The IBM UK "Hypermedia Browsers - GPE" PROJECT 1990

Peter Ward & Colin Parrott
The University of Leeds School of Medicine

Establishing The Hypermedia Browsers Project
The IMP Initiative

Late in 1989, The New Technologies Group at IBM Hursley Park returned from IBM Texas with a brief to explore "multimedia" and on the new platform – The IBM PC-RT Workstation, and employing AIX, X11, TCP-IP and the new OOPLs of which C++ was the only readily available example at that time.

I had been given the name of a senior IBM person at Hursley Park and I left him 10 voicemails which he picked up upon his return from Texas! He called me and I told him what I had in mind. He asked me to meet his team in London outside an Underground Station as they were en route to Winchester so that I could explain what I had in mind, my ideas and my proposal for a project. They were very intrigued about my ideas and my proposal which fitted as a glove to their new brief from IBM Texas! I submitted my proposal the next day and it was funded. It allowed me to establish The IMP Initiative - the Information Modelling Programme - an initiative to create a new way of modelling large and complex systems and domains and representing them in schemata realised as computer-based "hypermedia graphical browsers". Our stated aim was to design and develop a new "information modelling tool" – in order to reproduce the original 1988 exemplar concept demonstrator 'The HNS Browser'.

The HNS Browser, 1987
Demonstrated at BCS HCI Special Interest Group Poster Session Glasgow 1989
Created and displayed on Compaq Portable 286, donated by Compaq

