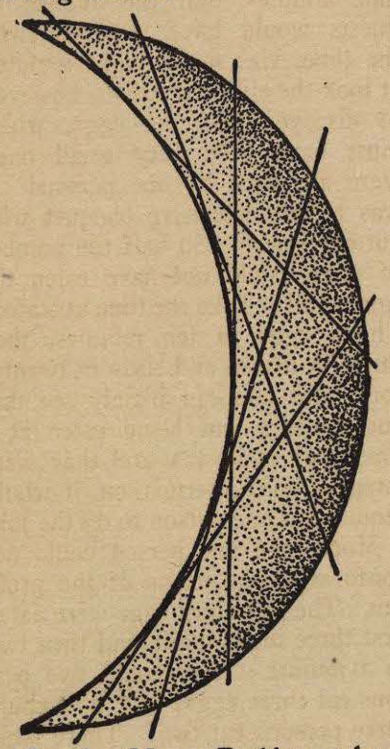
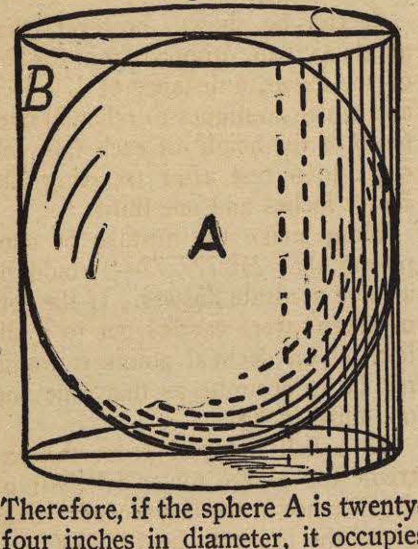
mountaineers, as shown in the following sketch:



In the Moon Problem wherein Professor Spaarwood undertook to reach the moon through the aid of a captive balloon, it was to give a common sense way of telling how many miles of wire one one-hundredths of an inch thick could be made out of a sphere twenty-four inches in diameter.

Well, all that is necessary is for the student to know that a round box termed a cylinder contains exactly one-half more than a sphere which it would hold, as shown in the illustration presented herewith.



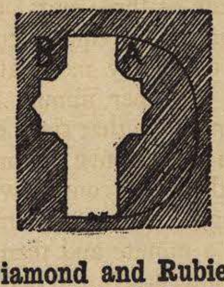
Therefore, if the sphere A is twenty-four inches in diameter, it occupies two-thirds of the interior of that hat box B, which is twenty-four inches high. Therefore, the ball would be equal to a cylinder two-thirds that height, viz., twenty-four inches in diameter, but only sixteen inches high. That converts the ball into a cylinder, and as wire is really nothing but an extended cylinder, we readily find out the relative proportion between twenty-four inches and the one one-hundredth of an inch, as the one is 2,400 times larger in diameter than the other, so 2,400x2,400 gives 5,760,000 as the number of little cylinders one one-hundredth of an inch thick, contained in the big cylinder, and as they would be sixteen inches long, we multiply by sixteen and find that there would be 92,160,000 inches which will reduce readily to 1,454 miles 2,880 feet as the length of the wire.

The relative proportions of a sphere to a cylinder was discovered by Archimedes 380 years B. C., and was engraven upon his tomb to perpetuate to succeeding ages what the great mathematician looked upon as his most important discovery.

That high stepping kid was a soldier of metal because he was led! The Y was on the flag because it is the 4th of July! The 4th of July is like an oyster stew because it don't amount to much without crackers.

The Crusader's Puzzle.

In that remarkable trick of converting a Turkish flag into the Crusader's Cross, it is merely necessary to make a straight cut down through the center of the eight-pointed star to the extreme points of the crescent, then continue the cut around the inside of the circle and move the piece (A) to the left so as to get the following change:



Diamond and Rubies.

Having explained that diamonds increase in value according to squares of their weights, it was required to give the size of two small stones, which could be represented in value by two stones of different size, without employing fraction of a karat, and upon the assumption that a single karat stone is worth $100.

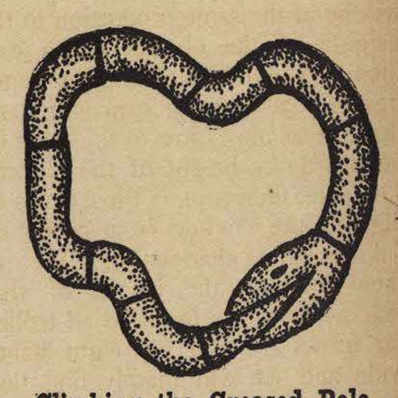
The trade which gave rise to this puzzle and which struck me as being unique and interesting was the exchange of two five karat stones, worth $2,500 each, viz., 5x5=25. So the two stones were worth $5,000, and were exchanged for a one-karat stone worth $100 and a seven-karat stone worth (7x7) $4,900, which shows the two-karat gems to be of the same value as the other two.

The Tinker's Kettle.

Taking 282 cubic inches as a one beer gallon, we have for 25 gallons 7,050 cubic inches. Then, by prismoidal formula for obtaining volume of figures of proportionate ends (sum of areas of two ends plus four times area of middle section parallel to them, multiplied by one-sixth vertical height, equals volume, we have 12 inches, the vertical height, divided by 6 equals 2; and 7,050 divided by 2 equals 3,525, which is the combined area of the two ends plus four times the area of the middle section. Now, as the diameter of the top and bottom are as 2 to 1, the diameter of the middle section will be represented by 1½ and areas will be in proportion of 4, 2¼ and 1; but as we take four times the area of the middle sections, the proportions, per formula, will be as 4, 9 and 1, or a total of 14, of which the area of the top represents 4/14, and 4/14 of 3,525 equals 1,007 2/14, the area of the top. Then, dividing 1,007 2/14 by .785398163397 and extracting the square root of the quotient to obtain diameter, we get 35.8096—which is the diameter of the top.

