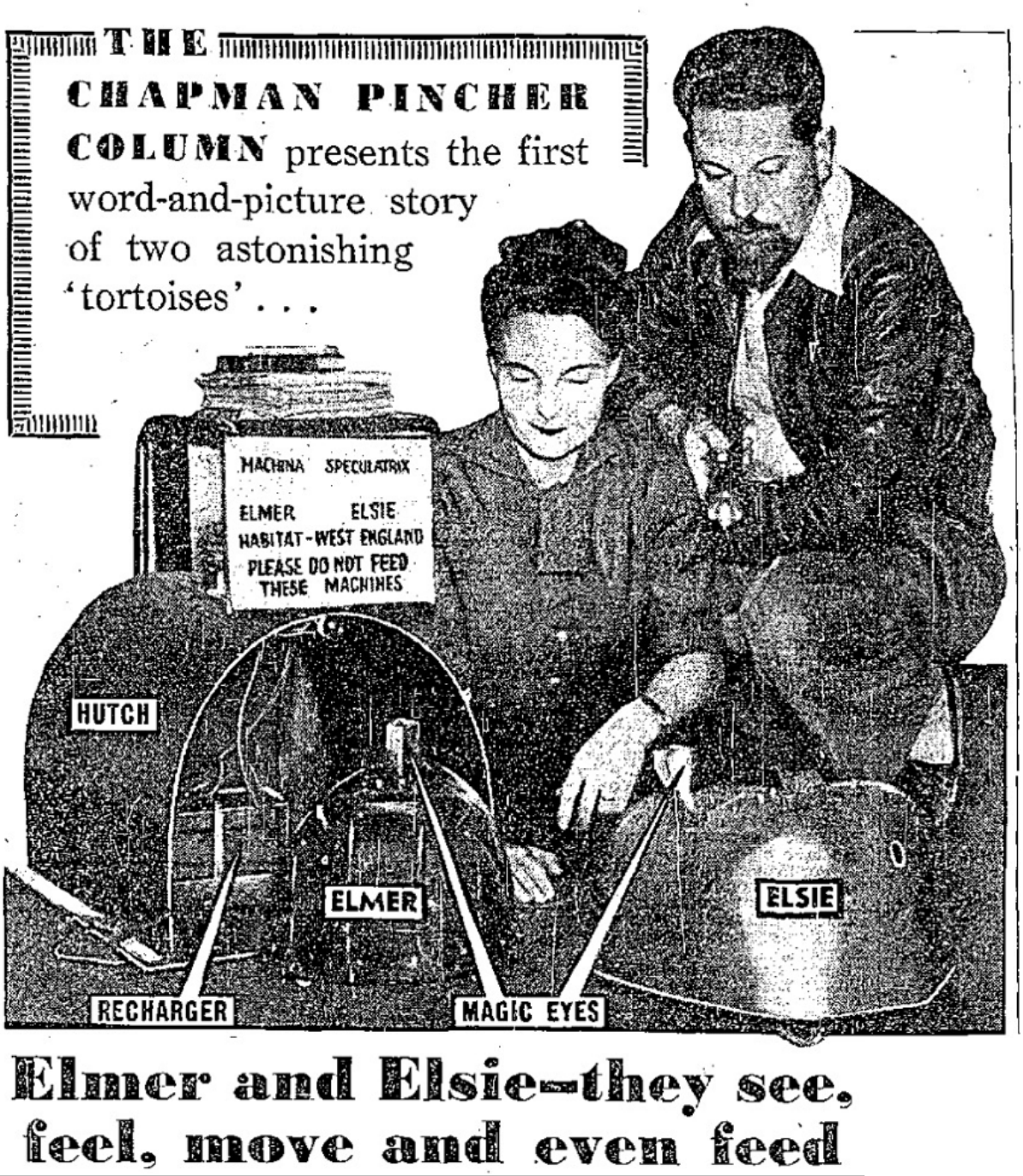
On the South Bank Site Chloride, Exide & Exide-Ironclad batteries have been chosen to power the emergency lighting & crowd counting systems and to provide the subject of many exhibits.

P.15

CHLORIDE
BATTERIES LIMITED
Makers of Exide Batteries
EXIDE WORKS · CLIFTON JUNCTION · NR. MANCHESTER

Economist, 15 September 1951, p. 636.

Figure 25: Chapman Pincher's Pets



Chapman Pincher, "Elmer and Elsie-They See, Feel, Move and Even Feed", *Express*, 13 December 1949, p. 3

Figure 26: Frank George Meets the Tortoises



A "game" at the Burden Neurological Institute in Bristol. Dr. Grey Walter, right, conducts an experiment with his mechanical tortoises

F. H. George, "Robots on the March", *John Bull*, Vol. 99, No. 2601, 5 May 1956, pp. 25-27

Figure 27: The Walter's 'Turtles' go to America



Charles H. Hewitt—*Picture Post*

DR. & MRS. W. GREY WALTER & "TURTLES"
Sometimes they get panicky.

"Science: Synthetic Pets", *Time*, 27 March, 1950, p. 74

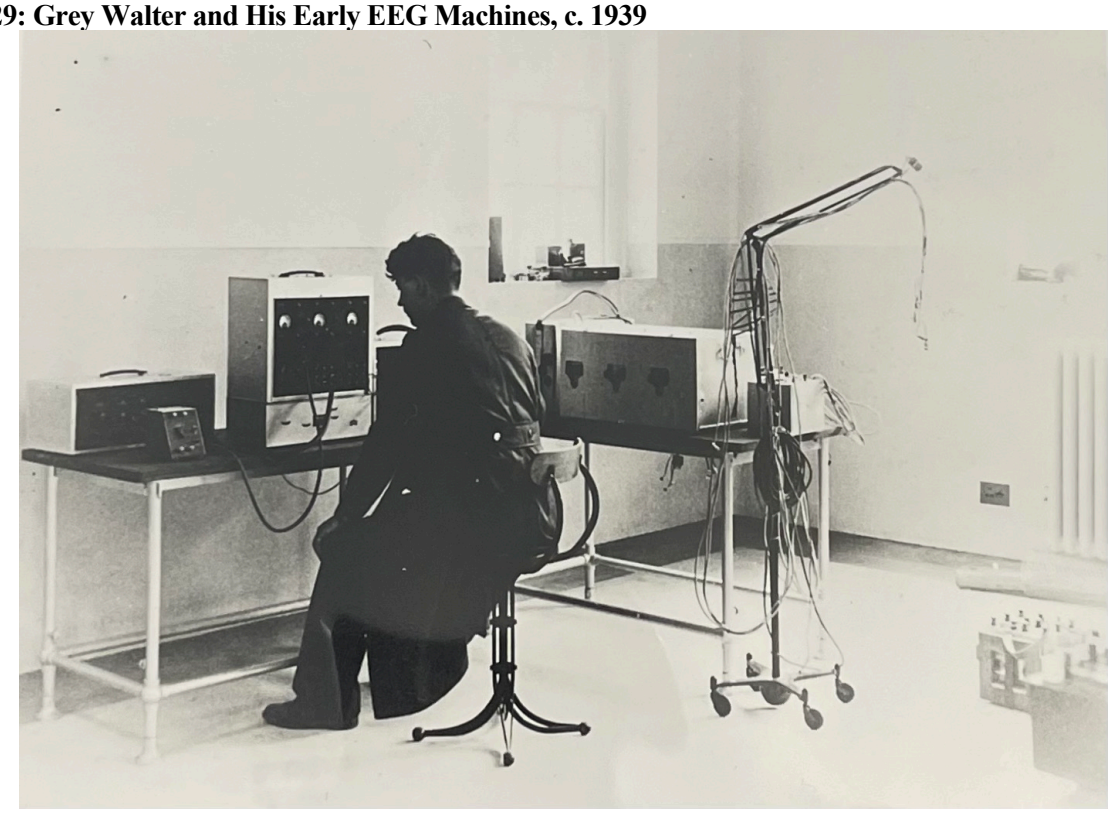
Figure 28: Grey Walter making His Early EEG Machines, c. 1939

(Walter is working at the lathe next to the window)



