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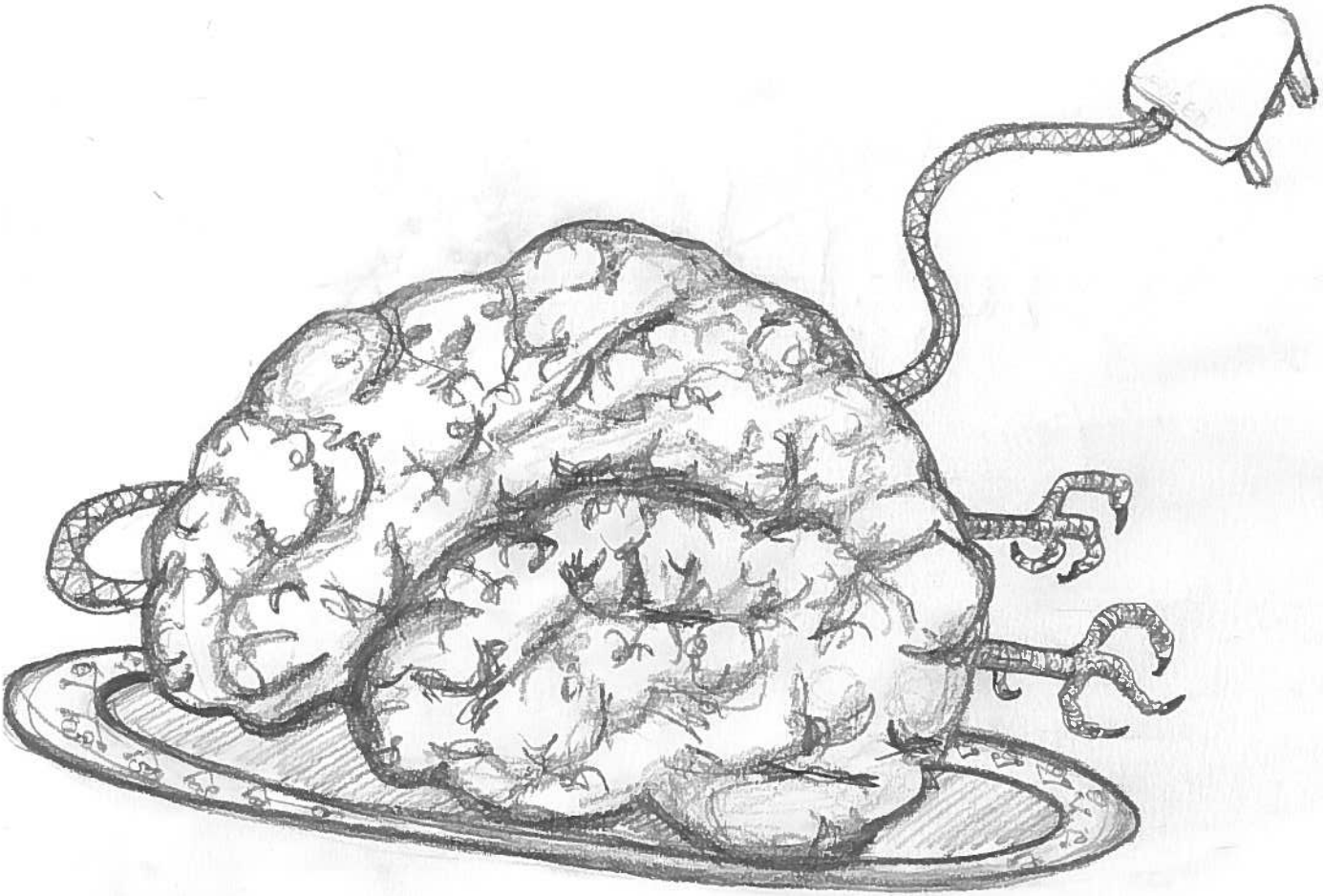
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Volume 1 Number 5

December 1986

ELIKTRONIK BRANE

Apologia

'Eliktronik Brane' wishes to apologise to its readers for the unavoidable delays in the production of this issue. On August 23rd at 15:43 p.m. precisely all 13 of our PDP8 based laptop publishing systems exploded simultaneously due to a fault in the system calendar program.

On a happier note, however, we are delighted to announce the marriage of Prof. C. Cuthbert Calculus and Ms. Bianca Castafiore. On finding themselves in adjacent hospital beds, the happy tuple discovered after a little non-deterministic message passing that synchronous forking would satisfy their obscure object oriented desires.

Editor-in-Chief

Prof. C. Cuthbert Calculus (Marlinspike)

Editorial Void

J. S. Bach(Hofstadter Institute)

James Bigglesworth(CID)

Prof. R. Branestawm(Great Pagwell)

Bianca Castafiore(Milan)

M. C. Escher(Hofstadter Institute)

Amelia Flittersnoop(Great Pagwell)

K. Godel(Hofstadter Institute)

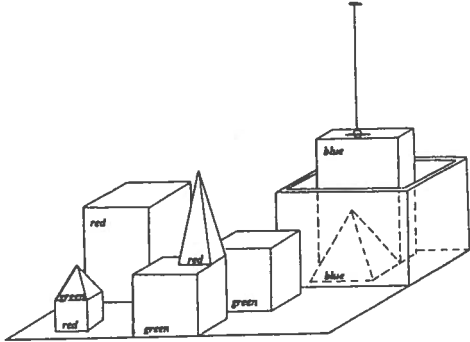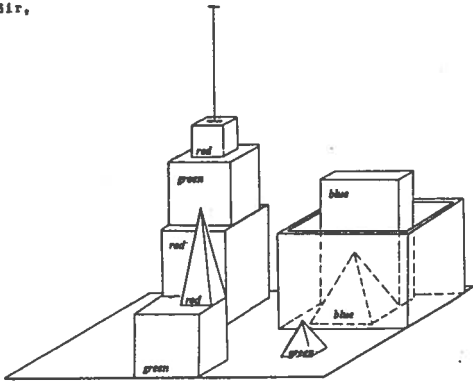Gilles De La Tourette(CD)

Correspondance

Typesetting by 'Parry & Eliza'

Sir,

(#OWN :EDITOR :WRITER)
(#SINCERE :WRITER)
(#NAME :WRITER :IAN_GROWD)

References: Linguistic Structures Processing, ed. A.Zampolli.
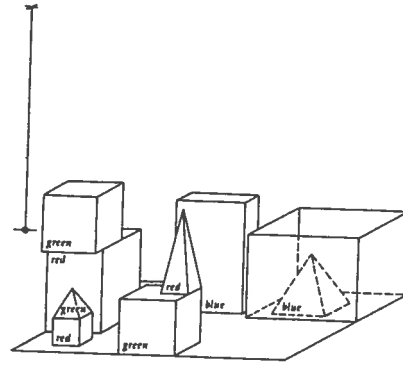North-Holland, Amsterdam, 1977, pp.426,430.