The Hoop Snake Puzzle.

Professor Von Schafskoppen gratefully acknowledges the valuable assistance of our puzzlists in mastering the difficulties of reconstructing that hoop snake.



Climbing the Greased Pole.

In this little problem which was given to afford the young folks an opportunity of exercising their ingenuity and common sense, it was told that the ambitious darkey would climb six feet in six minutes, but that at the end of every six-foot climb he would slide back three while taking a rest. The height of the pole was to be guessed at or to be calculated according to facts or circumstances as shown in the picture.

Of course, a good many were completely nonplussed and saw no ground upon which to base their calculations. Among puzzlists, however, there was a wonderful unanimity of opinion regarding the height of the pole, which anyone with half an artistic eye would place somewhere between eighteen and twenty feet, without giving any other reason than the general effect of the shadows in the picture.

The idea of judging of the height of a tower or pole from the length of its shadow is well known. One of Sir Walter Scott's knights figured out the height of a tower with the aid of a ten-foot lance, but a clearer illustration of the principle is given in Conan Doyle's "The White Company," where Sir Nigel and his gallant comrades were locked up in a besieged castle:

"The grizzled archer took several lengths of rope from his comrades and knotting them together he stretched them out in the long shadow, which the rising sun threw from the frowning keep. Then he fixed the yew-stave of his bow upon end and measured the long, thin, black line which it threw upon the turf. 'A six-foot stave throws a twelve-foot shadow,' he muttered. 'The keep throws a shadow of sixty paces, so thirty paces of rope will be enough.' "

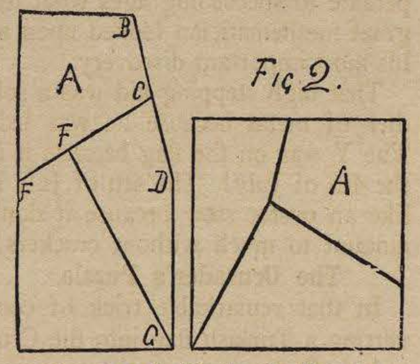
There is the secret of this little puzzle. All shadows in the picture will be in the same proportion to the heights of the objects which cast them. A plumb line from the finger tips of that sporting man will show that the shadows are to the scale of one-third the height of the objects. The pole, therefore, is three times as high as the shadow from center of pole to end of shadow line. We can then compute the length of that shadow from the fact that all trolley car tracks are four feet eight inches wide and we will readily find that the pole is nineteen feet eight inches high.

Now, remembering the fable of the frog in the well, we can allow for the various slips of the little darkey and will find that he gets a firm hold on the top of the pole in just thirty-four minutes and forty seconds!

The Joiner's Problem.

This problem called for a solution in the fewest possible number of pieces; it will be seen that the best answer requires but two straight cuts and accomplishes the feat through the happy medium of turning one of the pieces over—a practical piece of carpentering which some of the followers of Euclid did not think of.

Whether the angle from D to B is more acute or less acute makes no difference. Draw the line from the center of the left side E to middle of the angle at C. Then draw the line at right angle, so as to hit the corner G, and the three pieces will form the sqaure shown as Fig. 2.



The Dutch Barber's Puzzle.

Many clever puzzlists and mathematicians got caught on at least one of the two catches presented in this new version of the old-line apple women's problem. In saying that thirty eggs were eaten during the first course of an Easter banquet, at the rate of three eggs per minute, would naturally require ten minutes, and to eat thirty more at the rate of two eggs per minute would be fifteen more, so that sixty eggs were eaten in twenty-five minutes. But during the third course, when sixty more eggs were consumed, first three in a minute and then two in a minute alternately, so as to again average five eggs in two minutes, those who know the mathematics of the situation can see that five eggs in every two minutes would consume the sixty eggs in twenty-four minutes, so the entire dozen eggs would be eaten in exactly forty-nine minutes!

But the Dutch barber wanted to know "how long it would have taken to eat those ten dozen eggs if there had been but half as many guests at the banquet?" The mathematicians fell into the mistake of saying that if the eggs were eaten in forty-nine minutes, half the number of guests would have required twice the time, viz: ninety-eight minutes. It took the clever puzzlists, however, to discover that the eggs, which must have been very small ones, were all eaten by one person! It was a very exclusive banquet with but one guest! So half the number of guest could not have eaten the eggs at all! Take the time as stated: Thirty eggs in ten minutes, then thirty in fifteen and sixty in twenty-four, and you can plainly see that but one egg was being eaten at a time, and as it was said they were eaten without intermission, it would require but one person to do the job!

More than one person could not conform to the terms of the problem. The last sixty eggs were eaten first three in a minute and then two in a minute. How could two persons eat three eggs? Or how could three persons eat two? There is no number which will divide into two and three, except one!

Answer to Tower of Pisa Puzzle.

Ninety-nine per cent of our puzzlists and mathematicians fell into the popular error of confounding this puzzle with the famous race between Achilles and the tortoise, and pronounce the problem to be unsolvable. Skilled mathematicians give approximate solutions and show that by the use of decimals carried out to considerable length the answers will be less than the billion billionth part of a hair.

It can be shown, however, that an elastic ball, dropped from the top of the tower, a distance of 179 feet, and which continues to rebound one-tenth of the height of each fall, will come to a rest after traveling 218 feet 9 inches and one-third.

Many make the mistake of supposing that 218.777777+ would be a more accurate answer. If the row of sevens were carried out to a billion billion decimal points it would not be so accurate as that nine and one-third inches.

If a ball dropped from the extreme top of the tower fell half of the distance in the last second, would prove the tower to be 187.4806 feet high.

The Rebus word is Myriad.

The Bridges of Konigsberg.

