

Edinburgh and Essex -- the past & future of AI

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*“Artificial Intelligence – Recollections of the Pioneers”
Computer Conservation Society London Meeting
Science Museum, London
11 October, 2002*

The Talk Plan

Life at the EPU/DMIP (1963/9)

*Why was the EPU/DMIP the
way it was?*

What happened afterwards?

Has AI failed?

First Contact and First Research

Whilst a graduate student in biometrical statistics at Oxford under Norman Bailey, I spent a few weeks at Donald Michie's Experimental Programming Unit in the summer of 1963, and briefly visited again in winter 1964. I then joined the EPU as an RA in October 1964. My first research task, set by DM, was:

How can we automate problem solving in the style of Samuel's checker player (USA) rather than Newell, Shaw, and Simon's General Problem Solver (also USA)?

Hence the "Graph Traverser"

On the side I was

(with archaeologist Roy Hodson)

Applying Shepard/Kruskal non-metric multi-dimensional scaling to the analysis of sets of archaeological artefacts

→ computer archaeology

DM was a tolerant employer!

Some EPU/DMIP Exhibits

The Passalong Puzzle (1963)

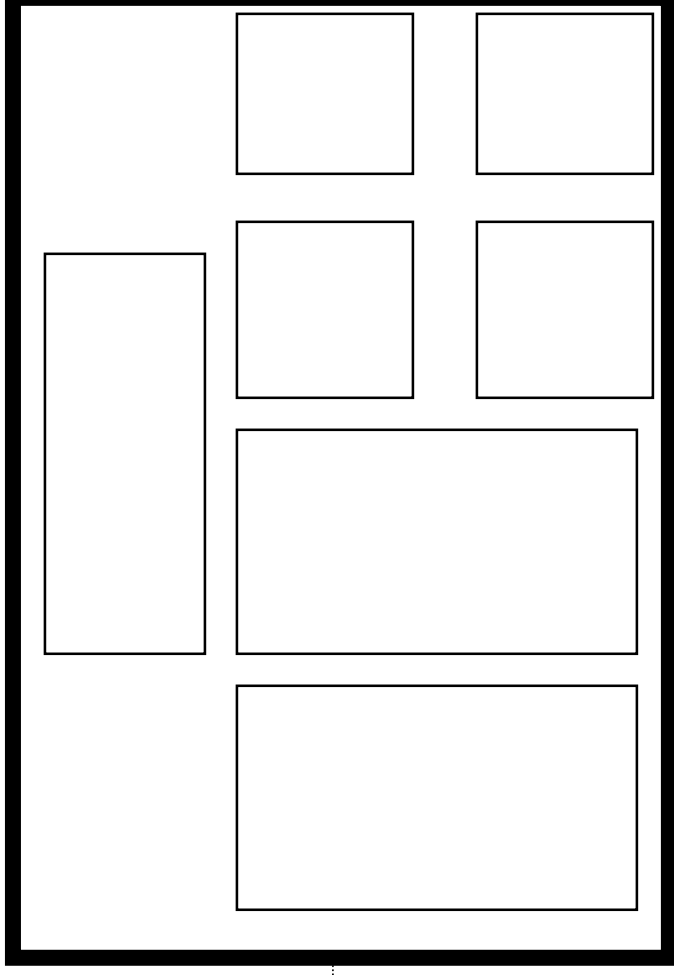
*Minutes of the First Round
Table Meeting (1965)*

*The Grand Opening (1966)
A Party (1967)*

Democracy at Work! (1968)

Passalong Sliding Block Puzzle

By sliding the “blocks”, reflect their arrangement in the horizontal axis



Minutes of the First Meeting of the Round Table (1965)

A.W.H.

Memorandum REF-1-3
15th November, 1965.

- 2 -

Dr. Michie, the Chairman, began the proceedings by explaining that as the Unit is expanding so rapidly, it is now necessary to have a weekly meeting to discuss proposals and take decisions. The meeting, he said, would take the form of a Round Table Discussion each Friday afternoon, and anyone who wishes to raise a point or have anything discussed should make use of the 'name-leaf' book provided so that anyone who might be unable to attend the meeting would be able to raise a point at the Round Table. This method would be tried out to see if everyone was in favour of it, and at a future meeting comments and ideas would be considered. Dr. Michie added that a record of the meeting was being taken by A.W.H. each week and that she was also representing the technical and secretarial staff.