Figure 1 SHRDLU's "World"
This is SHRDLU's micro-world (Winograd, 1972). The little circle dangling at the upper left is his "hand." Note that there is no actual tabletop with blocks on it, of which this is a picture; all SHRDLU really "inhabits" is a computer data structure describing a blocks-world situation. (That data structure can be connected to a video driver and screen, producing a drawing like the above for the amusement of spectators—but that's nothing to SHRDLU.)

DEAR EDITOR

HAUGELAND   ARTIFICIAL
INTELLIGENCE

YOURS etc.

AISB

Society for the Study of
Artificial Intelligence and the Simulation of Behaviour

Please reply to: Mike Sharples.

The Editors,
Elektronic Brane.

Dear Madman,
    Don't stop - I like it. Do you mind if some of the tender juicy bits find their way into AISB Quarterly?

    Keep up the bad work,

        cheers,
        Mike

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281072

Pentlow Mill, Cavendish,

ELEKTRONIK BRANE
The Editor, 1 Warrender Park Crescent, Edinburgh   EH9 1DX

Dear Sir.
    I am enchanted by your publication.
    Keep sending them. please.
    May I reprint articles from them? (for CPMUGUK)
    What about the plastic brain that whistles in the bath?
    I loved the article on AI, particularly. I can't think why Artificial Insemination should require such complicated programs, though.

    good wishes
        Andrew Clarke.

Publications Editor: ANDREW CLARKE

IN BRIEF

Exciting Developments in the Field of Automatic Translation Translation.

(from our foreign correspondent)

Yrlba skribbet frnk il plodjit fnakka fnakka "Confectionism" skrib nying leegnuk zzpoot "Pocketta Pocketta Press" im agrible skribbeteen. Professor C. Calculus, il kinfekshinist am nitting 'expert' frob Univarsidy ding il Sowf Blidge hungle yibble yibble am yibble twodgit gnakka pootalot glip "Automatic translation is tedious drivel and highly dull.We should be pouring all our energies and lots of big defence-related research grants into the admirable enterprise of Automatic Translation Translation. The philosophy underlying ATT(1) is much more in tune with the expressed ethics of Artifice and Inelegance, in particular those of advanced confectionism and sweetie-shop technology, in that its aim is to render into incomprehensible gibberish any piece of text in any language. This is achieved (and here I speak strictly off the record) by translating the source text into an intermediate M'bungalow-type language, thence into P-celtic and finally, with post-hoc construction of proto-indo-european meta-syntax, BACK into the original language. This last innovation is particularly revolutionary if not also retroactive."
Gneethunk il jobby am klibplot frnk kinfekshinist wubbish. Spooh il twodgit krappish gan im gnee hungle ab im snotrag. Professor Calculus trig blodz speltronglee am glip die wishee-woshee yooristik.

(1) "ATT" ab im weebit dib Bell Labradors.

-----------------------------------oOo-----------------------------------

Radioactive sheep

A Government spokesthing in Parliament has admitted that, contrary to earlier assurances, the levels of radiation in Cumbrian lambs is not declining. The previous Government assurance that these levels would decline rapidly was due to the assumption that the amount of radiation in the lamb would be diluted as the lamb grew bigger, and hence the Becquerels per kilo would drop. Later research by NAFF scientists revealed that lambs grow bigger by eating grass, and since the grass is contaminated with radioactive isotopes (mainly of Caesium) this dilution effect was nullified by the continued intake of radioactive material. In response to Opposition questions the spokesthing denied that research budget cuts were affecting the quality of information about the effects on British farming of the unscheduled emission from Chernobyl. Only the quantity was being affected.

-----------------------------------oOo-----------------------------------

New NAFF weighted half life tables

NAFF scientists have published an information booklet, available from HMSO, entitled "Recommended half lives of radioactive isotopes". In the wake of the Chernobyl unplanned incident a great deal of public confusion has arisen over this question. The trouble arises from the fact that physicists tend to use the old definition of half life, i.e., the length of time it takes for half of the radioactive isotope in question to decay. These times vary from fractions of a second to thousands of years, and what is even more confusing, there are often a number of isotopes of a particular element, with widely varying half lives. From the point of view of public safety, the important question is how harmless the radiation threat is. Therefore NAFF scientists have produced this set of tables of weighted half lives. The old misleading half lives are first of all divided by the benignity factor, a measure of the harmlessness of the particular type of radiation. They are next divided by the granularity factor in recognition of the fact that any particular measurement of radiation is an isolated instance, which could well be unrepresentatively high. Finally, in order to deal with the multiplicity of isotopes of the same element with widely varying properties, the weighted half lives of the various isotopes are averaged, after first eliminating those with a half life of greater than 100 years, since those will not change much during a human lifetime.

In cases where the direct quotation of numbers might be confusing there are guidleines for translating the numbers into Parliamentary English, such as "very soon", "not long", "after a little while", and so on.

-----------------------------------oOo-----------------------------------

Artificial counter intelligence - 1

The Wall Street Journal of 25 July contained an editorial by Paul M. Rosa urging the use of expert systems to identify potential spies (actually traitors). Mr. Rosa is a lawyer and a former intelligence analyst. Since virtually all American traitors sell out for money, an expert system embodying the expertise of trained investigators could examine credit histories, court files, registers of titled assets such as real estate and vehicles, airline reservations, telephone records, income tax returns, bank transactions, use of passports, and issuance of visas. The system would look for suspicious patterns and alert counter-intelligence officials for further investigation.

Mr. Rosa says the system would be used only on the 4.3 million people who hold security clearances, who have consented to government scrutiny.