Dr. Peter Ward University of Leeds School of Medicine, 1987
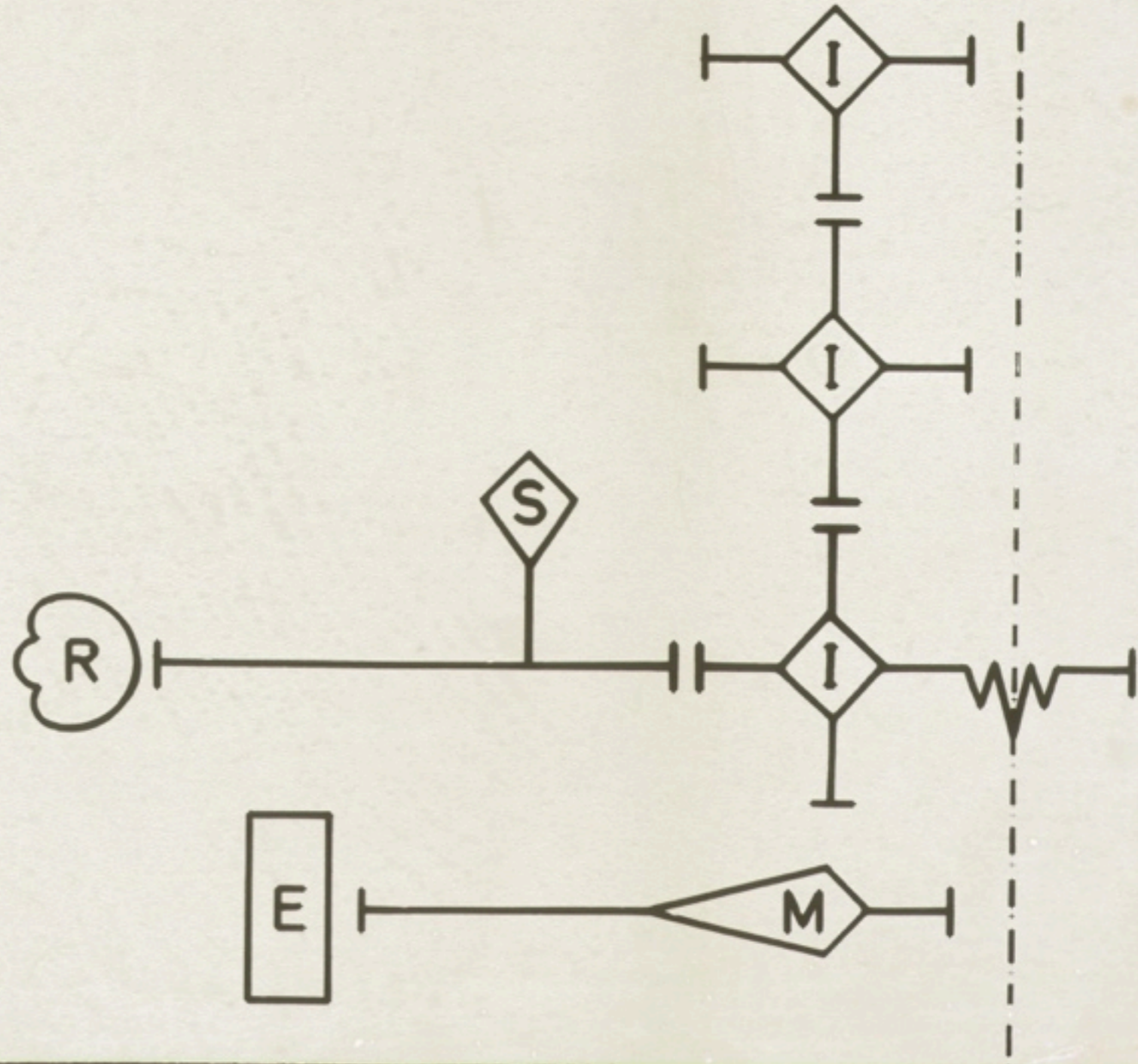