

13-14-15.

He sat and gazed with a placid mien,
And a cheerful and contented smile,
At the little square box with the "gem fifteen,"
And he said he'd bet his pile.

That he could figger it out right thar;
So he jumbled the blocks about,
And then he remarked: "It's simple, I swar,
And I reckon I'll work it out."

So he tackled it sharp for an hour or more,
And his hands he ran through his hair,
And he jumped right up and fearfully swore,
And his eyes had a maulin' glare.

That he'd "be dashed if the dash—dashed fool
That invented this game was here
He'd smash his dash—dash—dashed skull,
And chew off the end of his ear."

But after another hot hour had flown
The head drops down 'gan to roll,
And he raved in a way that the people all say,
Struck terror to each watching soul.

For Thirteen—Fifteen—Fourteen—alas!
Were all that he got for his pains,
So he frantically swallowed of poison a glass
And with a bullet bored out his brains.

THE GEM PUZZLE.

The above is one of several names of a puzzle which is now attracting such a degree of popular attention as may, perhaps, excuse an attempt to throw a little light upon its mysteries.

The puzzle is composed of fifteen small square blocks, numbered from 1 to 15, and contained in a square box large enough to hold sixteen such blocks. The blocks are to be placed in the box irregularly, and pushed about until they are in regular order, as shown on the cover of the box, thus:

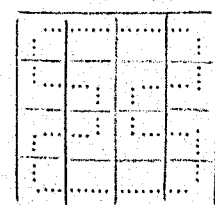
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

A little practice will enable any one to push the blocks about with such dexterity as always in a very short time to bring the blocks either into the above position, or else into one which differs from it only in having two of the blocks in the bottom row transposed, the other of the three being in its right place. This position may be called the 13-15-14 position, and the great problem with many puzzle-players is to find a method of reducing it to the position required. No difficulty is experienced in reducing it to a position which may be called regular, such as:

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

A kind of puzzle is made with round blocks, with which when the last of the above positions is reached, by giving each block a quarter turn, and then giving the whole box a quarter turn in the opposite direction, the required position may be successfully simulated; but with the square blocks with which only the puzzle ought to be made, most persons will be ready to confess that from the 13-15-14 position they cannot do the puzzle, and they are usually disposed to maintain that it cannot be done. What are they to say, however, when met, as they sometimes are, with the reply, "You say it can't be done; but I know better, for I have done it several times!" That a thing is difficult does not prove it to be impossible, and, however you may be convinced in your own mind that if it could be done at all you could do it yourself, this sort of reasoning has little weight with an opponent who thinks that he knows that he has actually done what you declare that no one can do.

To meet this difficulty let me attempt to prove that from the 13-15-14 position the puzzle can not be done by a rather more demonstrative method. The dotted line



on the accompanying figure shows how the places in the box may be considered as composing a complete circuit, and it is evident that by following this line the blocks may be pushed all round the box, and the vacant square be left in any part of the box without altering the order in which the blocks are arranged, or, so to speak, *strung* upon the line; but whenever a block is moved, otherwise than along the

dotted line, the order is changed, the block moving passing in one direction or the other either two or six of the other blocks. Now when a block passes any number of other blocks, the result is the same as if it changed places with each of such other blocks successively; for instance, if the block 1 passes the block 2 and 3, changing the order 1, 2, 3 to 2, 3, 1, it is the same as if 1 had first changed places with 2 and then with 3. Any move, therefore, must be equivalent to either two or six changes, each change being between the block moving and one of the blocks passed, and any number of moves must be equivalent to an even number of changes, because the sum of any number of twos and sixes must be an even number. Conversely, an odd number of changes, each between two blocks, is not the equivalent of any number of moves; but to reach the required position from the 13-15-14 requires but one change, between 14 and 15, and one is an odd number. Hence that result can not be obtained by any number of moves. Q. E. D.

The principle that the result to be obtained by any number of moves must be equivalent to an even number of changes furnishes a method of determining whether the problem is or is not soluble from any given position. For example, in the following position the following changes are necessary to get each block into its proper place, every change bringing one or two blocks into place; 1 and 13, 13 and 3, 3 and 5, 5 and 6; 2 and 11, 11 and 4; 7 and 14; 8 and 12; 9 and 10, 10 and 15—ten changes in all; *ergo* the puzzle can be solved. It will be seen that the changes are divisible into sets, separated above by semicolons. In practice, in applying this test it is only necessary to count the numbers in order thus: 1, 13, 3, 5, 6; 2, 11, 4; 7, 14; 8, 12; 9, 10, 15; and rejecting those sets that contain an odd number of numbers, if there remain an even number of sets the problem can be solved, *vice versa*.

A correspondent of the New York Herald proposed an ingenious method of determining the question to which the above method is applicable, namely: Consider the box as divided into sixteen squares coloured black and white like a chess-board, and let the proper square be left vacant. If then, he says, the sum of the numbers on all the blocks upon squares of one color be even, the problem can be solved; if odd, it cannot be solved; but this test is open to the objection that it is as likely to lead to a false conclusion as to a true one.