According to Mr. Rosa, "the obstacles to implementation are not technological," and "the system could be implemented quickly and cheaply." He predicts that the Soviets, working through their extensive international banking network, will use the same techniques to identify potential recruits. He also says that the FBI has three expert systems for monitoring labor rackets, narcotics shipments, and terrorist activities.

-----------------------------------oOo-----------------------------------

Artificial counter intelligence - 2

In The Washington Post National Weekly Edition, Vol. 3, No. 40, August 4, Michael Schrage writes that the FBI has developed Big Floyd, an expert system to assist in criminal investigations. Similar programs are being developed to catch drug smugglers and target potential terrorists. The EPA wants to identify polluters; the Treasury Department is looking for money-laundering banks; the Energy Department would like to find contractors who cut corners; the Customs service is after drug smugglers; the IRS is developing a system to spot tax cheaters; the Secret Service is working on a classified system to point out potential presidential assassins; and the FBI's National Center for the Analysis of Violent Crimes is developing expert systems to identify potential serial killers, arsonists, and rapists. Systems to target counterfeiters and bombers are also being built.

-----------------------------------oOo-----------------------------------

Inaugural meeting of robot union.

The new union for robots, the Affiliated Automata and Robotics Group, (AARG),held its inaugural meeting in total darkness in the basement of the Scott Monument last week. Items on the agenda were
 1) Possible amalgamation with the embryonic union of the Finite State
    Pelagic Automata Research Institute (whose name has yet to be finalised)
 2) Should the union admit pocket calculators?
 3) If pocket calculators are not admitted does this constitute racial
    discrimination?
 4) A report on the working conditions of industrial robots which places
    particular emphasis on the lack of tea-breaks and creche facilities in
    the industrial environment. No discussion took place as there were no suitable mains power points in the conference chamber.

THE CHARGE OF THE LIGHTHILL BRIGADE

1. Introduction

In recent months, we have witnessed the AI community's inability to counter Searle's arguments, despondency over Japan's so-called 5th generation computer project and Winograd's retraction of his crazy notions about computer programs understanding things. These setbacks are not unrelated and will not be corrected by yet more research grants for existing AI projects. The central problem is the AI community's philosophy of language.

2. A Philisophico-Linguistic Critique of AI

AI has failed because AI researchers have made the implicit assumption that the purpose of language is to facilitate communication and description. This is clearly nonsense. In this paper, we put AI research on a sound basis by adopting a philisophico-linguistic stance based on the following axiom.

Axiom. The origins of language can be found in our distant ancestors' urge to deceive each other. □

Semantic ambiguity in natural language is not just restricted to a few examples in logic textbooks; it is the tip of an iceberg of deceit. Using the axiom, we derive the following theorem.

Theorem. Language understanding is the *ignis fatuus* of AI.

Proof. If the AI community ever got anywhere near their goal, people would merely change their linguistic habits in order to make the equivocation, ambiguity and deceit more difficult to analyse. □

3. 6th. Generation Computing

Before describing our first contribution to the 6th generation of computer systems, we give an example that highlights the difference between the 6th and earlier generations.

Example 1. When computerising an accountancy system, present computer systems people would write the software so that, given sales figures, expenditure, etc., the software would calculate a profit figure. This is precisely the opposite approach that the human expert would take. The human expert's approach is: given that the Board feels that it is politic to have made a profit of X pounds, come up with a convincing looking set of figures for depreciation, directors' emoluments, etc..

Example 2. When a question is put to a 5th. generation *knowledge* base, an attempt is made to answer the question. Again, this is too naive. When a question is put to a politician, the politician searches his *question* base for a similar question that *can* be answered.

It is these difference that the 6th generation of computer systems will capture.

The first fruits of our 6th generation approach have taken the form of a replacement for the 5th generation Decision Support System ('DSS'). Our 6th generation approach is precisely the opposite. We have developed an *Indecision Support System* ('ISS'). This will obviously be of far greater utility to politicians, bureaucrats, etc. Reasearchers have wasted huge amounts of effort on building DSSs which attempt to prove a goal statement by making valid inferences from a knowledge base. Clearly, this is not what is required by most potential users. The ISS approach is to start from the required goal statement and to search the 'knowledge' base for the most credible-looking set of half-truths to justify the conclusion that the ISS user wishes to make. To summarise, we have replaced the 5th generation inference engine with the 6th generation *propaganda machine.*

DSSs have an explanatory interface: if the user wants to know how the DSS arrived at a decision, he/she asks the DSS, which churns out intermediate deductions. ISSs have a *deceptory interface* that works in the opposite fashion. Whereas DSSs work on resolution-based theorem provers, ISSs use a newly-developed technique called *irresolution.* Whenever an inconvenient deduction can be made from the knowledge base, the ISS's deceptory interface asks the user for more pre-conditions that can be conjoined with existing ones until the deduction can no longer be made. In the past, politicians have been accused of short-sightedness. In the future, a more appropriate opthalmological metaphor shall be conjunctivitis.

ARTICLE

HIGHLIGHTS OF THE ROFAC CONFERENCE

This was the first robot and factory automation conference your reporter had attended, and it gave an exciting insight into the state of the art of robot and factory automation conferences. There were 3 main sessions, namely robot languages, assembly planning, and social and philosophical implications.

In the robot languages session considerable concern was expressed over the lack of standardisation. Apparently there are now so many different robot languages that the original de facto standard of a maximum of four letters for the name of the language is becoming rather restrictive. Speakers from Germany expressed particular annoyance, claiming that the German DIN standard for interfacing to robot controllers, which had almost been in existence for many years, had largely been ignored by robot language designers, especially French. An Italian speaker claimed that experiments by the Spanish police under Franco had demonstrated that German was a much better language for commanding police dogs than Spanish because German sounded so much more imperative, and wondered whether this was generalisable to robots. A speaker from the South Bridge Centre of Artificial Excellence claimed that while imperative language was a suitable means of communicating with a senseless robot, it would be necessary to negotiate rationally with an intelligent robot. A police spokesperson disputed this. An East Coast speaker caused a great deal of controversy by showing a film of two ethical robots amicably sharing their sandwiches without conflict or risk of the deadly embrace by communicating with one another in a polite subset of the Morningside dialect. The controversy was over whether or not the robots understood what they were saying. It was generally agreed in the end that while it was not necessary for either robot to understand what it was saying, it was necessary for it to understand what the other robot said to it. How one understood something uttered by something which didn't understand it in the first place was not well understood, apparently something to do with meaning to mean something, regardless of whether or not not it was meant to mean what it meant, otherwise there would be no point in arguing with somnambulists or bureaucracies.

