
**OPERATORS
NOTEBOOK**

**BASIC
COURSE**



SUMLOCK COMPTOMETER LTD

by

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INTRODUCTION

During your course of training with Sumlock Comptometer Limited you are aiming at becoming an efficient operator with a thorough knowledge of business arithmetic.

Remember that you will be more competent if you memorise your decimals and study your notes regularly.

Accuracy First

Speed Later

Correct posture is essential to comfortable and tireless operating, so from the very first day, see that your chair is adjusted to the correct height, and that both feet rest flat on the floor. The greatest care should be taken of your hands and nails as these attract attention when you are working.

An efficient operator never puts down her pencil when operating, but holds it between the thumb and palm of the hand, so that it is immediately available to write down answers.

Take care of this book, as it is intended that you should use it not only during your training but as a reference book when you have finished the course.

**BASIC COURSE
OPERATORS NOTEBOOK**

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Note No. 1

ADDITION

1. When adding you use the large figures on the key-tops. Only one key at a time should be depressed. Slow rhythmical strokes are essential when learning addition. Speed will come naturally with practice.

YOU MUST NOT LOOK AT THE KEYBOARD

2. No figure on the keyboard above 5 is ever used in addition, so that for 6, 7, 8 and 9 you add:—

First 3 then 3 for 6
" 4 " 3 " 7
" 4 " 4 " 8
" 5 " 4 " 9

3. **Correct Fingering**

Pence

Units — Operate with second finger of right hand.
Tens — Operate with first finger of right hand.

Note

Other currencies and any decimal numbers would be operated in a similar manner. Halfpence should be added using the third finger of the right hand.

£'s or Whole Numbers

Units — Operate with second finger of right hand.
Tens — Operate with first finger of right hand.
Hundreds — Operate with first finger of left hand.
Thousands — Operate with second finger of left hand.
Tens of Thousands — Operate with third finger of left hand.

Note

It is often found quicker when adding 6 figures, to add units, tens and hundreds first, and then, thousands, tens of thousands and hundreds of thousands etc., afterwards.

4. In Cross Casting and Slip-adding the figures are added into the machine in their entirety, commencing with the left hand figure, and using the first two fingers of the right hand only.

Note No. 2

MULTIPLICATION – TWO FACTORS

The large figures on the key-tops and all keys 1 to 9 inclusive are used for multiplication.

Rule of Multiplication

Hold one factor and depress it the number of times indicated by the other factor.

e.g. 8×4 Hold 8 and depress it 4 times = 32

Working over a fixed decimal point

Place the decimal point in the most suitable position for working. Hold one factor in its correct position over the FIXED POINT, the whole numbers to the left of the decimal point and decimal numbers to the right of it.

When figures are held in their proper or natural positions, this is known as the **UNIT POSITION** and they may be multiplied in this position by **THE UNIT OF THE OTHER FACTOR**.

If the figures held are to be multiplied by tens, hundreds or thousands etc., move one place to the left (from the units position) for tens, two places to the left (from the units position) for hundreds and so on.

If the figures held are to be multiplied by decimal figures move one place to the right (from the units position) when the first figure is in the first decimal place, two places to the right (from the units position) when the first figure is in the second decimal place and so on.

Multiplication of large factors

e.g. 677.45×4983.6

Count the number of whole numbers in both factors and place a decimal pointer that number of place from the extreme left of the machine (including the carry-over register). In the above example the decimal point would be placed seven places from the extreme left of the machine.

Multiplication of decimal numbers

e.g. 0.0069×0.0034

The decimal point should be placed at the extreme left of the **keyboard**.

AVOID UNNECESSARY WORK

Example 234×978

Note that if 234 is held, multiplying by 978 results in 24 key depressions, whereas if 978 is held only 9 key depressions are made!

Common Fractions

The decimal equivalent of any common fraction is found by dividing the numerator (top figure) by the denominator (bottom figure).

Example $\frac{7}{16}$ to decimals

Add 7 into the machine and divide by 16

Answer = 0.4375

MULTIPLICATION – TWO FACTORS – continued

Recurring Decimals

Work out recurring decimals to as many decimal places as will give the required accuracy.

If the answer is to be given to as many decimal places as possible then it will be necessary to work right off the keyboard.

If the decimal point is well to the left of the keyboard and only a few decimal places are required then you may stop calculating when one more place than the number requested has been completed.

