DUCK SHOOTING AT BUZZARDS BAY
Problem by Sam Loyd

PROPOSITION—By changing the position of the fewest possible number of the ten ducks arrange them so there will be five rows of four in line.

THE SUBJECT OF this puzzle inspiration is a familiar one to residents of the vicinity of Buzzard's Bay and introduces one of the many problems which, aside from the mere question of a hunter's luck, have doubtless been noticed by such as revel in the pleasures of duck shooting.

Next to shooting the chutes, there is no salt water sport so exhilarating as gunning for ducks, and there are few problems of a political or economical character which call for such profound statesmanship and administrative ability to show a balance sheet in favor of the internal receipts of the game bag, as against the expenditure of powder and shot, to say nothing of the other lavish expenditures which pertain to the make-up of a great duck hunter.

There are a thousand and one problems connected with the game, any one of which would be worthy of consideration, but with which our puzzlists are doubtless more familiar than myself, so I only refer to one little proposition which may be peculiarly characteristic of my style of duck shooting. Of course it is a great feat to get more than one duck at a single shot, and as that can only be done by getting several of them in a line, it set me to studying the

principle upon which Buzzard Bay ducks line up, and I may have doubtless hit upon something which my uniform lack of skill as a marksman enabled me to discover.

I noticed that the birds invariably approached in two rows, with a corporal bird, so to speak, on each side in charge of either line, so that, as shown in the sketch, one could figure out three lines of four-in-row. Now just as soon as I got a line on four of these birds I would blaze away in the hopes of getting several birds with one shot. I could readily have killed one bird or possibly two, but my ambition to get four or none led me to the result of my making the following interesting discovery. As soon as the smoke cleared away, so that I could open my eyes, I would find that the ten birds had reversed their direction, and were shooting away like a company of Filipinos, to reorganize somewhere back in the swamps. What I particularly noticed, however, was that while they came in the three four-in-a-row form as shown, they invariably scooted away in the shape of five rows, with four-in-a-row. Just how they made the change I never could see, on account of the smoke and confusion, but I noticed that the fewest possible number of birds had changed their positions, so it will afford me

special pleasure to give credit to any lucky duck who will solve this little problem for me correctly.

The picture shows ten ducks advancing in geometrical form, showing three rows of four-in-line. Now reorganize them so there will be five rows of four-in-line, simply by changing the position of the fewest possible number of ducks and it will incidentally show how many ducks Grover bags out of the flock.

The problem can be worked out practically by placing very small counters upon the ducks in the picture and move them around until you get five rows of four-in-a-row.

A Tricky Problem.

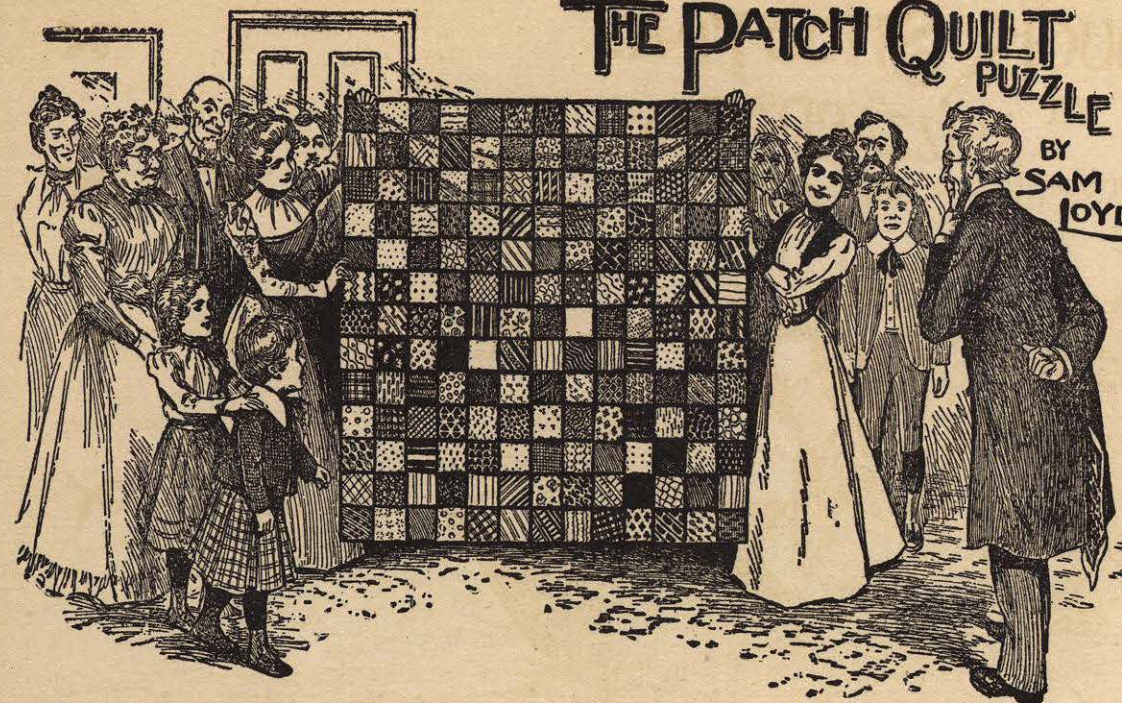Ask your friends if they can write down five odd figures to add up and make fourteen.