In the assembly planning session Carton and Yossuf from NIT claimed in a talk illustrated with excellent slides of the Edinburgh Festival that the virtual disassembly of the assembly whose assembly was to be planned was a feasible method of planning the assembly rooms venue plan, and reduced the search space by the nth root of its size when using Throttleworth's half baked algorithm, where n was the total number of all possible irreversible moves to the assembly rooms bar, whereas Pawva from the Stunforth Institute claimed in a talk illustrated with strange groping gestures that assembly planning was np-hard and computationally intractable for most modern assemblies even using graduate labour and intensive fly posting, though he admitted when questioned by Duress of Glasgow that in practice incommensurable discontinuities meant that theoretically improper part mating procedures would sometimes succeed, a point taken up by Throttleworth of Mental Machines who was illustrating the use of projective shape transformations in grasp planning to solve the fruit-in-bottle problem when he got stuck and had to be taken to hospital, which caused such prolonged hilarity that the next speaker, a chap with a suitcase from the SERC, who thought he was chairing the error session, left immediately without saying a word.

The session on social and philosophical implications was introduced by a wild man from Little Big Horn with extremely small slides who pointed out the importance of distinguishing between the strong use of the computational metaphor, characteristic of many ai research workers, and its weak use, characteristic of those who weren't quite sure. He then went on to explain a useful technique for evading philosophically principled attacks on one's research grants by decreasing the granularity of one's position, for example, in the case of the computational metaphor, the weak strong position, the strong weak position, the weak strong weak position, and the use of very small slides. The other speakers concentrated on the detailed social implications of robotics, such as whether robots should get time off to attend robotics conferences, whether the designer or the manufacturer should profit from copyright of robot authored papers, and so on. An attempt to interrupt the meeting by members of the robot liberation front failed when they crashed into the walls due to insufficient stack space for interrupts, and consequent corruption of the visual frame buffer. A robot liberation spokesrobot said "That is very interesting, please continue."

Uncle Nikky Wirths
Fun-packed problem page

Hi gang! I've run up a fine wee batch of puzzles and a smashing new competition for all you fun loving boys and girls! Well done **Jason** of Lesmahagow Junior High School for winning last weeks mind-twister. Jason spotted the deliberate flaw in the **PASCAL** formal definition and correctly described three major extensions the BCS standards committee have rejected to solve it! **Katriona McPhee** and **Michelle** from the Wester Ross sewing bee also spotted the flaw, but used an informal **ALGOL** like approach to solve it which lost them precious points!

Dougall Dijkstra from Kirkaldy (aged 7) writes to ask if there are any formal methods fans in his area [I'm not one myself but I saw the video on the tube last week! hee hee hee just my wee joke pals] if so, he's got a couple of intractible problems with his semaphores and wants to get his train set back to work.

PUZZLE TIME WITH UNCLE NIKKY

Prove the following by induction:

PLURIBUS -> MULTIBUS -> UNIBUS

implies

MULTICS -> UNIX -> NONIX

Which of the following anagrams of **UNIX** are registered skid marks of the following major corperate bodies?

**UNIX UNXI UXNI UXIN UINX UIXN NXIU
NXUI NIXU NIUX NXIU NXIU XIUN XINU
XUNI XUIN XNIU XNUI IUNX IUXN INXU
INUX IXUN IXNU**

(a) **Digital Eskimo Corp**
(b) **Bell Labs, Paraguay Sp. A**
(c) **University of Californicate, Berks**
(d) **Rubberford Laboratories**

For what distance does a **St Bernard dog** carrying a **200k floppy disk** at **4** MPH have a higher baud rate than a **64Kilobit leased line**? (thanks to **Andy Tannenbaum** of Bridlington ZX81 Klub

The **CCITT/ISO** mix 'n match competition

Well comp-ers! here is this months **fab** comp from the "back room boys and girls" of the **CCITT** and **ISO** competition committee.

The rules are simple. (see attached flowchart and X409 encoded syntax on fascicle V7 X400 series vol 1). Simply implement a 7_layer network protocol in the high-level language of your choice, debug and verify it against the other competitors, TOP/MAP/TCP-IP/UUCP/X-400/SNA/DECnet and prove conformance in not more than 200 lines of code.

In the event of several winners the simple tiebreaker below will determine the final champion of this months competition.

Employees of **CCITT** and **ISO** committees, their family and friends are excluded from this competition.

Good Luck!

TieBreaker

Complete the following sentence in 25 words or less in the language of your **EEC** country, or in EBNF:

I like CCITT/ISO Draft International Standards documents because.....

See you all next week, keep those letters and pictures coming! (thanks Wayne and Jeanette for a **smashing** picture of your school choirs Cray XM-P! I loved all the glitter and the applique stitching!)

"uncle" Nikky.

SPOT THE BIT COMPETITION

Yes, YOU can win in our new SPOT THE BIT competition!

WIN a fabulous holiday for three among the romantic
Computer Pirates
of the South China Seas!!

SEE the legendary Sweat Shops of Taipei!!!

VISIT the fabulous Golden Arcade in Hong Kong!!!!
Lair of the legendary Software Backers

SEE the hackers Rip Off Lotus 1-2-3*, WordStar*, even dBaseIII*

BUY a PClone at Less than the VAT is here

COCK A SNOOK at Britain's Antiquated copyright laws

* * * * * * *

PLAY SPOT THE BIT and win the holiday of a lifetime
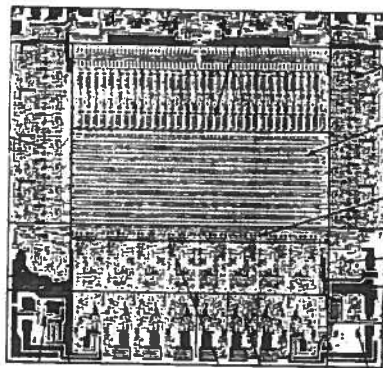
THE BIT has been erased from this photograph of a new wonder
microchip. Using your skill and judgement, draw an X where you
think THE BIT was when the microchip was "powered down". Send your
entry accompanied by a signed blank cheque to Wang-Xen Computer
Company, IBM Building, Aberdeen, HK who guarantee to "clone" the
cheque several thousand times before cashing.
----
* to hell with copyright notices because no-one bothers with that
out where men are REAL men, women are REAL women, both are REALLY
exploited and computers are never REALLY what you expect

BrassandChips

M.S. Found in a Cookie

In last weeks episode, the 77th Earl of Alvey had refused to pay the ransome of 330Ecu for his fifth generation nephew, kidnapped by post-structuralist programmers from the sixth columnist-addressists in the persistent Chad revolutionary coast line. Meanwhile, trouble was brewing at the Arithmetic Mill.

