

THE MISSING NUMBER



PROPOSITION—Arrange the nine digits and a cipher in two rows so that they will add up correctly as shown.



HE CHINESE ARE wonderfully expert at figures, although in some way or other they seem to do everything backwards, just as they do in their reading which always goes uphill. They seemingly do their multiplication by division, and addition by subtraction.

They are very clever at mental arithmetic and do some queer calculations by rules or tricks which they cannot or will not explain.

One of their professors showed me some exercises in addition, which in their own peculiar way he reversed so as to do it by subtraction and working backwards from the answer to get the figures which were added together.

He asked me to arrange the nine digits, 1, 2, 3, 4, 5, 6, 7, 8, 9, and a cipher in two rows, add them together and rub out the two rows and any two figures I liked from the sum, and he would restore them at once. It appeared to be a simple, but pretty feat, so I present it to our puzzlists and ask them to replace the ten missing digits, although the real puzzle is simply to tell what are the erased numbers taken from the answer.

Missing-Word Anagram.

Here is a clever missing-word puzzle. Use a four-letter word, the same letters each time, in each of the blank spaces, and make good sense of the following rhyme:

A ——— old woman on ———
 bent
 Put on her ——— and away she
 went;
 ——— she cried, as she went on
 her way,
 How are we going to ———
 to-day?

Why is a glass-blower the most likely person to set the alphabet off at a gallop? Because he can make a D-canter.

What letter in the Dutch alphabet will name an English lady of title? A Dutch—S.

What Christian names besides Anna, reads the same both ways? Hannah or Eve.

When you stole my first, I lost my second, and you are the only person to give me my whole.

Hearts-ease.

Why is a bridegroom often more expensive than a bride? Because the bride is given away, but the bridegroom is often sold.

THE FAMOUS HOT CROSS BUN PUZZLE



PROPOSITION—Tell how many children there were and how many hot cross buns each received.



HERE IS A TIMELY souvenir calculated to interest such philosophers as have been delving into the hidden meanings of Mother Goose's quaint rhymes, for as a matter of fact most of those jingling old melodies conceal riddles or puzzles which are really worthy the investigation of us children of a larger growth. Now, just listen to the cry of the Hot Cross-Bun man:

"Hot-cross buns, hot-cross buns,
 One a penny, two a penny,
 Hot-cross buns.
 If your daughters don't like them
 Give them to your sons!
 Two a penny, three a penny,
 Hot-cross buns.
 I had as many daughters
 As I had sons,

So I gave them seven pennies
 To buy their hot-cross buns."

The inference is clear that there are three sizes of buns—one for a penny, two for a penny and three for a penny. There were just as many boys as girls, and they were given seven pennies so as to treat each one alike. How many buns did each receive?

Put Eleven Men in Ten Beds.

Every now and then some correspondent, probably a hotel keeper in search of practical information asks for an explanation of the following perplexing proposition;

An innkeeper had a sudden influx of guests, eleven arriving in one party and demanding separate beds. The host had only ten beds at his disposal, but he notwithstanding

managed to accommodate them as follows: He put two in the first bed, with the understanding that the second should have a bed to himself in a few minutes as soon as the others were settled. He then put the third in the second bed, the fourth in the third bed, and so on the tenth being accommodated in the ninth bed. He had thus one bed still left, which the eleventh man, who was temporarily placed in the first bed, was now invited to occupy.

As a matter of course this problem is not supposed to be susceptible of a rigid mathematical demonstration. It is based on a paradoxical proposition, but the error is so cleverly concealed that it is liable to avoid detection. That is all there is to it.

Why is a room full of married folks like a room empty? Because there is not a single person in it.

How many wives are you allowed by the Prayer-book? Sixteen: viz. fo(u)r better, 4 worse, 4 richer, 4 poorer; total sixteen.

Why are good intentions like fainting ladies? Because all they want is carrying out.

What is the difference between a carriage-wheel and a carriage-horse? One goes better when it is tired; the other don't.

Formed long ago, yet made to-day,
 I'm most employed while others sleep;

What none would like to give away,
 Yet no one likes to keep?

Bed.

I came to a field and couldn't get through it,
 So I went to a school and learned how to do it?

Fence.