It is really astonishing how engrossed most people will get, and how much time they will spend over this, at first sight, simple problem. The questioner, however, must be careful to say figures, not numbers. Here is the answer:

11
1
1
1
—
14

THE PATCH QUILT PUZZLE
BY SAM LOYD.

PROPOSITION—Into how few square pieces, containing one or more pieces of patchwork, can the quilt be divided?

SOMEWHAT IN THE nature of a rest from study, we will call attention to the Patch Quilt puzzle as being a companion piece to Mrs. Deacon White's remnant problem. The sketch represents the members of the "Willing Workers" society overwhelming their good parson with a token of love and esteem, in the shape of a beautiful patch work quilt. Every member contributed one square piece of patchwork consisting of one or more of the small squares, each of these contributions being perfectly square in shape, involved a pretty puzzle which nearly disrupted the society.

Any lady would have resigned if her particular piece of work was tampered with or omitted, so it became a matter of considerable study to find out how to unite all of the squares, of various sizes, together, so as to form the one large square quilt. Incidentally it may be mentioned that as every member contributed one square piece of patch quilt, you will know just how many members there were when you discover into how few square pieces the quilt can be divided. It is a simple puzzle which will give considerable scope for ingenuity and patience.

The Lost Cent.

Here is a puzzle known as the Covent Garden Problem, which ap-

peared in London half a century ago, accompanied by the somewhat surprising assertion that it had mystified the best mathematicians of England. The problem is continually cropping up, in some form or other, generally accompanied by that same statement of its having baffled the European mathematicians, all of which must be taken with a liberal allowance of salt, as our Yankee scholars would find such little difficulty in dispelling the mystery that I can only feel justified in presenting it as a special practice problem for our more juvenile puzzlists. As some of the other puzzles have proven to be too difficult for many beginners who have become interested in such matters, I have determined to act upon an oft-repeated suggestion from our younger friends to present a few simple problems of a mathematical nature which all should be able to solve.

Well, to get back to the Covent Garden Problem, which I had almost forgotten. It is told that two huckster ladies were selling apples at the market, when Mrs. Smith, for some reason or other which must be the real mystery which has baffled the mathematicians, was called away and asked Mrs. Jones, the other apple lady, to dispose of her stock for her.

Now, it appears that they each had an equal number of apples, but Mrs. Jones had larger fruit and was

selling hers at the rate of two for a penny, while Mrs. Smith sold three of hers for a penny. Upon accepting the responsibility of disposing of her friend's stock, Mrs. Jones, wishing to be very impartial, mixed them all together and sold them off at the rate of five apples for two pence.

When Mrs. Smith returned the next day the apples had all been disposed of, but when they came to divide the proceeds they found that they were just seven pence short, and it is this shortage in the apple or financial market which has disturbed the mathematical equilibrium for such a long period.

Supposing that they divided the money equally, each taking one-half, the problem is to tell just how much money Mrs. Jones lost by the unfortunate partnership.

THE LOST CENT

A.B.C. Tea Party

CAMENNE

HERE IS A LITTLE tot's puzzle conundrum which will furnish food for reflection to the children of an older growth. Little Alice was playing tea party, but as all of her dolls had lost their heads and arms, so as not to be in a presentable condition, she was compelled to give the party to such remnants of her toys as she could muster, so, according to her vivid little imagination, she invited all of her A B C blocks to an afternoon tea.

She says that there was not places for all of them at the table, so half a dozen had to come later in the evening, which is very suggestive of a good prize conundrum. Why was it that the other letters were not present at the supper?