Multiplication of Sterling

Example 27 articles @ £4.45 each

Multiply $27 \times 4.45 = £120.15$

Example 183 articles @ 13½p each

Multiply $183 \times 0.135 = £24.70\frac{1}{2}$ to the nearest halfpenny or £24.71 to the nearest penny.

Note No. 3

SUBTRACTION

Both the large and the small figures on the key-tops are used in subtraction.

Example 1 $56\,749 - 235$

Add 56 749 into the machine at the right hand side of the keyboard using **large** figures.

Use the subtraction selector immediately to the left of the column of the first figure to be subtracted (in this example the hundreds column as we always subtract from left to right).

Using the **small** figures depress 2 in the hundreds column, 3 in the tens column and 4 (5 less 1) in the units column

Answer 56 514

Example 2 $56\,749 - 1230$

Use the subtraction selector to the left of the thousands column.

Depress small 122 - ignore the "O" - do **not** depress any key in the unit column.

Answer 55 519

Example 3 $56\,749 - 1023$

Use the subtraction selector to the left of the thousands column and depress small 1022.

Answer 55 726

Example 4 $56\,749 - 695$

Use the subtraction selector to the left of the hundreds column and depress small 6 - 4.

Answer 56 054

Note

On all manual Sumlock Comptometers and on some electric models it will be necessary to "borrow" just as when working mentally. To borrow you depress small "O" in the column immediately to the left of that from which the first figure is to be deducted.

Example $56\,749 - 874 = 55\,875$

Use the subtraction selector to the left of the thousands column and depress small 0873.

Decimal Subtraction

The principle remains the same, but care must be taken to see that the amounts are correctly entered around the decimal point.

Note

Always remember when subtracting, to add back to prove.

Note No. 4

DIVISION

Add the DIVIDEND into the machine at the left hand side on LARGE figures, placing the decimal point in its correct position.

Point-off according to the DIVISOR, before commencing to divide.

Rules for Pointing-Off

1. For each whole number in the divisor, move the decimal point one place to the LEFT.
2. If the divisor is a decimal such as 0.345, the decimal point is **not** moved from its original position.
3. If the divisor is a decimal with preceding ciphers such as 0.0024 the decimal point is moved one place to the RIGHT for each cipher.

HOLD THE DIVISOR ON THE SMALL FIGURES LESS ONE ON THE LAST FIGURE OF VALUE

Rules for working

1. Catch up index figure.
2. Reduce the remainder.
3. Move over one place to right and continue according to rules 1 and 2.

The INDEX FIGURE is the first figure in the answer register, immediately to the **left** of the columns on which the divisor is being held.

Rules for "O's"

1. When "O's" occur in the body of a divisor, small 'O' must be held.
2. When "O" occurs at the end of a divisor, ignore and less one from last figure of value.
3. When "O's" occur at the beginning of a divisor, they are ignored once the pointing-off rule has been carried out.

Rules for 9's

1. When 9's occur in the body of a divisor, do not hold any keys in that particular column or columns.
2. When 9 occurs at the end of a divisor, less one and hold small 8.
3. When the first figure of a divisor is a 9 it cannot be held but it must be remembered that it is part of the divisor – therefore the **index** figure becomes the figure appearing **TWO** places to the left of the columns on which the divisor is being held. When the first **two** figures of a divisor are 9's the index figure becomes the figure appearing **three** places to the left of the columns on which the divisor is being held and so on.

The Remainder Method of Division

To divide by the remainder method is to work with the object of showing a unit remainder instead of producing a decimal. It would be used to convert, for instance: –

Singles to dozens and singles.

Singles to gross, dozens and singles.

Minutes to hours and minutes, etc.

Note

Remainder method of division may only be used when division can be made the last operation.

Note No. 4

DIVISION – continued

Long Division

Long Division is used when the figures of the divisor are too many in number or too awkwardly placed to hold in one operation. In these instances it is necessary to split the divisor.

Hold the first half of the divisor and proceed with rules 1 and 2 of the normal division routine. Before moving over for rule 3 pick up the remaining divisor figures in their correct position and depress the number of times that the first half was depressed.

Move one place to the right with the first half of the divisor, and the same operation is repeated.

This routine is continued until the division has been completed.

