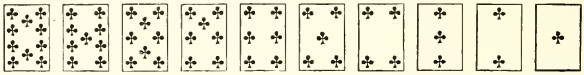
MIND-READING IN THE NURSERY.

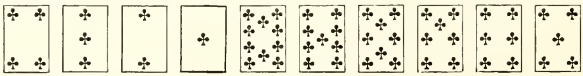
BY THE EDITOR.

A GOOD method of keeping up the interest of boys and girls in mathematics is to explain to them easy arithmetical tricks which they can readily perform for themselves. A very simple card-trick, which appears quite wonderful to the uninitiated, is as follows:

Ten cards from ace to ten are laid in order in a row, beginning at the right and with their faces down. The performer of the trick announces that he will tell the number of cards which may be moved by one of the company from the right to the left and in addition pick up the card bearing this number. As we wish to explain the trick, we will play with the faces of the cards upwards; and the original order (when uncovered) will be this:

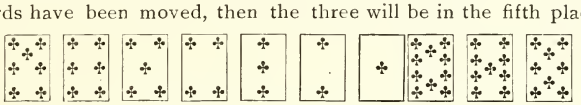


The magician then leaves the room, and some one who wishes to test the extraordinary accomplishment of his young friend transfers a few cards in their regular order from the right side to the left. Let four cards be moved, then the new order will be this:



You will at once see that the four-spot has become the first card of the row. The first card tells the number of the cards moved. Accordingly the young performer lifts up the first card, and seeing that it is a four-spot declares, "Four cards have been moved." The art of the magician consists in giving the impression that he knows the card before he picks it up, and that the discovery of the position of the four-spot is only an additional proof of his omniscience. He goes out again, knowing beforehand that

whatever number of cards may be moved from the right side to the left, the card which bears that number will always be found in the last position of the ten-spot, which at present is the next place after the four cards transposed in the first move; i. e., in the fifth place. If no card is moved, the ten-spot will remain in its place and will be picked up as a sign that all ten cards, or none at all, which means the same thing, have been moved. But suppose that three cards have been moved, then the three will be in the fifth place:



The place of the card showing the number of cards moved will always be "one plus the total number of moves," and it is a matter of course that only units count.

After the second move the card to be taken up will be $1+4+3=8$, and supposing that five cards are now moved the five will appear in the eighth place. Thus we may continue, and the uninitiated will wonder what trick is at the bottom of the performance, which is nothing but a very simple example in addition.

Another trick, which may be called "mind-reading," is also the work of simple arithmetic.

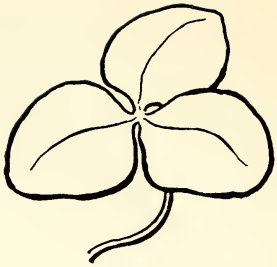
Suppose you request a person to think of any number from 1 to 15 and to point out to you the rows in which his number occurs in the following scheme:

1	3	5	7	9	11	13	15
2	3	6	7	10	11	14	15
4	5	6	7	12	13	14	15
8	9	10	11	12	13	14	15

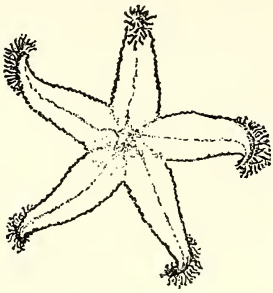
You will at once know the number which the person has in mind when he tells you in which horizontal rows it occurs, for all you have to do is to add together the first numbers of these rows. A close inspection will tell you that 3 occurs in the two lines beginning with 1 and 2; the number 5 in the lines beginning with 1 and 4, etc., and 15 in all four lines beginning with 1, 2, 4 and 8.

If we now replace the numbers with pictures, the arithmetical clue will be concealed, and the audience will be thoroughly mystified. In order to assist the little magician, whose memory is not as yet well trained, we propose to replace the numbers with pictures which will readily suggest the numbers that they represent. This may be done by representing the four numbers 1, 2, 4, and 8 by wheels; 1 by a wheelbarrow, which has one wheel; 2 by a bicycle or a cannon, which has two wheels; 4 by a wagon, which has four

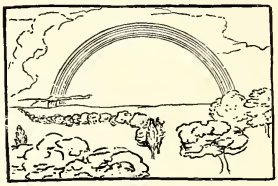
WHEELBARROW.