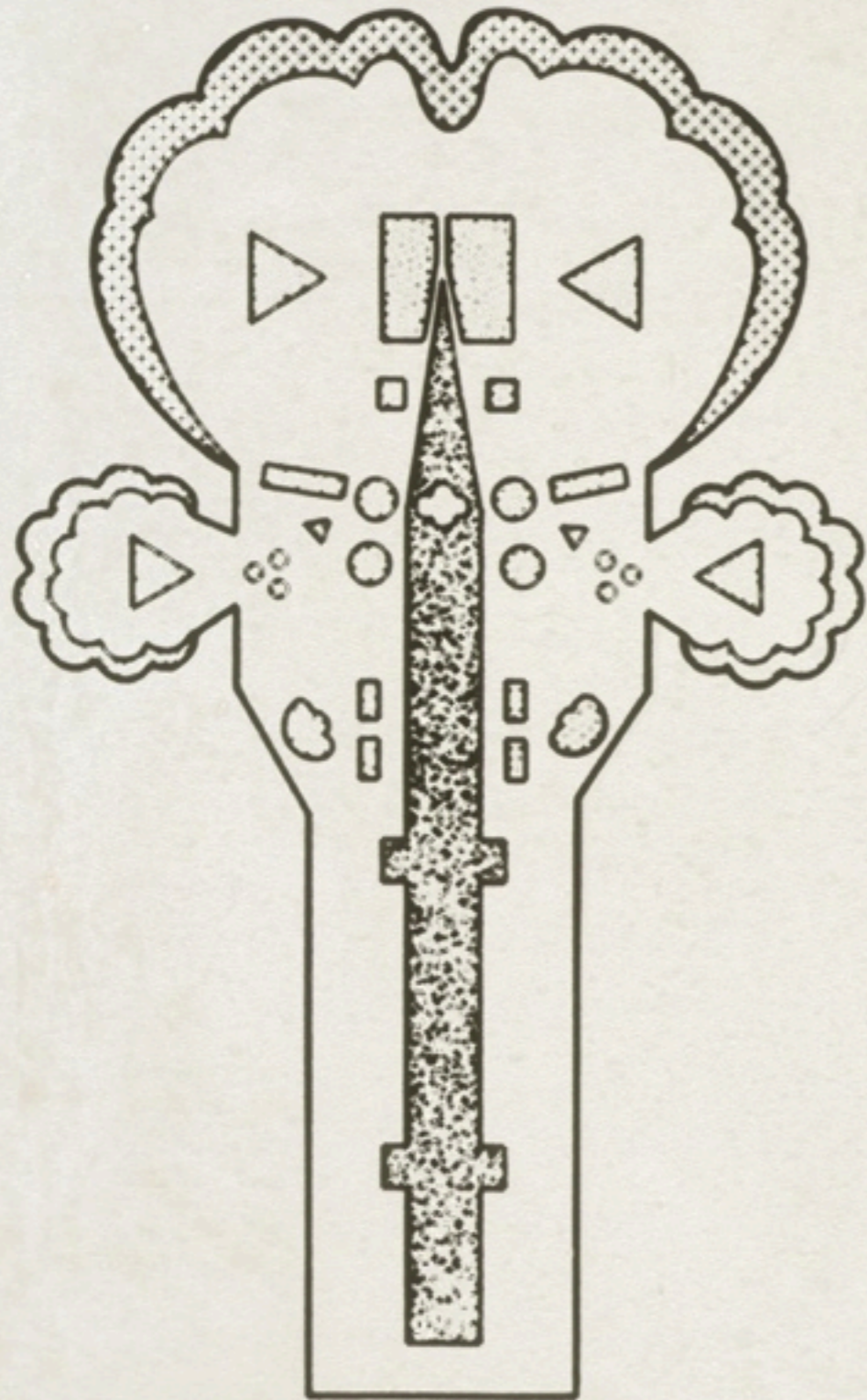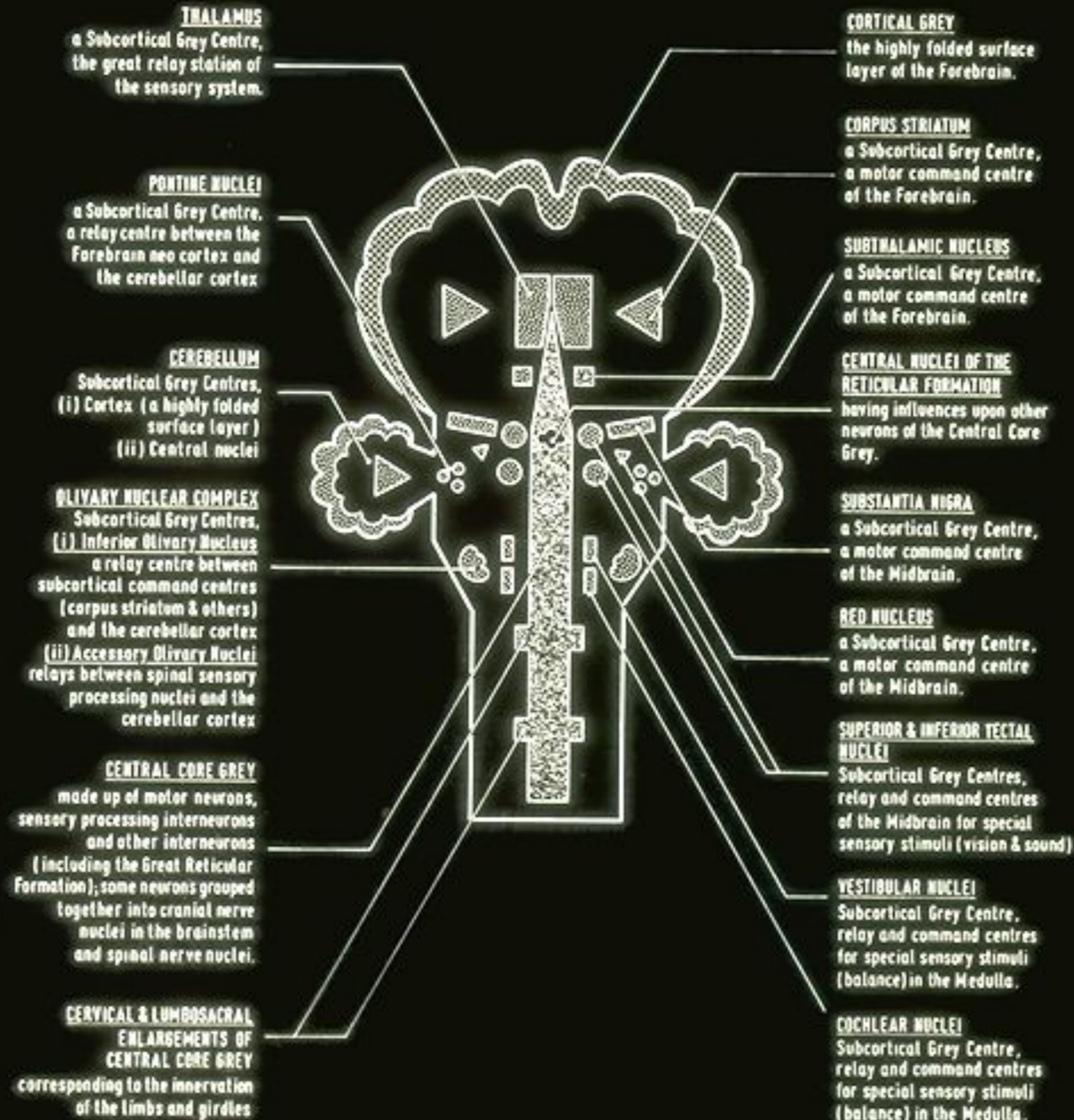
"IDEAGRAMS"