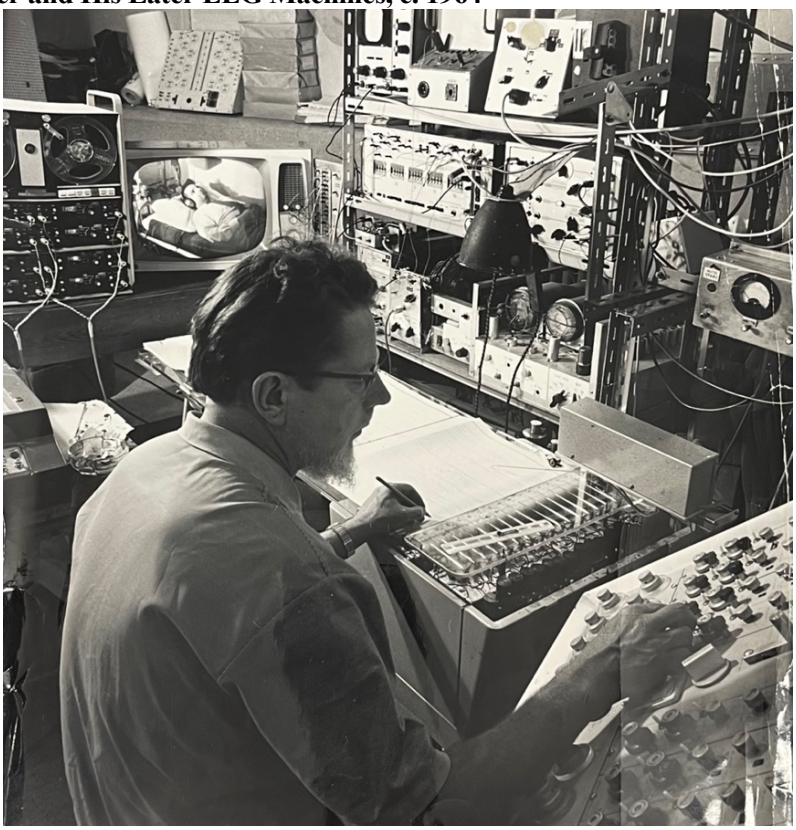
BNI Archive, Science Museum, BURD A6/14

Figure 29: Grey Walter and His Early EEG Machines, c. 1939



BNI Archive, Science Museum, BURD A6/1

Figure 30: Grey Walter and His Later EEG Machines, c. 1964



BNI Archive, Science Museum, BURD A6/5

Figure 31: Grey Walter and Vivian Dovey, c. 1943



BNI Archive, Science Museum, BURD A6/4

Figure 32: Grey Walter and Vivian Walter, c. 1953



BNI Archive, Science Museum, BURD A6/6

Figure 33: Grey Walter and Vivian Walter, c. 1956



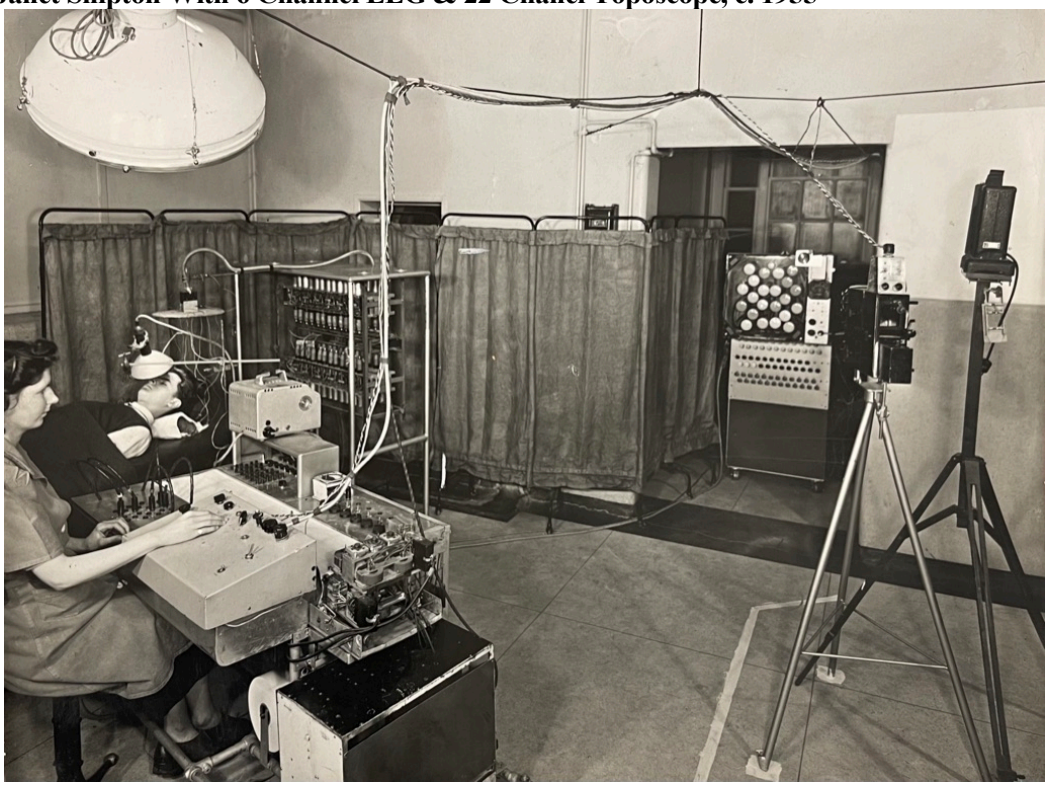
BNI Archive, Science Museum, BURD A6/13

Figure 34: Janet Shipton Operating 6 Channel EEG, c. 1952



BNI Archive, Science Museum, BURD A6/7

Figure 35: Janet Shipton With 6 Channel EEG & 22 Chanel Toposcope, c. 1955



BNI Archive, Science Museum, BURD A6/10

Figure 36: Janet Shipton With 6 Channel EEG & 22 Chanel Toposcope, c. 1955



BNI Archive, Science Museum, BURD A6/11

Figure 37: Janet Shipton Posing as a BNI Patient



Derek Morley, "New Light on the Brain" *Picture Post*, Vol. 46, No. 12, 25 March 1950, pp. 18-19

Figure 38: Ross Ashby and His Homeostat



«Projet pour un cerveau.» Voici, dans son laboratoire de Gloucester, le psychiatre W. R. Ashby, l'homme qui le projeta. Et voici son homéostat. 1950.

Philippe Breton "La Cybernétique et las Ingénieurs dans les Années Cinquante", *Culture Technique: Les Ingénieurs*, No 12, 1984, pp 154-161, (157)

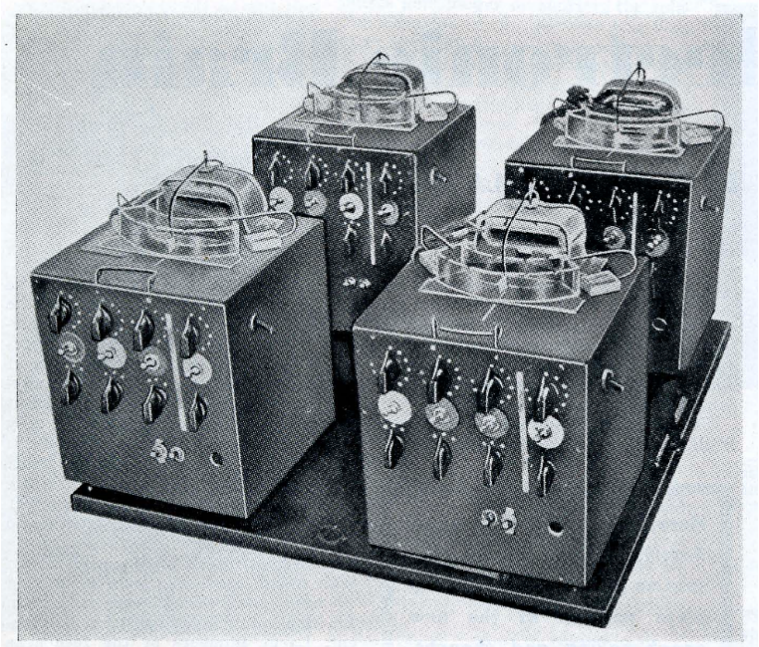
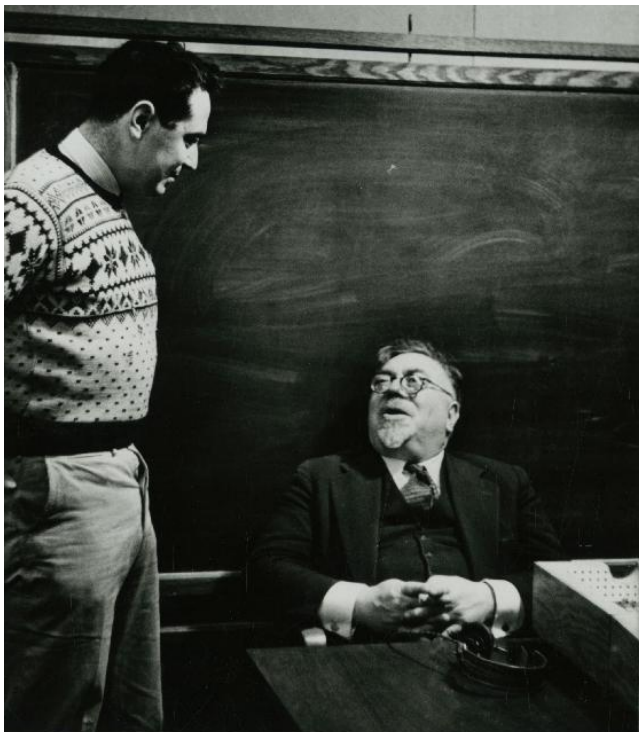


Fig. 1—The homeostat, with its four units, each one of which reacts on all the others.

W. R. Ashby, "The Electronic Brain", *Radio Electronics: Special Television Number*, March 1949, pp. 77-80

Figure 39: Norbert Wiener & Jerome Wiesner



May 10 1949, Credit: Alfred Eisenstaedt, May 10, 1949, MIT Archive, NWiener_073, https://webmuseum.mit.edu/media.php?module=people&type=popular&kv=12187&media=81

Figure 40: Wiener, Wiesner, Jumper and Moth



https://cyberneticzoo.com/cyberneticanimals/1949-wieners-moth-wiener-wiesner-singleton/

Figure 41: The Ratio Club 1951



Frontispiece. Members of The Ratio Club and their guests, 1951. *Back row*: Harold Shipton, John Bates, Edmund Hick, John Pringle, Donald Sholl, John Westcott, Donald Mackay. *Middle row*: Giles Brindley, Tom McClardy, Ross Ashby, Thomas Gold, Albert Uttley. *Front row*: Alan Turing, Gurney Sutton, William Rushton, George Dawson, Horace Barlow.

A. M. Uttley, *Information Transmission in the Nervous System*, (Academic Press, London, 1979) Frontispiece

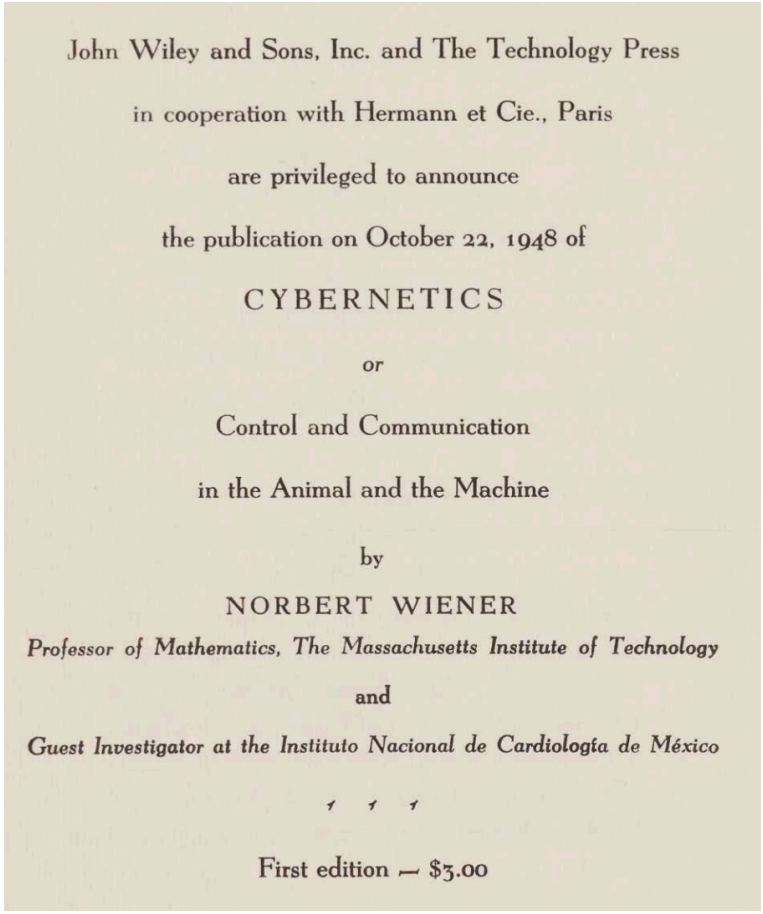
Figure 42: A Meeting of Minds – Paris 1951



THE FOUR PIONEERS OF CYBERNETICS GET TOGETHER IN PARIS:
left to right: W. Ross Ashby, W. McCulloch, Grey Walter and Norbert Wiener.

P. de Latil, *Thinking by Machine: A Study of Cybernetics*, (Houghton Mifflin, Boston, 1957), facing p. 35, translated by Y. M. Golla, foreword by Isaac Asimov.

Figure 43: *Cybernetics* is Born – Publisher's Announcement



John Wiley and Sons, Inc. and The Technology Press

in cooperation with Hermann et Cie., Paris

are privileged to announce

the publication on October 22, 1948 of

CYBERNETICS

or

Control and Communication

in the Animal and the Machine

by

NORBERT WIENER

Professor of Mathematics, The Massachusetts Institute of Technology

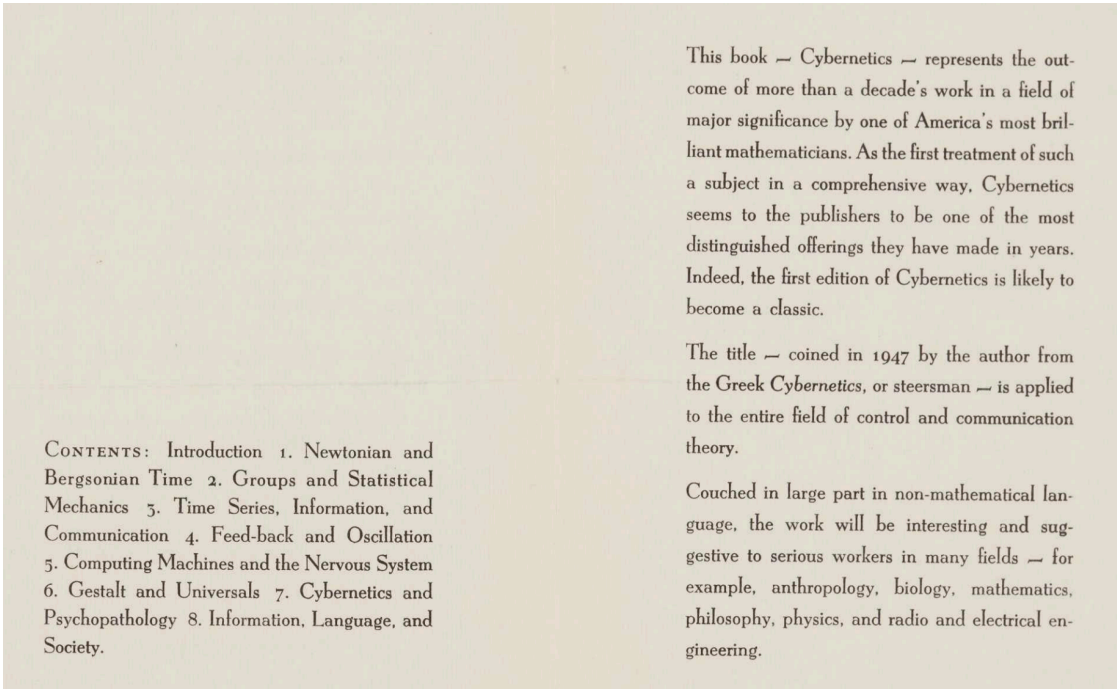
and

Guest Investigator at the Instituto Nacional de Cardiología de México

* * *

First edition — $3.00

Norbert Wiener Papers, MIT Archives, Box 6, Folder 85,
https://archivesspace.mit.edu/repositories/2/archival_objects/151206



This book — Cybernetics — represents the outcome of more than a decade's work in a field of major significance by one of America's most brilliant mathematicians. As the first treatment of such a subject in a comprehensive way, Cybernetics seems to the publishers to be one of the most distinguished offerings they have made in years. Indeed, the first edition of Cybernetics is likely to become a classic.