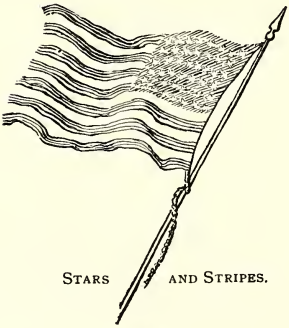
CLOVER.



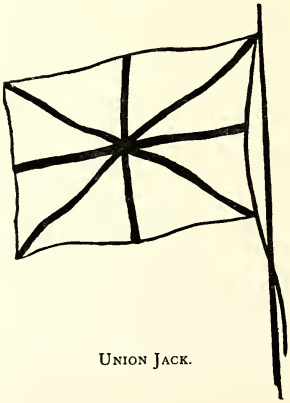
STARFISH.



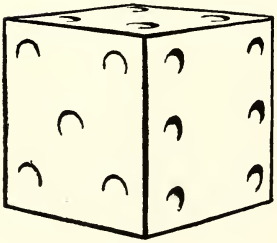
RAINBOW.



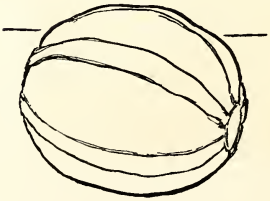
STARS AND STRIPES.



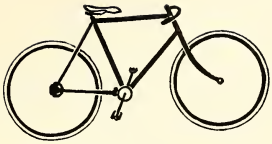
UNION JACK.



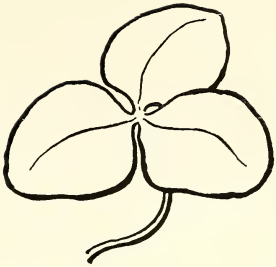
DIE.



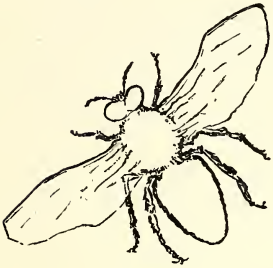
FOOTBALL.



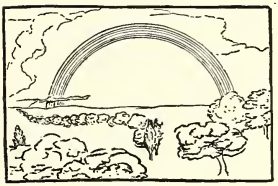
Bicycle.



Clover.

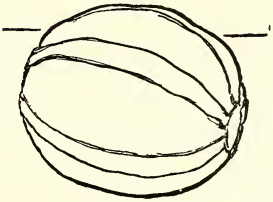


Bee.



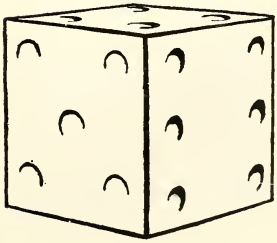
Rainbow.

Tent.

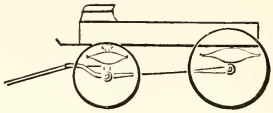


Football.

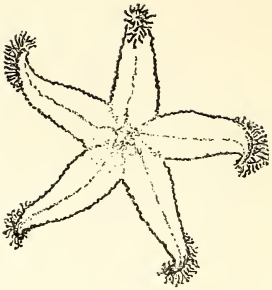
Constellations.



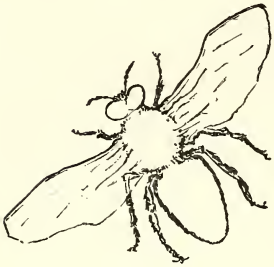
Die.



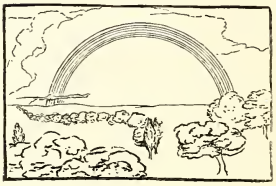
WAGON.



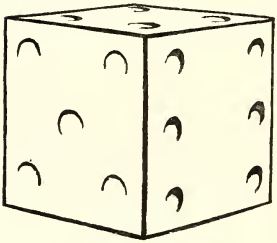
STARFISH.



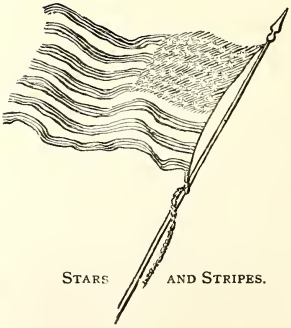
BEE.



