The display shows why cell B3 is used to hold the initial monthly budget amount — the label extends across columns one and two, so we start at column three in order to create a neat display. Note that all the figures are integer values — March's figure should read 202.005, but the spreadsheet 'rounds down', so this is displayed as 202 exactly. April's figure would really be 203.01502, but Vu-Calc would take it to be 203. As the inflationary increase grows larger month by month, so the discrepancy between the actual value and the figure displayed will also become greater.

This simple example demonstrates the effect of the REPLICATE command when used with relative cell addresses. Each time the program writes the formula into the next cell to the right, the formula changes accordingly. Our original formula in B4 was %B3*100.5/100. This formula replicates to B5 as %B4*100.5/100, to B6 as %B5*100.5/100, and so on. In each case the column number of the cell address is increased by one. Replicating down a column has the same effect on addresses (i.e. E1 becomes F1, etc.). If we had used absolute addresses ($) instead of relative addresses, this 'shift' in cell addresses would not have happened; instead the same formula would have been replicated across all the cells, and the value in each would be identical to the value shown in B4.

COST ANALYSIS

Now let's try using the same model to forecast a company's monthly expenditure on raw materials, starting at £100,000 per month and increasing by 0.5 per cent per month over two years. How much more would the goods cost if bought halfway through the second year? Using the model we have just built, this can be calculated very quickly.

Change the value in B3 to 100,000 by moving the cursor to B3 and typing in the new figure. Now use the REPLICATE command to extend the formula from B14 to B26 to make up the full 24 months. More sophisticated spreadsheets will show the new results the moment you change the value in B3. With Vu-Calc though, you must recalculate the results (which at the moment are still based on the old formula) by using the CALCULATE command, #C. Vu-Calc then calculates the new values and displays the answer we require in cell B20. If you try this example, you will find that the amount is £109,931 — an increase of nearly £10,000. This is not a precise figure, as all numbers are rounded down, but it is close enough to give you an idea of the effect of inflation over this period.

As a final example of the single-row type of problem, let's take a more complex formula, designed to work out the reducing balance of a £1,000 credit card debt or bank loan, on which interest is being paid at 27 per cent per annum. Assuming that you are paying back £80 per month, when can you expect to finish paying? The information needed to calculate this is the principal of the loan, plus the interest for the month, less the monthly repayment. So if we key in 1,000 in B1, the formula will be %B1+%B1*.27/12-80. Replicate the formula across all 28 columns in the model, scan the row to find the point at which the amount becomes positive, and you will have found the point at which the balance is paid off and you would be in credit if monthly payments continued. According to our model, this would take 16 months. As an added bonus, you also have a neat display of your outstanding balance each month, assuming you keep up the £80 payments.

In the next instalment, we will look at modelling on Abacus, the spreadsheet program offered with the Sinclair QL.

Relatively Absolute

In this simple model we have used the REPLICATE command across rows C, D and E; for the sake of example, we reproduce the formulae in each cell. Cell C3 has been absolutely replicated along the row, so the same formula, A5/12, appears in all the C cells, with the same result — £450. The formulae in cells D4 and E3, however, have been relatively replicated so the cell references in the formulae change from cell to cell along the row, with correspondingly variable results

	1	2	3	4	5
A		ANNUAL INCOME =			5400
B			JAN	FEB	MAR
C	HOUSEHOLD INCOME		A5/12 450	A5/12 450	A5/12 450
D	HOUSEHOLD EXPENSES		DATA 400	D3*1.01 404	D4*1.01 408
E	MONTHLY BALANCE		C3-D3 50	C4-D4 46	C5-D5 42

LIZ DIXON