What is that which, supposing its greatest breadth to be four inches, length nine inches, and depth three inches, contains a solid foot? A shoe.

What was the difference between Noah's ark and Joan of Arc? One was made of wood, the other was Maid of Orleans.

There is a word of three syllables, from which if you take away five letters a male will remain; if you take away four, a female will be conspicuous; if you take away three, a great man will appear; and the whole word shows you what Joan of Arc was? He, her, hero, heroine.

What is that which a young girl looks for, but does not wish to find? A hole in her stocking.

ANCIENT ORDER — OF THE — IRON CROSS

BY
SAM LOYD



THE DISCUSSIONS pertaining to the armless statue of Titus Livius, in the famous Corsini collection, are very similar to those of the Venus de Milo. In both cases the statues were discovered without arms, and either for lack of artistic ability or owing to certain anatomical difficulties or contradictions, sculptors have been unable to suggest acceptable restorations.

In the case, however, of Titus Livius, the warrior and historian, who was the founder of the order of the Iron Cross, a curious legend has been unearthed which carries with it the paradoxical implication that the lack of arms was a necessary feature to the completeness of the statue.

It is stated that Caesar Augustus, the first Roman Emperor, while riding one day in his chariot, espied the soldier Titus Livius, who had lost an arm in battle, begging alms of passers-by. Augustus addressed the veteran and asked why he had not received the cross of honor and pen-

sion awarded to such as had lost a limb in honorable service.

"Great Caesar!" replied the warrior, with becoming modesty, "I was but an humble soldier in the ranks, and was doubtless overlooked." Caesar took the decoration from his own breast and placing it upon the soldier, said: "If thou hadst lost both arms, thou shouldst be the founder of a new order." Whereupon the soldier promptly drew his sword, and by a deft stroke lopped off his other arm!

We will not go into a discussion of the paradoxical features of the exploit, by asking with what arm he must have drawn the sword to chop off "the other," as it is a matter of history, that Titus originated the well-known Victoria Cross which is closely allied to that of the St. Andrew's form.

In designing the insignia for a new order of the Iron Cross, Titus had to conform to the established law of adopting a symmetrical form of cross which could be constructed from the parts of a square.

By reversing this proposition

we obtain a remarkable puzzle which forms an important link in the mysterious chain of relationship which connects all of the ancient signs and symbols, including the square, triangle, cross, swastica, monad, crescent, etc., etc.

The puzzle is merely to divide a square piece of paper into the fewest number of pieces which will fit together so as to form the irregular St. Andrew's Cross, as shown in the sketch.

False Logic.

A brute of a judge recently refused to allow damages to be awarded for killing an infant. His line of reasoning must have been somewhat as follows:

A baby is a crier,
A crier is a messenger,
A messenger is one sent,
One sent is not worth two cents;
Therefore, a baby is not worth two cents.



PROPOSITION.—Rearrange the eight pieces so as to form a perfect checker board.



IN THE HISTORY OF the kings of France is told an amusing story of how the Dauphin saved himself from an impending checkmate while playing at chess with the Duke of Burgundy by smashing the chess board into eight pieces over the Duke's head. It is a well-known story often quoted by chess writers to prove that it is not always politic to play to win, and has given rise to a strong line of attack in the game known as the King's gambit.

Now, my view of it is that the Dauphin was an enterprising sort of a fellow, who had gotten up the match upon the most approved modern methods of playing for the biggest purse that any club would hang up, inclusive of the kinetoscope rights of the play, so when at the end of an hour his opponent had winked but once, and it required some 30,000 pictures to show that he had transferred his piece of chewing gum from the right to the left cheek, the young Dauphin's backers called on him to throw some action into the pictures, with the result that he turned the tables on his ad-

versary in a way that has made the incident one of the most notable events in the annals of the royal game.

The smashing of the chess board into eight pieces was the feature which always struck my youthful fancy, as it might possibly contain the elements of an important problem which had been overlooked by historians, the more especially as I could find no authentic reference to the putting together again of the broken chess board. The restriction to eight pieces does not give scope for great difficulty or variety, but not feeling at liberty to depart from historical accuracy, I shall give our puzzlists a simple little problem suitable for summer weather: Show how to put the eight pieces together so as to form a perfect 8x8 checker board. The puzzle is a simple one, given to teach a valuable rule which should be followed in the construction of tricks of this kind, viz.: By giving no two pieces of the same shape, other ways of doing the puzzle are prevented, and the feat is much more difficult of accomplishment, as you will find before discovering the answer to this one.