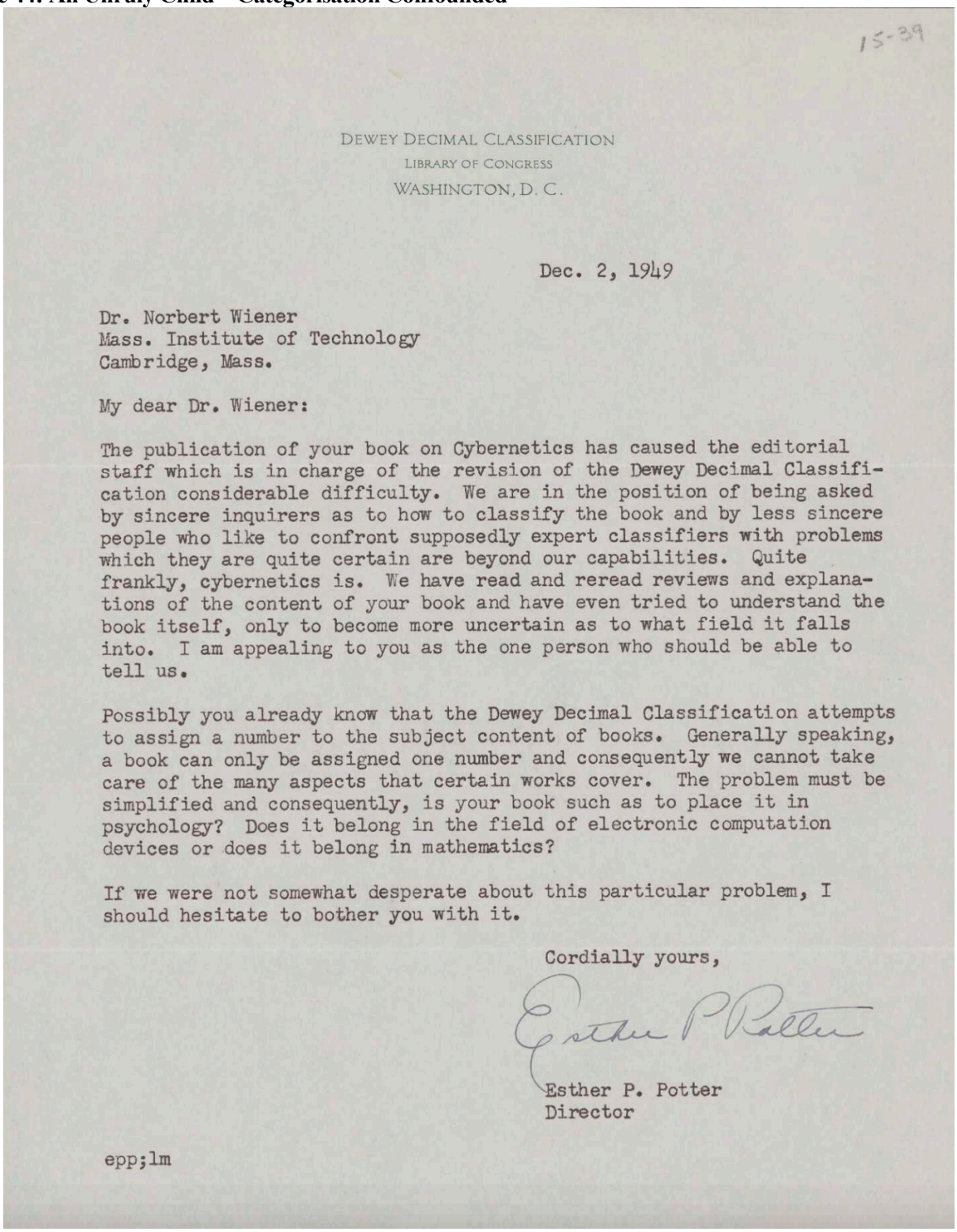
The title — coined in 1947 by the author from the Greek *Cybernetics*, or steersman — is applied to the entire field of control and communication theory.

Couched in large part in non-mathematical language, the work will be interesting and suggestive to serious workers in many fields — for example, anthropology, biology, mathematics, philosophy, physics, and radio and electrical engineering.

CONTENTS: Introduction 1. Newtonian and Bergsonian Time 2. Groups and Statistical Mechanics 3. Time Series, Information, and Communication 4. Feed-back and Oscillation 5. Computing Machines and the Nervous System 6. Gestalt and Universals 7. Cybernetics and Psychopathology 8. Information, Language, and Society.

Norbert Wiener Papers, MIT Archives, Box 6, Folder 85,
https://archivesspace.mit.edu/repositories/2/archival_objects/151206

Figure 44: An Unruly Child – Categorisation Confounded



15-39

DEWEY DECIMAL CLASSIFICATION
LIBRARY OF CONGRESS
WASHINGTON, D. C.

Dec. 2, 1949

Dr. Norbert Wiener
Mass. Institute of Technology
Cambridge, Mass.

My dear Dr. Wiener:

The publication of your book on Cybernetics has caused the editorial staff which is in charge of the revision of the Dewey Decimal Classification considerable difficulty. We are in the position of being asked by sincere inquirers as to how to classify the book and by less sincere people who like to confront supposedly expert classifiers with problems which they are quite certain are beyond our capabilities. Quite frankly, cybernetics is. We have read and reread reviews and explanations of the content of your book and have even tried to understand the book itself, only to become more uncertain as to what field it falls into. I am appealing to you as the one person who should be able to tell us.

Possibly you already know that the Dewey Decimal Classification attempts to assign a number to the subject content of books. Generally speaking, a book can only be assigned one number and consequently we cannot take care of the many aspects that certain works cover. The problem must be simplified and consequently, is your book such as to place it in psychology? Does it belong in the field of electronic computation devices or does it belong in mathematics?

If we were not somewhat desperate about this particular problem, I should hesitate to bother you with it.

Cordially yours,

Esther P. Potter

Esther P. Potter
Director

epp;lm

Norbert Wiener Papers, MIT Archives, Box 6, Folder 87,
https://hdl.handle.net/1721.3/200285

Figure 45: "Open the pod bay doors HAL"

Jack Good (r) as science advisor on the set of "2001: A Space Odyssey", Hawk Films, London 1966



Virginia Tech Special Collections and University Archives, https://scuablog.lib.vt.edu/2015/01/15/i-j-jack-good-virginia-techs-own-bletchley-park-connection/

Annex 3: Ratio Club Bio-Cards

Ashby, William Ross

Date of birth	• 6th September 1903	*Place of birth*	• Lewisham, South London	
Date of death	• 15th November 1972	*Place of death*	• South Gloucestershire	
Age 14th September 1949	• 46	*Age at death*	• 69	
Mother	• Florence Agnes Lemmon	*M. Occupation*		
Father	• William Ross Chamberlin Ashby	*F. Occupation*	• Sales Manager	

Marital status	• 1931: Elsie Maud Thorne ('Rosebud')
Children	• 1932: Jill • 1934: Sally • 1935: Ruth
Religion	• Agnostic

School	• 1917-1921: Edinburgh Academy
First degree	• 1921-1924: B.A., zoology, Sidney Sussex College, University of Cambridge • 1924-1928: M.B., B.Ch., St Bartholomew's Hospital, London
Postgraduate	• 1930: M.A., University of Cambridge ("The Thickness of the Cerebral Cortex and its Layers in the Mental Defective") • 1931: Diploma Psychological Medicine, Bethlem Royal Hospital, London • 1935: M.D., University of Cambridge
Doctoral supervisor	
Fields	• Medicine, pathology, psychiatry, cybernetics, information theory, systems theory
Doctoral students	

War work	March 1945 to 1946 (1947?) drafted into Emergency Military Service as a pathologist. Attained the rank of major in the Royal Army Medical Corps. Served in India at Poona and Jalallahi. Discharged on medical grounds, details unknown.

Title	*Institution*	*Place*	*From*	*To*
House Physician	Bethlem Royal Hospital	London		
Pathologist	Watford Peace Memorial Hospital	Hertfordshire		
Clinical Psychiatrist	Leavesdon Mental Hospital, London CC	Hertfordshire	1930	1936
Pathologist, Bacteriologist, Biochemist	St Andrew's Hospital for Mental Diseases	Northampton	1936	1947
Research Biochemist	Barnwood House Hospital	Gloucester	1947	1959
Director of Research				
Visiting Researcher	Ctr. Behavioural Sciences, Stanford Univ.	Palo Alto	1955	1956
Director	Burden Neurological Institute	Bristol	1959	1960
Prof. Biophysics & Electrical Eng., Biological Computing Lab.	Dept. Biophysics & Elect. Eng., Univ. of Illinois	Urbana	1961	1970
Professor Emeritus, Biological Computing Laboratory	Dept. Biophysics & Elect. Eng., Univ. of Illinois	Urbana	1970	1972
Hon. Prof. Fellow, Dept. Applied Mathematics & Mathematical Physics	University of Wales, Cardiff	Cardiff	1970	1972

Honours & awards	• 1932: Bronze Medal, Royal Medico Psychological Association • 1948: Burlingrame Prize • 1961: Frier Distinguished Lecture • 1982-2014: Ross Ashby Memorial Lecture, International Federation for Systems Research • 2004: W. Ross Ashby Centenary Conference, University of Illinois, Urbana-Champaign • 2009: "International Journal of General Systems", Ross Ashby special edition
Fellowships & memberships	• 1930: Member, Royal Medico Psychological Association • 1962 -1964: President, Society for General Systems Research • 1971: Fellow, Royal College of Psychiatry • Member, Royal College of Surgeons • Licentiate, Royal College of Physicians
Notable ideas, inventions, projects	• Homeostat • Law of Requisite Variety • Self-organising systems • Self-stabilising systems

Barlow, Horace Basil

Date of birth	8th December 1921	*Place of birth*	Chesham Bois, Buckinghamshire	
Date of death	5th July 2020	*Place of death*	Cambridge	
Age 14th September 1949	27	*Age at death*	98	
Mother	Lady Emma Nora (Darwin)	*M. Occupation*	Biologist, geneticist, Darwin scholar	
Father	Sir James Alan Noel Barlow	*F. Occupation*	Senior Civil Servant	

Marital status	• 1954-1970: Ruthala Chattie Salman (divorced) • 1980: Miranda Weston-Smith
Children	• First marriage: Rebecca, Natasha, Naomi, Emily • Second marriage: Oscar, Ida, Pepita
Religion	

School	• Winchester College
First degree	• 1940-1943: M.B., natural sciences, Trinity College, University of Cambridge ○ Tutor, William Rushton • 1946-1947: B.Chir., University College Hospital, London
Postgraduate	• 1944-1946: M.D., Harvard University, Rockefeller Studentship • 1947-1950: Ph.D., University of Cambridge, Medical Research Council Studentship • Sc.D
Doctoral supervisor	• Edgar Adrian, (William Rushton)
Fields	• Medicine, neurophysiology, information theory, computational and mathematical biology, psychophysics, theory of vision.
Doctoral students	• Johnathan Miller (undergraduate pupil whist teaching at Trinity)

War work	1943-1944: Worked at the Medical Research Council's National Institute for Medical Research at Mount Vernon Hospital in London under G. L. Brown conducting research for the Naval Personnel Research Committee on oxygen poisoning and underwater breathing equipment in preparation for D-Day.