There are 416 ways of doing this trick of which the shortest route is via O-P, D-C, E-F, H-G, I-F, L-K, N-M and A-B, but as there are several million ways of not doing it, such a small matter as 416 routes may have been overlooked.

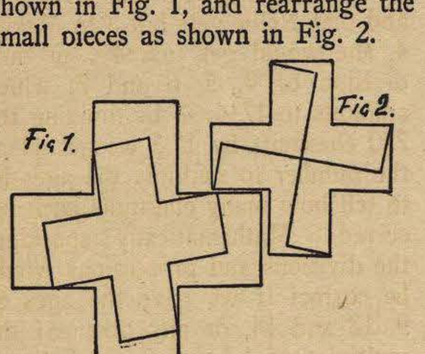
The Andre captors came from Dresden.

The General-Store Puzzle.

I find that algebra is more popular with our puzzlists than is generally supposed, and they found no trouble whatever in adding up bow-wow chops, Alsop's pale ale and cow's cheese so as to make it all wool. To such—if any there were—who could not solve the mystery which has puzzled me all these years, it may be stated that the keyword to the situation is "peach blows," a most popular variety of potatoes. Give each of these letters a number, running from 1, 2, etc., to 0, and it becomes an easy matter to discover the algebraic value of hoes, apples, soap, etc., the total of which adds up "all wool," which, to say the least, is a remarkable coincidence.

The Red Cross Puzzle.

The following illustration shows how the Greek cross may be cut into five pieces which will form two crosses of the same size. Cut as shown in Fig. 1, and rearrange the small pieces as shown in Fig. 2.



False Weights.

In regard to the puzzle of the broker in camel's hair who used a pound weight of seventeen ounces when buying and sold with a fifteen-ounce weight, so that he made $25 by cheating in addition to his two commissions of 2 per cent., it may be said that the ordinary methods by algebra or ratio and proportion seemingly fail to give a satisfactory answer, so I will attempt to give a plain, common-sense explanation, based upon simple arithmetic.

In the first place, if the broker weighed the goods with a pound weight one ounce too heavy, he got 17 ounces for a pound. When he sold them by a weight one ounce light he gave 15 ounces for a pound, and had two ounces over. If these two ounces were sold at the same price, so as to make $25 by cheating, it is plain that the two ounces represent 2/15ths of what he paid for the whole and charged for the 15 ounces. One-fifteenth being worth $12.50, fifteen-fifteenths, or the whole, would be $187.50, which, if there was no question of commission, would be what he paid for the goods.

We find, however, that he received 2 per cent. from the seller, $3.75, and $4.25 from the purchaser, making $8 brokerage in addition to $25, by cheating. Now, if he had dealt honestly, he would have paid for 17 ounces, which, to be exact, would have been $199.21875. His brokerage for buying and selling would therefore only be $7.96875, so he has made an additional 3⅛ cents by cheating. As the story said that he made exactly $25 by cheating, we must reduce the $187.50, price so that his two cheatings will amount to just $25.

Now, as 3⅛ cents is exactly the 801th part of $25.03125, we must reduce $187.50 by its 801th part, which will bring it down to $187.27, so that he will make just $25 and the .0006 of a cent by cheating. To such as wish to be very exact and honest, I would suggest that the seller be paid $187.2659176029973125 less the 2 per cent. brokerage of $3.745 plus.

City Hotel Puzzle.

Mary Ann was mother to the sick boy!

Football Puzzle.

The cubical area of the ball may be considered as made up of a great number of small pyramids, with apexes meeting at the center of the ball, and their bases representing the surface. We know that the volume of a pyramid is equal to its base multiplied by one-third of its height. Therefore, the volume of the sphere is equal to the sum of the bases multiplied by one-third of the constant height, viz: The surface of the sphere multiplied by one-third of the radius. If this volume is to be equal in number to the surface, it follows that one-third of the radius is unity; therefore, the radius is 3 and the diameter of the ball 6 inches.

Plato's Cubes.

The majority of our mathematicians, who were to a certain extent familiar with the subject, which it is plain to be seen calls for geometrical numbers which can be squared or formed into a cube, hit upon the elementary combination of 4, viz: 4x4x4 makes a cube containing 64 cubes. This monument, therefore, might readily be placed in the centre of a square plaza of 8x8 cubes, also containing 64 cubes. Puzzlists, however, who know that the picture cuts an important figure in the puzzle, saw at a glance that the dimensions just described would not build a monument and plaza of the proportions shown in the sketch.

They, therefore, suggested a higher series of numbers, and found that 9x9x9 would form a square monument containing 729 cubes. This same number of cubes could be arranged in a 27x27 plaza which gives the correct dimensions as shown in the picture. Of course the multiples of these numbers could be employed, but 729 cubes is the only number below 1,000 which would fill the bill.

The Monastery Puzzle.

Our clever puzzlists who were familiar with the ancient couplet:

"Persevere ye perfect men,
Ever keep these precepts ten,"

found no difficulty in reading one of the "precepts ten" so shown in the window. It is translated to be C on T in U in hole in S, which may be read: "Continue in holiness."

Answer to the Cat Puzzle.

Many good mathematicians fell into the error of attempting to solve Alice's cryptogram of "Was it a cat I saw," upon the basis of there being twenty-four starting points and the same number of endings. They reasoned that the square of 24, viz: 576 different ways, would be the correct answer. They overlooked the branch routes which give exactly 252 ways of reaching the center, C, and as there are just as many ways of getting out to the Ws, the square of 252 gives the correct answer as 63,504 different ways.

How we knew that Annapolis was the hidden city!

The Steeplechase.

Our puzzlists and mathematicians have had a hot race to the finish in that steeple chase puzzle. It was told that the sketch showed the judges' stand to be at the opposite end of a rectangular field, bounded by a road of a mile long on one side by three-quarters of a mile on the other. By the road, therefore, it would be a mile and three-quarters, which could be run in three minutes.