Note No. 5

MULTIPLICATION OVER – THREE OR MORE FACTORS

SIMPLE OR DIRECT MULTIPLICATION is multiplication of two factors only but in MULTIPLICATION OVER, which is multiplication of three or more factors **without clearing the machine** the method is to move the decimal point instead.

Memorise the following rules for pointing-off

When a factor (a set of figures) is in the machine, it is in the natural position, or **UNITS** position and is considered to be multiplied by 1.

To 'multiply-over' by, say, 5, pick up the figures in the machine and depress the keys four more times, call the first stroke "2", then continue with 3, 4 and 5. The first stroke (or multiplication by one) has already been made as the figures were in the machine once.

When multiplying-over by a number, the first figure of which is not a UNIT the position of the decimal point can be altered according to the following rules:—

1. 24.26 the **DECIMAL POINT** is moved one place to the **RIGHT** and the keys are depressed 1426 times
2. 324.26 " " " is moved two places to the **RIGHT** and the keys are depressed 22426 times
3. 5324.26 " " " is moved three places to the **RIGHT** and the keys are depressed 432426 times
4. 0.4 " " " is moved one place to the **LEFT** and the keys are depressed 3 times
5. 0.04 " " " is moved two places to the **LEFT** and the keys are depressed 3 times
6. 0.004 876 " " " is moved three places to the **LEFT** and the keys are depressed 3876 times

From the last example it will be seen that the decimal point is moved for the point (.) and the number of 0's and **not** for the number of figures after the decimal point.

REMEMBER in Multiplication-over you move the **decimal point only**:

you do **not** move your hands as well in order to multiply by the first figure shown.

Note No. 6

ACCUMULATION OF PRODUCTS

To accumulate is to allow one product to add to another in the machine and would be used when only the final figure is required in a series of multiplications.

Work over a fixed point but allow a sufficient number of columns to the left of the decimal point for whole numbers in order to have plenty of machine space for the "carry-over" figure.

Accumulation – when using a Sumlock Comptometer with only one Register – can only be applied to direct multiplication and **not** multiplication-over unless the multiplication-over factor is common to all items. Neither can it be applied to mixed quantities and weights such as:—

343 lb @ £1.07 per cwt
591 sins. @ £2.68 per gross
45 oz @ £0.57 per lb

unless a Storage Register model is available.

DISCOUNTS AND INCREMENTS

Discounts and Increments are always quoted per cent (%) – per 100.
When calculating Discounts or Increments first mentally divide the % figure by 100.

Example $25\% = \frac{25}{100} = 0.25$ $5\% = \frac{5}{100} = 0.05$

Discount and Net Amount

Discount

Example £48.65 less 25% = $48.65 \times 0.25 = £12.16$

Net Amount

Example £48.65 less 25%

Net Percentage = 75% = $48.65 \times 0.75 = £36.49$

Increment and Gross Amount

Increment

Example £246.75 plus 5% = $246.75 \times 0.05 = £12.34$

Gross Amount

Example £246.75 plus 5%

Gross Percentage = 105% = $246.75 \times 1.05 = £259.09$

Note No. 8

CHAIN DISCOUNTS AND INCREMENTS

When there is more than one percentage to be added or deducted this is termed Chain Discount.

Normally only the final answer is required, which means only the NET AMOUNT or GROSS AMOUNT. Always work the chain of discounts or increments first then multiply by the money.

Example 1 £35.00 less 5%, less 15%, less 2½%
 $0.95 \times 0.85 \times 0.975 = 0.787\ 312\ 5$
 $0.787\ 312\ 5 \times £35 = £27.56$

Example 2 £35.00 plus 5%, plus 15%, plus 2½%
 $1.05 \times 1.15 \times 1.025 = 1.237\ 687\ 5$
 $1.237\ 687\ 5 \times £35 = £43.32$

Example 3 £35.00 less 5%, plus 15%, less 2½%
 $0.95 \times 1.15 \times 0.975 = 1.065\ 187\ 5$
 $1.065\ 187\ 5 \times £35 = £37.28$

NOTE: When the same chains occur repeatedly work these out first and keep a note of them.

NOTE: When 'and' occurs in a chain discount or increment it indicates that the sign immediately preceding is to be repeated e.g. less 2½% and 5% means less 2½%, less 5%.

To Find Actual Amount of Discount

Multiply the Net Percentages together and deduct the result from 1.