Title	*Institution*	*Place*	*From*	*To*
Research Fellow	Trinity College, University of Cambridge	Cambridge	1950	1954
Post-Doctoral Research	Steve Kuffler's Lab, Johns Hopkins University	Baltimore	1953	
Lecturer	Physiological Laboratory, University of Cambridge	Cambridge	1954	1964
Demonstrator				
Assistant Director of Research				
Professor of Physiology				
Visiting (sabbatical)	Berkeley School of Optometry, University of California	Berkeley	1963	
Prof. of Physiological Optics and Physiology	Berkeley School of Optometry, University of California	Berkeley	1964	1967
	Dept. of Molecular and Cell Biology, University of California	Berkeley	1967	1973
Royal Soc. Research Professor Physiology	Physiological Laboratory, University of Cambridge	Cambridge	1973	1987

Honours & awards	• 1980: Royal Society Ferrier Medal and Lecture, "Cerebral Cortex and the Design of the Eye" • 1992: Edgar D. Tillyer Medal, Optical Society of America • 1993: Royal Medal, Royal Society • 1993: Australia Prize • 2003: Karl Spencer Lashley Award, American Philosophical Society • 2006: Ralph W. Gerard Prize, Society for Neuroscience • 2009: Swartz Prize, Theoretical and Computational Neuroscience, Swartz Foundation (Society for Neuroscience) • 2016: Ken Nakayama Prize, Vision Sciences Society (inaugural award)
Fellowships & memberships	• 1961: Founder Editor, "Kybernetik" (later "Biological Cybernetics"), with Norbert Wiener and Walter Rosenblith • 1969: Elected Fellow, Royal Society • 1971: President Kenneth Craik Club, University of Cambridge • 1973: Fellow, Trinity College, University of Cambridge • 1974-1976: Chair, Brain Research Association • 1976-1977: Chair, Brain Research Association • 1992: Honorary Member, The Physiological Society • Member, Experimental Psychological Society • Member, Berkeley Optometry Hall of Fame
Notable ideas, inventions, projects	• 1953: Discovered neurons in frog's brains that fire in receipt of specific stimulus prompting further work on receptive fields in the visual cortex. Anticipated the Nobel prize winning work of Hubel and Wiesel on information processing in visual perception. • 1961: Efficient Coding Hypothesis • 1989: Factorial codes • Single neurone doctrine

Bates, John Alexander Vincent

Date of birth	24th August 1918	*Place of birth*	Colchester, Essex	
Date of death	16th July 1993	*Place of death*	West Malling	
Age 14th September 1949	31	*Age at death*	74	
Mother	Alice Edith (Dickins)	*M. Occupation*	Medical Secretary (to husband)	
Father	John Vincent Bates	*F. Occupation*	Medical Practitioner	

Marital status	• 1946: Dianna Rushforth (General Practitioner)
Children	• Two daughters, two sons
Religion	
School	• Rugby
First degree	• 1942: M.B., B.Chir., Pembroke College, University of Cambridge, University College Hospital, Univ. of London
Postgraduate	• 1942: Member, Royal College of Surgeons • 1942: Licentiate, Royal College of Physicians
Doctoral supervisor	
Fields	• Medicine, neuroscience, EEG
Doctoral students	
War work	Physiological Research Laboratory in the Gunnery Wing of the Armoured Fighting Vehicle Training School, Lulworth, Dorset. This laboratory was established by the Medical Research Council on behalf of the Fighting Vehicle Subcommittee of the Army's Military Personnel Research Committee. Bates researched improvements the operation of the human element in the control systems of tanks, especially gun aiming.

Title	*Institution*	*Place*	*From*	*To*
House Physician	Sir Thomas Lewis' Clinical Research Unit, Univ. College Hosp., Univ. of Lond.	London	1942	1946
MRC External Scientific Staff	Neurological Research Unit, National Hospital for Nervous Diseases	London	1946	1978
Honorary Consultant Physician	Department of Applied Electrophysiology, National Hosp. Nervous Diseases	London		1978

Honours & awards	
Fellowships & memberships	• 1949, Member, Physiological Society • 1965, Member, Royal College of Physicians • 1967 – 1973, Editorial board, *Journal of Physiology* • 1975, Fellow Royal College of Physicians • 1976 – 1978, President Electroencephalographic Society • Member, Association of British Neurologists
Notable ideas, inventions, projects	• Established and ran the Ratio Club • Application of information theory and computing to neurophysiology • Coined the term 'voluntary movement'

Dawson, George Duncan

Date of birth	1912	*Place of birth*	Manchester	
Date of death	13th November 1983	*Place of death*	London	
Age 14th September 1949	37	*Age at death*	71	
Mother		*M. Occupation*		
Father	George Duncan Dawson	*F. Occupation*	Pathologist, Manchester Royal Infirmary	

Marital status	• Dr Mollie E. Heppenstall, (Biochemist, neurologist, EEG specialist, working at the Sutton Emergency Hospital)
Children	• Two sons
Religion	

School	• Repton
First degree	• 1936: M.B., Ch.B., Manchester Medical School
Postgraduate	• 1933: M.Sc., Manchester Medical School, ("The Recording of Nerve Action Potentials")
Doctoral supervisor	
Fields	• Medicine, physiology, neuroscience, EEG
Doctoral students	

War work	1939, joined the RAF Volunteer Reserve. Commissioned into the Medical Branch as a flying officer. Boarded (invalided) out with tuberculosis in 1941 with the rank of flight lieutenant. Elected to convalesce at the David Lewis Epileptic Colony, Sandlebridge, Cheshire to conduct research on the residents and patients with a self-built EEG.

Title	*Institution*	*Place*	*From*	*To*
Researcher	Created EEG Lab., Geoffrey Jefferson's Neurology Lab., Mcr. Royal Inf.	Manchester	1938	1939
MRC External Scientific Staff	Neurological Research Unit, National Hospital for Nervous Diseases	London	1944	1961
Hd. Dept. Clin. Neurophysiology	Institute of Psychiatry, Maudsley Hospital	London	1961	1966
Professor (personal chair)	Institute of Psychiatry, Maudsley Hospital	London	1963	1966
Second Professor of Psychiatry	University College	London	1966	

Honours & awards	• 1980: Geoffrey Parr Gold Medal, EEG Society
Fellowships & memberships	• 1942: Member, EEG Club • 1982: Honorary Member, Physiological Society

Notable ideas, inventions, projects	• World's first recording of an evoked cortical response
	• Laid the foundation for study of neural conduction velocity
	• Techniques for the discrimination of pattern from noise in EEG output
	  ○ 1947: Photographic superimposition of pen trace readings
	  ○ A manual mathematical averaging model using hand plotted graphs
	• The 'Dawson Averager' machine to filter out noise, automate the averaging technique, and provide real-time output signal
	  ○ 1951: Rotating switch, electromechanical
	  ○ 1955: Cathode ray tube, electronic
	  ○ Barrier grid storage tube, electronic

Gold, Thomas ('Tom', 'Tommy')

Date of birth	22nd May 1920	*Place of birth*	Vienna, Austria	
Date of death	22nd June 2004	*Place of death*	Cayuga Medical Centre, Ithaca, New York	
Age 14th September 1949	29	*Age at death*	85	
Mother	Josefine Martin	*M. Occupation*	Child actor	
Father	Max Gold	*F. Occupation*	Industrialist, Doctor of Law	

Marital status	• 1947 – 1972: Merle Eleanor Tuberg	• 1972 – 2004: Carvel Lee Beyer
Children	• First marriage: Linda, Lucy, Tanya	• Second marriage: Lauren
Religion		

School	• 1937-1938: Lyceum Alpinum, Zuoz, Engadine, Switzerland	
First degree	• 1939-1942: B.A., (ordinary) mechanical sciences, Trinity College, University of Cambridge	
Postgraduate	• 1946: M.A., mechanical sciences, Trinity Coll., Univ. of Camb • 1957: M.A., (honorary), Harvard University	• 1969: Sc.D., Trinity Coll., Univ. of Cambridge
Doctoral supervisor		
Fields	• Astronomy, engineering, aerospace engineering, physiology, biophysics, geophysics, astrophysics	
Doctoral students		

War work	1940-1941: Interned in a camp in Canada part way through his degree at Cambridge because of his Austrian birth 1942: Agricultural Labourer and Lumberjack (pit props) in the Lake District 1942-1947: Radar research under Fred Hoyle, with Herman Bondi, section XRC8 (theory), Admiralty Signal Establishment, Witley, Surrey. Director, Tantallon (East Lothian) Admiralty radar trials site and Deputy Head, New Devices Section. 1945-1947: Developed ultrasound memory for moving target radar and became interested in using ultrasound for materials and medical scanning. Led post-war scientific intelligence mission to Germany with temporary rank of Wing Commander.

Title	*Institution*	*Place*	*From*	*To*
Technician (magnetron design & construction)	Cavendish Laboratory, Univ. of Cambridge	Cambridge	1946	1947
Medical Research Council Researcher	Zoological Laboratory, Univ. of Cambridge	Cambridge	1947	1949
Fellowship	Trinity College, University of Cambridge	Cambridge	1947	1951
Demonstrator (Junior Lecturer)	Cavendish Laboratory, Univ. of Cambridge	Cambridge	1949	1952
Snr. Prin. Scientific Off., Chief Asst. to Astronomer Royal	Royal Greenwich Observatory	Herstmonceux	1952	1956
Sabbatical (semester)	Astronomy Department, Cornell University	Ithaca	1956	
Professor of Astronomy	Harvard University	Mass.	1957	1958
Robert Wheeler Wilson Professor of Applied Astronomy	Harvard University	Mass.	1958	1959
Chairman	Astronomy Department, Cornell University	Ithaca	1959	1968
Director	Ctre. Radiophysics & Space Rsch., Cornell Univ.	Ithaca	1959	1981
Professor of Astronomy	Astronomy Department, Cornell University	Ithaca	1959	1971
Assistant Vice President for Research (Arecibo Affairs)	Arecibo Radio Telescope, Cornell University	Ithaca	1969	1971
John L. Wetherill Professor of Astronomy	Astronomy Department, Cornell University	Ithaca	1971	1985
Honorary Fellow	Trinity College, University of Cambridge	Cambridge	1986	1987
John L. Wetherill Professor of Astronomy (Emeritus)	Astronomy Department, Cornell University	Ithaca	1987	2004

Honours & awards	• 1972: John F. Lewis Prize, Amer. Phil. Soc.	• 1985: Gold Medal & George Darwin Lecture, Royal Astronomical Soc.