Draw an 8x8 checker board on paper and try to find how to cut it into eight pieces like those shown.

When is a soldier like a watch? When he is on guard.

What word of ten letters can be spelled with five? X-p-d-n-c (expediency).

Why should the highest apple on a tree be the best one? Because it is a tip-top apple.

Why would a spider appear to have wings? Because it often takes a fly

Why is a railroad exceedingly patriotic? It is bound to the country with the strongest ties.

What is the most wonderful feat in jugglery? For a man to revolve a thing in his own mind.

Why is chloroform like Mendelssohn? Because it is the greatest of modern composers.

Do women like to see themselves in print? No; they prefer silk or satin.

Who is the man who invariably finds things dull? The scissors grinder.

What sort of men are most above board in their actions? Chessmen.

THE GUIDO MOSAICS PUZZLE BY SAM LOYD



PROPOSITION—Show how to divide the mosaics into two squares.

IT IS NOT GENERAL-ly known that the celebrated piece of Venetian mosaic by Domechio, known as the Guido collection of Roman heads, was originally divide into two square groups, which were discovered at different periods. They were brought together and restored into what is supposed to be their correct form, in 1671. Considerable discussion was aroused regarding the possibility as well as appropriateness of uniting the collections of 25 heads into one square, as it now exists, when, apparently by accident, it was discovered that each of the two squares consisted of several pieces which would fit together into one 5x5 piece as shown.

It is a pretty puzzle, and as all puzzles, like mathematical propositions, can be worked backwards to advantage at times, we will reverse the problem, and ask you to divide the large square into the fewest number of pieces which can be refitted into two squares which conform to the conditions described.

This puzzle is given as differing

from the Pythagorean principle of cutting lines on the bias, for, while we know that by the theory of the hypotenuse line two squares can be divided so as to produce one larger square, and vice versa, it is assumed in this puzzle that we must cut on the lines only, so as not to destroy the heads. It may also be mentioned incidentally, that students who have mastered the principles of square root, as explained in the Pythagorean problem, will not find much difficulty in discovering the same old theory cropping up among the Roman antiques, to tell them how many heads there must have been in the smaller squares which saves considerable experimental work.

As a lesson in puzzle construction it may be said that problems of this kind which call for the "best" answers, in the "fewest number of pieces," etc., offer great scope for cleverness. Anyone might find a solution in many pieces, or which stands some of the old Romans upside down.

Why is the emblem of the United

States more enduring than that of France, England, Ireland, or Scotland?

The Lily may fade and its leaves decay,

The Rose from its stem may sever,

The Shamrock and Thistle may pass away,

But the Stars will shine forever.

Why is a kiss like a sermon? Because it needs two heads and an application.

When two people kiss, what kind of a riddle does it make? A rebus.

What is it George Washington seldom saw, God never saw, and we see every day? Our equals.

Prove by logic that an oyster is better than heaven. Nothing is better than heaven; an oyster is better than nothing; therefore an oyster is better than heaven.

What is the difference between a honeymoon and a honeycomb? One is a big sell, the other little cells.

Why is a man who makes pens a wicked man? Because he makes men steel (steal) pens and then says they do write (right).

PROBLEMS OF HISTORY BY SAM LOYD.



IN ACCORDANCE with the time honored belief that mathematics and history are the most important branches of education, in my early days I was presented with nine ponderous volumes of Hume's History of England, accompanied by promises galore of guns, ponies, and everything else calculated to excite a boy's energy if I would only study those books.

Our puzzlists would not be interested in putting me through an examination of ancient history, as they would find that what I don't know on that subject would more than double the size of an ordinary library, but some of the things which I did discover about those ponderous tomes may be worth mentioning as the subject of an interesting and instructive puzzle.