Then there is a pretty little spelling match connected with the puzzle which is also of interest. Can you change one of the blocks in the name, Camenne, and substitute some other letter so as to make it spell a correct word?

When is the soup likely to run out of the saucepan? When there's a leak in it.

What is it that from which the whole may be taken, and yet some will remain? The word wholesome.

Which is easier to spell—fiddle-de-dee or fiddle-de-dum? The former, because it is spelt with more e's.

What is that which is black, white and red all over, which shows some people to be green, and makes others look blue? A newspaper.

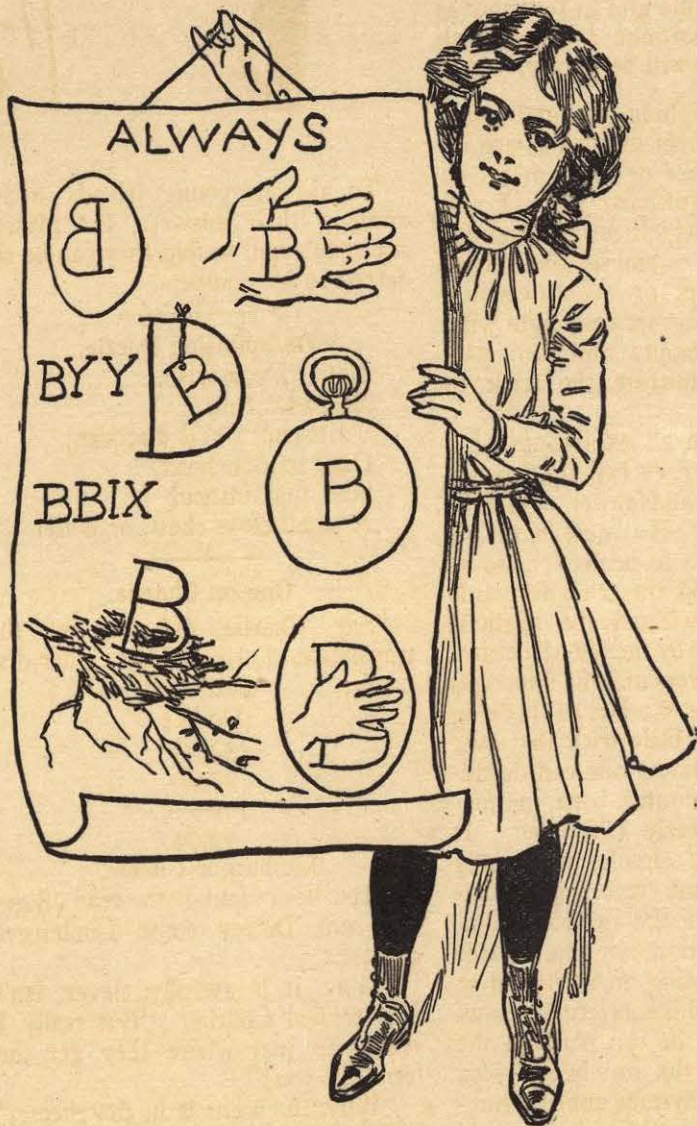What is the best advice to give a justice of the peace? Peace.

A SWARM OF GOOD BEES.

Here is a list of good resolutions for the New Year which a clever young miss has worked out in pictorial fashion upon a panel to be placed upon the wall, so as to catch one's eye upon rising in the morning. Figure them out so as to impress them upon the memory, as many of them are well worth keeping.

Who commits the greatest abominations. Nations.

Who is the greatest terrifier? Fire.

What is the best way of making a coat last? Make the trousers and waistcoat first.

If you drive a nail in a board and clinch it on the other side, why is it like a sick man? Because it is in firm.

A SWARM OF GOOD BEES

After Dinner Tricks BY SAM LOYD.

Proposition: Pick up two adjacent glasses at a time and in four moves change the positions so that each alternate glass will be empty.

To give something light and amusing for the benefit of such as are interested in tricks or what might be termed sleight-of-hand feats, I will give a puzzle which can be used advantageously to amuse the guests after a banquet or at an evening party. In the former case eight wine glasses—four empty and four partially filled—illustrate the trick to perfection.