Dr. Michie's first item of business on the agenda, was to bring the 'Special Responsibilities' list up-to-date. The following list details these responsibilities:-

- | | |
|---------------|--|
| F.K. Burstall | Seminars |
| | Publishing |
| | Dictating equipment and typing facilities |
| | Hardware and operations for the new installation, with the aid of D.R.H. |
| J.C. Collins | M.R.C. Mail-MS system |
| | On-line and peripheral equipment, with assistance from D.R.H. |
| | Typesetting facilities |
| | Diploma course |
| J.E. Icken | Library, books and journals |
| | Software library with assistance from R.J.P. |
| | Ground plans and surveying |
| R.H. Peely | On-line equipment, reporting to J.S.C. |
| | Machine-room operations reporting to R.H.B. |
| | Furniture |
| | Technical Staff |
| J.I. Hayes | Carden |
| | M.S.C. testing project |

The Grand Opening

- 3 -

15th July, 1966.

GUEST LIST FOR LUNCH

Sir E. Gordon Cox, F.R.S.	Agricultural Research Council, London.
Professor A. Erdélyi	Professor of Mathematics.
Professor M.H.J. Farvis	Professor of Electrical Engineering
Professor Brian Flowers, F.R.S.	Chairman of Flowers Committee.
Mr. Richard L. Gregory	University of Cambridge.
Mrs. I.P. Grieve	Mrs. Grieve and Dr. Michie's original I.P.U. secretary.
The Rt. Hon. Earl of Halsbury	Chairman of S.R.C. Computing Science Committee.
Dr. J. Howlett	Director of S.R.C. - owned Atlas Computer Laboratory.
Mr. C. Jolliffe	Director, S.R.C. Univ. Science & Technology, Div.
Professor N. Kemmer, F.R.S.	Chairman of University Computing Science Committee.
Professor E.C. Longuet-Higgins, F.R.S.	University of Cambridge.
Sir Harry Melville, F.R.S.	Head of the Science Research Council.
Mr. E. Michaelson	Director of Computer Unit.
Mr. and Mrs. J.K. Michie	Dr. Michie's parents
Mr. R. Seaton	Administrative Assistant, Old College.
Mr. C.H. Stewart, O.R.E.	Secretary to the University.
Professor F. Stewart, F.R.S.	Dean of the Faculty of Science.
Mr. Christopher Strachey	Director of the S.R.C. Programming Research Group, Oxford.
Professor M.M. Swann, F.R.S.	The Principal of Edinburgh University.
Dr. G.E. Thomas	Director of Edinburgh Regional Computing Centre.
+ Dr. E. Michie, Dr. J.V. Oldfield, Dr. J.S. Collins, and Dr. R.M. Burstell.	

October 11th, 1966

A Party (one of many) 1967

**But atypical, as no
visiting American
AI researcher or
similar !**

“...one long party...”

Robin Popplestone

October 11th, 2002

Jim Doran, CCS AI Meeting

9

Mr. J.Z. Doran

Assigned 16.1.

MULTI-ACCESS PARTY

You are cordially invited to a multi-access party at
15 Hope Park Terrace on Friday, 20th January, at 8.45 P.M. to
celebrate:

- ** The arrival in Edinburgh of Professor Christopher Longuet-Higgins and Dr. Jim Hovs
- ** The arrival in the world of Penmi Montgomery's baby daughter
- ** The arrival in the world of Lyn Lester's baby daughter
- ** The engagements of Jane Aldred and Janette Dow
- ** The coming-of-age of Anne Hunter
- ** My flat-warming

** and as a send-off to Robin Gilmore and James Palmer

Please bring husband/wife/partner

R.S.V.F. Ext. 6296
(before 16th January)

Donald

DONALD MUELLER

[1967 20]

Democracy at Work! (1968)

Multipop during IPIP - It was suggested that we invite Ray Dunn and Derek Healy to constitute an action group to lay on long stretches of continuous Multipop during IPIP in such a way as is compatible with users' interests. They will report back on this.