DIAGRAM ILLUSTRATING THE ORGANISATION OF THE HUMAN NEURAXIS

THALAMUS
a Subcortical Grey Centre, the great relay station of the sensory system.

PONTINE NUCLEI
a Subcortical Grey Centre, a relay centre between the Forebrain neo cortex and the cerebellar cortex

CEREBELLUM
Subcortical Grey Centres,
(i) Cortex (a highly folded surface layer)
(ii) Central nuclei

OLIVARY NUCLEAR COMPLEX
Subcortical Grey Centres,
(i) Inferior Olivary Nucleus a relay centre between subcortical command centres (corpus striatum & others) and the cerebellar cortex
(ii) Accessory Olivary Nuclei relays between spinal sensory processing nuclei and the cerebellar cortex

CENTRAL CORE GREY
made up of motor neurons, sensory processing interneurons and other interneurons (including the Great Reticular Formation); some neurons grouped together into cranial nerve nuclei in the brainstem and spinal nerve nuclei.

CERVICAL & LUMBOSACRAL ENLARGEMENTS OF CENTRAL CORE GREY
corresponding to the innervation of the limbs and girdles

CORTICAL GREY
the highly folded surface layer of the Forebrain.

CORPUS STRIATUM
a Subcortical Grey Centre, a motor command centre of the Forebrain.

SUBTHALAMIC NUCLEUS
a Subcortical Grey Centre, a motor command centre of the Forebrain.

CENTRAL NUCLEI OF THE RETICULAR FORMATION
having influences upon other neurons of the Central Core Grey.

SUBSTANTIA NIGRA
a Subcortical Grey Centre, a motor command centre of the Midbrain.

RED NUCLEUS
a Subcortical Grey Centre, a motor command centre of the Midbrain.

SUPERIOR & INFERIOR TECTAL NUCLEI
Subcortical Grey Centres, relay and command centres of the Midbrain for special sensory stimuli (vision & sound)

VESTIBULAR NUCLEI
Subcortical Grey Centre, relay and command centres for special sensory stimuli (balance) in the Medulla.

COCHLEAR NUCLEI
Subcortical Grey Centre, relay and command centres for special sensory stimuli (balance) in the Medulla.

From Paper-Based Schema to Computer-Based Browser

- Computer-Based Browser: Active (composition of Key System Elements in logical sequence into a meaningful array)

- Paper-Based Schema: Key System Elements - Static, festooned with Labels; graphical lines not part of the system structure

- Computer-Based Browser: Interactive (constructivism, constructionism) (analysis and representation and active cognitive and modelling exercise)

- Reducing Scale & Complexity; A 'Big Picture'

- Meta-Model with Hyper-Links to Detail; An Interface

- Hyper-Graphics, Hyper-text; Paivio's Dual Coding Theory

THIS IS A SCHEMATIC DIAGRAM OF THE NEURAXIS (CORONAL SECTION).

COMPONENTS ARE:-

1. Central Core Grey (CCG)
   in the spinal cord and
   brainstem.

2. Subcortical Grey (SG)
   in the brainstem and
   forebrain.

3. Cortical Grey (CG)
   in the forebrain.

The GPE, 1990
Created and displayed on the new IBM PC RT Workstation AIX/X11 Windows/TCP-IP/C++

The GPE, graphical programming environment
A visual tool for visual information modelling: browsers, hypermedia interfaces.

Created and delivered on IBM PC-RT Workstation. Employing state-of-the-art games programming techniques, UNIX/AIX, X11 Windows, TCP-IP , an OOPL, C++ and the new platform – The IBM PC-RT Workstation, with its AIX OS and high-resolution colour display, 11 months later we delivered 'The GPE' graphical programming environment. 'The GPE' demonstrated graphical construction of information models and graphical browsing, including "hypertext" and "hyper-graphics".