Fellowships & memberships	• 1964: Elected, Fellow, Royal Society • 1964, Member, President's Science Advisory Cmte., Space • 1974: Fellow, American Academy of Arts and Sciences • 1974: Member, National Academy of Sciences (USA) • Royal Astronomical Society • Fellow, American Geophysical Union	• Member, American Philosophical Society • Fellow, American Astronautical Society • Member, International Academy of Astronautics • Consultant, NASA • Member, NASA Lunar and Planetary Missions Board • Overseas Fellow, Churchill College, Univ. of Cambridge.

Notable ideas, inventions, projects	• 1947: Electromechanical feedback via hair cells in the cochlea in pitch (frequency) discrimination in mammalian hearing • 1948: Steady state theory of the nature of the universe (with Hoyle and Bondi) • 1955: Theory of (deep) lunar regolith • 1955: Theory of axial shift of the earth related to accumulation of mass • 1958: Theory that the movement of the universe could reverse from expansion to contraction • 1959: Coined the term 'magnetosphere' • 1968 – 1969: Identification of pulsars as rotating neutron stars • Designed the Apollo Lunar Surface Closeup Camera (ALSCC), for taking stereo pictures of the lunar surface • 1970s: Theory of the abiogenic origin of oil and gas in opposition to the idea of fossil (biological) origin • 1997: Theory of the deep hot biosphere to support his theory of the abiogenesis of petroleum

Good, Irving John ("I. J.", "Jack") (*b.* Isadore Jacob Goodak)

Date of birth	9th December 1916	*Place of birth*	213 Richmond Road, Hackney, London	
Date of death	5th April 2009	*Place of death*	Radford, Virginia	
Age 14th September 1949	32	*Age at death*	92	
Mother	Sophia Polikoff	*M. Occupation*		
Father	Edward Goodak	*F. Occupation*	Watchmaker, jewellery designer & dealer	

Marital status	• Unmarried
Children	
Religion	

School	• 1928 – 1935: Haberdashers' Aske's Boys' School
First degree	• 1935 – 1938: B.A., mathematics (first), Jesus College, University of Cambridge, (Major & State Scholar)
Postgraduate	• 1941: Ph.D., mathematics, Jesus College, University of Cambridge • 1943: M.A., mathematics, Jesus College, University of Cambridge • 1963: Sc.D., University of Cambridge • 1964: D.Sc., University of Oxford
Doctoral supervisor	• G. H. Hardy, A. S. Besicovitch
Fields	• Statistics, probability theory, Bayesian analysis
Doctoral students	

War work	1941 – 1945: Government Code and Cipher School, Bletchley Park

Title	*Institution*	*Place*	*From*	*To*
Lecturer, Mathematics & Electronic Computing	Victoria University	Manchester	1945	1948
Cryptographer (?)	G.C.H.Q.	Cheltenham	1948	1959
Visiting Research Associate Professor	Princeton University	New Jersey	1955 (Summer)	
Consultant	IBM	USA	1958/1959 (weeks)	
	Admiralty Research Laboratory		1959	1962
Consultant, Communications Research Division	Institute for Defense Analysis	Princeton	1962	1964
Science Research Council Snr Research Fellow	Trinity College & Atlas Computer Laboratory	Oxford	1964	1967
Professor (Research) of Statistics	Virginia Polytechnic Institute & State University	Blacksburg	1967	
University Professor	Virginia Polytechnic Institute & State University	Blacksburg	1969	
University Distinguished Professor	Virginia Polytechnic Institute & State University	Blacksburg	1975	
Adjunct Prof. Ctre. Study of Science in Society	Virginia Polytechnic Institute & State University	Blacksburg	1983	
Adjunct Professor of Philosophy	Virginia Polytechnic Institute & State University	Blacksburg	1984	
Professor Emeritus	Virginia Polytechnic Institute & State University	Blacksburg	1994	

Honours & awards	• 1939: Cambridgeshire Chess Champion • 1940: Smith's Prize, University of Cambridge • 1972: Horsley Prize, Virginia Academy of Science • 1998: Computer Pioneer Award, Institute of Electrical and Electronics Engineers Computer Society
Fellowships & memberships	• 1958: Fellow, Institute of Mathematical Statistics • 1973: Fellow, American Statistical Association • 1974: Member, New York Academy of Sciences • 1985: Fellow, American Academy of Arts and Sciences • 1990: Honorary Member, International Statistical Institute • 1995: Member, Academy of Motion Pictures Arts and Sciences • Member, Crypto-Mathematics Institute
Notable ideas, inventions, projects	• Advised Stanley Kubrick during production of film *2001: A Space Odyssey* (1968) • Developed modern Bayesian statistics with Turing at Bletchley • Conceptualised the 'ultraintelligent machine' (synthesis of artificial neural networks with deterministic algorithms) • Conceptualised the 'superintelligence explosion' created by ultraintelligent machines • Developed the Fast Fourier Transform

Hick, William Edmund

Date of birth	1st August 1912	*Place of birth*		
Date of death	20th December 1974	*Place of death*		
Age 14th September 1949	36	*Age at death*	62	
Mother		*M. Occupation*		
Father		*F. Occupation*		

Marital status	
Children	
Religion	

School	
First degree	• 1938: University of Durham, M.B., B.S. • 1949: University of Durham, M.D.
Postgraduate	
Doctoral supervisor	
Fields	• Medicine, psychology, psychiatry, information theory, ergonomics
Doctoral students	

War work	1941-1944: Officer, Royal Army Medical Corps. Commissioned in 1941 as a lieutenant. Medically discharged in 1944 with the war-substantive rank of captain which he retained as an honorary rank upon discharge. 1944: Joined the newly created Medical Research Council Unit for Research in Applied Psychology in the Cambridge Psychological Laboratory under Ken Craik.

Title	*Institution*	*Place*	*From*	*To*
	M.R.C., Unit for Research in Applied Psychology, Cambridge Psychological Lab., Univ. of Cambridge	Cambridge	1944	1953
Reader	Cambridge Psychology Department, University of Cambridge	Cambridge	1953	1966
Fellow	St John's College, University of Cambridge	Cambridge		
(Retired in 1966 on health grounds)				

Honours & awards	
Fellowships & memberships	• 1946: Founder Member, Experimental Psychology Group • 1949: Founder Member, Ergonomics Research Society • 1958: President, Experimental Psychology Group (the year of transition to Experimental Psychology Society) • Founder Member, Editorial Board *Ergonomics* • 1970: Honorary Member, Experimental Psychology Society
Notable ideas, inventions, projects	• Hick's Law • Experiments on therapeutic use of LSD with himself as the subject (with long term adverse effects)

Little, Victor Ivor

Date of birth	1920	*Place of birth*		
Date of death	30th May 1976	*Place of death*		
Age 14th September 1949	28	*Age at death*	56	
Mother		*M. Occupation*		
Father		*F. Occupation*		

Marital status	• 1949: Heather Elsie Potter
Children	
Religion	

School	
First degree	• 1941, B.Sc., King's College, University of London
Postgraduate	
Doctoral supervisor	
Fields	• Physics, non-linear optics, lasers
Doctoral students	

War work	Ministry of Supply: Radar, V1 and V2 counter measures

Title	*Institution*	*Place*	*From*	*To*
Assistant Lecturer	King's College, University of London	London	1946	
Lecturer in Physics	Bedford College, University of London	London		
Reader in Experimental Physics	Royal Holloway College, University of London	Egham	1965	1976
Dean	Faculty of Science, Royal Holloway College, University of London	Egham		

Honours & awards	
Fellowships & memberships	

Notable ideas, inventions, projects	• Established Royal Holloway Research School in Non Linear Optics • Pioneered the use of high energy light beams to change the optical properties of fluids (liquid lasers) • With Culham Research Lab. of the UK Atomic Energy Authority, produced the then most powerful liquid laser in the world • Chair, London A Level Board for Physics

MacKay, Donald MacCrimmon

Date of birth	9th August 1922	*Place of birth*	Lybster, Caithness, Scotland	
Date of death	6th February 1987	*Place of death*		
Age 14th September 1949	26	*Age at death*	64	
Mother	Janet MacKay	*M. Occupation*		
Father	Dr. Henry MacKay	*F. Occupation*	General Practitioner	

Marital status	• 16th July 1955: Valerie Wood (a physics student of his)
Children	• David, Eleanor, Janet, Margaret, Robert
Religion	• Christian (evangelical)

School	• Wick High School
First degree	• 1943: B.Sc., natural philosophy (physics), University of St Andrews
Postgraduate	• 1946-1951: Ph.D., physics, King's College, University of London (high speed analogue computers)
Doctoral supervisor	
Fields	• Electronic analogue computers, neuroscience, psychophysics, brain organisation, mechanics of visual and aural perception, information theory, Christian scientific apology, mind body problem, free will and determinism.
Doctoral students	

War work	• 1943 – 1946: Admiralty Signal Establishment, radar research, automated gun direction

Title	*Institution*	*Place*	*From*	*To*
Assistant Lecturer, Physics	King's College, University of London	London	1946	1948
Lecturer, Physics	King's College, University of London	London	1948	1959
Rockefeller Foundation	Fellow	USA	1951	1951
Reader	King's College, University of London	London	1959	1960
Granada Rsch. Prof. of Communication & Neuroscience	Dept. of Communication & Neuroscience Keele Univ.	Keele	1960	1982
Visiting Professor	University of California	Berkley	1969	1969
Emeritus Professor	University of Keele	Keele	1982	1987

Honours & awards	• 1961: Fleming Lecture • 1967: Edington Memorial Lectures, University of Cambridge, "The Freedom of Action in a Mechanistic Universe" • 1971: Herter Lecture, Johns Hopkins University • 1973: Foerster Lecture, University of California • 1975: Drummond Lecture, University of Stirling • 1975: Fremantle Lecture, Balliol College, University of Oxford • 1977: Riddell Lecture, University of Newcastle • 1979: Pascal Lecture on Christianity, University of Waterloo, Canada • 1985: Kelvin Lecture, IEEE • 1986: Gifford Lectures, Univ. of Glasgow, "Under Our Own Microscope: What Brain Science Has to Say About Human Nature" • 1986: Honorary degree, Gordon College, Massachusetts • 1986: Lecture at Harvard Medical School • 1986: Honorary Doctorate, University of St Andrews
Fellowships & memberships	• 1948: Member, Research Scientists Christian Fellowship • 1963: Co-editor, "Biological Cybernetics" • Associate, Neurosciences Research Program, MIT (mid 1960s & on) • 1966: Founding Editor, "Experimental Brain Research" • 1968: Founding Committee Member, Brain Research Association • 1977: Honorary Member, American Scientific Affiliation • 1979: Fellow, King's College, University of London • 1980: Fairchild Fellow, California Institute of Technology • 1983: Foreign Member, Royal Netherlands Academy of Arts and Sciences • 1985: Hermann von Helmholtz Prize, Distinguished Research Cognitive Neurosciences, New York • Co-Editor, *Handbook of Sensory Physiology* • Council Member, International Brain Research Organisation • Chair, Commission on Communication and Control Processes, International Union of Pure and Applied Biophysics • Member, Physiological Society • Member, Experimental Psychology Society • Fellow, Institute of Physics • Member, EEG Society • Member, Society for the History and Philosophy of Science

Notable ideas, inventions, projects	• Built his own electronic equipment for displaying and recording neurological activity

McLardy, Turner

Date of birth	16th April 1916	*Place of birth*	(Netherfield, Strathaven?)	
Date of death	9th January 1988	*Place of death*		
Age 14th September 1949	34	*Age at death*	73	
Mother	Jessie McLardy	*M. Occupation*		
Father	Ralf McLardy	*F. Occupation*		

Marital status	• 1939 (?): Faye Cameron
Children	• Three
Religion	
School	
First degree	• BSc, University of Glasgow • MB, University of Glasgow • Ch.B, University of Glasgow
Postgraduate	• 1948: Diploma Psychological Medicine • 1948: Ph.D., University of Glasgow ("Clinico-Pathological Studies on 101 Cases of Leucotomy") • M.D.
Doctoral supervisor	
Fields	• Medicine, psychiatry, neuropathology, neurobiology
Doctoral students	
War work	1939-1946: Royal Army Medical Corps. Commissioned, lieutenant. Became acting/temporary major. Discharged as substantive captain. Served in Egypt. POW, Stalag 344, Lamsdorf, Poland. On the Lamsdorf Death March 1945.