They were at liberty, however, to cut across lots at any point, but owing to the rough ground would run 25 per cent. slower. By starting down the mile course and going a little over the eighth of a mile, and then taking a cut across lots to the finish the race can be won in 2 minutes and 51 seconds plus, which is somewhat better than by starting off on the hypothenuse line at once.

"Grandfather's Clock" Puzzle.

"The clock stopped short,
Never to go again
when the old man died,"

it was explained that the hour and minute hands had tangled up, and the puzzle was to determine their point of contact from the position of the second hand. Well, as the second hand may be said to be a little less than 5½ seconds past 60, we will find that the time must have been 49 minutes, 5 and 5/11ths of a second past 9, which would bring the hour and minute hands together so that they caught and stopped the clock, which so irritated and excited grandfather that he just "up and died."

Hands off of that tiger which is on exhibition at Bangor.

The Switch Puzzle.

The problem is solved in thirty-two moves, as follows: First engine F passes alone through the switch via C, B, A (two moves), pulls engine E to D and once more passes through switch via C, B, A (total, five moves); pulls car D to D, pushing E out to right; passes again through switch (eight moves); pulls G to D, pushing others out to right, engine goes through switch again (eleven moves); pulls B to D, and passes through switch as before (fourteen moves); pulls A to D and passes through switch for the last time (seventeen moves); goes to right, then draws A, B, C, D, E, G to left and backs G onto switch (twenty moves); draws A, B, C, D, E to left, backs them to right (twenty-two moves); goes to left alone, backs up on switch at A and takes G to left (twenty-four moves); goes to right, then pulls everything out to left, backs H, I onto switch (twenty-seven moves); pulls G, A, B, C, D, E out to left, backs them to right, then takes F to right and backs up to switch and connects G to H, I (thirty-one moves), and is now prepared to go ahead on the thirty-second move.

Uniform Price Puzzle.

My friend, who was explaining the "uniform price" system of doing business at the Klondike, showed me that the price of one dollar for a quart of liquor was the key to the whole situation, and gave the price for all of the other articles in the window. The lady's side saddle would be worth $4, as it holds a "gal on." The anchor would be worth $40, because in wine measure an anker holds ten gallons. The hogshead would be worth $252, as there are that many quarts to a hogshead, and the pipe would be worth twice as much, as there are 504 quarts to a pipe.

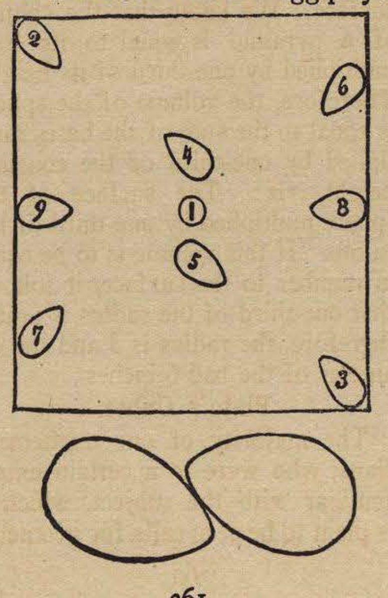
Great Columbus Puzzle.

The secret of winning in a contest to see who can place the last egg upon a square napkin as described in the Columbus puzzle, turns upon placing the first egg exactly in the center of the napkin, as shown in the square diagram. Then, no matter where your opponent places an egg, duplicate his play on the opposite in a direct line through egg No. 1. The numbers given illustrate the beginning of the game, proceeding in regular order of play, viz.:

1, 2, 3, 4, 5, 6, 7, 8, 9, etc.

The placing of the first egg in the center would not win, if simply laid on the table, for, owing to the oval form of the egg, the second player might place an egg in close proximity to the conical end, as shown in the last illustration, which could not be duplicated.

The only way to win, therefore, as discovered by the great navigator, according to popular history, is to flatten one end of the first egg played



so as to make it stand erect, so as to represent a circle.

This puzzle, as previously explained, was not given for practical demonstration, but just to develop the gray matter in the brain.

Lost Opportunities.

Every one of our young lady correspondents voted Cholly Slowpop a mutton head for his explanation of the sweetness of stolen kisses, and the stupid answers to those easy conundrums. Of course he should have replied that they were like that tempting fruit because they were such a "nice pair." If, when she had asked him what kind of animals fell from the clouds, he had replied "reindeer," the atmosphere would have been less chilly during the ride home.

That drifting scene hides the name Arno.

Dividing the Spoils.

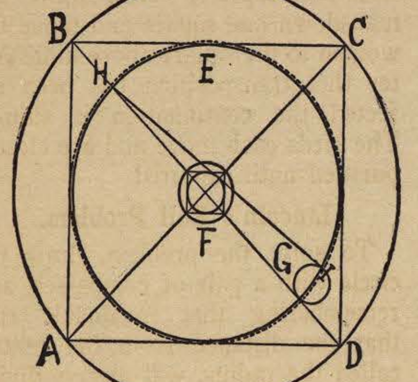
The correct answer is that Nellie, who was 4½ years old, got 198. Mary, who was 6 years of age, got 264, and Susie, who was 7 years old, took 308.

The analysis of the problem shows that as Susie gets 7 to Mary's 6, and that Nellie gets but 3 to Mary's 4, she would get just 4½ in each division of 4, 5, 6 and 7, which amounts to 17½, so by dividing the 770 chestnuts by 17.5 we get 44 as the number to multiply the ages by to tell how many chestnuts each received. Mathematically speaking, the divisions and proportions would be correct if we gave the ages as 9, 12 and 14, or any other of the multiples of 4.5 and 6 and 7 years, but as a glance at the picture would show that the ages would not correspond to the little girls as shown, those answers would not be correct, according to puzzle principles.

The Grindstone Puzzle.

