

Fascinating

FIGURE

PUZZLES

100

Fascinating Figure Puzzles

Compiled by
FREDERICK W. DAVIS, A. A.
of the Burroughs Adding Machine Company

COPYRIGHT, 1933



Burroughs

6

TO YOU for whom there is a certain fascination in figures it is hoped that this little collection of puzzles, old and new, will bring keen enjoyment. While routine figuring is drudgery and, properly, machine work, mental arithmetic, such as is called for by these problems, is healthy exercise for the human brain. May this booklet bring you interest and recreation in the time that you have saved through the use of Burroughs machines



Fascinating Figure Puzzles

1. ONE IN SUBTRACTION.

Subtract 45 from 45 and leave 45 as a remainder.

2. ONE IN ADDITION.

Arrange the figures 1 2 3 4 5 6 7 8 9 0 so that they add 100.

Note: This is usually done by using fractions, but it can be done without.

3. THE BOTTLE AND THE CORK. (ONE IN ALGEBRA.)

A bottle and a cork cost \$1.10. The bottle cost \$1.00 more than the cork. What did each cost?

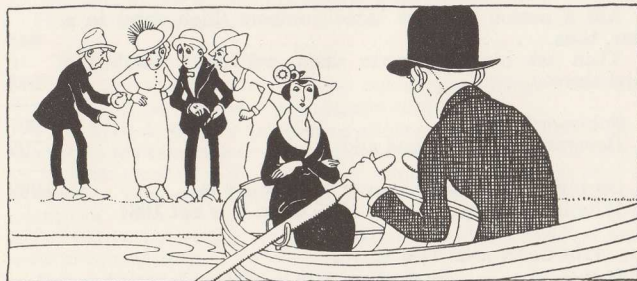
4. THE HORSE QUESTION. AN EXAMPLE IN PRESENT WORTH.

A man sold a horse for \$90, bought him back for \$80, and resold him for \$100. What did he make on the transactions?

5. THE THREE JEALOUS MEN AND THEIR WIVES.

Three men, traveling with their wives, came to a river which they wished to cross. There was but one boat, and but two could cross at one time; and, since the husbands were jealous, no woman could be with a man unless her own husband was present. In what manner did they get across the river?

Note: Simple as this question may appear, it is found in the works of Alcuin who flourished a thousand years ago; hundreds of years before the art of printing was invented.—Parke.



"She can't vamp my husband"

6. THE IMPECUNIOUS MAN AND THE PHILANTHROPIC MERCHANTS.

A man goes into a store and says to the proprietor: "Give me as much money as I have with me and I will spend \$10.00 with you." It is done, and the man repeats the operation in a second and a third store, after which he has no money left.

How much did he start with?

7. IN THE MONTHS WITHOUT THE "R," CLAMS A DEADLY PIZON ARE!

Two men, stopping at an oyster saloon, laid a wager as to which could eat the more oysters. One ate ninety-nine, and the other ate a hundred and won. How many did both eat?

8. THE SQUIRREL AND THE EARS.

Six ears of corn are in a hollow stump. How long will it take a squirrel to carry them all out, if he takes out three ears a day?

9. MENTAL TELEPATHY.

Show a person the dial of your watch and ask him to think of a certain hour. Then point, or tap on the dial, and at each tap he will silently add ONE to the number of the hour he has selected until he arrives at TWENTY. On that tap he will stop me and my pencil should be resting on the hour he first selected.

10. THE INEVITABLE ANSWERS.

Ask a person to write three numbers (high ones) in a line, thus..... 845
 Then ask him to reverse them, and place below the first three..... 548

Subtract them..... 297
 Reverse them again and add..... 792

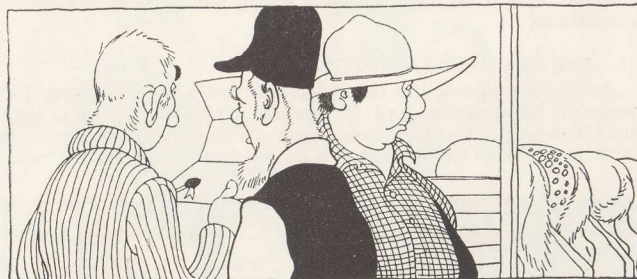
On high numbers the answer will always be..... 1089
 Why is the answer always 1089 when it is not 198?

11. THE CATS AND THE RATS.

If three cats can catch three rats in three minutes, how many cats can catch one hundred rats in one hundred minutes?