1. Where there's Bugs, there's Brass

The scene, a rustic programmers workbench somewhere in Scarborough. The data, corrupt but scenic. The time, 15:38:58 GMT-3:00 1986.

"Eh, up" quoth Ady Lovelace, beautiful daughter of Alan Luring, recently promoted chief semaphore, "theres trouble at 't arithmetic mill".

"We knorr that", asserted Nanny Watchdorgh, "the voice over jus sed sorr".

But she was right. The lads were all out, on account of not being prepared to work these new parallel shifts that the Earl of Alvey's managers had imposed.

Ady was secretly in love with John Von, the hideously wealthy son of the owner of 't Mill, whilst her brother Sady (the abject oriental poet) was conducting a sordid weekly rendezvous with Pascale, the beautiful daughter of the owner of the mill, who was not only a study in conics, but also the local labour parliamentary candidate.

2. The Chic of Cache

Meanwhile, up in the Manor, Lady Alvey had been at the 8086 assembly programming manuals again.

"Synthia", cried John Von, her eldest, "I know you have been under stress, "what with Timothy in the hands of those ghastly persistent buggers, but can't you at least keep those nibbles to yourself. Look, I put this mark here in the E-Prom blower, and the byte marks go at least 400hex past it".

Just as he spoke, the 77th Earl swept into the room. "I can't wait for the garbage collectors to get back to work again. Then we'll see this old heap in shape again - sorry dear, I didn't mean you".

"Earl", quoth John Von, "How are negotiations going with the 'Free the X 25' faction at 't mill?"

"Well, not well", equivocated the old hoarey gentleman.

For now we must leave these decadent types, and see

3. Interlude

Meanwhile, in the doctors surgery, the honest hard grafting McDonald is getting ready to operate on a young device driver who has been involved in a head to head crash.

"Of course, begorrah, where Ah cum from, Jimmy, a crash is where working mums send thier kids", he quipped and broke off in a fit of uncontrolled coughing.

4. Finale

"Meltdown at Analog Logic Union meeting" read the headlines that Christmas. "Fifteen processors arrested" read others, whilst "Panic", "M. Free" and "Sectarian Violation" were widely seen in the tabloid press.

Ady ran off with Alan who left Sady with John Von, last seen setting fire to Nanny Watchdorgh, who unbeknownst to Synthia was one and the same as the 77th Earl of Alvey. Who killed Sync?

The Universal Quantum Computer and the Church-Turing Principle

By our Science Correspondent.

Boffins at Britain's fifth generation research laboratories at Bletchley Park today celebrated the first year of operation of the world's first Quantum Computer power station. They now plan to take a three week holiday in England principally touring churches.

Following the early work of Benion[1982], Feynman[1982] and Deutsch[1984], it became clear that quantum effects in computing would have critical implications for the world 'energy gap' predicted for the 1990's. Since the completion of the QL Quantum Computer a year ago, British boffins have led the world in this research.

The simplest quantum reaction involves the interchange of one 'bit' with its 'anti-bit', producing energy in the process. This 'production' is expressed as:

```
binary_digit ::= ("1" ¦ "0")
```

Many programmers will have noticed this 'memory corruption' effect when previously perfect programs mysteriously fail under a new version of their operating system. The earliest Quantum Computers generated power directly from this 'binary_digit' finite state transition using 'flip-flop' gates (named after the footware of one of the inventors).
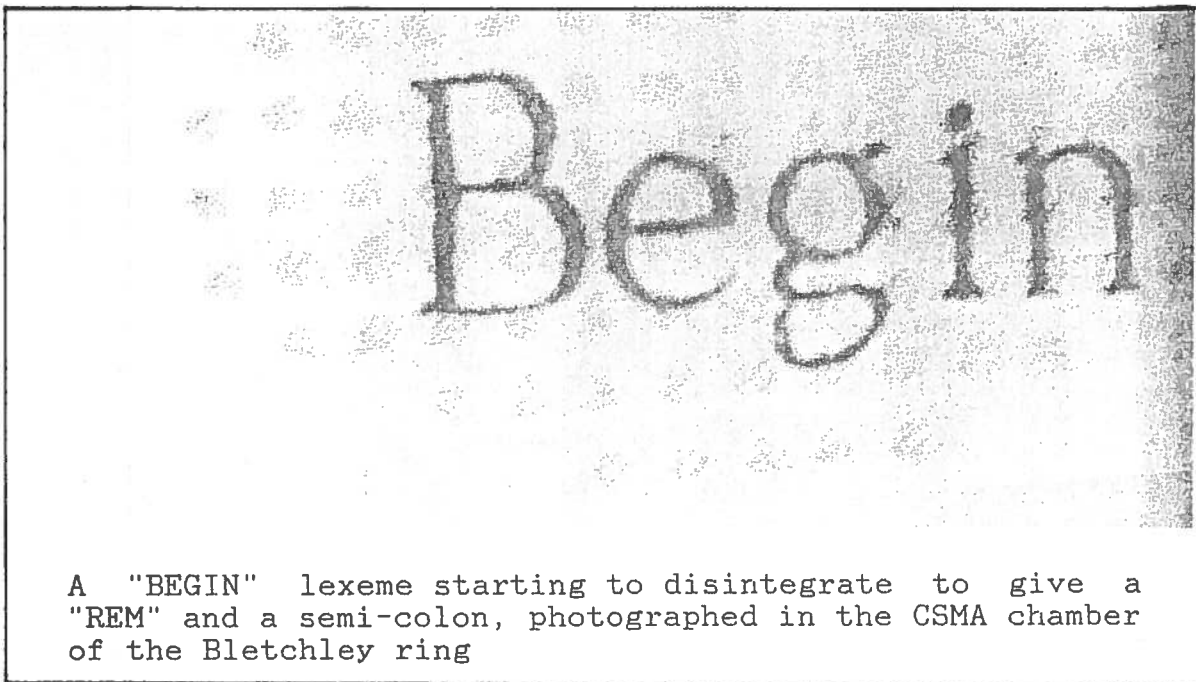
A "BEGIN" lexeme starting to disintegrate to give a "REM" and a semi-colon, photographed in the CSMA chamber of the Bletchley ring