In experimenting for instance, it was found that by placing the four volumes above the eight, as shown in the picture, 6729 over 13458 is equal to one-half. Then

by another mix-up of the books, always employing them all, they may be made to represent the equivalents of one-third, one-fourth, one fifth, one sixth, one-seventh, one-eighth, and one-ninth. It is a simple puzzle, without any mathematical difficulties, so it is presented as an amusing study which will familiarize the young folks with the peculiar properties of figures.

This problem suggests an inexhaustible field of puzzles and an excellent school for learning to originate new puzzles, as the idea can be carried on indefinitely in the construction of other and more difficult problems.

What are the embers of the expiring year? Nov-ember and Dec-ember.

How is a poultry dealer compelled to earn his living? By foul means.

Why is a butcher's cart like his top boots? Because he carries his calves there.

Why does a maltese cat rest bet-

ter in summer than in winter? Because summer brings the caterpillar (cat-a-pillow).

Is there anything a man with a kodak cannot take? Yes, a hint.

Why do American soldiers never run away? They belong to a standing army.

Why does tying a slow horse to a post improve his pace? It makes him fast.

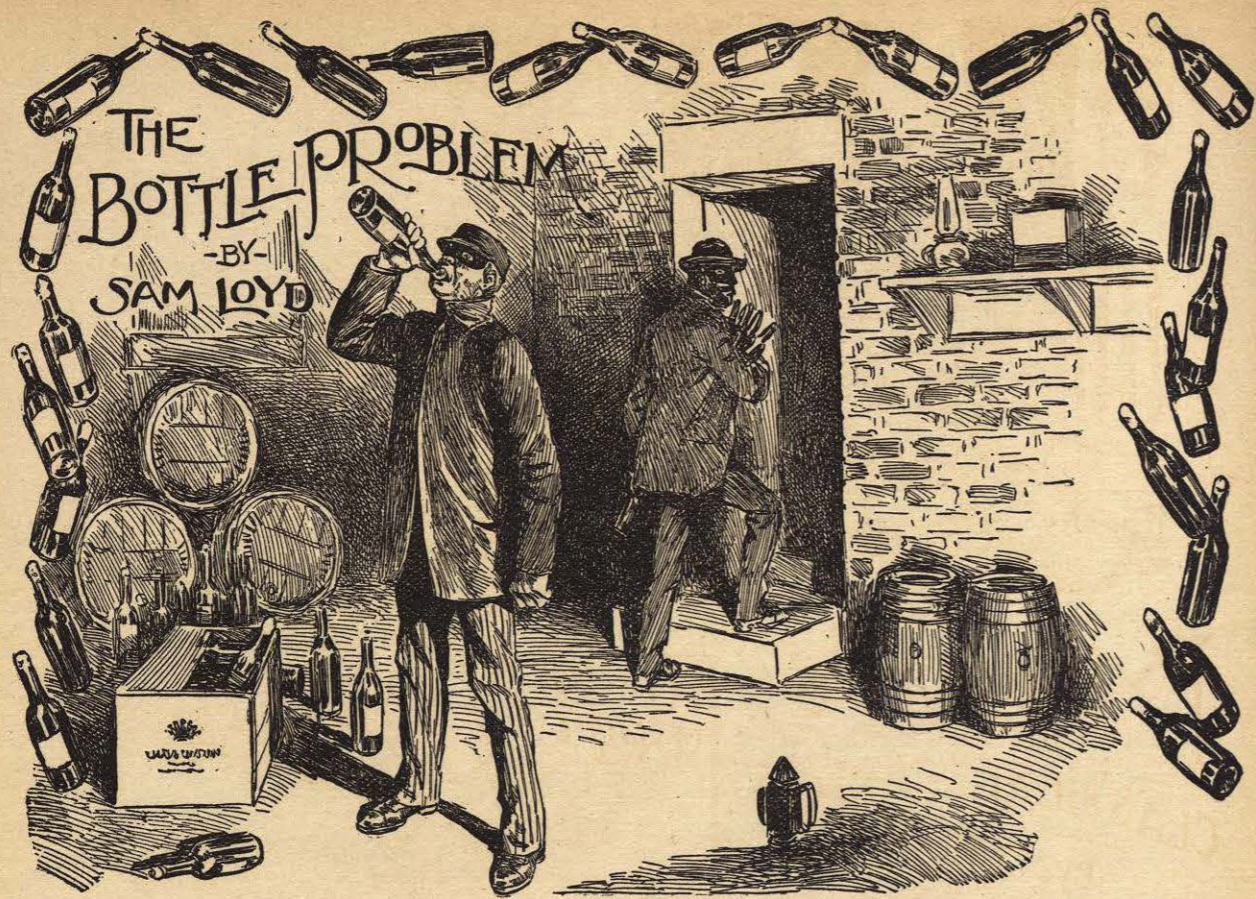
What is it that a man, no matter how smart he is, overlooks? His own nose.