Action - Ray Dunn and Derek Healy

Testing time for students - Roger Chambers - Owing to a "bug" on the PDP7 very little testing was carried out so Roger Chambers is being granted the same facilities for another month.

Action - Roger Chambers (in 1 month's time)

Computing rights for the Theoretical group - Donald Michie - Donald Michie proposed that the Theoretical group have prior right to 1 night per week 1.30 time, i.e. 10.00 p.m. - 8.00 a.m. on a designated night on agreed notice, and as a general principle to have rights similar to those enjoyed from time to time by the CAD project. Roger Chambers then put forward an amendment to the motion saying that in view of Christopher Longuet-Higgins' special relationship with the research work of the Department and to the original application for the upgrading of the Elliott 4100 that all full-time graduate members of his Department be invited to accept Associate Membership of the Round Table with full computing rights with effect from the formal separation of their group from the Department. Jim Doran seconded this and it was then agreed to by the Round Table. The motion as amended was then put and passed unanimously.

Action - Donald Michie

Computer users accounts - Derek Healy - Derek Healy produced a sheet showing the money made from outside users on the machine during the quarter April 1st - June 30th. It amounted to £172.17.0.

ANY OTHER BUSINESS

Request from Ray Dunn - Ray Dunn asked the Round Table if it would consider selling Multipop time to outside users. It was decided to defer this until more experience of the system had accumulated.

Training of S.C.L. programmers - Ray Dunn - Ray Dunn requested Multipop time for S.C.L. programmers involving four channels and a modest number of blocks. This will take place on either Wednesday or Friday. This request was supported by Donald Michie and then granted by the Round Table.

Action - Derek Healy

The meeting was closed at 12.06 p.m. The next meeting will be held on Monday 29th July at 11.00 a.m. at Hope Park Square.

*Capsius
it to
read!
24.7*

October 11th, 2002

Certified correct

EPU/DMIP Style

Centralised but Informal

Rational: Tough on Nonsense

*Social: National and
International Contacts (esp.
USA)*

Expansionist

EPU/DMIP Research (63/69)

Learning (e.g. MENACE, BOXES)

Heuristic Search (e.g. Graph Traverser)

“Agents” and Early Robotics

Multi-Access Systems Software (MiniMac,
Multi-Pop)

Language Development (Pop, Prolog)

Most has (partly) survived the test of time

Other Major AI Initiatives of that Time:

DM Report to SRC: Computing Science in 1964

DM Royal Society visit to USSR (1964)

AISB & AISB Newsletter (1964 onwards)

Meltzer's MetaMathematics Unit (1965)

The Machine Intelligence Workshops (1965 onwards)

Alex Andrew's USSR Survey 1967

The AI Journal (1970 onwards)

The Talk Plan

~~*Life at the EPU/DMIP (1963/9)*~~

*Why was the EPU/DMIP the
way it was?*

The People

“... all juniors and dropouts...”

Donald Michie, in 1991, on his EPU team

“... the notorious collection of anomalies and eccentrics in the wartime code-breaking establishment at Bletchley...”

Eric Hobsbawm 1994, “Age of Extremes”, p 526

Fleck's Insights

James Fleck, in his valuable 1982 history of AI, suggests that DM was greatly aided in the establishment of the MIP Dept by:

*a climate of expansion in the
Universities*

the support of Michael Swann

Some AI in UK before 1963 (defining AI broadly)

Off duty talk at Bletchley Park (ca 1943)

Turing's NPL paper (1947)

The Ratio Club (1949-58)

Turing's Mind paper (1950)

Ross Ashby's "Design for a Brain" (1952 & 1960)

"Faster than Thought" (1953)

Grey Walter's "The Living Brain" and his
pseudo-Turtles (1953)

NPL Symposium on "Mechanisation of Thought
Processes" (1958)

Michie on Game Learning (1961/3)

Some AI in USA before 1963 (defining AI broadly)

McCulloch and Pitts (1943)