Our Syrian friends could get the approximate number of square inches contained in a circle of 22 inches diameter; from this they would deduct the number of inches contained in the 3 and 1/7 hole. Then they would figure out the approximate size of a circle containing half of the number of square inches, which would be the size of the grindstone when the first man is done with it. The only perfect method, however, is based upon our demonstration that the area of circles may be computed from the squares of their diameters. Knowing from our Pythagorian problem, that a square drawn within a circle would contain another circle just half the size of the larger circle, let us take the grindstone, and after drawing the lines A to C and B to D, build the square, A, B, C, D; then draw the circle, E, just within that square, and it contains exactly one half the area of the large circle.

Having stated, however, that loss from the centre hole must be divided between the two owners of the grindstone, we draw a square inside of the circular hole, and inside of that small square describe another small circle, which is just half the size of the circle, F. We will now work the Pythagoras rule for adding circles, and place the small circle at G, and the line from H to I will form the hypothenuse line of a right-angled triangle, which gives the diameter of a circle, combining the area of the circle E and the smallest circle, which is half of F. This enlarges the circle E, so that the dotted line shows a circle which contains exactly one-half of the grindstone, and will have a diameter of 15 5/7 inches.



Hoch der Kaiser conceals the name Berlin.

One Cent Shy.

In that simple little study in United States coins, wherein the conductor happened to be one cent short to change the dollar bill, it will be found that he must have had a fifty-cent piece, two twenty-cent pieces, a three-cent and a one-cent piece. As the smaller coins are of different sizes, he could not have had two two-cent pieces as some supposed.

One thing at a time occurred at "Lowes."

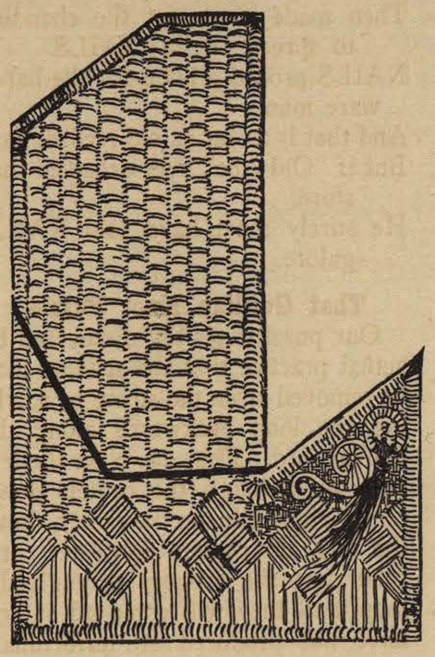
The Oracle Puzzle.

To that mystic reply of the oracle which told the peasants their flocks would increase "until the number of sheep multiplied by the number of goats would show a product which when reflected in a mirror would show the number of the entire flock," it may be said that the peasants, as well as some of our puzzlists, experimented before a mirror until they hit upon the number of nine sheep and nine goats. 9x9=81, which held before a mirror, becomes 18, which would be the total of the flock.

That neck-tie puzzle reads, "It was the season for bass, but with such heavy seas on they caught none.

The Sedan-Chair Puzzle.

In that odd little cutting puzzle, where it was required to divide the sedan chair into the fewest number of pieces which could be fitted together so as to form a perfect square, the following line shows how several of our clever puzzlists perform the feat in only two pieces:



Barnum brought Jumbo from "Boonton."

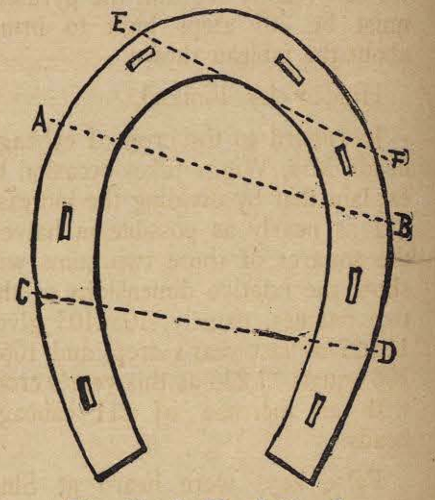
The Chinese Switch-Word Puzzle.

In this little switch-word puzzle, which was built upon similar lines to the old star puzzle, I took occasion to explain the principle of such puzzles, and, incidentally, to give a good tip regarding the nature and character of the word which, according to my own analysis, would furnish the best key to the Chinese mystery. In the original Chinese switch-word puzzle they use a sentence of twelve words, as in the Chinese language every word is represented by a specific sign word, but in the present Americanized version of the puzzle it was explained that the sentence must be translated or represented by a twelve letter word, one letter on each block—so I introduced the portraits of two interpreters translating the word. The puzzle being to change the position of the block, by sliding them like the old 14-15 puzzle, in the fewest possible moves, so that the word would read correctly from left to right, instead of from top to bottom.

Many clever and ingenious answers were received, giving all manner of twelve-letter words, and varying in from thirteen to twenty-five moves, but few solvers caught on to my intimation that there was a peculiarly appropriate word, or who took their "queues" from the Chinese interpreters, hit upon the lucky word "interpreting" which runs it right off the reel in twelve plays without any "drilling," as the railroad men term it.

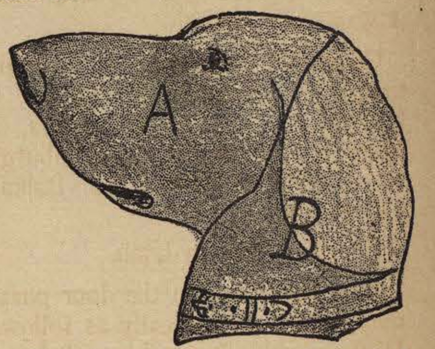
More trouble is located at "Corea."

The Good Luck Puzzle.



The Dog's Head Puzzle.

The following cut shows the way of dividing the head in two equal halves.



