History of Computing Collection
Personal Reminiscences

Noel Cox

Decimalisation in 1971

The United Kingdom and the Introduction of Decimal Currency

On the 15th February, 1971 (D Day) Britain (and Ireland) introduced a decimal currency based on one hundred pence to the pound sterling (£p, for ease of implementation this was actually a £p½ system) - it replaced a currency system of a pound sterling which was divided into 20 shillings, and each shilling divided into 12 pence i.e. 240 pence to the pound (£.s.d). In the new system a value such as £5.11s.6d would appear as £5.57½p. The introduction of the new currency effected all parts of society: the banking system, commerce, industry, and the general population. It also had a particular relevance to the computer industry which was faced with a major conversion and change to all those computer systems which held sterling monetary values.

The origin of the £.s.d. (or L.s.d) system dates from Roman times when a pound of silver i.e. a livra, was divided into 240 silver pennies known as denarii (denarius, for singular) and during the time of Constantine I (312 a.d.) a gold coin called a solidus i.e. one twentieth of a pound and worth 12 denarii was issued, hence Livra, Solidus, Denarius became the standard currency notation. There was, of course, never a coin worth one pound of silver except as a silver ingot used for its bullion value in trade.

Following the decline of the Roman empire £.s.d became the basis of the monetary systems used in much of Europe, but by 1970 all countries with the exception of Britain and Ireland had abandoned it in favour of a simpler decimal system. Russia 1710, France 1803 and the United States of America 1792 led the way whilst other European countries like Austria and Germany adopted decimal systems in the nineteenth century and more recently India 1957, South Africa 1961, Australia 1966 and New Zealand 1967. And, of course, coins are no longer made of gold and silver, but in base metals like copper and nickel.

It was time for Britain and Ireland to catch up.

The Decimalisation Process

On 1st March, 1966 the Chancellor of the Exchequer, James Callaghan, announced in Parliament that Britain would adopt a decimal currency system in February, 1971. The pound would remain the major unit of currency divided into 100 minor units (pence) instead of into twenty shillings each of twelve pence - instead of 240 pence to the pound there would now be 100.

The process to decimalisation was started in December, 1961 when a Committee of Inquiry on Decimal Currency was appointed under the chairmanship of the Earl of Halsbury with the following terms of reference:

Noel Cox

Decimalisation in 1971

1. to advise on the most convenient and practical form which a decimal currency might take, including the major and minor units to be adopted;

2. to advise on the timing and phasing of the change-over best calculated to minimise cost;

3. to estimate the probable amount and incidence of the cost to the economy of proposals based on (1) and (2).

The main recommendation made by the committee was the adoption of a £-pence-½ decimal system over a 10s-pence system. The decision to stay with the pound as the major unit of currency recognised the role of the pound sterling in international trade, whilst the inclusion of a ½p unit was an attempt to control inflation which was seen as possibly one of the main affects of decimalisation.

In making the move to a new form of currency a Decimal Currency Board under Lord Fiske was appointed to mastermind the conversion process, there were many important considerations to be made: the new currency and what values would be used; how would business and the general public be educated and advised in handling the new currency; and how would the change-over be managed. 3,500 tons of new coins were required which necessitated the building of a new Mint at Llantristant and these coins would have to be distributed around the country and the old coins withdrawn.

On D Day, 15th February, 1971, six new decimal coins would be used which equated to the current £.s.d coins on the following basis:

50p	equal to	10s
10p	equal to	2s
5p	equal to	1s
2p	equal to	4.8d (just under 5d)
1p	equal to	2.4d (just under 2½d)
1/2p	equal to	1.2d (just over 1d)

History of Computing Collection
Personal Reminiscences

Noel Cox
Decimalisation in 1971

In preparation for the introduction of the decimal currency the new 5p and 10p coins were introduced in 1968, and the 50p coin in 1969 whilst the old half-crown (2/6d) 1970 and half-penny (½d) 1969 withdrawn. The existing florin (2s) and shilling (1s) coins had exact equivalents to the decimal system and remained in circulation until eventually replaced by their decimal equivalents.

The main area of difference was in those values below a shilling where there was no exact equivalent and it was necessary to impose an agreed set of conversion values for the rounding up or down of each value as follows:

Old £sd	**New £p**	
1	1/2	
2	1	
3	1	
4	1 1/2	
5	2	
6	2 1/2	Same value
7	3	
8	3 1/2	
9	4	
10	4	
11	4 1/2	
1/-	5	Same value

Noel Cox

Decimalisation in 1971

The old threepenny bit (3d) and penny (1d) remained valid during the changeover period provided they were used in quantities of 6d and were then withdrawn whilst the sixpence (6d) which was equivalent to 2½p remained in circulation.

Prior to D Day the Decimal Currency Board carried out a full programme of education for industry, commerce and the public. Educational literature was distributed and sample packs of the new coins made available.