One of the outcomes of The GPE Project was the realisation that C++ was really not entirely satisfactory in a number of respects and we subsequently discovered Eiffel as a good approach equal to structured software engineering where the aim was the realisation of our vision of interactive hypermedia information modelling.

SEE "The GPE graphical programming environment" 'TOOLS 91' Technology of Object-Oriented Systems

SEE The GPE 1990, pdf

SEE The Magic Browser Website: http://www.magicbrowser.co.uk/evolution/gpe/index.html

Nerve Fibres and Synapses

Nerve Fibres are the extensions of neuron cell bodies.

They propagate electrochemical signals. They make up the White Matter of the Neuraxis (the majority are insulated with Myelin). They are arranged into Tracts.

Synapses are junctions between nerve fibres, neurons and effectors.

This example shows synapses at which chemical messengers (Neurotransmitters) effect the link.

Rectangle

Image

Text

Resize

Move

Copy

Select

Query

Colour

Protection

Destroy

Exit
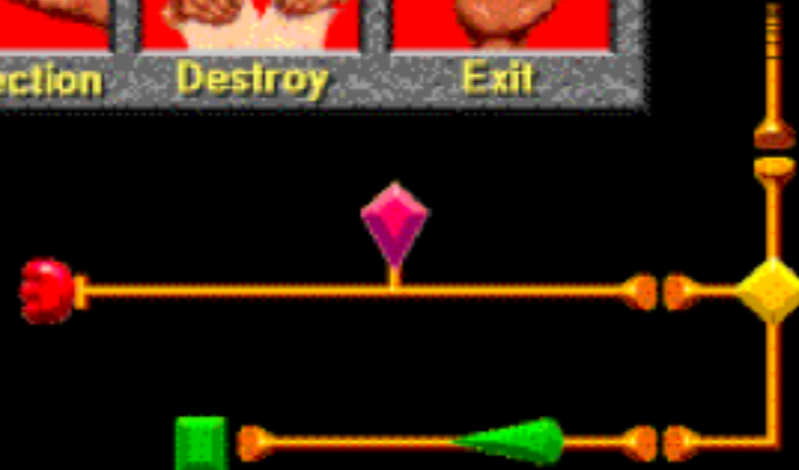
Go to Simulation Mode

The GPE
Applied to Object-Oriented Graphical Prototyping

The HNS Browser was 'handcrafted code' (a variety of Basic). The idea of the Hypermedia Graphical Browsers Project was to create a new tool to enable such as The HNS Browser (and any other system browser) to be constructed - with a simple and easy to use tool.

The GPE was an essentially *graphical* programming tool – enabling users to manipulate and program the behaviour of graphical objects via a tool-based interface. An experimental prototype hypermedia application authoring tool. It demonstrated principles of the object-oriented paradigm and object-oriented programming e.g. class libraries, encapsulation, machine-independent distributed on a network. The GPE demonstrated the feasibility of using an object-oriented tool metaphor for hypermedia and prototyping applications. It provided a framework for serious evaluation and development and was a useful prototyping tool in its own right. The implementation used a variety of novel techniques that could be transplanted into other applications. Indeed, we took the GPE to a group in Bochum University, Germany who had for 2 years been engaged in a major EC ESPRIT project on prototyping user interfaces in the design of telecoms devices, and, to the amazement of the research group there, in the space of 45 minutes, we were able to construct a working simulation of a telecoms terminal with the GPE!