Example £135.52 less 10%, less 2½%
 $0.9 \times 0.975 = 0.8775$
 $1 - 0.8775 = 0.1225$
 $£135.52 \times 0.1225 = £16.60 = \text{Actual Amount of Discount}$

To Find Actual Amount of Increment

Multiply the Gross Percentages together and deduct 1 from the result.

Example £135.52 plus 10%, plus 2½%
 $1.1 \times 1.025 = 1.1275$
 $1.1275 - 1 = 0.1275$
 $£135.52 \times 0.1275 = £17.28 = \text{Actual Amount of Increment}$

Note No. 9

RECIPROCAL

A reciprocal is the result of dividing any number into 1. It would be used to find the result of a division by simple multiplication, since the process of multiplication by Comptometer is usually quicker than that of division. Reciprocal division is mostly used when several amounts have to be divided by the same number.

Example £ 10.48
 501.57
 2.98 All to be divided by 33.5
 1065.25
 31.09

The reciprocal of 33.5 is 0.029 850 744 3. Multiply each item in turn by this decimal number.

Reciprocals can also be used for a single division if the divisor is one which can be used fairly frequently and can be committed to memory.

Example 349 oz. @ £1.18 per lb. = 349 x 1.18
 Leave result in the machine and multiply by 0.0625 (Reciprocal of 16).

RECIPROCAL MUST ALWAYS BE PROVED ACCURATE BEFORE THEY ARE USED.
CHECK BY MULTIPLYING BACK.

MISCELLANEOUS EXTENSIONS

An 'Extension' is the type of calculation involving a given number of articles at a given price, weight or measurement, to arrive at a total price, weight or measurement.

When extending bring the quantity to the same unit as the price 'per'.

The following notes give instructions for calculating various types of extensions using reciprocals to build up decimals. There are also decimal charts covering each of the following groups of extensions which can be used instead of reciprocals.

Lb. Oz.

Lb. oz. @ price per lb.

Multiply lb. and oz. – as 16th – by price per lb.

NOTE When oz. have fractions e.g. 3 lb. 15¼oz. @ 39p per lb.
add lb. into Register multiplying oz. by 0.0625, multiply by price.

Lb. oz. @ price per oz.

Convert lb. to ozs. by multiplying by 16, add in the odd ozs. multiply by price.

Yardage

Yards, Feet and Inches

12 inches = 1 foot.
3 feet = 1 yard.
36 inches = 1 yard. Reciprocal of 36 = 0.027̄.

Yards and Inches @ price per yard

Add yards into Register multiply inches by 0.027̄, multiply by price.

Yards and Feet @ price per yard

Multiply yards and feet – 1 foot as 0.3̄ or 2 feet as 0.6̄ – by price.

Yards, Feet and Inches @ price per yard

Add yards as whole numbers, add each foot as 0.3̄, multiply inches by 0.027̄, multiply by price.

Liquid Measure

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon.
8 pints = 1 gallon.

Gallons, Quarts and Pints at price per gallon

Treat gallons as whole numbers, mentally multiply quarts by 2, add pints and decimalise as 8ths. multiply by price.

MISCELLANEOUS EXTENSIONS—Continued

Gallons, Quarts and Pints at price per quart

Convert gallons to quarts by multiplying by 4, add in quarts and decimalise any pints as halves multiply by price.

Gallons, Quarts and Pints at price per pint

Convert gallons to pints by multiplying by 8, leave result in machine, multiply quarts by 2 and add in pints as whole numbers, multiply by price.

Gross

12 singles = 1 dozen

12 dozen = 1 gross

144 singles = 1 gross Reciprocal of 144 = 0.00694

Gross, Dozen and Singles at price per gross

Add gross as whole numbers, add dozens as 12ths. Multiply singles by 0.00694 multiply by price.

Gross, Dozen and Singles at price per dozen

Convert gross to dozens by multiplying by 12, add in the dozens as whole numbers and decimalise the singles as 12ths, multiply by price.

Gross, Dozen and Singles at price per single

Convert gross to singles by multiplying by 144 and then dozens to singles by multiplying by 12. Add in the singles, multiply by price.

Tonnage Extensions

Tons, cwt. qr. and lb. @ price per ton

The TONS will be whole numbers.

CWT will be decimalised as 20th's

QRS will be 1 qr. = 0.0125

2 qrs. = 0.025

3 qrs. = 0.0375

1/20th is 0.05,
therefore 2/20's are 0.10,
3/20th's are 0.15, and so on.