In this, as in all exhibitions of a similar character, everything depends upon the skill and clever acting of the performer. He must have his little hook down to perfection, so as to be able to do the trick forwards or backwards without the slightest hesitation, while by the aid of a ceaseless flow of conversation he impresses upon his hearers the fact of its being the most simple little trick that ever happened, which any one can do unless he be a natural born mutton-head or hopelessly befuddled. It really looks so simple, apparently working itself out correctly, no matter how or when the exhibitor commences, that almost any one will be lured into accepting an invitation to step up and test his sobriety by showing how readily he can perform the feat—and then the fun begins—for it will rattle ninety-nine out of a hundred.

To aid our young friends in describing their answers, the glasses are numbered, so that they can be referred to by numbers.

Decapitation Puzzle.

Now, if you wish,
Behead a fish,
"To listen" you'll discover;
Once more behead,
And find instead
A small close chest, or coffer.

One on Charlie.

"Say, Charlie, did you see the translation of Aguinaldo's cipher dispatch: 'BBBBBB
Do We
32541
27340

59971
Limburger Cheese.'
It has been found to read 'Sigsbee sent Dewey some Limburger cheese.'"

"Why, it is awfully clever, isn't it?" replied Charlie. "But really I don't see just where they get the 'sent,' do you?"

"Why, the scent is in the cheese," replied his friend.

Animals Enigmatically Expressed.

1. To decline, and to declare.
2. Approached and an animal.
3. To gorge and a weight.
4. A rod and an animal.
5. To injure and a number.
6. A letter and a grain.
7. An insect and to run away.

A Numerical Enigma.

How strange a city this would be,
If we had not our 1, 2, 3;
But, in this wondrous 6, 7, 8,
Had learned the air to navigate,
Ourselves with 7, 6, 9 inflate
And skyward 4, 5, 9, 8!
Cipher Answer.—C. 1, 18, 9, 1, 7, 5, 19.

Comical Conundrums.

Who gave the tar-tar?
The jackall gave the Jack all.

Why did the wood-saw?
Because it saw the lamb-chop.

Why did the butter-fly?
Because it saw the cake-walk.

Why did the fly fly?
Because the spider spied her.

KLONDIKE YARNS
BY SAM LOYD
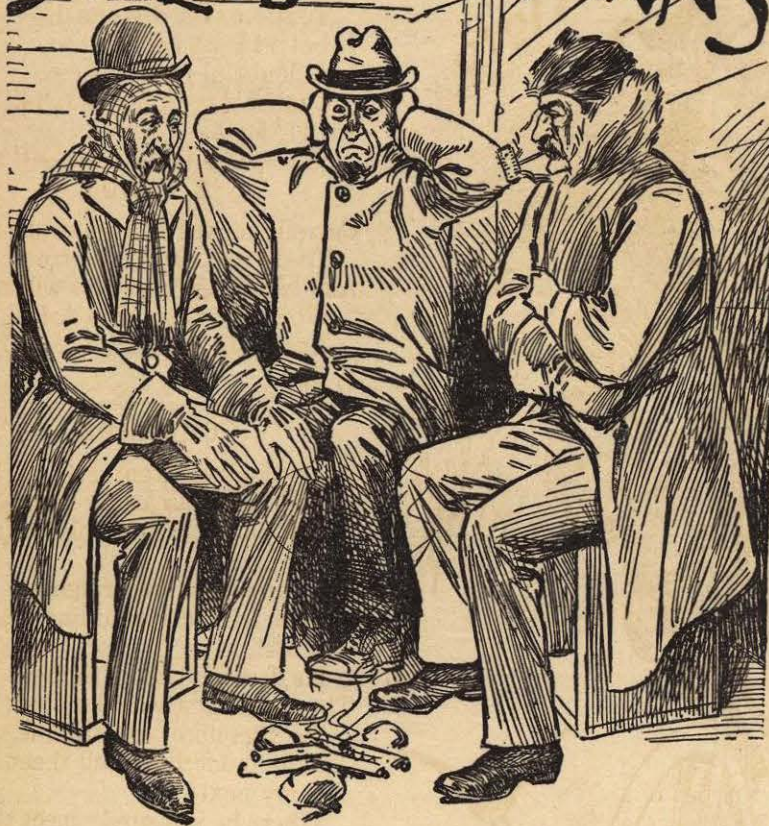
S SHOWING HOW A puzzle may be extracted from anything, I am going to ask our young puzzlists to pass judgment upon the relative merits of three prize yarns which were spun in the Klondike.