SEE The GPE graphical programming environment doc

The GPE employed at The University of Bochum ESPRIT Project The Siemens Interactive Terminal Mock Up, 1991
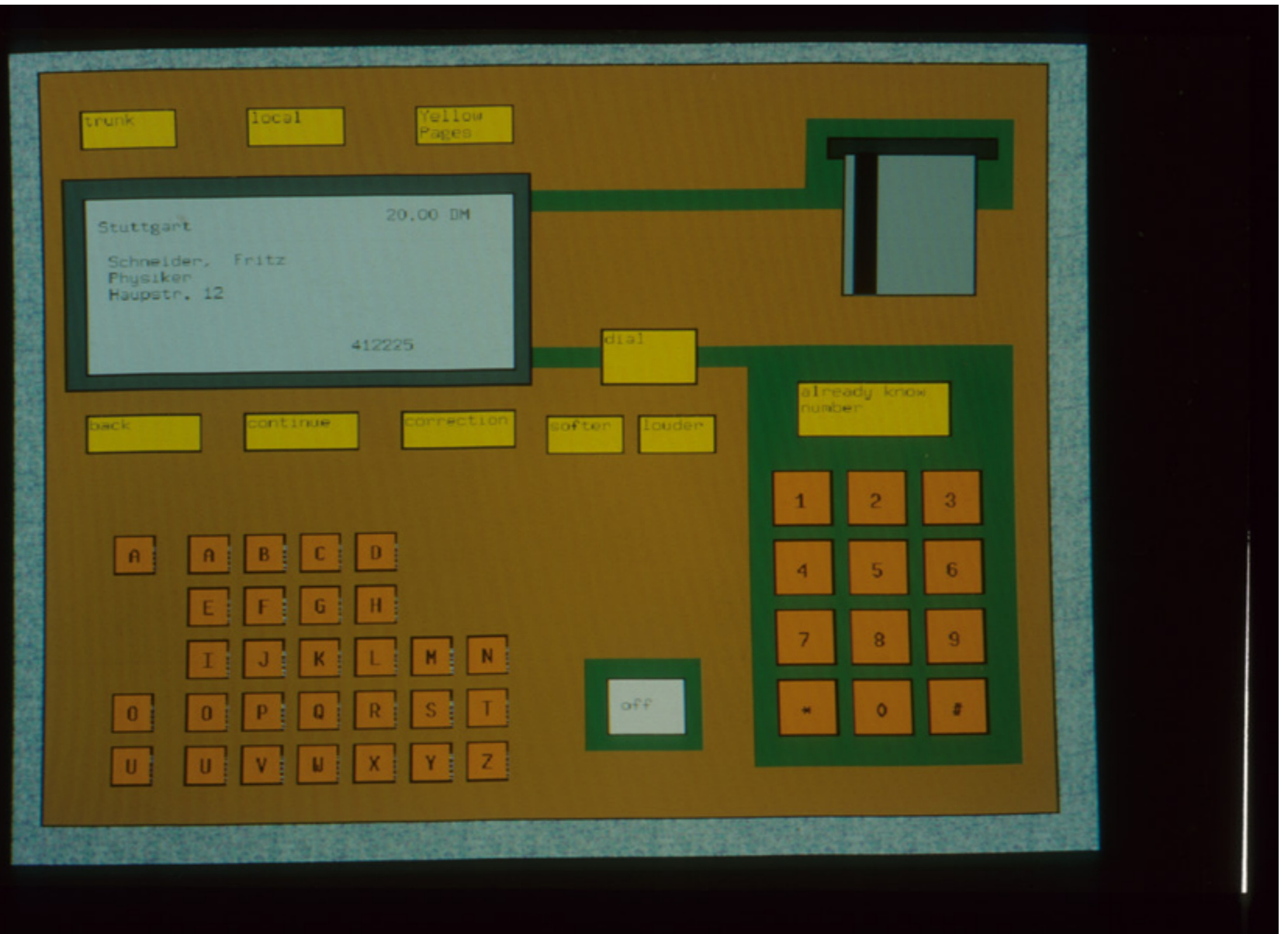
Professor Bertrand Meyer, Designer of The OOPL Eiffel

We subsequently met with Bertrand Meyer, the originator of the new pure OOPL Eiffel who was interested in The GPE Project and our strategy of employing the OOP and OOPL.

He introduced us to Eiffel and we proceeded with a programme of user-led R&D – applied within a context of education and library science – in the prototyping of an evolutionary series of object-oriented hypermedia information modelling tools.