The kings of the turf lived in Alexandria.

In Fritz the Barber's problem there are eleven positions where the minute hand will take just fifteen minutes to get as far ahead of the hour hand as it was previously behind it, but as there would be but one position which conforms to the position of the second hand as shown in the picture, and where the hands cannot be seen, so the only answer would be that he began at 10.47 and 2 and 8-11 seconds, and ended at 11.2 and 2 and 8-11 seconds.

Concealed Geography. 85. Rathisbon, 86. Briston, 87. Cowes, 88. Normandy, 89. Albania, 90. Ostend, 91. Liege, 92. Ghent, 93. Madawaska, 94. Labrador, 95. Grenada, 96. Iowa, 97. Meuse, 98. Lyons, 99. Acre, 100. Siam, 101. Iser.

The weary traveler started from Erie.

In the problem of the pyramids it is evident that if the lion goes seven steps, the guide six and the tourist five, 7x6x5 gives 210 as the number of steps, which would bring them out together at the top. As the lion is five steps shy in the sketch, the guide three and the tourist one, we can readily see that the pyramid must be 201 steps high to bring about the tableau shown.

Hidden city, Finland.

In regard to the crop of cabbage heads Mrs. Wiggs takes occasion to explain that by dividing the increase 211 as nearly as possible in halves, the squares of those two sums will show the relative dimensions of the two patches, namely, 105x105 gives 11,025 as last year's crop, and 106x106 equals 11,236 as this year's crop, with an increase of 211 cabbage heads.

False keys were heard at Sing Sing.

That autobiography of a silver quarter of a dollar tells of its being stamped in 1853 and *re-fused* when it was worn smooth.

Concealed Geography 1. Constantinople, 2. Samaria, 3. Thebes, 4. London, 5. Sedan, 6. Tours, 7. Metz, 8. Inkermann, 9. Edinburgh, 10. Bergen, 11. Genoa, 12. Balkan, 13. Berlin.

Bingham was in Utah.

The horseshoe on the door puzzle may be solved poetically as follows:

With a golden horseshoe nailed over the door,
Many tradesmen made fortunes in this famous store.
First came the tailor on whose sign was writ PANTS,
Next a dealer who in PINTS saw his chance.
A florist then followed with a choice lot of PINKS.
Which in turn were displaced by a furrier's MINKS.
After this a jeweler selling LINKS made his pile,
But the plumber with his SINKS beat him a mile.
SILKS were the source of the dry goods man's wealth,
And the carpenter did not make SILLS for his health.
The druggist sold such a great lot of PILLS
That his successor, the notary, kept busy writing WILLS.
The mason built WALLS and a fortune, too.
While the undertaker made PALLS for Gentile and Jew.
When the grocer moved in he made money in PAILS,
Then made room for the chandler to spread out his SAILS.
NAILS proved a boon for the hardware man—
And that is as far as old records ran,
But if "Old Abe" ever occupied that store,
He surely must have sold RAILS galore.

That Gordian Knot Puzzle.

Our puzzlist readily discovered by actual practice that the scissors may be removed from the string by working the loop backwards along the double cord. First down on the left side, up through the center, down on the right side, up the center, down the left, up center, down left and then pass the scissors through the loop, and they will come off if you have not produced an unfortunate tangle by twisting the cord.

Regarding the problem of Biddy's wedding day, it can be shown that the happy couple will celebrate their tenth anniversary on next St. Patrick's Day. "When a week ago last Tuesday was to-morrow" it must have been Monday, Feb. 17, 1896, and when Biddy said, "When a day just two fortnights hence will be yesterday," she was talking about St. Patrick's Day, March 17, 1896, as no other day would fill the bill except 1868, in which case they would now be thinking of a golden celebration.

Concealed Geography 102. Annapolis, 103. Arles, 104. Oregon, 105. Chester, 106. Pan, 107. Gath, 108. Maine, 109. Hague, 110. Utica, 111. Boston, 112. Omaha, 113. Glasgow, 114. Utah, 115. Dan, 116. Dan, 116. Stoneham, 117. Syria, 119. Parma, 120. Milan, 121. Perugia, 122. Magdeburge, 123. Cyprus, 124. Leeds, 125. Candia, 126. Corea, 127. Goshen, 128. Greece, 129. Berne, 130. Georgia, 131. Pultora, 132. Macon.

Answer to Chicken-in-the-Corn Puzzle.

The real point of this puzzle is that, play as you will, the "man" could never catch the "rooster" nor the "woman" the hen," for, as they say in chess or checkers, the rooster "has got the move" on the man, and for the same reason the woman can never get the "opposition" on the hen. But if they will reverse matters the answer is very simple—the man can catch the hen in nine moves and the woman will catch the hen in eight. The principle can best be shown on a checkerboard: First move the man toward the woman, and the woman toward the man. Both birds move, following their would-be captors. Now move the man down one square and move the woman to the square above him. After that transposition has been effected the continuation is simple. The birds each move and are closely pursued until captured.

Lincoln's Rail Problem.

To solve the problem, draw the circle with a pair of compasses, and remembering that invaluable rule that the distance from the center, called the radius, will always divide a circle into six equal parts, mark it off into six equilateral triangles, as shown. We will then triangulate it once more by introducing the intermediate distances from A to B, and from B to C, etc., which represent our 16-foot rails. From this we can readily compute that the distance from C to B is 30 feet 11 inches, and as from A to D is just half as long, any puzzlist will speedily discover that the triangles X X can be fitted with the triangles Y Y to form one oblong 30 feet 11 inches by 15 feet 5½ inches. Thus 477¾ feet represents just one-sixth of the area of the entire field, 2,866½ square feet being the correct answer.

NOW AND THEN conceals the name Amherst.

The Merchant of Bagdad.

The number at the end of a paragraph denotes the number of manipulations in that paragraph.