Lb. are multiplied by the reciprocal of 2240 (0.000 446 428)

All to be multiplied over by the price.

Example 5 tons 18 cwt. 2 qr. 15 lb. @ £25.00 per ton.

Add:—

tons as whole numbers	=	5
18 cwt. = 0.9	=	5.9
2 qr. = 0.025	=	5.925
Multiply 15 lb by 0.000 446 428	=	5.931 696 38
Multiply by price		
Answer =		£148.29

MISCELLANEOUS EXTENSIONS—Continued

Tons, cwt. qr. and lb. @ price per cwt.

Example 2 tons 5 cwt. 3 qr. 11 lb. @ 84p per cwt.

Multiply 2 (tons) by 20 and add in the 5 cwt. = 45
 3 qr. = 0.75 = 45.75
 11 lb. x 0.008 928 571 (reciprocal of 112) = 45.848 2142

Multiply by the price

Answer = £38.51

Tons, cwt. qr. and lb. @ price per lb.

Convert tons, cwt. and qr. to lb. add in odd lb. and multiply by price per lb.

Lb. @ price per cwt.

Multiply lb. by price and divide by 112.

Lb. @ price per ton

Multiply lb. by price and divide by 2240.

Work Priced Per Hundred and Thousand

(C or %) is an abbreviation for price per hundred.

(M or ‰ or mille) is an abbreviation for price per thousand.

Mentally divide quantity by 100 or 1,000 before commencing the calculation.

i.e. two places to left to divide by 100.
three places to left to divide by 1,000.

Then make a simple multiplication, quantity by rate.

Metric Conversions

e.g. Kilogrammes @ price per lb.
Metres @ price per yard
Litres @ price per gallon

Multiply weight or measurement by price; multiply by appropriate decimal from Metric Conversion Table.

Note No. 11

WAGES

Hours and minutes @ rate per hour

Add hours into Register, multiply minutes by 0.016̇ (or use decimal chart).

Multiply by price

If minutes are taken to the nearest five minutes, mentally divide them by 5 and treat as 12ths.

e.g. 7hrs 40 mins. = $7\frac{8}{12} = 7.6\dot{6}$

Multiply by price

Hours at Rate per Hour plus Overtime

Calculate the number of hours by adding the flat number of hours into the machine and accumulate the overtime by multiplying the hours at time and a quarter by 1.25; the hours at time and a half by 1.5; the hours at double time by 2.

Multiply by rate per hour

Payroll

This could involve any or all of the following:

- 1) Add daily hours for each employee to give total hours.
- 2) Extend hours by rate to give gross wage.
- 3) Cross cost deductions column to give a total deductions figure.
- 4) Subtract total deductions from Gross wage to give Net wage.
- 5) Add Gross wage, Total Deductions and Net wage to balance.
- 6) Coin denomination.

Coin Denominating

Example	Result
£	Amounts under the various denominations:—
12.83	£
13.14	£1 notes 139.00
18.75	50p pieces 2.50
16.02	All other silver 1.55
15.91	Coppers <u>0.21</u>
18.29	£143.26
28.74	
<u>19.58</u>	
<u>£143.26</u>	

Each item in the above column is the wage to be paid to a certain worker. The cashier must therefore draw from the Bank enough £1 notes, enough 50p pieces and as much silver and copper as will enable him to give each worker the exact money. To find the necessary amounts under each denomination, work as follows.-

1. Add the £'s only and note answer.
2. Add the 50p's and note answer.
3. Add the remaining silver and note answer.
4. Add the coppers, 2p and 1p and note answer.

The total of the various amounts must agree with the total of the Wages column.

NOTE: You may be required to list £5 notes and £10 notes; or to show the breakdown in a different form from that given above. Check with your employer first.

FOREIGN EXCHANGE

Foreign Exchange conversions involve expressing one country's currency in terms of another.

The term 'Rate of Exchange' means the value of one country's currency, expressed in terms of another country's currency.

When converting foreign currencies, it is for the operator to decide by applying common sense, whether the calculation is one of **Multiplication** or **Division**.

NOTE: One point to remember is that if the amount to be converted and the rate of exchange are the same currency you **DIVIDE**. If they differ you **MULTIPLY**.

EXAMPLE

1. \$ 384.56 to £'s @ \$ 2.39

As there are 2.39 dollars to £1. there will be fewer £'s than there are dollars, therefore **DIVIDE** $\$ 384.56 \div \$ 2.39$

Answer = £160.90.