He invited us to present the tools and applications at a series of TOOLS Conferences in Europe and USA during the 1990s, and to explain in Tutorials our technical strategies in generic and modular Hypermedia Class Construction, Real Working Software for MultiUser Applications distributed on The Network, and attractive and engaging and minimal GUI/Hypermedia User Interface design.
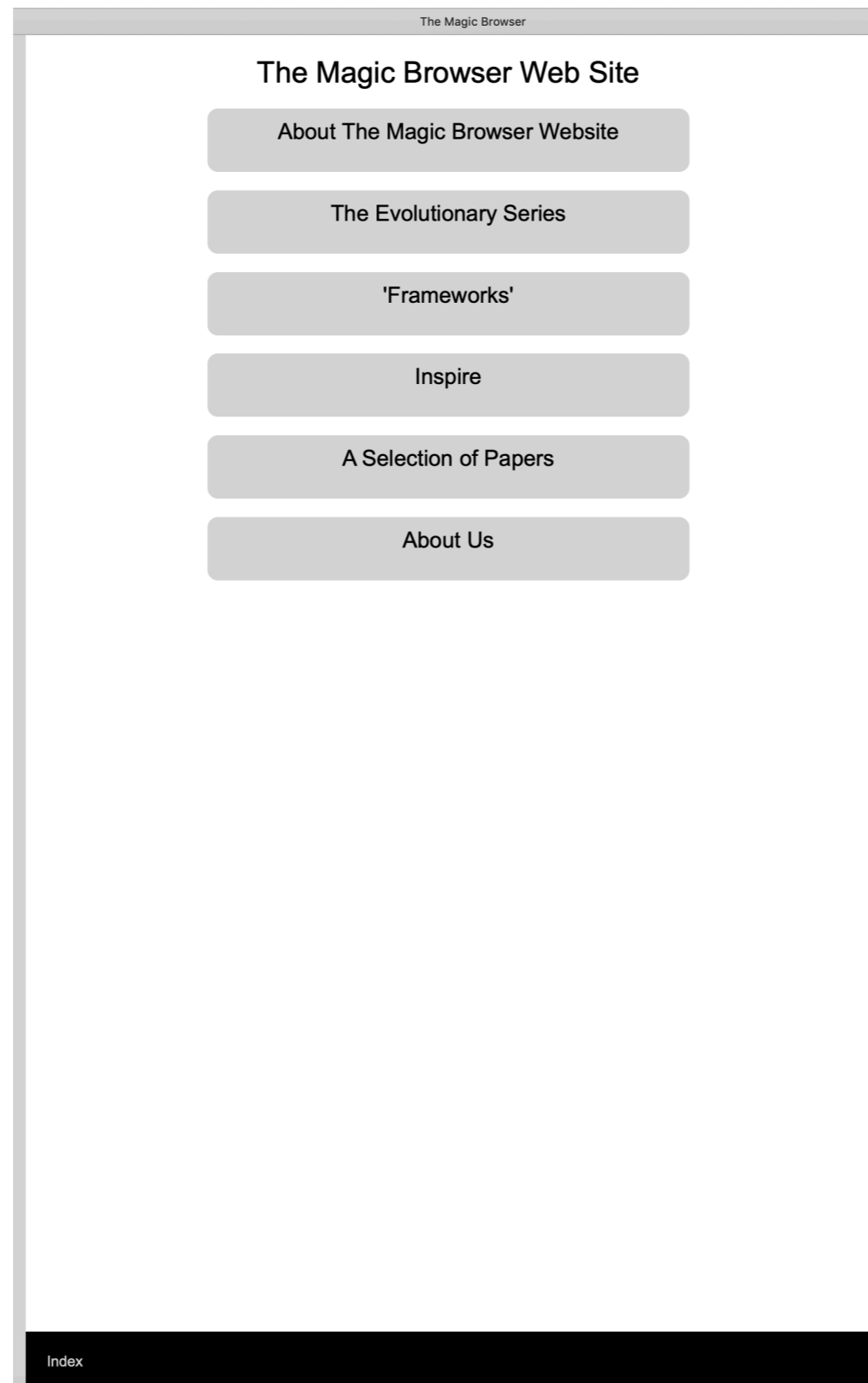
SEE http://www.magicbrowser.co.uk/evolution/index.html

'The Media Language' 1991 – an evolution of 'The GPE'

The Magic Browser Website:
http://www.magicbrowser.co.uk/evolution/index.html

The Magic Browser

The Magic Browser Web Site

About The Magic Browser Website

The Evolutionary Series

'Frameworks'