What goes most against a farmer's grain? His reaper.

Why may we suppose that Noah had beer in the ark? Because the kangaroo went in with hops, and the bear was always bruin.

A duck before two ducks, a duck behind two ducks, and a duck between two ducks; how many ducks were there in all? Three in line.

How many fathers has a man? Nine: his father, his godfather, his father-in-law, his two grandfathers, and his fore- (four) fathers.



PROPOSITION—Divide seven quarts and seven pints of wine, and five empty quarts and five empty pints.

THERE IS A LITTLE study in subtraction and division which shows the importance of being well up in elementary arithmetic, no matter what our vocation in life may be. Solvers with an aversion to figures, however, need not be deterred from tackling the puzzle, for the subtraction and division here referred to calls for the cleverness of a Sherlock Holmes rather than the learning of a mathematician.

It appears that a gentleman's wine cellar had been burglarized to the extent of two dozen bottles of wine, which the robbers carried off and might have kept if they had been as proficient in division as they were in subtraction.

They stole a dozen quarts and a dozen pints of champagne, but finding the same somewhat heavy to carry, they proceeded to reduce the weight by drinking off five quarts and five pints to the success of their respective candidates in the next aldermanic election. To leave no traces behind, as well as on account of their value, they took the empty bottles with them, but upon reaching their rendezvous they could not hit upon an equitable division of

seven full quarts and five empty ones, and seven full pints and five empty pints, so that each should have the same value in bottles and wine, although the same would have been an easy matter, probably, if they had not already imbibed so freely as to muddle their brains.

Not knowing enough to keep "mum," which was very essential in this case, they quarreled and made a great racket, which attracted the attention of a couple of policemen, who descended upon them and drank all of the champagne which had cost them so much labor to secure. But that, as well as what became of the empty bottles, like the question as to how their heads felt in the morning, has nothing to do with this puzzle.

Without asking me for any further information, as I do not wish to appear to know too much about this transaction, I require you to tell me how many burglars there were and how they might have divided their seven quarts of wine and seven pints of wine, and the five empty quart bottles and the five pint bottles so that each man would have an equitable share. Of course it is assumed that no wine is to be transferred from one bottle to another.

Any reputable burglar knows that champagne can not be handled in that manner, so there is no opportunity of introducing a clever juggling trick in connection with the puzzle.

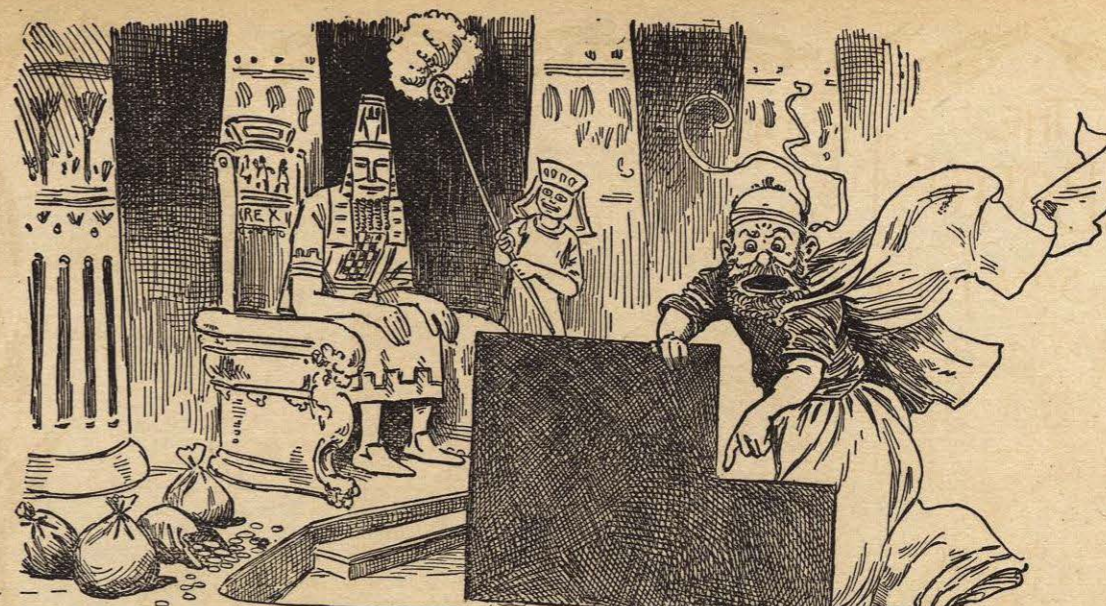
Poetical Decapitations.