Title	*Institution*	*Place*	*From*	*To*
Senior Ass. Neuropathologist	Research Lab., Maudsley Hospital Medical School/Inst. of Psychiatry	London	1946	1953
Research Student	Warren McCulloch's Laboratory, Illinois Psychiatric Institute	Chicago	1950	
Pathologist Director Research Laboratory	St Andrew's Hospital for Nervous and Mental Disorders	Northampton	1953	1965
Director Pathology Dept Head Myerson Lab	Boston State Hospital	Boston		

Honours & awards	• 1947: M.B.E., Military Division
Fellowships & memberships	• 1948: Member, Royal Medico Psychological Association
Notable ideas, inventions, projects	• Booked Warren McCulloch to speak at the first meeting of the Ratio Club • 1951: Founder Member, Neurophysiological Club

Merton, Patrick Anthony

Date of birth	8th October 1920	*Place of birth*	Godalming	
Date of death	13th June 2000	*Place of death*	Cambridge	
Age 14th September 1949	27	*Age at death*	79	
Mother	Mary Elizabeth Crowley	*M. Occupation*	Singer	
Father	Gerald Merton, M.C., Ph.D., F.R.A.S.	*F. Occupation*	Astronomer	

Marital status	• 1951: Gabriel Howe, divorced 1988
Children	• One son, three daughters
Religion	• Catholic upbringing. Not practicing in adulthood
School	• Ampleforth College (Catholic, Benedictine) • The Leys School, Cambridge (Methodist) • Beaumont College, Old Windsor (Catholic, Jesuit)
First degree	• 1942: B.A., natural sciences, Trinity College, University of Cambridge ○ Tutor, William Rushton • 1946: M.B., B.Chir., St Thomas' Hospital, London
Postgraduate	• 1982: M.D.
Doctoral supervisor	
Fields	• Medicine, neurophysiology
Doctoral students	
War work	• Undergraduate and medical student

Title	*Institution*	*Place*	*From*	*To*
On Staff	M.R.C. Neurological Research Unit, Nat. Hosp. for Nervous Diseases	London	1946	1957
	Nobel Inst. Neurophysiology, Neuroscience Dept., Karolinska Inst.	Sweden	1952	1954
Lecturer	Physiological Laboratory, University of Cambridge	Cambridge	1957	1977
Reader	Department of Physiology, University of Cambridge	Cambridge	1977	1984
Professor of Human Physiology	Department of Physiology, University of Cambridge	Cambridge	1984	1988
Hon. Consultant Clinical Neurophysiology	National Hospital for Nervous Diseases	London	1979	2000
Hon. Senior Research Fellow	Royal Postgraduate Medical School, Hammersmith Hospital	London	1981	1982

Honours & awards	
Fellowships & memberships	• 1962: Fellow, Trinity, University of Cambridge • 1979: Elected, Fellow, Royal Society • 1991: Fellow, Royal College of Physicians
Notable ideas, inventions, projects	• Servo theory of human muscle action

Pringle, John William Sutton

Date of birth	22nd July 1912	*Place of birth*	Manchester	
Date of death	2nd November 1982	*Place of death*		
Age 14th September 1949	36	*Age at death*	70	
Mother	Dorothy Emily Beney	*M. Occupation*		
Father	John Pringle, M.D.	*F. Occupation*	General practitioner	

Marital status	• 1946: Beatrice Wilson (née Gilbert Carter)
Children	• One son, two daughters, and a daughter from Beatrice's first marriage (widowed)
Religion	• Christian (upbringing and practice)
School	• 1922-23: Manchester Grammar School • 1923-26: Langley Place Preparatory School, St Leonard's-on-Sea, Sussex • 1926-31: Winchester College, (Major Scholarship)
First degree	• 1931-34: B.A., natural sciences, King's College, University of Cambridge, (Major Scholarship)
Postgraduate	• 1934-37: Studentship, King's College, University of Cambridge • 1955: Sc.D., University of Cambridge • 1961: M.A., University of Oxford • 1961: D.Sc., University of Oxford
Doctoral supervisor	
Fields	• Zoology
Doctoral students	

War work	1939-1944: Telecommunications Research Establishment 1942: Principal Scientific Off. and Head Telecommunications Flying Unit at Telecommunications Research Establishment 1943-1946: Squadron Leader (honorary commission) 1944-1945: Ministry of War Transport Radar research. Stationed at Perth, St Athan, Swanage, and Malvern. For a time, in overall charge of the development of airborne radar. Led the development of the Rebecca/Eureka radar location system. Rebecca was the airborne transceiver, Eureka the ground located transponder. Appointed by A. P. Rowe in 1942 to the Invasion Panel to explore the use of radar in assisting the Allied invasion of Europe. Seconded to the Ministry of Transport as secretary of a committee examining uses of radar by the Merchant Navy.

Title	*Institution*	*Place*	*From*	*To*
University Demonstrator, Zoology	University of Cambridge	Cambridge	1937	1938
	Rockefeller Fellowship, under Detlev Bronk	Philadelphia	1939 (September)	
University Lectureship	Department of Zoology, University of Cambridge	Cambridge	1945	1959
Tutor	Peterhouse College, University of Cambridge	Cambridge	1947	1949
Senior Tutor	Peterhouse College, University of Cambridge	Cambridge	1948	1957
Leverhulme Research Fellow	Department of Physiology, University of Ceylon	Colombo	1953 (Jan. - June)	
Senior Bursar	Peterhouse College, University of Cambridge	Cambridge	1957	1959
Librarian	Peterhouse College, University of Cambridge	Cambridge	1959	1961
Reader in Experimental Cytology	Department of Zoology, University of Cambridge	Cambridge	1959	1961
Linacre Professor of Zoology	Department of Zoology, University of Oxford	Oxford	1961	1979
Royal Society Visiting Professor	University of Nairobi	Kenya	1971	1973

Honours & awards	• 1946: M.B.E. (Civil Division) • 1945: American Medal of Freedom, Bronze Palm, USA
Fellowships & memberships	• 1938-1945: Fellow, King's College, University of Cambridge • 1945-1961: Fellow, Peterhouse College, University of Cambridge • 1961-1982: Emeritus Fellow, Peterhouse College, University of Cambridge • 1954: Elected, Fellow, Royal Society • 1961-1979: Fellow, Merton College, University of Oxford • 1977: President, Society for Experimental Biology • 1982-1982: Honorary Fellow, Peterhouse College, University of Cambridge
Notable ideas, inventions, projects	• 1935: Co-founded the Cambridge University Gliding Club • Founded the Oxford Human Science School, now the Institute of Human Sciences at University of Oxford • President, British Gliding Association • Member, Council of the International Bee Research Association

Rushton, William Albert Hugh

Date of birth	8th December 1901	*Place of birth*	London	
Date of death	21st June 1980	*Place of death*		
Age 14th September 1949	46	*Age at death*	78	
Mother	Alice Louise Jane Amsler	*M. Occupation*		
Father	William Rushton	*F. Occupation*	Dentist	

Marital status	• 1930: Marjorie Glasson Kendrick
Children	• Gillian, Jocelin, Adrian, Julian
Religion	

School	• 1909-1915: The Hall, London	• 1915-1920: Gresham's School, Holt
First degree	• 1921-1925: B.A., M.B., Emmanuel College, University of Cambridge, Middlesex Hospital Medical School	
Postgraduate	• 1925-1928: University of Cambridge ○ M.A. ○ Ph.D., ("The Dependence of the Threshold For Nervous Excitation Upon The Position Of The Electrodes") ○ Michael Foster Studentship ○ 1926-1927: George Henry Lewes Studentship ○ 1927-1928: Stokes Studentship, Pembroke College, University of Cambridge • 1931-1937: University College Hospital, London ○ Member, Royal College of Surgeons ○ Licentiate, Royal College of Physicians ○ 1931: Beit Memorial Fellowship • 1946: Sc.D, University of Cambridge	
Doctoral supervisor	• E. D. Adrian	
Fields	• Medicine, neurophysiology, physiology and neuroscience of vision	
Doctoral students		
War work	• Teaching medical students at Cambridge	

Title	*Institution*	*Place*	*From*	*To*
Fellow	Johnson Foundation, Univ. of Pennsylvania, under Detlev Bronk	Philadelphia	1929	1931
Research Fellow	Emmanuel College, University of Cambridge	Cambridge	1930	1932
Research Fellow	Emmanuel College, University of Cambridge	Cambridge	1935	1937
Lecturer	Physiology Laboratory, University of Cambridge	Cambridge	1935	1953
Director Medical Studies	Trinity College, University of Cambridge	Cambridge	1938	1963
	Nobel Inst. Neurophysiology, Neuroscience Dept, Karolinska Inst.	Sweden	1948	1949
Reader	Physiology Laboratory, University of Cambridge	Cambridge	1953	1966
Sabbatical	National Institute of Health, Bethesda	Maryland	1959	1960
Visiting Professor (sabbatical)	Johns Hopkins University, Baltimore	Maryland	1966	
Professor of Visual Physiology	Physiology Laboratory, University of Cambridge	Cambridge	1966	1968
Distinguished Rsch. Prof. Psychobiology	Florida State University	Tallahassee	1968	1976
Fogarty International Scholar	National Institute of Health, Bethesda	Maryland	1972	1973
Visiting Professor	University of Sydney	Sydney	1973	1974
Visiting Fellow	Australian National University	Canberra	1973	1974
Emeritus Prof. of Visual Physiology	Kenneth Craik Lab., Physiology Dept., University of Cambridge	Cambridge	1977	1980

Honours & awards	• 1959: Edridge Green Lecturer, Royal College of Surgeons • 1962: Ferrier Lecturer, Royal Society • 1963: First Prentice Medallist, Amer. Academy Optometry • 1966: Siliman: Lectures, University of Yale • 1967: Feldberg Prize	• 1968: Waynflete Lecturer, Magdalen College, Univ. of Oxford • 1969: Honorary D.Sc., Case Western Reserve University • 1970: Royal Medal, Royal Society • 1971: Proctor Medal, USA • 1971: Kenneth Craik Award, St. Johns College, Univ. of Camb.

Fellowships & memberships	• 1938-1980: Fellow Trinity College, University of Cambridge • 1948: Elected, Fellow, Royal Society • 1963: Foreign Honorary Member, American Academy of Arts and Sciences • 1968: Foreign Member, Royal Swedish Academy of Sciences • 1970: President, Society for Psychical Research • 1973: Member, Physiological Society
Notable ideas, inventions, projects	• Light and dark visual adaptation • Precisely measuring spectrophotochromic properties of light reflected back from the photosensitive pigmentation of retina • Role of visual pigments with specific and differential sensitivities in explaining normal and anomalous colour vision

Shipton, Harold William ('Shippy')

Date of birth	29th September 1920	*Place of birth*	Shrewsbury	
Date of death	9th April 2007	*Place of death*	Utah	
Age 14th September 1949	28	*Age at death*	86	
Mother	Mrs Shipton	*M. Occupation*		
Father	Albert W. Shipton	*F. Occupation*	Foreman, Shrewsbury Parks Department	

Marital status	• 1947: Janet Helen Attlee, (daughter of Clement Attlee, then Labour Prime Minister)
Children	• Two daughters
Religion	

School	• St Michael's School, Shrewsbury
First degree	• Shrewsbury Technical College • Chartered Engineer • Did not attend university
Postgraduate	• Ph.D.
Doctoral supervisor	
Fields	• Electronic engineering, EEG, biomedical engineering
Doctoral students	

War work	Joined the RAF in 1939. Worked at RAF St Athan on airborne radar systems for night fighters as an electronics technician with the rank of corporal (sergeant?).