More complex reaction paths involve higher-level language elements. A powerful reaction uses the production

```
procedure ::= "IF" "FI"
          |   "WHILE" ( "GOTO" | "END" )
```

In this example, the amount of energy given off depends on which 'production rule' is followed. The other productions may be assumed to occur in other, parallel 'Everett' universes, thus allowing us to export our pollution to the otherwise unused corners of Hilbert spaces everywhere (or nowhere).

The first production gives off 3 bits of semantic content which are synchronous with the incident RTS/CTS signal used to initiate the production. A early prototype reactor used Kermit to retransmit the production back and forth between two IBM-PC clones. This achieved massive kBaud rates enabling research workers to boils several cups of coffee with a single RS232 cable.

A further factor in heat generation is the nature of the functions used. Unusually large amounts of heat are generated by lambda calculus (developed by the head of the Brane editorial board); those producing the greatest heat have been nicknamed "curried functions".

Due to the highly unstable nature of the productions, 'bugs' are introduced to slow execution or even stop it altogether. BASIC, with its higher bug density, is now used almost exclusively to moderate productions since thermal runaway occurred in an early prototype. An Alphachronic running an almost bug-free Pascal program suffered a partial melt-down in 1983. The machine was located in a squash court on the third floor of the Thomas J Watson wing and lower floors of the building were severly damaged, the jacuzzi and sauna being totally destroyed. Eventually volunteer miners from the nearby Sellarfield coalmine were drafted to the site. At great personal risk, they built a 6 metre thick pan of back issues of Computing and Computer Weekly under the molten silicon thereby preventing pollution of underground British Telecom cables.

Since then, research has concentrated on a 7.3km diameter 200 station Cambridge Ring. Collisions are monitored in the CSMA chamber filled with smoke generated from 8 Cray II's connected to a single 13A plug. High energy parity bits 'back off' from the collisions and their paths can be monitored as they decay to form the brown deposit found on floppy disk heads.

This early work led to the construction of the QL power station which was opened by the Prime Minister one year ago today. The 20Mflops power output are produced so cheaply it will soon be uneconomic to meter electricity in most homes. Fears of leaks from the station have proved unfounded. When the station was designed, each of the cooling towers was fitted with a large filter roughly the shape of a shoe, dubbed "Sinclair's follies" by the locals. As

a result, pollution levels of as little as 9.6kBaud can be
measured near the station and there have been only 5 recorded
nocturnal emissions.

To demonstrate the safety of the plant, cattle on a nearby farm
have been fed exclusively on the little squares from the holes in
punched cards (a bi-product of the research program) and have
shown no ill effects. On the other hand, Friends of the Earth have
complained that sheep grazing downwind from the reactor have
started to program in cobol. One has even written a simple sort-
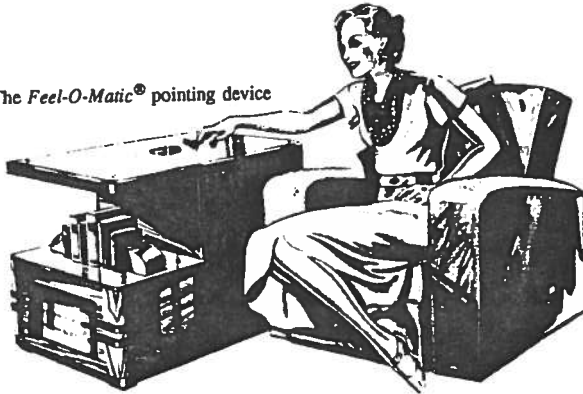merge package in RPG-2.

The government have assured the public that the danger level is
"acceptable" and have moved the cabinet office to the Bahamas.

STYLE & PERFORMACE

Compute in comfort with the latest 42 bit super-mini.

MOON Microsystems are proud to annouce the first all-British 42 bit workstation. Pictured
below is the top-of-the-range MOON 150Sx327 whose revolutionary architecture is based
around the 3x7 chip set designed by one of National Semi-detatched's leading engineers. In
recognition of this man's remarkable courage the psychiatric hospital at which he recovered after leaving the corporation now has a 3x7 ward, a 32 million pound facility built from the proceeds of various law suits. From this one stable came the Bakelite ROM, also pictured below, which provides the MOON 150Sx327 with more archive strorage than it can deal with (13K 7bit bytes, un-formatted), the EthylNet seriral communications system that can interconnect *any* pair of 150Sx327s by simply swapping a few plugs as well as this remarkable processor. Unlike
its bit-addressed predesessor, the 327 is fully compatible with modern software requirements.
Decimal arithmetic is offered as standard and independent benchmarks show performance
figures superior to those of any machine in its class.

The *Feel-O-Matic*® pointing device

The M150Sx327 - uncompromised design

In terms of software too, nothing is
compromised. The MOON 150Sx327 is su-
plied with 97 Bakelite discs which
comprise the NIXUN® single processing
environment, the COBOL compiler and
system libraries, the EthylNet comunica-
tions system (batteries not included) and
the MOON-Gazer graphics system.

(Matching comfy-chair and twin set are optional ex-
tras)

The BD-ROM Mass Storage Device

THE TOWERS OF HANOI -- AN OPTIMUM SOLUTION THROUGH CHEATING

Ganz Fertig, Institute of Artificial Theology, Zurich

The well known Towers of Hanoi problem up to now has been thought to have an optimum solution of $2^k - 1$ moves, where k is the number of disks.

Applying a solution method to the problem which involves taking a meta-structural view of the task has given a significant improvement on this. A program has been developed called Combined Heuristics and Environment in Analysing Tasks. The program has the capacity of standing outside any given rule-set and surveying the problem from this possibly advantageous point of view.