12. AN UNMANAGEABLE LEGACY.

An old farmer left a will whereby he bequeathed his horses to his three sons, John, James and William, in the following proportions: John, the eldest was to have one-half, James to have one-third, and William one-ninth. When he died, however, it



"How are we going to give John eight horses and a half?"

was found that the number of horses in his stable was seventeen, a number which is divisible neither by two, by three, nor by nine. In their perplexity the three brothers consulted a clever lawyer, who hit on a scheme whereby the intentions of the testator were carried out to the satisfaction of all parties.

How was it managed?

13. THE LUCKY NUMBER.

Many persons have what they consider a "lucky" number. Show such a person the row of figures subjoined:

1, 2, 3, 4, 5, 6, 7, 9 (consisting of the numerals from 1 to 9 inclusive, with the 8 only omitted), and inquire what is his lucky, or favorite number. He names any number he pleases from 1 to 9, say 7. You reply that, as he is fond of seven, he shall have plenty of them, and accordingly proceed to multiply the series given above by such a number that the resulting product consists of sevens only.

It is required to find (for each number that may be selected) the multiplier which will produce the above result.

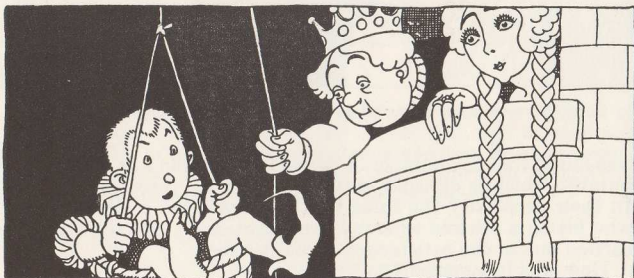
14. THE SHEPHERD AND HIS SHEEP.

A shepherd was asked how many sheep he had in his flock. He replied that he could not say, but he knew if he counted them by twos, by threes, by fours, by sixes, or by sixes, there was always one over, but if he counted them by sevens there was none over.

What is the smallest number which will answer the above conditions?

15. THE ROYAL DESCENDANTS.

An elderly queen, her daughter, and little son, weighing 195 pounds, 105 pounds, and 90 pounds respectively, were kept prisoners at the top of a high tower. The only communication with the ground below was a rope passing over a pulley with



"Hold on tight, son!"

a basket at each end, and so arranged that when one basket rested on the ground the other was opposite the window. Naturally if the one were more heavily loaded than the other, the heavier would descend; but if the excess on either side was more than 15 pounds, the descent became so rapid as to be dangerous, and from the position of the rope the captives could not check it with their hands. The only thing available to help them in the tower was a cannon-ball, weighing 75 pounds. They, not withstanding, contrived to escape.

How did they manage it?

16. THE RESTLESS FAMILY.

In how many ways may a family of ten persons seat themselves differently at dinner?



"Let's all change places"

17. A DIFFICULT PROBLEM IN DIVISION.

Two men have 24 ounces of whiskey, which they wish to divide between themselves equally. How shall they effect the division, provided they have only three vessels, one containing 5 ounces, the other 11 ounces, and the third 13 ounces?

18. CAN YOU ESTIMATE THE WEIGHT OF COAL IN YOUR COAL BIN?

Note: A cubic foot of anthracite coal, before it is prepared for domestic use, will on an average weigh about 93 pounds. When broken for the market it will average about 54 pounds.

Rule: Multiply the contents in cubic feet by 54 for anthracite, or by 50 for bituminous coal, and the product will be the weight in pounds.

How many tons of anthracite coal, of 2000 lbs. each, can be stored in a bin 28 ft. long, 20 ft. wide, and 4 ft. deep?

The above rule is a useful one to know for anyone who may be moving away and leaving a certain amount of coal in the cellar to be sold to the new tenant.

19. PERMUTATION.

How many changes can be made in the arrangement of 5 grains of corn, all of different colors, laid on a row?

20. THE MENAGERIE.

The proprietor of a menagerie was asked how many birds and how many beasts it included. He replied, "Well, the lot have 36 heads and 100 feet."

How many of each were there?

21. ONE IN FRACTIONS.

What three figures, multiplied by 4, will make precisely 5?

22. AN EASY ONE?

How may 100 be expressed with four nines?

23. THE UNWELCOME EIGHT.

Write 24 with three equal figures, none of them being 8

24. A LITTLE PUZZLER.

What is the third and a half of a third and a half of ten?

25. MAGIC SQUARES.

These are very interesting, and have engaged the attention of some of our greatest mathematicians, among whom we may mention Leibnitz, Stifels, etc. The methods of arrangement given in the back of this booklet are by no means the only ones that may be used.