2. £368.53 to Francs @ 11.86½

As there are 11.86½ Francs to £1. there will be more Francs than £'s therefore **MULTIPLY** 368.53×11.865 .

Answer = 4372.61 Francs

Method of Finding Rate of Exchange

Example £150.52 = 2683.85 Kroner; find rate of exchange.

DIVIDE the £'s into the foreign currency and the result will be the number of Kroner to the £ Sterling.

Answer = 17.83 Kroner

THE 993/S – STORAGE REGISTER

The foregoing Notes apply to all models of Comptometer. They can be used equally well with Storage Register equipment, often with greater efficiency, accuracy and speed.

The following Notes will explain some of the more obvious advantages you will gain from using a machine with a Storage Register.

Addition – Columnar

Add the column of figures from top to bottom and transfer \oplus to the Storage Register.

Re-add the column of figures this time from bottom to top. Visually check that answers in both Registers are the same. Write down the answer from the Working Register – compare written answer with that in the Storage Register. Operate the Storage Transfer Control towards \ominus ; this will achieve two things.

1. will give a **ZERO PROOF** and
2. clear the machine ready for the next addition, calculation, etc.

Addition – Analysis or Cross Casting

Example

	A	B	C	D	Total
1.	236	95	312	43	686
2.	29	73	250	746	1098
3.	423	428	65	92	1008
4.	<u>776</u>	<u>33</u>	<u>231</u>	<u>517</u>	<u>1557</u>
	<u>1464</u>	<u>629</u>	<u>858</u>	<u>1398</u>	<u>4349</u>

Add column A. record answer, transfer \oplus to Storage Register.

Repeat for columns B, C and D.

Record grand total now appearing in Storage Register (4349)

Add line 1, record answer, transfer \ominus from Storage Register

Repeat for lines 2, 3 and 4

BOTH REGISTERS SHOULD NOW READ ZERO.

Note No. 13

The 993/S—Continued

Subtraction

When two Registers are available subtraction is simplicity itself; no reference whatsoever is made to the small figures on the keytops.

Example 200 351 – 109 70

Add 200 351 into the machine at the right hand side of the keyboard; transfer \oplus to Storage Register.

Add 10 970 into the machine at the right hand side of the keyboard; transfer \ominus to Storage Register.

Answer 189 381, appears in Storage Register.

DEBITS AND CREDITS

Example 1	£	
	16.39	
	13.18	Cr
	145.97	
	27.31	
	<u>108.54</u>	Cr

Add Debit items; transfer \oplus to Storage Register

Add Credit items; transfer \ominus to Storage Register = £ 67.95 – Debit balance.

Example 2	£	
	31.87	
	5.95	Cr
	22.93	
	43.78	Cr
	6.56	
	<u>18.15</u>	Cr

Add Debit items; transfer \oplus to Storage Register

Add Credit items; transfer \ominus to Storage Register

Register reads 9 999 999 993.48 indicating a Credit balance.

In order to find the true Credit balance, ignore the 9's and copy 3.48 to the keyboard in **small figures** (small 3.47) = £6.52.

Check the copy back by operating the Storage Transfer Control to \oplus obtaining zero's in both Registers.

The 993/S—Continued

Multiplication

Accumulation of Products with discount and increment

The Storage Register Comptometer is fitted with a Rounding Feature and using it will ensure that the Storage Register shows the exact total of rounded-off amounts which have been written down.

The feature consists of two red controls for penny rounding or halfpenny rounding and a contrasting No. 5 key in the third column of keys from the right. The decimal position must always be fixed between the fifth and sixth columns of keys from the right. (If the storage model Comptometer you are using also has Sterling columns then you will find the contrasting No. 5 key in the sixth column from the right and the fixed decimal position will therefore be between the eighth and ninth columns from the right).

Example	Showing penny rounding	645	@ £7.50	per 1000	£ 4.84
		2183	@ £1.62½	per C	35.47
		38½ doz	@ £2.73	per doz	<u>105.11</u>
					145.42
			Less 7½%		<u>10.91</u>
					<u>£134.51</u>

Latch the Penny Rounding Control – the red control to the right of the first column on the right.

Multiply 0.645 by £7.50 and then depress the No. 5 Rounding Key.