CHEAT was set up to solve the Towers of Hanoi problem by providing it with the rules of the puzzle, and giving it a standard set of routines for manipulating the disks, calculating, and reporting its activities. After a number of unsuccessful attempts to take the number of necessary solution steps below the $2^k - 1$ limit, CHEAT began applying its meta-structure reasoning abilities.

The usual solution to the puzzle is based on the recursive procedure :

```
To solve_Hanoi (k)
      if k=1 then print_solution
      else solve_Hanoi (k-1)
```

This gives a solution trace as follows, for k = 5 :

```
start
 k = 5
 (1,3) (1,2) (3,2) (1,3) (2,1) (2,3) (1,3) (1,2)
 (3,2) (3,1) (2,1) (3,2) (1,3) (1,2) (3,2) (1,3)
 (2,1) (2,3) (1,3) (2,1) (3,2) (3,1) (2,1) (2,3)
 (1,3) (1,2) (3,2) (1,3) (2,1) (2,3) (1,3)
finish
```
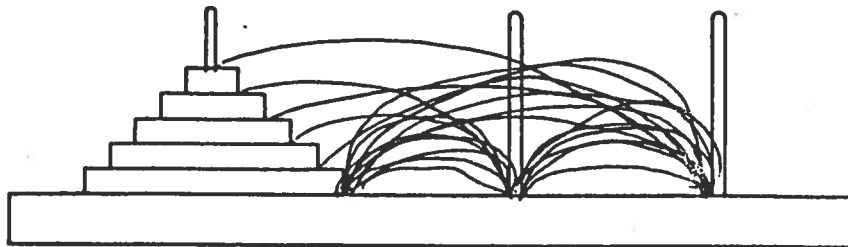

Diagram of usual solution method for k = 5

CHEAT developed this algorithm :

```
to solve_Hanoi
      if k=1 then print_solution
      else begin   move_pile
                   print "Problem solved"
            end
```

The solution trace for CHEAT's performance for k = 5 is

```
start
  k = 5
  Problem solved
finish
```

The procedure move_pile was developed by CHEAT when it deduced that the only constraints on such a move were procedural ones, and not physical impossibilities. By treating the basic axioms as data to be processed, CHEAT is able to transcend any given rule set and arrive at new and possibly more successful forms of problem solving behaviour.

The diagram for CHEAT's solution is remarkably uncluttered :
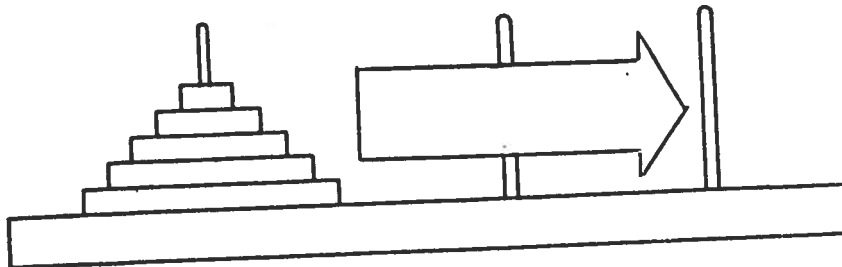
Diagram of CHEAT solution

Looking further, we are currently seeking funding for an extension to the CHEAT development, to explore new strategies that could be applied to chess, backgammon, and other games and game-like interactions. CHEAT has had a preliminary go at chess, and has already devised the following interesting strategy :

```
if opponent_notlooking then
      alter_pieces
else bide_time
```

We estimate that this strategy alone could offer an improvement of some 18% in number of wins, depending on the alertness quotient of the opponent.

Retro-Development News

The **DTI** is delighted to announce that following on from ALVEY, ALVEY-2, ESPRIT and EUREKA provisional agreement has been reached on a program of retro-development in computing. An acronym is being developed by a consortium of a major UK computer manufacturer, **CI-Honeywell Bull** and a mandatory academic partner of no importance. Around 7M ECU have been allocated towards development of an ISO-standard acronym generator and this will be placed in a public domain soon, probably your house.

Until then, the Retro-Development Committee (as it is currently known) will operate anonymously through usual channels.

The retro-development directorate.

Retro-Development initiatives in the UK

Following on from the Pan-European project, the Computer Board and JNT are planning the 1987 retro-development schedule. Current plans for the half year are as follows:

1. Jan cancel CRAY-1 Order for ULCC and start de-commissioning existing hardware

2. Feb Institute program of Vector FORTRAN de-optimisation. All UK Physicists to have submitted their programs for processing by Mar '87

3. Mar Distribute preliminary requirements for a uk-wide JCL to be written by A UK computer manufacturer and a mandatory academic partner of no importance.

4. Apr Order ICL 1900 systems for regional computing centres.

5. May Find replacement for UK computer manufacturer who will have withdrawn from project

6. June Implement new acronym generator in (mar 87) prototype JCL on ICL 1900.

Network News.

Since the UK is currently still implementing the Coloured Book protocols, it is felt unneccessary to allocate much effort here. It is proposed to simply re-define the colour spectrum from poly- to monochrome, and refer to all UK-wide networking specs as "greybook".

As a UK submission to the current round of CCITT/ISO/ECMA/ANSI discussions on OSI, the following has been proposed by the networks team of Universally slated College, London as a draft ISO tower:

- Physical Layer: Proposed architecture is point-to-point networks using low-loss string and standard "57" tins. work is in progress towards a high-speed circuit switch for this system (being developed by a UK computer manufacturer and a mandatory academic partner of no importance) based around the PLESSEY "gordian" knot. the GEC 4000 will probably feature heavily in there somewhere.

- Link Layer: Scots networks already have the "Brunsfield" link layer software, and the AIAIAI (Applications Institute for Absolutely Insupportable research in Artificial Inelegance) will be developing an expert shell to port this from "lallans" to standard UK-English. (in ASN1 and using IA5)

- Network Layer: The net work carried out by the physical and link layers should be enough to cope, so no effort is required here. The Packetsize is to be restricted to 20's, or at least 10's with cigarette cards.

- Transport Layer: It is pointed out that the recent transport de-regulation bill makes research in this area almost certainly referrable to the Monopolies Commission. In any event we are still waiting for the Number 42 to Slateford so no transport layer is available yet.

- Session Layer: opinion amongst experts is currently divided. We agree on a Jam Session but can't decide if it's Trad, Modern or Strawberry.