It was during my last trip to the gold fields, when, in the company of some adventurous spirits, who, like myself, were in search of health, wealth and happiness under adverse circumstances, that we found ourselves huddled together in the main drawing-room of our domicile, patiently awaiting certain climatic changes which would soften up the ground so as to permit of its being scratched with a pick. We were all semi-professional men, which fact, I suppose, injected a certain spirit of rivalry into every discussion that was started No matter how marvelous a story was told, it at once became the duty of the others to narrate a tale which, for daring improbability, should eclipse it. Veracity never was questioned; everything went, and the palm was yielded gracefully to the one who told the biggest "whopper" which had the slightest semblance of probability.

I remember that the question of intelligence, or rather precociousness, in very young chldren had been under discussion, when one of the party remarked: "I never was so taken aback nor struck by the reasoning powers of a child as one day at dinner, when we were partaking of what we called soused pigs' feet. Harry, who was but three years old, had already eaten four pigs' knuckles, and was clamoring for more, when his mother said: 'I don't think you had better eat any more, Harry, or you will see the bogie man to-night.'

"'Now, mamma,' replied Harry, after a moment of silent thought, 'I may just as well settle the truth of that bogie story in my mind now and once for all; give me some more pigs' feet.' So, from a purely investigating standpoint, he ate twice as many as he had before."

"Yes," said another member of the party, who was a civil engineer, "some children have precocious reasoning powers. for I remember reasons for the preference.

when Fanny was less than two years old, we took her to Niagara, and she made a calculation which proved how much water runs over the Falls in a month to an exact quart."

There was silence for a few moments, and it looked as if the engineer would retain the championship, but the doctor, who had a very slow and deliberate manner of speech, which added greatly to the impressiveness of what he might be telling, remarked: "Those are indeed remarkable stories, which go to prove the inheritance of mental power; but I recall a curious case which happened to me in Switzerland, which I have never been able to explain satisfactorily to myself. I was staying for the night at a little inn at Altdorp, when the host,who had probably heard of my reputation as a specialist, told me that one of his neighbors had a child which they feared was deaf and dumb. The parents had made all those little tests, such as clapping hands, etc., to attract the baby's notice, such as all mothers do, but without avail, and to relieve their minds the host asked me to examine the child's ears. I did so very thoroughly, and pronounced the case to be a hopeless one, wherein the child would grow up to be deaf and dumb.

"The parents, who were Swiss, did not speak a word of English, but asked through the host, who acted as interpreter, if something could not be done for the child.

"'Absolutely nothing,' I replied; 'the case is hopeless.'

"To my utter astonishment the child, which was not yet six months old, looked up in my face with a sweet, infantile smile, and murmured: 'Absolutely nothing?'

"It sounds incredible, I know, especially as the parents and every one else but mine host only spoke German; nevertheless, it is an actual fact."

Sometimes, after each of us had spun his yarn, there was a discussion as to which had told the best, and at times the competition was so close that it took considerable argument and some little force to settle the dispute. In a competition of the kind just mentioned it would be an easy matter to adjudicate, nevertheless, just as a lesson in logic, we will ask our young puzzlists to pick out the most remarkable of the three yarns, giving reasons for the preference.

42

A MERRY CHRISTMAS
BY SAM LOYD

PROPOSITION—Find the parts of a human being concealed among Santa Claus' presents.

S ANTA CLAUS WISHes our puzzlists the compliments of the season and presents a puzzle which may be looked upon as a pictorial illustration of the famous riddle propounded by the Bishop of Oxford, wherein the parts of the human body were described. Santa Claus is the only complete person in view, but if you will carefully inspect and guess the correct names to each and all of his stock of presents it will be found to contain an interesting and instructive lesson in human anatomy, accompanied by a chance to win one of the gifts which he proposes to divide among those who guess the best lists of the articles contained in his capacious sack. Of course, every one will see the palms and calf at a glance, but it is prtty safe to say that there are many things which are liable to be overlooked, so the aim is to see who can make the most complete list, even if everything is not discovered.

43

CHARADE.

Upon the check'rd battle field,
    I'm foremost in the ranks;
My second makes a certain ga'n
    'Mongst railways, stocks and banks.
My whole though sanctioned by the law
    To succor the distress'd,
Is but, at least I think it so,
    A doubtful good at best.
    Cypher Ans. 16, 1, 23, 14, 2, 18, 15, 11, 5, 18.

A REBUS.

Curtail me, and I'm what you use
    To do my whole, 'tis true,
And which I'm sure few will refuse,
    Woe be to them who do!
    Ans. 2, 18, 5, 1, 20, 8, 5 or 11, 14, 5, 5, 12.