No one but a child, I suppose, after becoming acquainted with the principles of the puzzle, can derive amusement by playing with it in the manner first proposed, placing the blocks in the box irregularly, getting them in order, upsetting the box, and repeating the operation; but the puzzle is capable of variations which may serve to prolong its use. The first of these which I would suggest is that, instead of the regular order, we should try to bring them into the shape of a magic square, the sum of the numbers in every row or diagonal being 30, whether such row or diagonal contains four blocks or only three and the vacant square. Another variation is to try to reach a position in which from each number to the next higher is a knight's move—two squares in one direction and one in another. A third is from a given selected position to try to reach the regular order in as few moves as possible, either counting single moves, each of one block one place, or combined moves, as where two or three blocks are pushed in the same direction at the same time. I shall conclude with some examples of the last way of using the puzzle:

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

Position 1.—To be solved in 72 simple, or 28 combined moves.

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

Position 3.—To be solved in 28 simple moves.

JOHN, dear, the baby's crying!" "Oh, well, confound it, Maria, don't bother a man while he's doing this inf—blest puzzle. Go out and buy him one for himself; it'll keep him quiet." "Yes, love, I will, in one minute—just wait till I get this—how was it I had it just now—14—13—15—oh dear!"

When the maid I mean to marry
I of evenings go to see,
I make it a rule to carry
Watches twain along with me.
One is hours and hours too fast,
One is hours and hours too slow;
I call by the first—the last
I consult when I should go.

SQUARE NUMBERS.

THE USE THAT WAS MADE OF THEM IN PREPARING CHARMS THREE HUNDRED YEARS AGO.

In the appendix of the tenth volume of the works of Paracelsus, published at Basle, in 1591, very many curious things are to be met with, particularly in the part called "Liber Septimus Archidoxis Magice; De Sigillis Planetarum." Herein the author gives minute directions for the preparations of seals—*Sigilla*, or medals of the various planets, believing them to bring to the possessor either luck or misfortune, according as the planets were in a favourable or unfavourable aspect at the time of such preparation. The *Sigillum* of Jupiter was to be made of a circular piece of English tin, and upon one of its surfaces was to be cut a large square subdivided into sixteen smaller ones, with the numbers from one to sixteen so arranged as to count thirty-four either way.

The following is the arrangement.

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

On the reverse was to be stamped the likeness of the planet, namely a priest like and learned man reading a book, with a star upon his forehead and surrounded by the name Jupiter. This charm was to be made on a Thursday when the moon was in its first quarter and entering Libra, and, when finished, to be worn in a blue silk bag. Its possessor was sure to experience love, kindness and favors from all his fellow men, and wherever it was placed by him there would everything be increased for him a hundred fold. It insured success in every business venture and dissipated all fear.

The *Sigillum* of Mars, made of Cornish iron, besides having on one side the figure of the planet, was to contain upon the other 25 small squares within a larger one, and the numbers from 1 to 25 so arranged as to count 65 either way, and was to be made when the planet was in a favourable condition, and, when finished, encased in a red silk bag. The following is the arrangement.

11	24	7	20	3
4	12	25	8	16
17	5	13	21	9
10	18	1	14	22
23	6	19	2	15

The wearer of this would possess superhuman strength, and would come off victorious in every conflict, overcome all his enemies, and never receive an injury. The fortress beneath whose walls, such a charm was buried would be impregnable, and laugh its besiegers to scorn: such powers did this *Sigillum* receive from its planet: but great care was to be taken lest this medal should be struck when the planet was leaving the sun, and then its possessor would meet with all kinds of reverses, and be the buffet of fortune. Its presence under such circumstances, insured strife, anger, envy, and general misfortune.

The *Sigillum* of Saturn, made of lead, and containing squares counting fifteen each way, was particularly efficacious when worn by pregnant women, obviating all danger of premature birth, procuring for them a happy delivery, as well as steadily augmenting the family circle. All cavalymen and sportsmen would be forever freed from the danger of being unhorsed by wearing the medal in their left boot-leg.

The *Sigillum* of Venus, made of pure copper, and covered with green silk, containing 49 squares, counting 17½ each way, and was most wonderfully efficacious in all cases of love. If placed in a goblet of wine or water and offered to one's most deadly enemy, that person, upon drinking the liquid, would become the warmest friend. In the same manner were coy and dilident maidens to be attracted by the sterner sex. Its influence was irresistible.

What is puzzling so many of our fellow-citizens was, in all probability, the source of even more serious interest and study to hundreds of thousands of people long since dead.

"THE FIFTEEN PUZZLE."

DOMESTIC DISSENSIONS CAUSED BY THIS MOST VEXATIOUS GAME.

Mr. Spoopendyke of Clinton street is one of the most cheery, cheerful gentlemen in Brooklyn, and his wife is the soul of good humour.