Title	*Institution*	*Place*	*From*	*To*
Technician (?)	Burden Neurological Institute	Bristol	1946	1957
Research Associate	Bioengineering Resource Facility, Univ. Iowa College of Medicine	Iowa	1957	1963
Professor	Bioengineering Resource Facility, Univ. Iowa College Medicine	Iowa	1963	1979
Director	Bioengineering Resource Facility, Univ. Iowa Coll. of Medicine	Iowa	1963	1979
Professor Biomedical Engineering	Washington University School of Medicine in St Louis	Missouri	1979	1989
Chairman Biomedical Eng. Program	Washington University School of Medicine in St Louis	Missouri	1983	
Chairman Dept. of Electrical Eng. (Acting)	Washington University School of Medicine in St Louis	Missouri	1986	

Honours & awards	
Fellowships & memberships	• Honorary Fellow, American Electroencephalographic Society
Notable ideas, inventions, projects	• Born in a 1920s Shrewsbury council house without electricity upstairs • Married the daughter of a Prime Minister • Retired as a professor at one of the leading medical schools in the USA

Sholl, Donald Arthur

Date of birth	1903	*Place of birth*	Romford	
Date of death	11th February 1960	*Place of death*	Wood Green, London	
Age 14th September 1949	46	*Age at death*	57	
Mother		*M. Occupation*		
Father		*F. Occupation*		

Marital status	• Marianne Luise Salomon
Children	
Religion	

School	
First degree	• B.Sc.
Postgraduate	
Doctoral supervisor	
Fields	• Mathematical biology, neurology, neuromorphology
Doctoral students	

War work	

Title	*Institution*	*Place*	*From*	*To*
	Department of Embryology, University College, University of London	London		
Reader	Department of Anatomy, University College, University of London	London	1956	1960

Honours & awards	
Fellowships & memberships	
Notable ideas, inventions, projects	• Sholl Analysis (Concentric Shell Method) for analysis of neuronal morphology

Slater, Eliot Trevor Oakeshott

Date of birth	28th August 1904	*Place of birth*	London
Date of death	15th May 1983	*Place of death*	London
Age 14th September 1949	45	*Age at death*	78
Mother		*M. Occupation*	
Father	Gilbert Slater, M.A., D.Sc.	*F. Occupation*	Economist (Madras). Principal, Ruskin Coll., Oxford



Marital status	• 1935: Lydia Pasternak (daughter of Leonid, brother of Boris) • 1946: Jeanie Fyfe Foster
Children	• Two sons, two daughters
Religion	• Agnostic
School	• Leighton Park School, Reading
First degree	• 1928: B.A., M.B., St John's College, Univ. of Camb. (Minor Exhibition/Sizarship), St George's Hosp., London
Postgraduate	• M.D. • M.A., University of Cambridge • Diploma Psychological Medicine • 1981: Ph.D. London
Doctoral supervisor	
Fields	• Medicine, psychiatry, genetics, eugenics
Doctoral students	
War work	1939-1945: Clinical Director, Sutton Emergency Hospital

Title	*Institution*	*Place*	*From*	*To*
Junior House Physician	West End Hospital for Nervous Diseases	London	1928	1930
Assistant Medical Officer	Derby County Mental Hospital	Derby	1930	1931
Medical Officer	Maudsley Hospital Medical School	London	1931	1939
Rockefeller Fellowship	Dept. Genealogical & Demographic Studies, Ger. Inst. Psychiatric Rsch.	Munich	1934	1935
	Genetics Division, Kaiser Wilhelm Institute for Brain Research	Berlin		
MRC Research Grant	London County Council's Mental Hospitals	London	1935	1937
Clinical Director	Sutton Emergency Hospital	London	1939	1945
Physician in Psychological Medicine	National Hospital for Nervous Diseases	London	1946	1964
Senior Lecturer	Institute of Psychiatry, Maudsley Hospital	London	1950	1959
Dir. MRC Psychiatric Genetics Unit	Institute of Psychiatry, Maudsley Hospital	London	1959	1969

Honours & awards	• 1939: Gaskell Gold Medal in Psychiatry • 1959: Litchfield Lecture, University of Oxford • 1960: Maudsley Lecture • 1966: C.B.E. • 1971: Honorary L.L.D. Dundee • 1978: Theodosius Dobzhansky Memorial Award for Research in Behavior Genetics • 1983: Eliot Slater Prize in Psychiatry, University of Cambridge
Fellowships & memberships	• 1949: Member, Royal Commission on Capital Punishment • 1955: Member, Royal Medico Psychological Association • 1958-1959: President, Psychiatric Section, Royal Society of Medicine • 1961-1972: Editor-in-Chief, "British Journal of Psychiatry" • 1963-1966: Vice President, Eugenics Society • 1973: Honorary Fellow, Royal College of Psychiatrists • 1976: Honorary Fellow, Royal Society of Medicine, Psychiatric Section • 1981: Honorary Fellow, St John's College, University of Cambridge • Fellow, Eugenics Society • Honorary Member, German Society for Psychiatry • Honorary Fellow, American Psychiatric Association • Member Euthanasia Society • Trustee Shakespearean Authorship Trust
Notable ideas, inventions, projects	• Genetic basis of psychiatric disorders, especially 'schizophrenia' and 'manic depression'

Turing, Alan Mathison

Date of birth	23rd June 1912	*Place of birth*	London	
Date of death	7th June 1954	*Place of death*	Adlington Road, Wilmslow, Cheshire	
Age 14th September 1949	37	*Age at death*	41	
Mother	Ethel Sara Stoney	*M. Occupation*		
Father	Julius Mathison Turing	*F. Occupation*	Indian Civil Service	

Marital status	• Unmarried
Children	
Religion	• Atheist

School	• 1918-1922: St Michael's, Day School, St Leonards, Sussex
	• 1922-1926: Hazelhurst Preparatory School, Frant, East Sussex
	• 1926-1931: Sherborne School, Dorset
	  ○ School Scholarship (tenable at University of Cambridge)
	  ○ Goodman Scholarship (tenable at University of Cambridge)

First degree	• 1931-1934: B.A., mathematics (B-star Wrangler), King's College, University of Cambridge
Postgraduate	• 1934: Harold Fry Studentship, King's College, University of Cambridge • 1935-1936: Fellow, King's College, University of Cambridge • 1936-1938: Jane Eliza Procter Visiting Fellow, Institute for Advanced Study, Princeton • 1938: Ph.D. mathematics, Institute for Advanced Study, Princeton ("Ordinal Logics")
Doctoral supervisor	• Alonzo Church
Fields	• Mathematical logic, cryptology, computing, philosophy of mind, mathematical biology
Doctoral students	• Robin Gandy • Beatrice Helen Worsley

War work	• Summer 1938: Training and part time work at Government Code and Cipher School HQ, Broadway Buildings, London • September 1939-September 1943(c): Government Code and Cipher School, Bletchley Park • November 1942-January 1943: Liaison, Washington DC • January 1943-March 1943: Bell Labs, New York • September 1943(c)-October 1945: Radio Security Service, Special Communications Unit No.3, Hanslope Park • July 1945-August 1945: Scientific intelligence gathering, Germany • Summer 1945: Post Office Research Station, Dollis Hill, London

Title	*Institution*	*Place*	*From*	*To*
Fellow (*in residence*), Lecturing (*ad hoc*)	King's College, University of Cambridge	Cambridge	1938	1939
Temporary Senior Scientific Officer	Mathematics Division, NPL	Teddington	1945	1946
Senior Principal Scientific Officer (Special Merit)	Mathematics Division, NPL	Teddington	1946	1948
Fellow (*in residence, on sabbatical from the NPL*)	King's College, University of Cambridge	Cambridge	1947	1948
Reader in Mathematics	Victoria University	Manchester	1948	1954
Deputy Director Royal Society Computing Laboratory				

Honours & awards	• 1946: O.B.E.
Fellowships & memberships	• 1935: Fellow, King's College, University of Cambridge • 1936: Smith's Prize, University of Cambridge • 1951: Elected, Fellow, Royal Society
Notable ideas, inventions, projects	• Universal computing machine • Intelligent computing machinery • The Imitation Game • Mathematics of the chemical mechanisms of morphogenesis

Uttley, Albert Maurel ('Pete')

Date of birth	14th August 1906	*Place of birth*	Stoke Newington, North London	
Date of death	13th September 1985	*Place of death*	Ditchling, Sussex	
Age 14th September 1949	43	*Age at death*	79	
Mother	Ethel Player	*M. Occupation*		
Father	George Uttley	*F. Occupation*	Professor of Singing	

Marital status	• 1936: Gwendoline Lucy Richens
Children	• Susan Primrose Uttley
Religion	
School	
First degree	• 1926: B.Sc., mathematics (first), King's College, University of London • 1927: Teacher's Diploma • 1936: B.Sc., psychology, King's College, University of London
Postgraduate	• 1940: Ph.D., psychology, King's College, University of London ("The Phi Phenomenon")
Doctoral supervisor	• Francis Arthur Powell Aveling
Fields	• Computational and informational theory of the neurological system, electronics, aeronautic instrumentation
Doctoral students	

War work	Telecommunications Research Establishment, Group 13: Simulators and Trainers at Worth Matravers and Dunford House. Developed a real time visualisation system for the Type 19 combat flight simulator used in training aircrew on airborne interception radar. Worked on Blue Sapphire project, an automatic astro-navigation system. Worked on a navigational radar (H2S) simulator which used ultrasound pulsed through liquid. Worked with F. C. Williams on the development of cathode ray tubes as electronic data storage mechanisms. Remained with TRE at Malvern post war and was the principal designer of the TRE Automatic Computer (TREAC). Led the TREAC development team from 1943 to 1957. 1941-1943: Temporary Scientific Officer 1943-1945: Temporary Senior Scientific Officer 1945-1946: Temporary Principal Scientific Officer

Title	*Institution*	*Place*	*From*	*To*
Teacher			1927	1934
Principal Scientific Officer	Telecommunications Research Establishment	Malvern	1946	1947
Senior Principal Scientific Officer	Telecommunications Research Establishment	Malvern	1947	1951
Deputy Chief Scientific Officer	Telecommunications Research Establishment/Radar Rsch. Est.	Malvern	1951	1957
Assistant Superintendent	Physics Research Group, TRE/RRE	Malvern	1951	1957
Superintendent	Electronics Division, TRE/RRE			
Deputy Chief Scientific Officer	National Physical Laboratory	Teddington	1957	1966
Superintendent	Control Mechanisms and Electronics Division, National Physical Lab.	Teddington	1957	1960
Superintendent	Autonomics Division, National Physical Laboratory	Teddington	1960	1966
Fellow (unpaid leave from NPL)	Centre for Advanced Study of Behavioural Sciences, Stanford Univ.	Palo Alto	1962	1963
Rsch. Prof. Experimental Psychology	Laboratory of Experimental Psychology, Sussex University	Brighton	1966	1973

Honours & awards	• 1950: Simms Gold Medal, Royal Aeronautical Society
Fellowships & memberships	• 1950: Fellow, Institute of Navigation • 1951: Associate Fellow, Royal Aeronautical Society • 1963-1966: President, Biological Engineering Society
Notable ideas, inventions, projects	• Conditional Probability Computer

Walter, William Grey ('Grey')

Date of birth	19th February 1910	*Place of birth*	Kansas City, Missouri
Date of death	6th May 1977	*Place of death*	Flat 2, 20 Richmond Pk Rd, Clifton, Bristol
Age 14th September 1949	39	*Age at death*	67
Mother	Minerva Lucrezia (Margaret) Hardy	*M. Occupation*	Journalist
Father	Karl Wilhelm Walter	*F. Occupation*	Journalist



Marital status	• 1934-1946: Katharine Monica Ratcliffe, a British journalist and lecturer, separated 1945 • 1947-1960: Vivian Joan Dovey, (separated, not divorced?) • 1960-1972: Lorraine Josephine Donn (co-habiting, not married?)
Children	• Nicolas, Jeremy, Timothy
Religion	• Atheist
School	• 1922-1928: Westminster School
First degree	• 1928-1931: B.A., natural sciences (first), King's College, University of Cambridge
Postgraduate	• 1931-1935: M.A., University of Cambridge ("Conduction in Nerve and Muscle") • 1933: Member, Cambridge Apostles, University of Cambridge • 1947: Sc.D., Cambridge
Doctoral supervisor	• M.A. under Edgar Adrian and Bryan Matthews
Fields	• Neurophysiology, clinical and diagnostic applications of EEG, robotics, cybernetics
Doctoral students	

War work	The Burden Neurological Institute was co-opted into the Emergency Medical Service. At the Burden Neurological Institute for the duration of the war. Served in the 11th Gloucester Home Guard Unit as 2nd Lieutenant where he exhibited a noted penchant for using explosives.