Shannon on Chess (1950)

Dartmouth AI Workshop (1956)

“Automata Studies” (1956)

Newell, Shaw and Simon’s GPS (1958)

Rosenblatt’s Perceptron (1958)

Samuel’s Checker Player (1959)

MIT AI Lab founded (1959)

Stanford AI Lab founded (1962)

“Computers and Thought” (1963)

The Meme Stream

*It's the ideas that matter
as they get passed down
the generations!*

The Impact of Bletchley Park

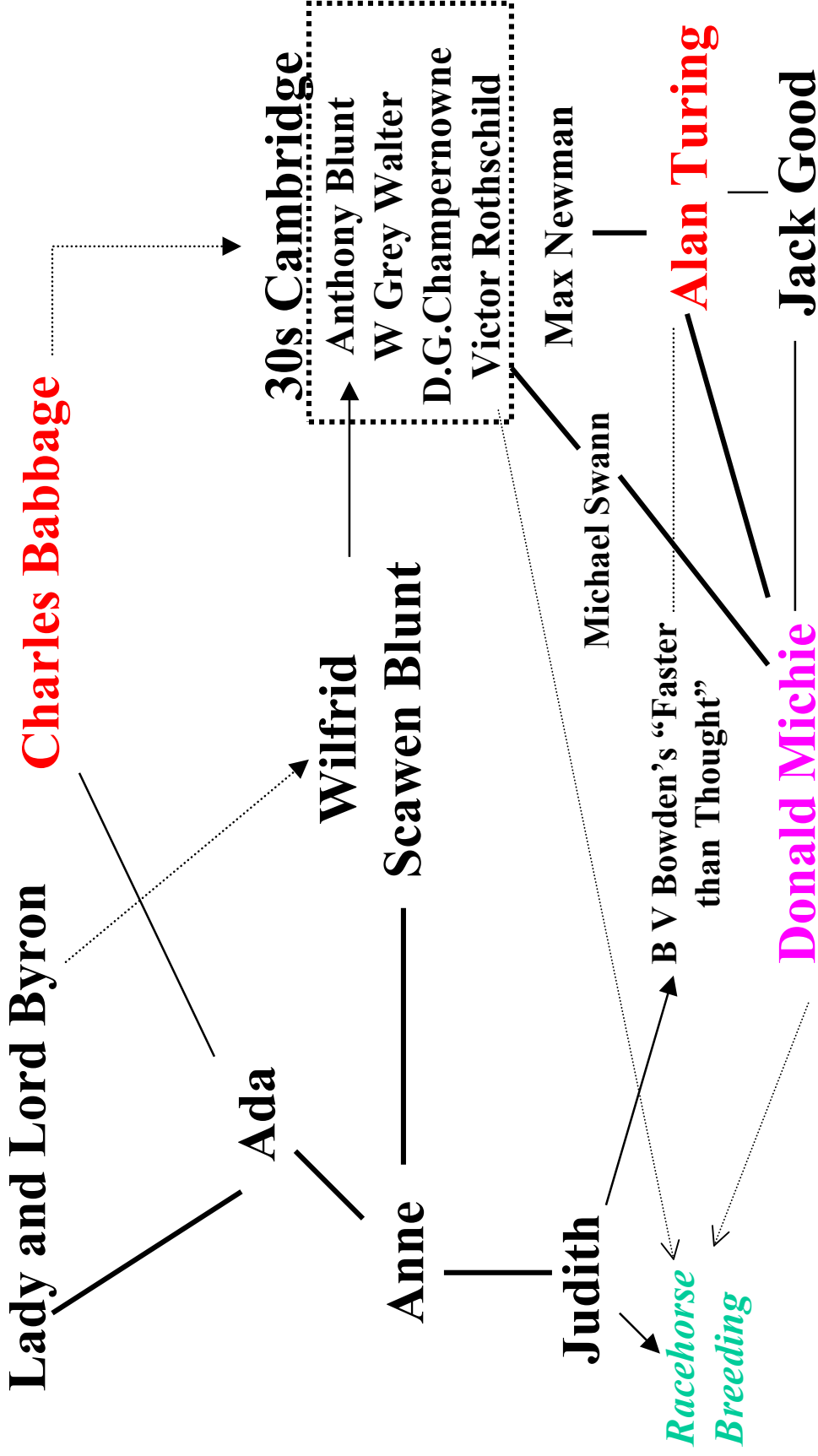
“... my whole professional life really was fundamentally affected by those three years [at Bletchley Park], and I am sure by the people.”