NOTE: the answer reading the first two decimal places (pence) as shown, ignoring all figures to the right of them.

Operate the Storage Transfer Control to

(You will notice that the figures in the 3rd, 4th and 5th decimal positions do not transfer to store).

Calculate the second and third items in a similar manner; the Storage Register now shows the gross total.

Hold the figures shown in the Storage Register (145.42) multiply by 0.075 then depress the No. 5 Rounding Key.

You can now record the gross total from the Storage Register and the discount from the Working Register. Operate the Storage Transfer Control to

NOTE: If the percentage figure is one of increase transfer would of course replace transfer

UNLATCH THE PENNY ROUNDING CONTROL

Example	Showing halfpenny rounding	645	@ £7.50	per 1000	£ 4.84
		2183	@ £1.62½	per C	35.47½
		38½ doz	@ £2.73	per doz	<u>105.10½</u>
					145.42
			Less 7½%		<u>10.90½</u>
					<u>£134.51½</u>

Make sure the Penny Rounding Control is unlatched.

Multiply 0.645 x £7.50 then carry out one of the following operations:—

- a. If the 3rd, 4th and 5th decimal figures are between 000 and 249, operate the red Halfpenny Rounding Control (which you will find next to the subtraction selectors).
- b. If the 3rd, 4th and 5th decimal figures lie between 250 and 749, operate the red Halfpenny Rounding Control and depress the No. 5 Rounding Key ONCE.

(The red Halfpenny Rounding Control clears the 3rd, 4th and 5th decimal figures from the register, allowing you to adjust the answer if necessary by means of the No. 5 Rounding Key).

- c. If the 3rd, 4th and 5th decimal figures lie between 750 and 999, operate the red Halfpenny Rounding Control and depress the No. 5 Rounding Key TWICE.

Note the answer and transfer to store.

Note No. 13

The 993/S—Continued

Calculate the second and third items and the discount in a similar manner.

Remember that the Penny Rounding Control must ALWAYS be UNLATCHED except when rounding to the nearest new penny.

Pro-Rating and Proportioning Percentages

There are two ways of utilising the Storage Register when solving these particular problems.

One way uses the Storage Register to memorise the constant.

Example Pro-rate £150 over the following:

£
37.50
181.38
82.54
<u>43.46</u>
<u>£344.88</u>

Find the constant (0.434 933 862) and transfer to the Storage Register.

Calculate each line using the constant 'noted' therein.

Add each calculated amount to check to the figure of pro-ration.

The alternative method involves writing down the constant and accumulating each calculated amount in the Storage Register.

Each method has its advantages and the one you choose will depend upon the work involved.

Percentage of Decrease

Divide the later dated amount by the earlier dated amount in the usual way.

Transfer \square to the Storage Register, this automatically gives you the percentage of decrease

Example

Find the percentage of decrease:	1968	£19 573
	1967	£22 135

$19\ 573 \times 100 \div 22\ 135 = 88.425\ 5..$

Operate the Storage Transfer Control towards $\square = 911.574\ 5$

Ignore the 9 and read the answer as 11.57% Decrease

NOTE: This method can be used equally well when calculating percentage of Profit.

Pro Rate & % proportions

Find total. = 100%

100 in machine \div total = constant Multiple.

Must check constant to prove it correct.

1 unit is --- of 100%.

Rounding off - put + or - against anything which can be upped or downed if total does not add back to 100.

e.g.

$$\begin{array}{r}
 1386 \\
 + 2173 \\
 9248 \\
 380 \\
 89 \\
 1472 \\
 318 \\
 2467 \\
 \hline
 57533 = 100\%
 \end{array}$$

\therefore This fig \uparrow into 100 = .0017381328 - Constant.

(to check this mult. constant .0017381328 x 57533 = 9999999)
CHECK IS MOST IMPORTANT.

To make mult easier now mentally move decimal place on above fig. eg. 1.386, 42.173, 9.248. (because of .00)

Now multiply these figures by constant.

$$\begin{array}{r}
 2.41 \\
 73.30 \\
 16.07 \\
 .66 \\
 .16 \\
 2.56 \\
 .55 \\
 4.29 \\
 \hline
 100.00
 \end{array}$$

correct.

→

% of one quantity & Another
} rules.