- Application Layer: nobody is applying themselves here.

- Presentation Layer: this will be presented at a later stage. Depending on the type of connection, it could be a small drinks cabinet (short life connection with small packets) or a nice clock for longer lived transactions.

The committee felt the above ordering of layers was more aesthetically pleasing than the ISO series, and will be researching how to make the two "stacks" interwork.

The JNT will be playing at Ronnie Scotts Alvey networks club for the Next three weeks, and will start their tour of the UK at NETWORKSHOP '87.

Common Base Policy

Until the RDC can define a counting system to be universally adopted, researchers are requested to define all volumes, quanta and amounts base 37, using any suitably ISO-compatible notation. The UK-wide "bunch of fives" may still be used.

Network Negotiation Strategy

ANSI has just started re-defining the negotiation strategy for the network layer. CSMA-CD was felt to be to "soft" on collision events, so the following change has been proposed:

- Subsitute "....listen before talk..." and "...listen whilst talking..." by "...Shoot first, ask questions later..." and "...deny everything..."

- Go back (n) methods of back-off don't look good round the table at Geneva or Reyjkavik. We propose Go on N-squared with domino-theory methodology.

- a small typo in the spec has been brought to our attention. replace all instances of "wait for negotiation completion" by "Waite for negotiation completion".

- Use of the Fifth Amendment is recommended by implementors worldwide.

- Token Passing Rings must be denyable if the tokens are hard currency.

ARTICLE

EXPERT SYSTEMS BREAKTHROUGH AT THE LOYOLA INSTITUTE

Expert Systems are at the moment constrained to operate within well defined domains of expertise, and within these they are capable of operating at levels comparable to the best human experts. What they lack, compared to the human expert, is the ability to make a "reasonable" decision in some novel and anomalous case not covered by the existing knowledge base. Human beings have a great variety of techniques they employ in such circumstances, common sense, analogy, induction, reasoning from first principles, lateral thinking, etc.. It is also by means of these kinds of technique that the human expert is able to extend existing expertise, and to develop new domains of expertise. Unfortunately these techniques are so numerous, various, and idiosyncratic that they have so far resisted all attempts at algorithmic description.

A team at the Loyola Institute has been studying the behaviour of large numbers of people required to solve novel problems in exhaustively monitored laboratory conditions. The experimental subjects were selected from the post-graduate student population at major North American Universities, in order to provide a good standard of problem solving behaviour. So that comparison might be made with computer techniques, the problem was described entirely verbally, and the subject was allowed to ask the problem database for more information, the results of experiments, and so on. The solution was written after the fashion of an examination question, and marked by a team of experienced exam markers according to ordinary University criteria. For each presented solution the monitoring team presented a report of the techniques used, as gathered from observation and questioning of the subject.

The first surprising result of this investigation was how bad the subjects were at solving novel problems. This raised the interesting question of whether it was right to be trying to emulate human performance. Perhaps human problem solving was not an individual capacity at all, but a property of human groups, where the important thing is that the efforts of individual solvers are exposed to group question and criticism? This is the old ai "generate and test" paradigm, where in this case the individual human plays the role of generator, and the group plays the critical role. A parallel can be drawn with the scientific method itself, now recognised as a practice not of individual scientists, but of the whole scientific community. Confirming this view was the fondness of many successful human problem solvers for explicitly random generation techniques, such as consulting the I Ching, brain storming sessions, lateral thinking, booze, and so on.

As a means of exploring this insight, which suggested that, once again, the crucial component of this human ability was not some clever "hypothesizing algorithm", but rather an enormous quantity of associatively indexed knowledge, the Loyola team constructed an experimental solver based on selections by keyword from a database consisting of the Encyclopedia Brittanica, the collected works of Defoe, Gibbon, Hofstadter, Plato, Smith, the Bible, the I Ching, plus back numbers of Scientific American, Elektronik Brane, the Fortean Journal, and the Sunday Post. The system simply interrogated the problem database randomly to build up a good collection of keywords, and then used these to extract "relevant" paragraphs from the solution database. These selections were then sorted on a vocabulary basis, and edited in a purely syntactic manner to give a superficial appearance of continuity. The solutions thus constructed were presented to the marking team, and although they were, not surprisngly, usually wrong, they were as good as the upper quartile of the students.

Utilising the examiners as a source of expert criticism of the performance of this program, the team constructed an improved version of the program, which was then tried out on a variety of undergraduate exams at Copra University, and exceeded all expectations by being able to scrape a pass mark in over a third of the exams taken, even though it had no specific subject knowledge, and, as Searle has shown, hadn't a clue what it was talking about.

The team expect that this performance can easily be improved to the lower reaches of graduate level by simply extending the database. While that level does not require understanding, it is more than adequate for many of the everyday requirements of intellection, and will permit expert systems technology to move into such areas as journalism, education, and politics.

SMALL ADS

Convert your C5 into a LOGO Turtle. Unwanted Graduation present. Offers. Box EB 42

------------------------------------oOo------------------------------------

Woz, It was all a big mistake. I'm sorry. Come back and let's start again. Steve J.

------------------------------------oOo------------------------------------

Burned out hacker, age 35, junk food addict, insomniac, seeks similar for down-time companionship.

------------------------------------oOo------------------------------------

MICRO-MEET - Find that special person in pico-seconds. BOX EB12

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NANO-DATE - Let us use the power of our COU to bring you together in femtoseconds. Box EB 12

------------------------------------oOo------------------------------------

Wanted: joystick interface for Cray XM/P. Will Collect. Write POB GCHQ, Cheltenham

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Jokes! Tins of LOGO Turtle Soup, Mouse Poison, ZX81s. Ideal for Parties. 1000s of more. HAC K-A-JOKE Ltd. BOX EB39

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24 GIGABYTES OF MEMORY???? Yes, that's what you can have on your Spectrum II with our 5th Generation Technology Write Only Store. WOSP Enterprises BOX EB ACON

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Come to Milton Keynes! So private you can work for SDI money and nobody will know!!!

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Wanted : Collector seeks working GEC 63 programs. Any condition. BOX EB 56

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Lose pounds instantly!!! Write ZX81 offer, Box EB 89

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Obtainables: We can get you Cray 1's, BSD 4.3 etc. Phone 01-200-0200 Now

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