.....

“ [The EPU] was run by what we called ‘The Round Table,’ which I set up and modeled exactly on Newman’s tea party.”

Donald Michie interviewed in 1991

Some Earlier Connections



So what might have been expected at the EPU?

Social Energy and “Upper Class”

Self-Confidence

Anti-Convention and Anti-Bureaucracy

*Progressive and Anti-Imperialist
Thought*

Mathematics (and maybe poetry)

And indeed all were there!

The Talk Plan

~~*Life at the EPU/DMIP (1963/9)*~~

~~*Why was the EPU/DMIP the
way it was?*~~

What happened afterwards?

What happened afterwards?

The great “falling out”
(circa 1970)

The Lighthill report
(1973)

Researchers on the Move
(see Fleck’s Paper)

Chilton Atlas Lab *(Director: Jack Howlett)*

Research Fellows included:

Jack Good (to 1967)

P. O'Donald (to 1967)
(GAs/Alife)

Jim Doran (1969-73)

(AI and Archaeology)

Uni. Essex AI : (1973 – ca. 1979)

(recruited by Tony Brooker)

Floor 4B People

Richard Bornat

Mike Brady

Jim Doran

Pat Hayes

Bernard Suffrin

Ray Turner

+ *Tony Cohn, Jorg Siekmann, Bob Wielinga, Yorick Wilks et al*

Early Essex AI Research

Floor 4B Projects

Fortran Coding Sheet Project

Naïve Physics Manifesto

The Evil Language

.....

What has survived the test of time?

Pat Hayes' "Naïve Physics Manifesto"?

Contrast....

EPU/DMIP *Centralised with
Strong Charismatic Leadership*

Atlas Lab *Individual Researchers*

Essex Floor 4B *Cooperation and
Competition in a conventional
academic setting*

Which was/is most effective? Not obvious!

Later AI Research at Essex (1980-2002)

Planning

Machine Learning

Vision

Robotics

Constraint Satisfaction Problem Solving

Neural Networks

Agents

Genetic Algorithms

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way it was?*~~

~~*What happened afterwards?*~~

Has AI failed?

AI: Success or Failure?

Much solid detailed work, and many applications

The “original” application, chess (which interested both Babbage and Turing), has gone relatively well (consider ongoing match between Kramnik & Deep Fritz)

But many disappointments and a widespread feeling that the goal of “real”, general intelligence remains far away

And not much “Basic” Intelligence Theory?

(see DM re. Lighthill report)

AI History

At the outset – *Heuristic Programming* v *Logic* v *ANNs*

- Game-playing, chess, machine learning,
problem solving, natural language, planning,
vision, heuristic search, theorem proving,
perceptrons, semantic nets, frames
- **robotics, expert systems, ANNs, fuzzy systems, cps,**
distributed AI
- **artificial life, animats, GAs and GPs,**
- **agents and multi-agent systems**

An Observation

To "take off" ideas need (a) enabling technology and (b) a good publicist. Very often (crude forms of) the ideas long predate the enabling technology they need for their development

e.g. General Purpose Digital Computer, Chess Playing Programs, Evolutionary Computation

AI: symptoms of disorder?

Waves and Fashions

Sideways Moves

Fragmentation

Denial

Causes of disorder?

Too many pre-conceptions?

Muddled Methodology?

*Career structure and requirements
discourage depth and persistence?*

*Funding (now) too much oriented to
short term applications?*

Final Questions....

Is AI nevertheless broadly on course?

Has mathematical logic been a distraction?

Could the development of the digital computer have sent us down a wrong road?

Is there something important missing (e.g. quantum IP)?

Will AI (and Cognitive Science) soon be overtaken by bio-molecular accounts of cognition and intelligence?

???