FREAKS OF FIGURES.

THERE IS A GOOD DEAL OF MYSTERY AND ROMANCE IN ARITHMETIC.

The Figure Nine Has Many Obstinate and Erratic Characteristics — Seven and Three are Also Numbers That Turn Up Everywhere.

If figures won't lie, they do often play strange pranks. For instance:

There is the number nine. It is a most romantic number, and a most persistent, self-willed and obstinate one. You cannot multiply it away or get rid of it anyhow. Whatever you do it is sure to turn up again, as did the body of Eugene Aram's victim.

Mr. W. Green, who died in 1794, is said to have first called attention to the fact that all through the multiplication table the product of nine comes to nine. Multiply by any figure you like, and the sum of the resultant digits will invariably add up as nine. Thus, twice 9 is 18; add the digits together, and 1 and 8 make 9. Three times 9 is 27; and 2 and 7 is nine. So it goes on up to 11 times 9, which gives 99. Very good. Add the digits, 9 and 9 is 18, and 8 and 1 is 9. Go on to any extent and you will find it impossible to get away from the figure 9. Take an example at random. Nine times 339 is 3,051; add the digits together and they make 9. Or, again, 9 times 2,137 is 19,143; add the digits together, they make 18, and 8 and 1 is 9. Or still again, 9 times 5,071 is 45,639; the sum of these digits is 27, and 7 and 2 is 9.

This seems startling enough. Yet there are

OTHER QUEER EXAMPLES

Of the same form of persistence. It was M. de Maivan who discovered that if you take any row of figures, and, reversing their order, make a substraction sum of obverse and reverse, the final result of adding up the digits of the answer will always be 9. As, for example:

2941
Reverse, 1492

1449

Now 1+4+4+9=18; and 1+8=9.

The same result is obtained if you raise the numbers so changed to their squares and cubes. Start anew, for example, with 62; and reverse it, you get 26. Now 62—26=36, and 3+6=9. The squares of 26 and 62 are respectively 676 and 3,844. Subtract one from the other and you get 3,168—18, and 1+8=9. So with the cubes of 26 and 62, which are 17,576 and 238,328. Subtracted they leave 220,752—18, and 1+8=9.

Again, you are confronted with the same puzzling peculiarity in another form. Write down any number, as, for example, 7,549,132; substract therefrom the sum of its digits, and, no matter what figures you start with, the digits of the products will always come to 9.

7,549,132, sum of digits=31.
31

7,549,101, sum of digits=27, and 2+7=9.

Here is a different property of the same number. If you arrange in a row the cardinal numbers from 1 to 9, with the single omission of 8, and multiply the sum so represented by any one of the figures multiplied by nine, the result will present a succession of figures identical with that which was multiplied by nine. Thus, if you wish a series of fives, you take 5×9=45 for a multiplier, with this result:

12345679
45

61728395
49382716

555555555

A VERY CURIOUS NUMBER

Is 142,857, which, multiplied by 1, 2, 3, 4, 5 or 6, gives the same figures in the same order, beginning at a different point, but if multiplied by 7 gives all nines. Multiplied by 1 it equals 142,857; multiplied by 2 equals 285,714, multiplied by 3 equals 428,751; multiplied by 4 equals 571,428; multiplied by 5 equals 714,285; multiplied by 6 equals 857,142; multiplied by 7 equals 999,999. Multiply 142,857 by 8 and you have 1,142,856. Then add the first figure to the last and you have 142,857, the original number, the figures exactly the same as at the start.

The number 37 has this strange peculiarity: Multiplied by 3, or any multiple of 3 up to 27, it gives three figures all alike. Thus three times 37 will give 111. Twice three times (6 times) 37 will be 222; three times three times (9 times) 37 gives three threes; four times three times (12 times) 37, three fours; and so on.

The wonderfully procreative power of figures, or rather, their accumulative growth, has been exemplified in that familiar story of the farmer, who, undertaking to pay his farrier one grain of wheat for the first nail, two for the second, and so on, found that he had bargained to give the farrier more wheat than was raised in all England.

My beloved young friend who loves to frequent the roulette table, do you know that if you began with a dime and were allowed to leave all your winnings on the table, five consecutive lucky guesses would give you a million and a half of dollars, or, to be exact, $1,450,625.52.

Yet that would be the result of winning thirty-five for one five times hand running.

Here is another example: Take the number 15, we will say. Multiply that by itself, and you get 225. Now multiply 225 by itself, and so on until fifteen products have been multiplied by themselves in turn.

You don't think that is a difficult problem? Well, you may be a clever mathematician, but it would take you about a quarter of a century to work out this simple little sum.