The hhd. contains 63 gall. water, and the barrel 31½ gall. honey. Fill the three 10-gall. bottles with honey, pouring remaining 1½ gall. into 2-gall. measure, thus emptying barrel (4).

By means of the 4-gall. measure fill barrel from hhd., eventually leaving ½ gall. in 4-gall. measure. Give this ½ gall. to camel No. 1. By means of 4-gall. measure return 28 gall. of water from barrel to hhd. Pour 1½ gall. honey from 2-gall. measure into 4-gall. measure. Pour 2 gall. water from barrel into 2-gall. measure and return to hhd. Draw off remaining 1½ gall. water from barrel into 2-gall. measure and give this to camel No. 2. Pour 1½ gall. honey from 4-gall. measure into 2-gall. measure (37).

Repeat the whole of the operations in last paragraph 11 more times, so that 6 camels shall have each received two ½-gall. drinks, and other 6 camels two 1½-gall. drinks. But on the 10th and 11th repetition, instead of returning the 2 gall. to hhd., deliver them to any two camels who have already received two ½ gall. only. Eight camels have now received 3 gall. each, and four camels 1 gall. each, and there will be 35 gall. water in hhd. (407).

Fill barrel from hogshead, using 4-gall. measure and give ½ gall. over to camel No. 13. Draw 3 gall. in hogshead into 4-gall. measure (18).

Return all honey to hogshead. Empty barrel into 3 10-gall. bottles, and draw remaining 1½ gall. into 2-gall. measure. Return contents of 3 bottles to barrel, and pour 1½ gall. from 2-gall. measure into bottle No. 1 (12).

Fill the 2-gall. measure from 4 gall., leaving 1 gall. in 4 gall. Fill barrel from 2-gall. measure, and give remaining ½ gall. to camel No. 13. Give 5 camels 2 gall. each, all the camels having now been served (13).

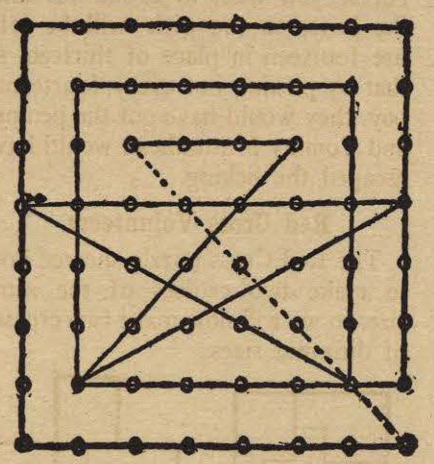
Fill the 2 empty bottles from barrel, and draw remaining 1½ gall. into bottle No. 1. Return contents of bottles Nos. 2 and 3 to barrel (5). "A."

Pour 1 gall. from 4-gall. measure into No. 2 bottle. Put 6 gall. honey in bottle No. 3, using 2-gall. and 4-gall. measures. Empty the 1 gall. from bottle No. 2 into 4-gall. measure, and fill up that measure with honey from bottle No. 3. Pour contents of 4-gall. measure into bottle No. 2. Draw 2 gall. water from barrel and put into bottle No. 2 (10).

The 13 camels have now each received 3 gall. of water, one of the 10-gall. bottles contains 3 gall. of water, another 3 gall. honey, and the third 3 gall. of honey and 3 gall. of water mixed. The hogshead contains 25½ gall. of honey, and the barrel 18 gall. of water, while the total number of manipulations is 506.

Answer to Going Into Action.

In this naval problem, wherein it was required to show the fewest possible number of moves whereby Uncle Sam's battleship could run down and destroy the sixty-three vessels of the enemy, it may be said that there are many simple ways of performing the feat in from fifteen to eighteen moves, but the following plan in fourteen moves, returning to starting point, seems to be the best possible answer:



Answer to the Lip-Reading Puzzle.

Out of the thousands of persons who were interested in the scientific feature of that curious lip-reading puzzle the ease and unanimity with which they picked out little Matthew as the first boy on the top row encouraged them to tackle the next, and by a large majority Matthew, Alfred and Eastman were located on the top row, Richard, Theodore, Luke and Oom on the second row, with Hisswald, Shirmer, Fletcher, Arthur and Alden below. From the many correct answers received it would appear to be an easier feat to read the motion of the lips than one would suppose.

THE BIRD CATCHER lived in Erin.

In weighing the baby the scales show their combined weight to be 170 pounds, and as Mrs. O'Toole weighed 100 pounds more than the combined weight of the dog and baby, she must have weighed exactly 135 pounds. As the dog weighed 60 per cent. less than the baby, we can readily see that the baby weighs 25 pounds and the dog but 10 pounds. All of which is very simple when you know it.

In that match trick the nine matches are laid in the form of letters so as to spell TEN, while Harry is expected to spell NIX.

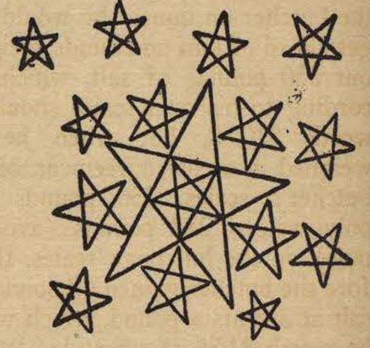
Concealed Geography.

Concealed Geography—54, Venice; 55, Remina; 56, Senegal; 58, Berlin; 59, Corinth; 60, Bath; 61, Calcutta; 62, Elba; 63, Lansing; 64, Malta; 65, Tarragona; 66, Peru; 67, Italy; 68, Versailles; 69, Oneida.

Those chattering monkeys hide the name Albany.

The New Star Puzzle.

The accompanying diagram shows how the French astronomers would locate the new celestial find which proves to be of such heroic dimensions as to cast the other little stars quite in the shade.