Friday afternoon Mr. Spoopendyke brought home a "fifteen puzzle," and told his wife he had bet a hat he could solve it.

"Deed you can," said she, preparing to assist him. "I'd like to know what you can't do," and she dusted off the table so he wouldn't muss his cuffs.

He pulled out the box. "Now," said he,

"You see these blocks run four in a row up to 12, and then there are three, numbers 13, 14 and 15. I muss them around, and the object is to make them come out just as they were, consecutively, you know."

"Certainly. That's easy," and she put the 15 block in her mouth while she swashed around with the rest.

"What'n thunder you doing?" demanded Mr. Spoopendyke. "You mustn't take 'em out!"

"Oh!" said she, putting the block upside down, "you mustn't take 'em out, 'eh! well, we'll do it with 'em in."

Mr. Spoopendyke moved the cubes around awhile and then pondered.

"I see," said Mrs. Spoopendyke, "I've got it! Put that 12 down there and the 11 here, and then move 'em around."

He did it, and they were worse than before.

"Hold on!" she exclaimed; "now put—"

"S'pose you hold on," he responded. "This thing works by hand, not by steam. You've got to go slow. Now I'll put the 10 there and that lets the 13 come up in place. Then we put the 15 here and slip down the 9."

"That ain't right. That makes it 11, 10, 12. You want to get the 9 up and transpose those."

"Lemme be, will ye? I'm going to fix those. There—now I'll bring down the 11 and carry—"

"But you can't. You've got—"

"I haven't either. There's the 14, 15, 13. I've only to make them run 13, 14, 15, and then—"

"Why, you can't even count. What are you going to do with the 10, 11, 12?"

"Do with them! What d'y'e s'pose I'm going to do with them? Think I'm going to bore a hole in 'em and wear them for socks! Talk sense if you know any. Now I'll put the 10 in here and that lets the 9 in. Then we move the 11 up and get the 12 in place."

"But where's your 13, 14 and 15?"

"They are right here, Mrs. Spoopendyke; did you think they'd gone to prayer-meeting! Confound a woman around a puzzle, anyway. Just you lemme figure on this alone, will ye? I guess I know how to fix this."

"Of course you do," said Mrs. Spoopendyke, soothingly, "you can get it if any one can."

"Just see, now. If I can only get the last three straight. I've got it. H'm—ah! yes. The 15 goes here. Now I've got it. Then the 13 and then the 14. Just move—hold on."

"I see where you're wrong," said Mrs. Spoopendyke. "You want to move—"

"I don't want to do any such thing."

"Yes, you do; just move—"

"Well, if I move it'll be about eight miles from here, where I can have some peace."

"Don't be so touchy; all you've got—"

"If you don't let this puzzling business alone I'll just make a hole in the air with it. What do you know about it, anyway? I've got it all but three blocks—"

"Well, I'll show you how to get these."

"Then show me, show me, just show me, that's all. Oh, show me. Why don't you show me how it's done?"

Mrs. Spoopendyke moved them around and then studied awhile.

"Why don't you show me?" demanded Mr. Spoopendyke. "You said you'd show me. I'm waiting to be shown. Go on with your showing. Let the show proceed."

"If one could only get that 12 out of the way, so that 13 would come in, we'd be all right," mused Mrs. Spoopendyke.

"Oh, certainly, certainly. If the 12 had a pair of legs, and could build a railroad around the 15, and then would give 14 a free pass, he might ride into his place. Say, Mrs. Spoopendyke, if you'll quit handling that 15 block like a stove-lid, and take your thumb out of the blank square, I'd be obliged to you. Let's see now. The 14 goes there—"

"No, it don't; it goes there."

"Goes where?"

"Why, there."

"There! Where! 'There' may mean up the chimney or down my throat. Where! Where do you mean?"

"Why, there, of course; can't you see? I believe you're crazy!"

"I am not crazy, Mrs. Spoopendyke, nor am I a woman. I might just as well put that block in the fire as where you say. I'll put it here."

"Then you're all wrong. It goes here."

"A minute ago you said it went there. Let it alone, I tell you. Drop it. Put it back where you found it. Now, let things be. I'll move this 12 down here."

"That makes a fine arrangement. Nobody but a lunatic would put it there. Put it here!"

"Go away from here. You ain't half witted. I can do this puzzle."

"You can't do anything, you old idiot. You deserve to lose your hat. Go, stand around bare-headed and cool your skull, you old heathen. You do a puzzle! You don't know the bottom of the box from the top."

Crash! Down went the outfit, and Mr. Spoopendyke crawled into bed.

Mrs. Spoopendyke re-arranged the blocks and went to work at them.

"Thomas," said she, timidly, after awhile.

"Look here."

He looked. She had solved it.

"I could have done it," he growled.

"Yes," said she, "if you had done it in my way."

"You only did it just as I was doing it," he responded. "You picked it up where I left off."

"Yes," she replied, putting out the light, "I picked it off the floor."