Title	*Institution*	*Place*	*From*	*To*
Rockefeller Fellowship	Central Pathological Laboratory, Maudsley Hospital Medical School	London	1935	1939
Rockefeller Fellowship	A. E. Kornmüller & J. F. Tönnies, Dept. Neurophysiology, Kaiser Wilhelm Inst. Brain Rsch.	Berlin	1935	
	Otfrid Foerster & Hans Altenburger, Inst. Neurological Rsch., Univ. of Breslau.	Breslau		
	Hans Berger, Dept. Psychiatry & Neurology, Jena University Hosp., Friedrich Schiller Univ.	Jena		
Clinical application of EEG	Central Pathological Lab., London County Mental Hospitals, Maudsley Hosp.	London	1935	1939
	Maida Vale Hospital for Nervous Diseases (Including Epilepsy & Paralysis)			
Physiological Department	Burden Neurological Institute	Bristol	1939	1960
Head Physiological Dept.	Burden Neurological Institute	Bristol	1960	1970
Scientific Consultant	Burden Neurological Institute	Bristol	1970	1975
Emeritus Sci. Consultant	Burden Neurological Institute	Bristol	1975	1977
Visiting Prof., Dept. Neurology	University of Richmond	Virginia	1976	1976

Honours & awards	• 1949: Honorary Professor, Aix-Marseilles Univ. • 1949: Honorary M.D., Aix-Marseilles University • 1950: Maudsley Lecture • 1959: Adolf Meyer Memorial Lecture, Philadelphia	• 1960: Myers Memorial Lecture, Society for Psychical Research • 1969: Arthur Stanley Eddington Memorial Lecture, Univ. of Cambridge • 1974: Oliver–Sharpey Prize, Royal College of Physicians • 1975: Grey Walter Medal, EEG Society

Fellowships & memberships	• Member Association of Scientific Workers • 1930s: Member Peace Pledge Union • 1942: Founder Member, EEG Society • 1947: Organiser, Inaugural International EEG Congress • 1949: Co-Founder, International Federation of Societies for Encephalography and Neurophysiology • 1949: Founding Editor, "Electroencephalography and Clinical Neurophysiology - An International Journal" • 1953-1957: Honorary President, International Federation of Societies for Encephalography and Neurophysiology • 1956: President, First International Congress of Cybernetics, Namur, Belgium • 1960s: Member Bristol Committee of 100

Notable ideas, inventions, projects	• Automatic wave frequency analyser for EEG readings • Created first clinical EEG department in Britain • Identified and named delta and theta waves represented in EEG scans • 'Machina Speculatrix', ('Elmer' and 'Elsie'), 'tortoise' robots simulating behaviour caused by neuronal and sensorial functions • 'Machina Docils', CORA (Conditioned Reflex Analogue), Mk. 1, a modified Elsie tortoise robot • CORA Mk. 2, a purpose built desktop demonstration unit • IRMA (Innate Releaser Mechanism Analogue) • Stroboscopic lamp for the photic stimulation of brain activity • Toposcope ('Topsy') for dynamic real time visualisation of EEG signals on an array of cathode ray tubes • Discovery of Contingent Negative Variation or Expectancy Wave, a neurological electro-chemical anticipation of motor function

Westcott, John Hugh

Date of birth	3rd November 1920	*Place of birth*	Whitehall Gardens, Chiswick, West London	
Date of death	10th October 2014	*Place of death*	Oxshott, Surrey	
Age 14th September 1949	28	*Age at death*	93	
Mother	Margaret Elisabeth Bass	*M. Occupation*		
Father	John Stanley Westcott	*F. Occupation*	Mechanical Engineer (esp. refrigeration)	

Marital status	• 1950: Helen ('Fay') Morgan
Children	• Gill, Tom, Nick
Religion	

School	• Wandsworth School	• City & Guilds College
First degree	• 1938-1941: B.Sc. electrical eng., part time Battersea Polytechnic Institute and as external student at London University	
Postgraduate	• 1946-1950: Ph.D., Imperial College, University of London, ("Studies in Analysis of Servomechanisms with the Development of a New Performance Criterion") ○ 1946-1948: Ferranti Scholarship, Institution of Electrical Engineers ▪ 1946-1948: Three days a week at GPO Research Station, Dollis Hill, London ○ 1948-1949: Commonwealth Scholarship, (£500) ▪ 1948-1949: Guest studentship at MIT, met Norbert Wiener, read draft of *Cybernetics* ○ 1949-1950: Royal Commission for the Exhibition of 1851 Senior Studentship • D.Sc. (Eng), Imperial College, University of London	
Doctoral supervisor	• Willis Jackson, Colin Cherry	
Fields	• Electrical engineering, control systems, automation, computing	
Doctoral students	• Kevin Warwick	

War work	1942-1945: Seconded from BTH to Air Defence Rsch. & Dev. Est., Bawdsey which, in May 1942, became the Radar Rsch. & Dev. Est., Malvern. Developed Shell Splash system for centimetric (3cm) radar guidance of anti-ship coastal artillery. Promoted to Scientific grade.

Title	*Institution*	*Place*	*From*	*To*
Apprentice, Radar Research and Development	British Thomson-Houston	Rugby	1937	1945
Scientific Staff	Control Commission for Germany	Germany	1945	1946
Lecturer Electrical Engineering	Imperial College of Science and Technology	London	1950	1956
Consultant	Batavian Oil Company (Royal Dutch Shell subsidiary)	The Hague	1953	1958
Consultant	Associated Electrical Industries	England	1955	1969
Reader Electrical Engineering	Imperial College of Science and Technology Univ. of Lond.	London	1956	1961
Chairman	Feedback PLC	London	1958	1999
Professor of Control Systems	Imperial College of Science and Technology Univ. of Lond.	London	1961	1984
Consultant	Imperial Chemical Industries	London	1965	1969
Head of Automation, Ctre. Computing & Automation	Imperial College of Science and Technology Univ. of Lond.	London	1966	1970
Head of Computing and Control Department	Imperial College of Science and Technology Univ. of Lond.	London	1970	1979
Consultant	George Wimpey & Son	London	1975	1980
Consultant	Westland PLC	Yeovil	1983	1985
Senior Research Fellow	Imperial College of Science and Technology Univ. of Lond.	London	1984	1994
Emeritus Professor of Control Systems	Imperial College of Science and Technology Univ. of Lond.	London	1984	2014

Honours & awards	
Fellowships & memberships	• 1957: Founding Member, International Federation of Automatic Control • 1968–1969: Chair, Control and Automation Division, Institution of Electrical Engineers • 1969–1975: Member, Executive Council, International Federation of Automatic Control • 1973–1979: Chair, United Kingdom Automation Council • 1974–1980: Governor, Kingston Polytechnic • 1979–1980: Vice-President, Institute of Measurement and Control • 1980: Elected Fellow, Royal Academy of Engineering • 1983: Elected Fellow, Royal Society • 1986–2001: Member Advisory Council, Royal Military College of Science • Honorary Fellow, Institution of Engineering and Technology • Honorary Fellow, Institute of Measurement and Control • Fellow, Institute of Directors • Fellow, City and Guilds of London Institute
Notable ideas, inventions, projects	

Woodward, Philip Mayne

Date of birth	6th September 1919	*Place of birth*	Ipswich	
Date of death	30th January 2018	*Place of death*	Malvern	
Age 14th September 1949	30	*Age at death*	98	
Mother		*M. Occupation*		
Father		*F. Occupation*		

Marital status	• 1942: Alice Robertson (top first in mathematics, University of St Andrews, worked in same section at TRE)
Children	
Religion	

School	• Ipswich Grammar School • Blundell's School, Devon
First degree	• 1939-1941: B.A., mathematics, Wadham Coll., University of Oxford (Open (Methuen) Minor Scholarship – awarded 1937)
Postgraduate	• D.Sc., University of Oxford
Doctoral supervisor	
Fields	• Mathematics, probability theory, radar, computer programming languages, horology
Doctoral students	

War work	Joined the Telecommunications Research Establishment in 1941. Worked on the discrimination of signal from noise in the Chain Home radar system using a precursor to an information theoretic approach based on an independent development of the idea of inverse probability unknowingly similar to Bayes' theorem. Used Fourier waveform frequency sampling to improve beam shaping of H2S airborne ground mapping navigation radar. March 1942: T.R.E. Group 26 Maths, Durnford House; Assistant Grade 3.

Title	*Institution*	*Place*	*From*	*To*
Scientific Officer, Maths Group	1945-1953: Telecommunications Rsch. Establishment	Malvern	1945	1979
Head, Mathematics Division	1953-1957: Radar Research Establishment			
Superintendent, Computing Division	1957-1976: Royal Radar Establishment			
Deputy Chief Scientific Officer (Individual Merit)	1976-1979: Royal Signals and Radar Establishment			
Visiting Lecturer, Cruft Laboratory	Harvard University	Camb., Mass.	1956	
Honorary Professor, Electrical Engineering	University of Birmingham	Birmingham	'ten years'	
Visiting Professor, Cybernetics	University of Reading	Reading	'ten years'	

Honours & awards	• The Woodward Building at Defence Evaluation & Research Agency, Malvern (opened 14th April 2000), named in his honour
Fellowships & memberships	• Fellow, British Horological Society • 1994: Barrett Silver Medal, British Horological Society • 2005: Lifetime Achievement Award, Royal Academy of Engineering (inaugural award) • 2009: Dennis J. Picard Medal, Radar Technologies and Applications, Institute of Electrical and Electronics Engineers • 2009: The Tompion Medal, Worshipful Company of Clockmakers

Notable ideas, inventions, projects	• Woodward's Ambiguity Function
	• Woodward Synthesis Theorem
	• Wrote software for TREAC (Telecommunications Research Establishment Automatic Computer)
	• Wrote software for RREAC (Royal Radar Establishment Automatic Computer)
	• Led team which developed complier for the ALGOL 68 computer programming language
	• Led team which developed CORAL computer programming language
	  ○ Initially COARL = Computer On-Line Radar Applications Language
	  ○ Subsequently CORAL = Computer On-line Real-time Applications Language
	• Designed N Building at Royal Radar Establishment, Malvern, housing Electronic Materials and Computing Laboratories
	• Ran the Computer Programming Course at Royal Signals and Radar Establishment, Malvern
	• W5 Clock