CHARADE.

A troubadour from foreign lands,
    To a lady fair came singing;
"O lady bright, from thine own true knight
    A message I am bringing:
He lies in the mountains near my first,
    He dares not come to thee;
The foe accurst would on him burst,
    He therefore sendeth me.
And he biddeth me tell thee to seek my next,
    Where he will surely meet thee;
O! be not vexed, nor with fear perplex'd,
    For thine own true love shall greet thee."
Like a timid fawn, at early dawn,
    To my second the lady hied;
And at his word, she met her lord,
    Who had my whole supplied.
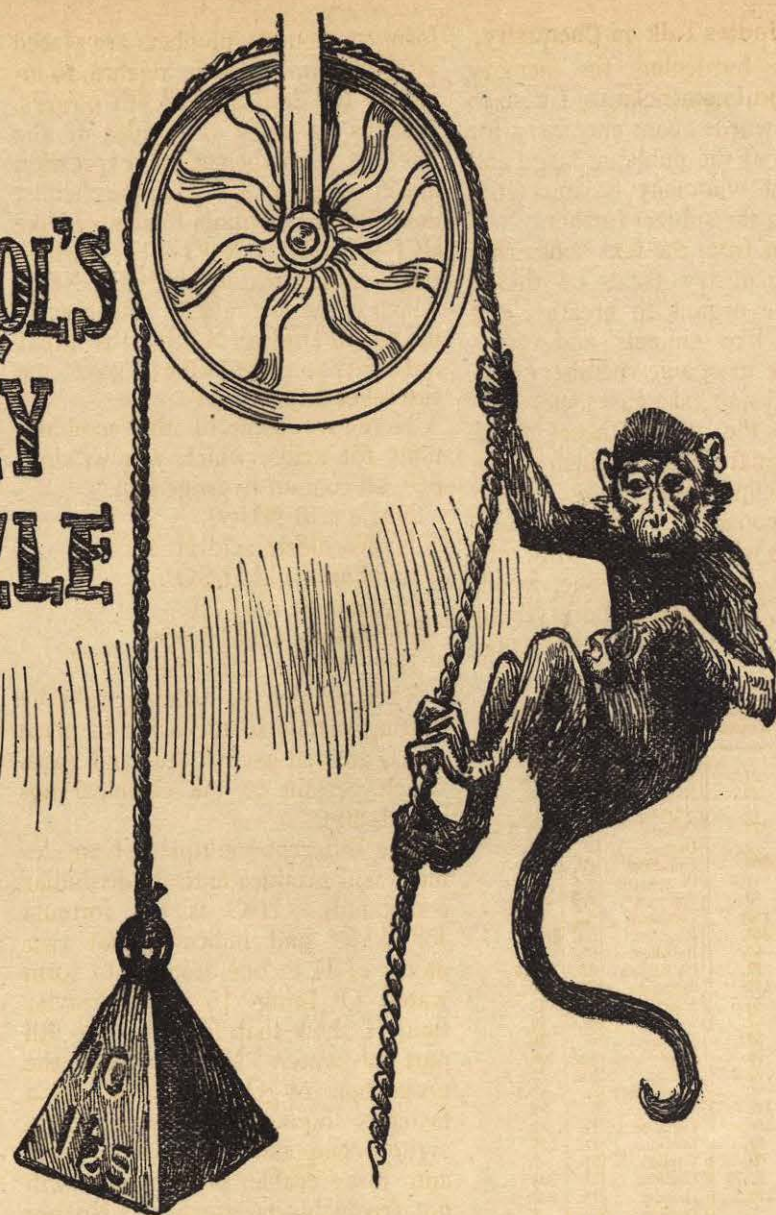   Cypher Ans. 16, 1, 19, 19, 16, 15, 18, 20.

A REBUS.

In yon vast field of cultivated space,
I there am found with members of my race;
Decapitate me—if you've no objection—
You then will find what brings me to perfection;
Take one more cut, and then you'll plainly see,
What I am destined, day by day, to be.
    Cypher Ans. 23, 8, 5, 1, 20.

Why is a leaf of a tree like the human body? Because it has veins in it.

What is that which is lengthened by being cut at both ends? A ditch.

LEWIS CARROL'S MONKEY PUZZLE

PROPOSITION---What will be the result if the monkey attempts to climb the rope? Will the weight rise or fall?