How may the nine digits (1, 2, 3, 4, 5, 6, 7, 8, 9,) be arranged in a rectangular form, so that the sum of any row, whether vertical, or diagonal, or horizontal, shall equal 15?

26. A MATTER OF ARRANGEMENT.

How may the first 16 digits be arranged, so that the sum of the vertical, and the horizontal, and the two oblique rows may equal 34?

27. WHERE NINE MAKES TEN.

Put down four marks and then require a person to put down five more marks and make ten.

28. FIGURE IT OUT.

Two-thirds of six is nine, one-half of twelve is seven. The half of five is four, and six is half of eleven.

29. PERHAPS YOU CAN BORROW IT.

Take ten pieces of money, lay them in a row, and require someone to put them together in heaps, 2 in each, by passing each piece over 2 others.

30. RURAL ECONOMICS

A farmer sent his three daughters to the market to sell apples. The eldest had 50, the second daughter 30, and the youngest 10.



"Who'll buy our apples?"

The farmer jokingly told them all to sell at the same price, and bring home the same amount of money, and, to his surprise, they actually did so.

How did they manage it?

31. THE EXPUNGED NUMERALS.

Given, the following sum in addition:

$$\begin{array}{r} 111 \\ 777 \\ \hline 999 \end{array}$$

Required, to strike out six of these numbers, so that the total of the remaining numbers shall be 20 only.

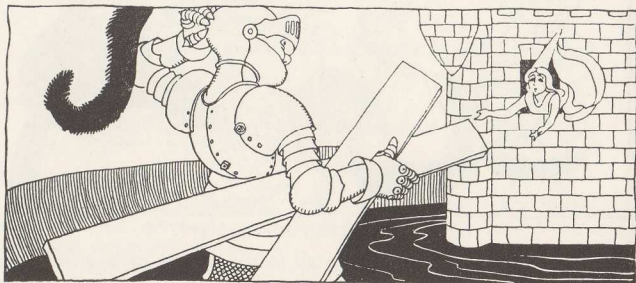
32. ONE FOR BRIDGE WHIST PLAYERS

A friendly circle of twenty-one persons agreed to meet each week, five at a time, for an evening of bridge whist, so long as they could do so without forming exactly the same party on any two occasions

As a central room had to be hired, it was important to have some idea as to the length of time for which they would require it. How long could they keep up their weekly meetings?

33. ONE FOR THE MOAT-ORIST.

In ancient times it was customary to have a moat around a castle to protect it from robbers and invaders. A man once had a square moat twenty feet wide surrounding his castle. The common way of getting into his castle from the road



"Oh, for an aeroplane!"

was to cross a drawbridge. One day the drawbridge failed to work and the man found the only means of reaching the inside of his castle was by the aid of two planks, one 19 feet long and the other 19½ feet long. He could not splice or nail the planks together. How did he arrange them so as to span the moat and allow himself to enter his castle?

34. MENTAL TELEPATHY.

Think of any three numbers less than 10. Multiply the first number by 2, and add 5 to the product. Multiply this sum by 5, and add the second number to the product. Multiply this last result by 10, and add in the third number to the product. Tell me the answer you have obtained and I will name the number you first thought of and in the order in which they were thought of.

35. A DANGEROUS WAY TO BUY SHOES.

A man went into a store and purchased a pair of shoes worth \$5, handing over a \$50 bill to pay for them. The merchant, not being able to make the change, crossed the street and asked a friend to give him change. He then returned and gave the stranger the shoes and his change. After the purchaser of the boots had been gone a few hours, the friend, finding the bill to be a counterfeit, returned and demanded \$50 in good money from the merchant. Of course, the merchant gave it to him. How much did he lose by the operation?

36. THE PERSISTENT DIGITS.

What number added to itself one or several times will give a total having the same digits as that number but differently arranged, and after the sixth addition will give a total all nines?

37. A PROBLEM IN WAGES.

Suppose you were offered a job and were promised one cent for the first day's work, double that or two cents for the second day, four for the third, and so on for every day in the month. Would you take the job? Figure it out on a Burroughs.

38. A PROBLEM IN ADDITION.

Can you assign a number to each of the eight letters of the alphabet used in this problem so that, when written numerically, the first two words added together equal the third?

S	E	N	D
M	O	R	E
<hr style="width: 100%; border: 0.5px solid black;"/>			
M	O	N	E
Y			

9. The method used in executing this trick is as follows: Point promiscuously about the face of the watch until the eighth tap, which should be upon "12," and then pass regularly around, towards "11," to the left, pointing at "11," "10," "9," etc., until "twenty" is called, when, as may be easily shown, pointer will be over the number selected.