The banks closed for business four days before D Day on Thursday, 11th February, to convert all their systems (bank accounts and machinery to decimal) and to clear all £.s.d. cheques. The banks re-opened for business on Monday 15th, February (D Day) and thereafter all transactions had to be carried out in decimal. Industry and commerce followed likewise, and most organisations also went decimal on the same day. In order to facilitate the changeover most organisations had adopted a dual pricing policy and had shown tariffs and prices in both £.s.d and £p. There was, of course, a major logistical programme to convert all vending and charging machinery: cash registers and tills, taximeters, telephone call boxes, electricity and gas prepayment meters etc. from £.s.d to £p.

The changeover period was planned to last six months, but in practice it was accomplished very quickly and in a few days the country had gone decimal.

The success of decimalisation can be summed up in one question - who now would wish to convert back to £.s.d? The simplicity of the decimal system was all too clear and any doubts that the government had about the cost of conversion was quickly forgotten.

The Computer Process

By 1971 many large organisations had, of course, already introduced computers for accountancy and commercial applications: banking, payroll, purchase and sales ledgers, cost analysis, and stock control albeit that these systems were based on sequential files and batch control technology. The problem of handling £.s.d. values was overcome by handling all values internally in pence, thus, a value of £5.11.6 would be converted to 1338 pence on input and all subsequent calculations carried out in pence before any resultant value was converted back to £.s.d. on output.

This principle applied to all master data and transaction files. In a payroll system, for example, an annual salary of £2000 (£166.13.4 monthly, rounded) would be held as 480000 pence, calculated as 40000 pence monthly before being converted back to £166.13.4 (rounded) on output.

Noel Cox

Decimalisation in 1971

The introduction of the new decimal currency at a ratio of 100 pence to 240 meant that all internal values had to be divided by 2.4 and any resultant value below a pound rounded to the nearest whole penny. Computer systems were never designed to cater

for fractions of a penny (old or new) other than by using decimal parts of a penny where appropriate.

The conversion process to decimalisation therefore required a planned programme of work which involved:

1. Converting to decimal all the values held in master data and transactions files and re-balancing overall file totals so that the financial ledgers remained in balance.

2. Re-designing all input and output documents to provide two columns for sterling values rather than three.

3. Converting all price and tariff tables to decimal.

4. Amending all existing computer programs to reflect the new decimal values.

5. Program, system testing and parallel running the amended systems against the old systems to ensure that they were compatible.

6. And, finally, carrying out the whole conversion process and implementation of the new decimal version of each application.

The whole conversion process while not difficult required many hours of development work and for a time diverted computer departments from developing other new systems.

And What of the Future?

Since decimalisation the ½p and sixpence (6d) 1984 have been withdrawn so that the one decimal penny is now the lowest value unit i.e. the decimal system is £p. New coins: £2, £1 and 20p have been introduced and the first decimal coins reduced in size. The value of the pound sterling has continued to change on the home and international money market and the continued use and value of the 1p and 2p coins are open to doubt. Some euro and dollar countries have, for example, already withdrawn one and two cent coins and one wonders how long these small values will still have a use as a medium of exchange.

Noel Cox
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Decimal Currency in the United Kingdom, presented to Parliament by the Chancellor of the Exchequer by Command of Her Majesty 12th December, 1966 (H.M.S.O., London)

Your Guide to Decimal Money - Decimal Currency Board (H.M.S.O., London)

Euro Preparations - what you need to know, H.M. Treasury, London

The big question is, however, will we ever accept the Euro? Government policy is that we will join the Euro if Government, Parliament and the people, in a referendum, all agreed that it would be the right thing to do. If we do, computer systems will once again have to adapt.

Early Digital Data Processing from 1953

The Office in the 1950's In the 1950's industry and commerce were using a number of electro/mechanical devices mainly for accounting functions:

Payroll

· Stores Inventory and Stock Control

· Purchase Ledger

· Sales Ledger

· Cost Control and Operational Statistics

The machines which required a large amount of manual effort included:

Accounting Machines which were similar to a large type-writer with an alpha/numeric keyboard, had several registers for simple arithmetic, used and updated thin card ledger sheets and produced continuous stationery output. Required the use of a highly trained operator. Comptometer Adding Machines for fast high volume addition and subtraction. Required the use of a highly trained operator.

Simple Adding Machines for simple addition and subtraction with tally roll output. Brunsviga Hand Calculators for more complex arithmetic. Type-writers used by trained typing operators. In my own experience working in the

Noel Cox
Bibliography

general office of Tir John Power Station, Swansea there were some ten office staff employed in producing the weekly payroll for 400 staff, maintaining stores records, purchasing materials and services for power station maintenance, recording the volumes of coal bought from the National Coal Board, recording the volumes of transmission of electricity to the South Wales Electricity Board, and compiling power station operating statistics and costs. Records were essentially paper based and apart from safe storage there was little concept of security or back-up.