Inspire

A Selection of Papers

About Us

Index

1. The GPE as an Example

1. Supporting 'Blue Skies' Ideas from UK Universities

The fact was that I put my enthusiasm and ideas to IBM – who almost without hesitation, grasped these and without further ado (a minimum of project proposal protocols) launched a new promising project. I am very pleased and proud to record that we fulfilled, actually we exceeded, all expectations in the delivery of 'The GPE'. Ian Brackenbury debriefed me and told me that of the 5 projects initiated with third parties by IBM around the world, during that year 4 projects had been closed but not mine because our progress was remarkable and my enthusiasm dangerous! This was the time when apparently IBM was engaging in a major reassessment of its business strategies. The support that IBM gave me at that time was the catalyst and life-blood of my subsequent work: for as a lecturer in human anatomy, guess how the formal academic domains had greeted my proposals! The Leverhulme Trust and Nuffield Foundation were very interested in my proposals but they could not take the last step and suspend disbelief in my proposal to develop novel object-oriented software employing a games programmer – where they urged me to take the conventional route of employing a post doc in computer science and to use an expert system. IBM grasped the opportunity to support 'Blue Skies' thinking from an individual and unconventional source!

2. The GPE as Demonstrator of OOT applied to Multimedia in 1990 (New Technologies, PC RT AIX High Resolution Screen)

2. The GPE was original and innovative – it was an exemplar, a demonstrator, of "new Technology' – indeed a demonstrator of distributed machine independent object-oriented hypermedia which we went on to develop further in the 3 years *prior to the invention of the World Wide Web.* In fact, where the WWW, the HTML standard and web browsers were essentially hypertext-text based, 'The GPE' and the information modelling tools my group subsequently developed and prototyped *were essentially graphical and visual.* I am currently completing the text of a book: **"'Frameworks': Making Sense of It All in The Age of Big Information".** The genesis of 'Frameworks' is 'The HNS Browser' 1987 and the IBM UK Project: 'The GPE'.

In the early through mid 1990s – "computer-based multimedia" became a band wagon – for hardware manufacturers, for software applications enterprise, and for such as universities e.g. in the TLTP initiative (teaching and learning technologies programme). The world and his wife chased funding for "computer-based multimedia gadgets" – resulting in crates full of software and applications mostly hand-crafted idiosyncratic Windows things, otherwise Apple OS things. Meanwhile I continued – somewhat in the wilderness - with my original technical strategies of games programming, modular structured and correct software engineering employing distributed computing on the network employing UNIX, X11 Windows, TCP-IP and OOT the OOPL Eiffel. Recognised and supported by professor Bertrand Meyer the originator of Eiffel I was invited through the 1990s to give seminars on my work at a series of TOOLS Conferences in Europe and USA.

3. Walking the Talk: Evolutionary Software Development and Simple Working Software

3. Recognised and supported by professor Bertrand Meyer the originator of Eiffel, we seized upon the opportunity to employ this pure OOPL. Colin Parrott - as an accomplished games programmer and with a special interest in computer language design - designed and built a series of novel software as we prototyped applications and hypermedia user interfaces and we delivered a series of Eiffel-based hypermedia projects to end users through the 1990s - in a spectrum of domains - The Sciences & Medicine, The Humanities and Textile Industries and Libraries - I was invited to give seminars on my work at a series of TOOLS Conferences in Europe and USA. The programmers and the enterprise managers wanted to know how we had done it - how we had used Eiffel to evolve the series of applications - as attractive, engaging teaching and learning applications including the management of users and files distributed on campus networks in the domain of university and college education.

The reality was that through the 1990s – I had to fight for every project – where user-led projects were key to iterative software evolution – and where my original technical strategies of games programming, modular structured and correct software engineering employing distributed computing on the network employing UNIX, X11 Windows, TCP-IP and OOT the OOPL Eiffel were unconventional and bucked the trend.

Not conventional academic research in the domain of computing science – my focus was on proof of concept in tangible software that real people could use. People-centred software. I did publish some of the work and I was invited to contribute to various journals and books dealing with the new object-oriented technologies – but my principal focus was on sustaining my research group IMP and realising the ideas original and as they evolved.

All made possible by the blue skies thinking and sense of adventure of The IBM UK New Technologies Group at IBM UK Hursley Park.