Here is an odd little bit of decapitation, where the removal of the first letter, then the second, third and fourth in the three missing words, makes the meaning clear:

The lilies on the bank are —, —,
While in our little bark we're — —
Our course to favoring breezes — —,
Like birds upon the — —.

With lily-pads the oars are — —,
As eager hands the blossoms — —;
Each shouts "Dull care away — —,"
And echo answers " — —."

It seems to me a strange — —,
That we should pay so great — —,
For trifles like a little — —,
Or such a common thing as — —!



Pythagoras' CLASSICAL BY- PROBLEM SAM LOYD

PROPOSITION—Take a piece of paper of the dimensions of the two squares, as shown in the picture, and cut it into three pieces which will fit together and make a perfect square.

IN ACKNOWLEDGMENT of a flattering criticism from Professor Rogers, which is going the rounds of the press, wherein he says, "Sam Loyd is doing more to encourage higher mathematics than all of our colleges put together," accompanied by a hearty endorsement from a noted professor, I take occasion to discourse upon what he terms my life-long hobby."

Half a century's interest in puzzle matters has shown me that in puzzles we have the only elementary school for the development of ingenuity and a love of the mathematical and mechanical arts. I have witnessed such a wonderful record of civil service examinations, as well as growth of master minds from the ranks of puzzledom, that, when I hear of a puzzlist trying for some competitive position, it seems like a foregone conclusion that his success is assured. On the other hand, my connection with mechanical matters frequently shows a class of graduates whose course of study appears to have made them so stupid as to be unfitted for their professions.

The "kindergarten school" of teaching aims to fascinate pupils with their studies, and is built upon the fundamental law that the mind should not be burdened with rules which are to be committed to memory. If the theory of the lesson is made clear, the student formulates his own rules and methods, just as one describes an incident in his own language.

The science of mathematics is heavily freighted with musty rules, so ponderous and obscure that few even with explanations, grasp their meaning, and are glad to dismiss them from their minds when they leave school or college. When a principle is thoroughly understood difficulty ceases to exist, for even in what are termed abstruse calculations we can do nothing but add or multiply, so, while it may take more time to multiply 888,888 by 777,777 it is really as easy as to multiply 8 by 7. The difficulty of a complex sum is due entirely to lack of knowledge, or familiarity with the principle involved.

Mechanical science and the principles of higher mathematics may be taught through the medium of a simple puzzle, and to relieve the dry

technicalities a little fun may be injected into the puzzle story which will do much toward cultivating an appreciation of humor. The problem should be clothed in suitable dress to make the result sought appear probable and more readily understood. It is well also to base the proposition upon some mechanical truth, historical incident or bit of classical lore such as may improve the general knowledge of the student, for in this way a thousand and one little tid-bits of information may be picked up and unconsciously stored away in the mind in a way never to be forgotten.

Twenty-four hundred years ago Pythagoras discovered that if he drew squares upon the three sides of a right-angled triangle the larger square will be exactly equal in area to the two smaller squares combined.

He was so elated over the proof of the larger square being equal to the other two, no matter what might be the dimensions of the triangle that he gave away all of his worldly goods and chattels in offerings to the gods, and yet he was ridiculed and told to show his discovery to the dogs.