THE CLEVER COIN TRICK is answered as follows:

In that instructive visit to the zoo, our young friend readily computed that if there were one hundred feet and thirty-six heads among the horses and riders, there must have been fourteen horses and twenty-two riders. Also, as it was told that there were fifty-six feet and twenty heads among the curiosities, and we can see ten animals and seven birds in the picture, it is plain that only three more curiosities are to be accounted for, which can have but two feet and three heads among them, so it does not require a vivid imagination to surmise that the attraction in the cage which absorbs so much attention must be the wonderful Hindoo snake-charmer with her two serpents.

THAT TURKEY weighed just 24 pounds, which would cost therefore 16 times 24, or $3.84, Dr. Shylock played a trick on the butcher by weighing the turkey on his own scales, whereby in troy or apothecary's weight, it would weigh but 350 ounces instead of 384, as claimed on the butcher's scales.

The unsophisticated butcher stood the loss of 34 cents, and to show that he had no ill feeling ordered as many pounds of rock salt at 3 cents a pound as he had sold ounces of turkey.

The doctor thought that if he beat the butcher on ounces he would also get ahead of him on pounds, weighed out 350 pounds of salt, which, according to his own scales should be worth $10.50, but when he reweighed it, as per agreement, on the butcher's scales, 350 pounds troy only weighs 288 pounds (avoirdupois) on the butcher's scales, therefore the butcher gained 62 pounds of salt at 3 cents a pound, which would be worth $1.86 to offset his loss of 34 cents on the turkey. So the answer to the problem is that the butcher comes out $1.52 ahead on the whole deal.

Heard at the Zoo.

In that complicated bit of octamal arithmetic, wherein it was asked to write the year 1902 in a system of notation which only employs the first eight digits, it may be shown that the answer would be 3556. This sum represents six units, five 8's, five 64's and three 512's. To produce the answer, first divide 1902 by 512. Then divide the remainder by 64, and what is left by 8, and we get the answer as given, 3556. If we wished to describe 1902 by the septamal system, we would divide 1902 by the multiples of 7, viz., first by 343, then the remainder by 49, and what is left by 7. We get the answer 5355, which represents five 343's, three 49's, five 7's and five units.

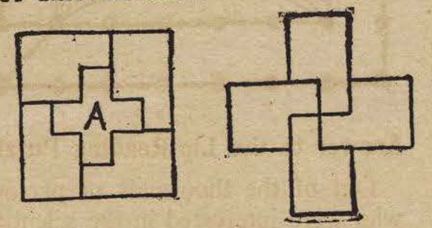
Answer to Christians and Turks.

This puzzle is just the reverse of of the ordinary story of the Turks who were thrown overboard, as in that problem the point is to arrange the men in a circle so that every thirteenth man would be a Turk, while in this puzzle the question was to find the best number as well as the correct starting point, to count out all the boys.

As discovered by some of our clever puzzlists, the solution is obtained by commencing the count with second girl from the left in the upper part of the circle, and, counting her as No. 1, continue to the right counting off every thirteenth one. This method will count out all the girls and the boys will be "left," but if you wish to count out only the boys, so the girls will be left, use fourteen in place of thirteen, so that by picking out every fourteenth boy, they would have got the pennies and Tommy Muttonhead would have escaped the licking.

Red Cross Volunteers.

The Red Cross puzzle showed how to make two crosses of the same size, so we will now make two crosses of different sizes:

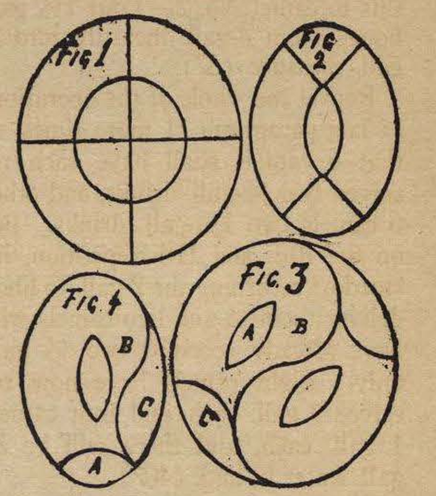


Riding Against the Wind.

Contrary to the popular answer to problems of this kind, that if a rider goes a mile in three minutes with the wind, and returns against the wind in four minutes, that 3 and 4 equal 7, should give a correct average, so that his time should be taken to be 3½ minutes. We find this answer to be incorrect, because the wind has helped him for only three minutes, while it has worked adversely for four minutes. If he could ride a mile in three minutes with the wind, it is clear that he could go a mile and a third in four minutes, and one mile in four minutes against the wind. Therefore two and one-third miles in eight minutes gives his actual speed, because the wind helped him just as much as it has retarded him, so his actual speed for a single mile without any wind would be 3 minutes and 26 seconds.

Old Saws With New Teeth.

In the following diagram Fig. 1 shows the popular way of solving this old puzzle according to the puzzlebooks. This would divide each of the oval rings into four pieces, as shown in Fig. 2. According to our recently-discovered method, which introduces the Chinese Monad sign, as shown in Fig. 3, the feat can be performed with six pieces instead of eight.



Keen Wit.

In the juvenile puzzle wherein the object was not only to discover the locality of the incident, but to explain the meaning of the jolly Hibernian's sarcasm, it may be said that our young puzzlists readily located the incident as concealed in the sentence: "Begora, Mr. P. (hiC) (HIC) A GOod batin ye'd get if I could get in yer cage!"

Everyone, however, did not appreciate the subtlety of his addressing the nine dummy tailors as one man, nor his slurring intimation that Mr. Shaw's name should be spelled "Pshaw!" to say nothing about his criticism of Mr. Shaw's grammar in saying that he and not his goods could not be beaten.

Old Style Enigma Ans.

My whole is now before you.
HIDDEN CITY—Hartford.

That apple tree conundrum is because the tail is farthest from the bark.