10. This is a peculiar feature of the digits 1 to 9. Try it yourself on various numbers and write your own explanation. The "casting out of 9's" or the divisibility by 9 enters into the solution.

11. The same three cats!

12. The lawyer had a horse of his own which he drove into the stable with the rest. "Now," he said to John, "take your half." John took nine horses accordingly. James and William were then invited to take their shares, which they did, receiving six and two horses respectively. This division exactly disposed of the seventeen horses of the testator, and the lawyer, pocketing his fee, drove his own steed home again.

NOTE: The above solution rests on the fact that the sum of the three fractions named, $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{9}$, when reduced to a common denominator, will be found not to amount to unity, but only to $\frac{17}{18}$. The addition of another horse ($\frac{1}{18}$) bringing the total number up to eighteen, renders it divisible by such common denominator, and enables each to get his proper share, the lawyer, then resuming his own $\frac{1}{18}$, which he had lent for the purpose of the division.

It is not generally known, but in the administration of the Mohammedan Law of Inheritance, which often involves numerous and complicated fractions, this expedient is frequently employed.

13. Multiply the selected number by NINE, and use the product as the multiplier for the large number. It will be found that the results will be respectively as follows:

1234567 9 x 9 (if 1 is selected) = 111 111 111
 1234567 9 x 18 (if 2 is selected) = 222 222 222
 1234567 9 x 27 (if 3 is selected) = 333 333 333

and so on down the line the next multipliers being 36, 45, 54, 63, 72, 81. It will be observed that the result in each case is the "lucky" number, nine times repeated. This may be nicely illustrated on a Burroughs.

14. To ascertain the number of the flock, find in the first place the least common multiple of 2, 3, 4, 5, and 6—i. e. 60. Then take the lowest multiple of this, which, with 1 added, will be divisible by 7. This will be found to be 301, which is the correct answer.

15. The boy descended first, using the cannon-ball as a counterpoise. The queen and her daughter then took the cannon-ball out of the upper basket, and the daughter descended, the boy acting as a counterpoise. The cannon-ball was then allowed to run down alone. When it reached the ground, the daughter got into the basket along with the cannon-ball, and their joint weight acted as a counterpoise while the queen descended. The princess got out, and the cannon-ball was sent down alone. The boy then went down, the cannon-ball ascending. The daughter removed the cannon-ball and went down alone, her brother ascending. The latter then put the cannon-ball in the opposite basket, and lowered himself to the ground.

16. Answer: 3,628,800. When we consider that this would require a period of over 9935 years, (one meal a day) the mind is lost in astonishment. We are inclined to wonder if there is not some mistake; and yet on just such chances as this one do gamblers constantly risk their money!

17. The easiest way would probably be to first fill up the 13 oz. measure. Pour it into the 11 oz. measure, which would leave 2 oz. in the 13 oz. measure. Then add two 5 oz. measures to the 2 oz. This leaves one ounce in the jug for the other man.

18. Answer: $28 \times 20 \times 4 \times 54 \div 2000 = 60.48$ tons.

19. Rule: To determine the number of permutations, commence with unity and multiply by the successive terms of the natural series 1, 2, 3, etc., until the highest multiplier shall express the number of individual things. The last product will indicate the number of possible changes.

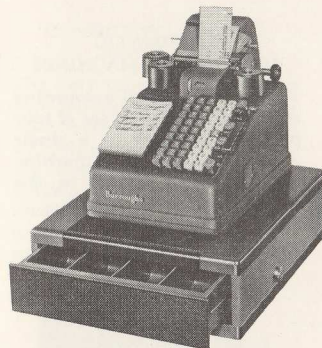
Answer to the Corn Question:
 $1 \times 2 \times 3 \times 4 \times 5 = 120$

This may seem improbable, the number being so great but if there were but a single grain more, the possible changes would be 720; and another would extend the limit to 5040; and so on in a constantly increasing ratio.

39.
$$\begin{array}{r} 12(1089708)90809 \\ \underline{108} \\ 97 \\ \underline{96} \\ 108 \\ \underline{108} \end{array}$$

40. Ask the person thinking of a number to indicate all the squares in which the number appears. The sum of the figures in the upper left corners of the squares in which the number appears will equal the number thought of. EXAMPLE: Supposing the number "5" is selected. This number appears in only the first two squares. Adding the figures in the upper left corners, 1 and 4, the result is 5.