HERE IS A QUAINTLY told problem in mechanics, which, despite its apparent simplicity, is said to have caused Lewis Carroll considerable disquietude. Whether the famous author of "Alice in Wonderland," who was an Oxford professor of mathematics was the originator of the problem is not known, but in an evil hour, as mentioned in a recent paper upon his writings and doings, he asked for information upon the following subject:

"If, to a rope, passed over a loose pulley, is suspended a ten-pound counter weight, which balances exactly with a monkey eating an apple, swinging at the other end, what would be the result if the monkey attempts to climb the rope?"

"It is very curious," says Lewis Carroll, "to note the different views

taken by good mathematicians. Price says the weight goes up with increasing velocity. Both Clifton and Harcourt maintain that the weight goes up at the same rate of speed as the monkey; while Sampson says that it goes down."

A distinguished mechanical engineer says "it would have no more effect than a fly crawling up a rope," while a scientist claims that "the weight would rise or lower, according to the inverse ratio of the speed with which the monkey ate the apple," from which, however, should be extracted the square root of the monkey's tail. Seriously speaking, it is a pretty problem, and, as the principle of Lewis Carroll's monkey puzzle has become a much-discussed problem, worthy of serious consideration, it is presented to illustrate the intimate relationship between puzzles and mechanical problems.

It is a well-known fact that the study of puzzles of any kind gives one a clear insight into the principles of mechanical laws or natural philosophy.

In theory the problem appears to be about as paradoxical as a recent conundrum which is going the rounds as to what is it that will go up a chimney down or down a chimney down, but will not go up a chimney up nor down a chimney up? (An umbrella.)

For Bible-Students.

If the children slain in Herod's Slaughter of the Innocents were buried in sand with but the right foot showing, how could you tell the girls from the boys?

This has puzzled many theologians, but the answer is simple: Only boys were slaughtered!

A Five Minutes Talk on Chemistry.

Without burdening the memory with technical nomenclature I wish to say a few words about chemistry for the benefit of the public at large and the student who may be interested in pursuing the subject further.

We learn from the text books that organic chemistry treats of things which have organs to breathe, eat, and grow, like animals and vegetables, while inorganic chemistry pertains to rocks, metals, gases, etc. According to the atomic theory there are 71 original elements which go into the makeup of everything. These elements consist of infinitesimally small atoms which combine with other atoms to make flesh, bone, wood, coal, water, air, acids and everything that exists. Here are the 71 elements:

Names.	Symbols	Atomic Weights.	Names.	Symbols	Atomic Weights.
Aluminum	Al.	27.3	Molybdenum	Mo.	96.
Antimony	Sb.	120.	Nickel	Ni.	58.
Arsenic	As.	75.	Nitrogen	N.	14.
Barium	Ba.	137.	Osmium	Os.	198.6
Beryllium	Be.	9.	Oxygen	O.	16.
Bismuth	Bi.	208.	Palladium	Pd.	106.
Boron	B.	11.	Phosphorus	P.	31.
Bromine	Br.	80.	Platinum	Pt.	195.
Cadmium	Cd.	112.	Potassium	K.	39.1
Cæsium	Cs.	133.	Rhodium	Rh.	104.
Calcium	Ca.	40.	Rubidium	Rb.	85.5
Carbon	C.	12.	Ruthenium	Ru.	103.5
Cerium	Ce.	141.	Samarium	Sm.	150.
Chlorine	Cl.	35.5	Scandium	Sc	44.
Chromium	Cr.	52.	Selenium	Se	79.
Cobalt	Co.	59.	Silicon	Si.	28.
Columbium	Cb.	94.	Silver	Ag.	108.
Copper	Cu.	63.3	Sodium	Na.	23.
Decipium	Dp.	?.	Strontium	Sr.	87.5
Didymium	Di.	142.3	Sulphur	S.	32.
Erbium	Er.	166.	Tantalum	Ta.	182.
Fluorine	F.	19.	Tellurium	Te.	125.
Gallium	Ga.	69.	Terbium	Tb.	?.
Germanium	Gr.	72.75	Thallium	Tl.	204.
Gold	Au.	196.5	Thorium	Th.	232.
Hydrogen	H.	1.	Thulium	Tm.	?.
Indium	In.	113.6	Tin	Sn.	118.
Iodine	I.	127.	Titanium	Ti.	48.
Iridium	Ir.	193.	Tungsten	W.	184.
Iron	Fe.	56.	Uranium	U.	240.
Lanthanum	La.	138.2	Vanadium	V.	51.2
Lead	Pb.	207.	Ytterbium	Yb.	173.
Lithium	Li.	7.	Yttrium	Yt.	89.
Magnesium	Mg.	24.	Zinc	Zn.	85.
Manganese	Mn.	55.	Zirconium	Zr.	90.
Mercury	Hg.	200.			