The final product called for contains 38,589 figures, the first of which is 1,442. Allowing three figures to an inch, the answer would be over 1,070 feet long. To perform the operation would require about 500,000,000 figures. If they can be made at the rate of one a minute, a person working ten hours a day for 300 days in each year would be twenty-eight years about it. If, in multiplying, he should make a row of ciphers, as he does in other figures, the number of figures would be more than 523,959,22[illegible]. This would be the precise number of figures used if the product of the left-hand figure in each multiplicand, by each figure of the multiplier was always a single figure, but, as is most frequent, and yet not always, two figures, the method employed to obtain the foregoing result cannot be accurately applied. Assuming that the cipher is used on an average once in ten times, 475,000,000,000 approximates the actual number.

There is a clever Persian story about the wealthy Oriental who, dying, left seventeen camels to be divided as follows: His eldest son to have half; his second son, a third; and his youngest, a ninth. But how divide camels into fractions? The three sons, in despair, consulted Mohammed Ali.

"Nothing easier," said the wise man. "I'll lend you another camel to make 18, and now divide them yourselves."

The consequence was, each brother got from one-eighth to one-half more than he was entitled to, and Ali received his camel back again; the eldest brother getting nine camels, the second six, and the third two.

We have spoken of the number nine as a sort of Old Man of the Sea in mathematics.

But nine is not the only number that is dowered with a strong and self-assertive will. In history and legend

THE NUMBER SEVEN

Turns up with the same frequency that nine displays in the multiplication table.

Take the bible, for example: There are seven days of creation; after seven days' respite the flood came; the years of famine and plenty were in cycles of seven; every seventh day was a Sabbath; every seventh year the sabbath of rest; after every seven times seven years came the jubilee; the feasts of unleaven bread and of tabernacles were observed seven days; the golden candlestick had seven branches; seven priests with seven trumpets surrounded Jericho seven times, and seven times on the seventh day; Jacob obtained his wives by servitude of seven years; Samson kept his nuptials seven days, and on the seventh day he put a riddle to his wife, and he was bound with seven green withes, and seven lock of his hair were shaved off; Nebuchadnezzar was seven years a beast; Shadrach and his two companions in misfortune were cast into a furnace heated seven times more than it was wont. In the New Testament nearly everything occurs by sevens, and at the end of the sacred volume we read of seven churches, seven candlesticks, seven spirits, seven trumpets, seven seals, seven stars, seven thunders, seven vials, seven plagues, seven angels, and a seven-headed monster.

The Jews considered this number the embodiment of perfection and unity. Thus they claimed that the Hebrew letters composing the name of Samuel have the value of seven—a recognition of the greatness and perfection of his character.

Among other nations than the Jews the number seven is a mystic character.

Pythagoras pronounced the number to belong especially to sacred things. Hippocrates divided the ages of man into seven, an arrangement afterward adopted by Shakspeare. Long before them, however, the Egyptian priests had enjoined rest on the seventh day, because it was an unlucky day; and still further back in the mists of antiquity we find the institution of a Sabbath, or day of rest, every seven days, existing in a rudimentary form among the Chaldeans. The Egyptians knew of seven planets, hence the seven days of the week, each ruled and named after its proper constellation. It is singular that the ancient Peruvians also had a seven-day week, though without planetary names. They also had a tradition of a great deluge wherefore seven people saved themselves in a cave and repeopled the earth. This tradition tradition existed also in Mexico, but there the seven survivors were each hidden in a separate cave until the subsidence of the waters.

THE MYSTIC NUMBER THREE.

But seven was not and is not the only mystic number. The number three and the number nine also find their votaries. The Chinese have a great reverence for the latter. They prostrate themselves nine times before their emperior. Some African tribes have the same form of salutation for their chiefs.

Three was looked upon with great veneration by the early Christians, and, indeed, almost rivaled the reverence given to seven, for it was the symbol of the Trinity, and it was found over and over again in the Scriptures. When the world was created we find land, water and sky; sun, moon and stars. Noah had three sons; Jonah was three days in the whale's belly; Christ three days in the tomb. There were three patriarchs; Abraham, Isaac and Jacob. Abraham entertained three angels. Job had three friends. Samuel was called three times. Daniel was thrown into a den with three lions for praying three times a day. Shadrach, Meshach, and Abednego were rescued from the fiery furnace. The commandments were delivered on the third day. St. Paul speaks of Faith, Hope and Charity, these three. And so on and so on. It were tedious to continue the enumeration.

In classic mythology the Graces and the Furies were three, the Muses were originally three, and Cerberus' three heads, Neptune's trident, the tripod of Delphi, are a few more instances of the sacred character of the number.

Nay, does not life itself and nature proclaim the same truth? Have we not morning, noon and night; fish, flesh and fowl; water, ice and snow; hell, earth and heaven?

No wonder the witches in "Macbeth" ask: "When shall we three meet again?"

It will be seen that sacred numbers are always odd. Hence may arise that modern superstition among gamblers that there is luck in odd numbers. But among the ancient heathens, also, even numbers were shunned, because each can be divided into two, a number that Pythagoras and others denounced as the symbol of death and dissolution and evil augury generally.—The Illustrated American.