Combination Cash Registers



General Purpose models are equipped to certify receipts or slips for each type of transaction and to provide locked-in grand totals and easily-read, locked-in tapes.



DESK ADDING MACHINES IN A WIDE RANGE

Eight-, ten- and thirteen-column adding, duplex adding, and adding-subtracting Desk Machines. Wide or narrow carriage. Hand or electric operation, plus and minus motor bars and credit balance feature, and the famous Short-Cut keyboard.



There's a Burroughs Machine for



SENSIMATIC ACCOUNTING MACHINES

This multiple-total accounting machine allows a choice of four posting schedules on a single control unit, giving the machine versatility unmatched in the accounting machine field.

CALCULATORS

With or without electric operation. The style illustrated accumulates group totals and a grand total. Amounts may be subtracted from grand total at the touch of a key. Many other styles are available with six-, ten-, or fourteen-column totaling capacity.



ACCOUNTING AND STATISTICAL MACHINES

For all commercial and bank accounting work requiring type-written description. Posts any combination of related records in one operation. Compact keyboard. Front insertion of forms. Electrically controlled carriage. Wide selection including machines that accumulate a large number of totals.



Every Accounting Requirement

COMPUTING BILLING MACHINES

The only machine that writes and computes a complete invoice in one operation, including all typing, extending, discounting and totalling of the bill. Extensions computed by direct multiplication. Extensions and results are printed by the depression of a single key.



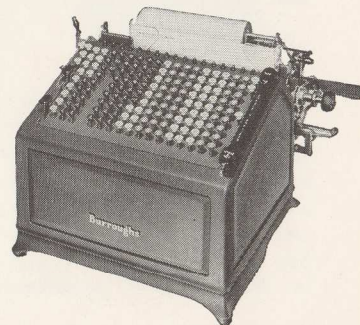
DUPLEX ADDING- SUBTRACTING MACHINES

Burroughs duplex adding-subtracting machines provide individual and grand totals, true minus totals without extra machine operations, multiple totals, quantity and amount, tax and amount, addition, subtraction, multiplication.



COMMERCIAL AND BANK ACCOUNTING MACHINES

Burroughs Multiple Register Accounting Machine in styles for commercial and bank use. Equipped with front feed carriage. Posts several related records in one operation, provides full-width journal and establishes figure proofs.

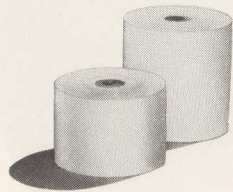


Business Machine Supplies



A complete line of supplies is offered to users of business machines as an important Burroughs service. All supplies are guaranteed, and are sold direct to users from Burroughs factories at Detroit, Michigan, and Windsor, Canada, as well as from all Burroughs branch offices.

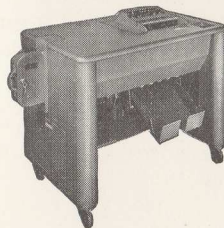
Burroughs supplies include carbon paper for all commercial requirements, in various grades, weights, finishes, colors and sizes, roll paper, journal sheets, journal rolls, ribbons, cash register rolls, cushion key-tops, machine hoods and aprons, and other items. A complete list, with prices, will be sent on request.



Burroughs supplies may be purchased through any of several plans designed to meet the requirements of various types of users. Substantial discounts are offered for quantity purchases. Deliveries can be arranged as needed, insuring fresh, clean supplies at all times, at minimum prices.

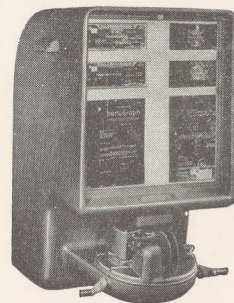
Burroughs Microfilming

The microfilming equipment offered by Burroughs represents the best in modern methods of copying, storing and preserving business records. These products, manufactured by Bell & Howell, are backed by forty years' research and experience in manufacturing precision motion picture equipment.



A new principle reduces cost of microfilming. The easy-to-operate Recorder photographs both sides of a document simultaneously, placing more images on a single roll of film than is possible with any other method.

With the Reader, images may be turned in any direction; 8mm images on both halves of 16mm film can be read at the same time. Facsimile prints, to actual size, can be made in a few minutes without a darkroom.



Burroughs processing centers render prompt, efficient service in developing exposed rolls of microfilm. Many large volume users, however, prefer to develop their films on their own premises. These users find the Automatic Processor simple and easy to use. A roll of film may be processed, dried and spooled, automatically, in a matter of minutes.