OF. Amount is always your Divisor

1) Is Amount goes in machine

2) $\times 100$ i.e. move dec. pt 2 to right

3) Divide by of amount, after counting whole no. + moving point again.

eg. what % is 1789.34 of 8546
= 20.94%

WAGES.
To find 40 hrs @ £8. per 38 hours ovt. at double time:-
2 hours ovt $\times 2 = 4 + 38$ hrs = 42 hrs \times £8 = 336

METRIC.
mult. no. of kg or lbs. by money then mult. by conversion rate, not other way round.

PRO-RATA.

Do exactly the same but you have a

figure & pro rata instead of using 100.

eg. pro rata 3164.
instead of dividing total of something into 100

divide it into 3164 & continue the same

Mult. by 3 factors with decimals.

Mult 1st 2 as usual. If 3rd factor is decimal :-

If .95 move dec. place 1 to left.

" .095 " " " 2 " "

" .0095 " " " 3 " "

" .00095 " " " 4 to left.

Then ignore '0's and continue as usual i.e. add in 1 less than figure shown.

Reverse this if 3 factor is more :-

If 2.4 have in unit pos.

If 22.4 move 1 to right

etc.

eg. $13 \times 7.5 \times .95 = 92.625$
 $22 \times 14 \times .95 \times .005 = 1.463$

Accumulation of X.

with a set of figures of mult & get total answer just keep mult. a leaving total in machine.

SPLIT X.

Mid dec. place by hold counting whole no's
make sure 1st fig (whole no's will fit into this)
mult. 1st half of number across,
then go back $\times X$ ~~set~~ second $\frac{1}{2}$ across board.

$2\frac{1}{2}\% = .025$
 $33\frac{1}{3}\% = .333$

mult - the perc. as a decimal figure in the usual manner.

move 1 to right if not unit pos.
 ~ 2 - - - - - if 0 1st dec. place
 ~ 3 - - - - - 0 2nd dec. place.

CARE :

* DECIMAL POINTS.

multiplication :: move to right or left depending on position.
 if 1.1 base
 ~ 11.1 move 1 to right
 ~ 111.1 - 2 - -
 if 0.1 - 1 to left
 0.01 - 2 to left
 0.001 - 3 to left.

DIVISION.

if 1.1 move 1 to left
 ~ 11.1 - 2 - -
 ~ 111.1 - 3 - -
 0.1 - 0 right
 0.01 - 1 right
 0.001 - 2 right.

Multiplication of money:

- select dec. place.

put amount in multiply as usual.

$$2p = £0.02$$

$$\text{e.g. } 44 \times 33p = £14.52.$$

$$30p = £0.30.$$

unit pos. = £ now & right if only got pence as dec. of £

Subtraction.

put in whole number

to take away use subtract key to left of

num. & also take care of last fig. of subtrahor.

if 9 is middle fig. take do not do anything

Use small figures on keys to take subtrahor away.

with a 0 in middle depress it.

with a 0 on end of fig. - ignore it & make last fig. before it 1 less

$$\text{e.g. } 8700 \text{ becomes } 86--$$

DIVISION.

find dec. place by counting whole nos in divisor & move to left. put no. to be divided into machine from left hand side.

take 1 fig off divisor as in subtraction.

using small keys as in subtraction.

~~the~~ ^{does} the divisor go in

- 1) Equal index fig. i.e. the fig. to the left of where fingers are placed on keys. depress ~~the~~ until you have equalled this fig. i.e. if fig is 6 press until you have done 6.
- 2) I depress as often as divisor will go into figures.

- 3) move 1 place to right & repeat.

$$\text{e.g. } 16425 \div 25 = 657.$$

Div cont

when div by .000... move dec. place 1 @ right

for each 0 and then ignore them

For $\frac{1}{2}$ & $\frac{1}{5}$ if 3-4-5 Rig. between

250-749 = $\frac{1}{2}$ if below = 000 if above = 1

And

mult by 3 factors

to find dec place count no of whole figs in

for 2 nos. then add one = dec. place.

mult. 1 x 2nd then keeping that fig in machine

by 3rd, remembering it is already in once

eg. $63 \times 48 \times 7$

$63 \times 48 = 3024 \times (6)$ already in once

$= 21168$

* with 3024 in machine depress these same keys 6 more times.

if 3rd fact. is 70 move dec. place 1 @ right & add 6 times

if -- " -- 700 " " 2 " " " " "

eg. $52 \times 62 \times 82 = 264368$

$108 \times 38 \times 240 = 984960$