This structure was repeated in all the other power stations in South Wales. Tir John Power Station was in operation from 1936 to 1976, burnt anthracite duff and had a potential capacity output of 150 MW. Built by Swansea Corporation it became part of the British Electricity Authority when the electricity industry was nationalised in 1948, which became the Central Electricity Generating Board (CEGB) in the mid 1950's. There was a divisional office in Cardiff which in the early 1960's was replaced by a regional office in Bristol.

The Introduction of Electronic Data Processing - Late 1950s-1960s

The late fifties/early sixties saw the earlier electro-mechanical machines in larger offices bring replaced by punched card tabulating machines supplied by Powers Samas and the British Tabulating Machine Company. In 1959 the two companies merged to form ICT - International Computers & Tabulators Ltd. and in 1968 ICL – International Computers Ltd. These machines processed large volumes of punched card input/output and could carry out a limited range of logical functions. These operations were controlled by electric circuits which were initiated by linking the circuits together in the sequence required using cables and a plug board. The equipment consisted of:

· Processors with wax drum storage for the storage of intermediate calculations

· Tabulators/Printers

· Sorters

· Punched Card devices operated by highly trained operators

The machines were not particularly robust and often required hands-on support from the ICT customer engineers. In my own experience these machines were installed in the CEGB regional office based in Bristol and took over some of the work carried out in the individual power stations of the south west of England and south Wales. Applications for payroll, creditor payments, and stores accounting were converted to using punched cards

Noel Cox
Bibliography

accounting, commercial and engineering use. Input was, however, still largely, punched card based.

The use of an 8 bit segment which could represent binary, character and decimal values also allowed 2 numeric digits to be held a one byte and this provided a convenient method for compacting data to conserve both machine and external storage, for example, a date held as 6 characters (bytes) e.g. 31/12/99 could be represented as 6 numeric digits e.g. 311299 in three bytes i.e. 50% saving. It led to many clever(?) techniques for conserving storage, but at the expense of additional program code to convert data on input and output. Further, the failure to hold the century as part of a date e.g. 31/12/1999 whilst initially very useful in saving storage was to lead to the Y2K problem which was to blight computer systems at the end of the twentieth century. The IBM System /360 also saw the introduction of a number notation called hexadecimal using the digits 0 to 9 and A to F to represent the 16 binary values which could be held in each half byte. The ability to read storage dumps printed in hexadecimal soon became an essential skill of system engineers and programmers. One aid to working in hexadecimal arithmetic was a handheld hexadecimal adder.

The South Wales Electricity Board in St. Mellons which I joined in 1965 as a project leader installed one of these machines in 1966. In a similar way to that used in Bristol a new computer department under the control of the Chief Accountant was established in 1964 consisting of a computer manager, a chief systems analyst, a chief programmer, 5 project leaders and 25 systems analysts and programmers. Again the first task was to replace the existing punched card systems which had been installed in the early 1960's for energy billing and stores accounting. The existing 30 data preparation staff and operators were absorbed into the new department to continue their operational duties in the new set-up. The main emphasis, however, was on the development of a new multifunction system for energy billing (850,000 quarterly billed domestic and commercial consumers and 4500 monthly billed industrial consumers). This system which was developed in Assembler Language took two years to develop. However, Assembler Language with its large instruction set of binary, decimal and character instructions led to complex programs which were difficult to debug at program testing and live running time.

At this time there were few development tools and design aids to help the systems analyst and programmer apart from a plastic flowcharting template for drawing diagrams and flowcharts, a coding sheet for program code, and typed manuscripts for system manuals From this point it was onwards and upwards as technology continued to expand, even bigger computers, disk capacity and the formulisation of operating systems, and system and programming languages and methodologies allowed larger and more sophisticated systems to be developed. The introduction of electronic forms of data capture also led to the elimination of punched cards.

However, this all stopped in 1969/70. Why? One simple word:

Noel Cox
Bibliography

Decimalisation

With the £p replacing LSD it meant that all those systems and programs which held financial data had to be altered. Data files had to be converted, input/output forms amended, tariffs and prices changed, and arithmetic calculations reworked. Decimalisation Day was Monday, 15th February, 1971 and the amended systems had to be implemented along with the introduction of the new decimal currency. It was perhaps a reflection that computer systems don't work in isolation and have to reflect the real world.

Noel Cox at County Hall in Cardiff, July 2008

These notes reflect my own personal experience and similar stories can be told of the other large industries and commercial organisations in South Wales: National Coal Board at Tredomen, Steel Company of Wales at Port Talbot, and Richard Thomas and Baldwins at Ebbw Vale and Llanwern were all IBM based, the Wales Gas Board in Cardiff used Burroughs systems, whilst local authorities e.g. Glamorgan County Council and Cardiff City Council used ICL equipment. Noel Cox, FCCA FBCS CITP May 2008 Further Reading: A R Walker, The history of the Tir John power station and its relation with Crymlyn Bog, The Swansea History Journal: Minerva, Volume 15 (2007-8), 66-85