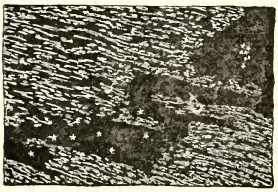
RAINBOW.



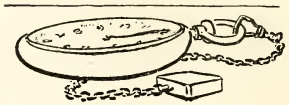
DIE.



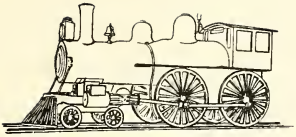
STARS AND STRIPES.



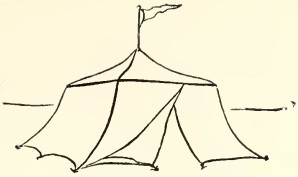
CONSTELLATIONS.



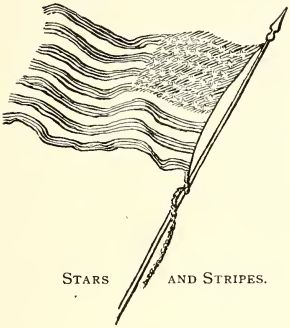
WATCH.



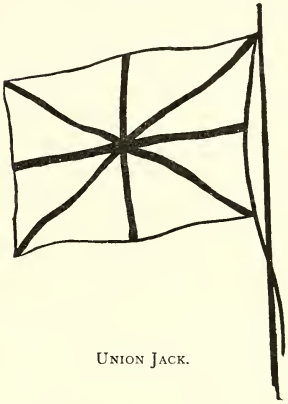
ENGINE.



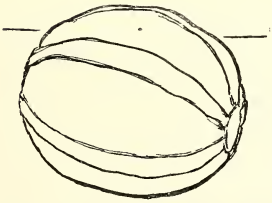
TENT.



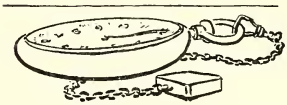
STARS AND STRIPES.



UNION JACK.

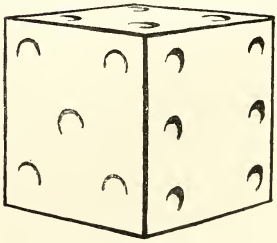


FOOTBALL



WATCH.

CONSTELLATIONS.



DIE.

wheels; and 8 by an engine which has eight wheels. Another method of representing these four numbers would be by feet: 1 as a top or as a stork standing on one foot; 2 as a man; 4 as any quadruped; and 8 as a spider or an octopus.

The other figures may be represented by other objects suggesting the several numbers. Clover may represent 3; a hand or a starfish, 5; an insect having six feet, 6; a rainbow, 7; the Union Jack, which can be made with 9 strokes, or a school-house, will represent 9 (nine o'clock being the hour for beginning the recitations); the decalogue of Moses, 10; or if this be too weighty a subject or too difficult to draw, take a tent, the sound of whose name will remind you of ten; 11 would be well represented by a football; 12 by the meridian sun, or by a clock or watch whose small hand points to twelve; the American flag with its thirteen stripes will represent 13; another representation of 13 would be Christ with the twelve Apostles, or a cross: for the idea that 13 is an unlucky number originated through the thought of the crucifixion, Christ having been the thirteenth at the Last Supper; fourteen may be the crown of Louis XIV., or his coat-of-arms, or a valentine, since St. Valentine's day falls on the fourteenth of February, or the two constellations, the Dipper and the Pleiades, each one consisting of seven brilliant stars visible to the naked eye; while 15, finally, may be represented by a die showing the faces 4, 5, and 6.

All these things can be easily drawn by children and should be so arranged on four cards as to reproduce the number-arrangement given above. Each card will correspond to a row, and in our illustrations the first number of each row is represented by the picture in the upper left-hand corner. It is not necessary to preserve the same order, if our youngster only remembers the place of the pictures which represent the numbers that must be added. Having drawn his four cards, he presents them to some one with the request that he think of some of the objects and hand him back those cards on which this object appears. Each card that is handed back represents a number, and their sum indicates the object thought of. Thus if a person thinks of the flag (number 13), he will hand back the cards bearing the pictures wheelbarrow, waggon, and engine, as being those on which the flag occurs, representing the numbers 1, 4, and 8, the sum of which makes 13.

The underlying theory of the trick is of course old and pretty well known, but the idea of expressing it in pictures that represent the numbers and that can be easily drawn by the children themselves, is new and may be welcome to educators and parents.