It will be seen that each of the elements has its chemical symbol and atomic number. These atoms will combine with other atoms to produce acids, salts, bases or compounds only in multiples of those numbers. Hydrogen (H) is the lightest of all known substances and is therefore designated as 1. It is fourteen times as light as air, from which we might readily estimate its usefulness for balooning.

Oxygen (O) being 16 times as heavy as H has 16 for its atomic number and unites with other elements in proportions of 16, 32, 48, 64, etc. In uniting these elements to

form compounds, numbers are placed after the symbols as in algebra, to indicate the 2nd, 3rd, or 4th powers. Just as we get a clear idea of the work in a mathematical expression like $A^2 + B^3 - XY = Z$, the chemist describes his formula in symbols like $HCl + NaHO = NaCl + H^2O$ which produces salt water, or $C^3H^5(ONO^2)^3$ which is the formula for nitroglycerine which Hudson Maxim, the great authority on explosives, gave me the other day.

Here are some of the combinations for acids, which you will notice, all contain hydrogen:

Nitric acid NHO^3.
Hydrochloric acid HCl.
Sulphuric acid H^2SO^4.
Hydroiodic acid HI.
Phosphoric acid H^3PO^4.
Hydrobromic acid HBr.

Then we get the different salts by putting metals in the acids in place of H, as well as hydrates and bases which pertain to the chemical nomenclature.

The different multiples of an element will produce entirely dissimilar compounds. H^2O is the formula for water and indicates that two atoms of H to one atom of O form water, O being 16 times heavier than H show that H forms the 9th part of water. Now increase the proportion of O and what was a tasteless liquid becomes a thick, syrupy compound with a bitter taste and disagreeable odor which will not freeze by intense cold. No use has yet been discovered for this curious compound.

Air consists of one-fifth oxygen to four-fifths nitrogen, and yet five dissimilar compounds result from their combinations: Nitrous oxide (laughing gas) is N^2O. Nitric oxide is NO. Nitrous anhydride is N^2O^3. Nitrogen peroxide is NO^2, and nitric anhydride is N^2O^5.

Anything may be decomposed, burned or changed by chemical action but nothing is destroyed, every atom can be accounted for and restored. It is somewhat akin to Sir Walter Raleigh's wager that he could weigh the smoke from his tobacco. He carefully preserved and weighed the ashes from his cigars, which, deducted from the original weight of the tobacco, showed exactly how much had escaped in smoke.

Broadly speaking there are two principles in chemistry: Analysis,

which analyzes or dissects a compound to discern its ingredients; and synthesis which combines the elements to form other compounds. The modern chemist knows intelligently which of nature's products contain the elements required to produce a new combination and in separating them will save the other elements and form valuable bi-products.

It requires but little knowledge of chemistry to realize how blindly the old alchemists were groping in the dark, or how absurd are the popular stories of great chemical discoveries having been hit upon by accident.

Nothing explains the principles of analysis better than the little game of questions, which I heartily recommend to my young friends. Think of any thing and I will guess it in fifteen questions to which you need reply but "yes" or "no." All right, you have thought of "a sticker," have you? Well, does it belong to the animal kingdom? "No." That's good, there are already 10,000 things which I know it is not. Does it belong to the vegetable kingdom? "No." Good, now there are a whole lot of things I know it isn't, and I know it belongs to the mineral kingdom, so I ask at once, is it metal? "Yes!" Is it sold at the hardware store? "Yes." Is it a kind of tool? "Yes." Does it have to be sharpened? "No." That was a foolish question, but I was wasting no time, so I will lump a lot of queries. Now listen. Is it one of the following articles: A fire shovel, spoon, poker, stove lifter, cake turner, hammer, cork screw, or pincers? "Yes!" Hurrah, it is one of eight, and you can reduce eight to one in three questions, so I get it in ten queries. Ingenious people may originate clever questions which eliminate thousands of articles, just as the chemist eliminates and proves more by what there is not, than by what there is. It reminds me of what a little boy wrote about salt. "It is something that makes our taters and things taste orful bad when there isn't any."

The clever reader will see that this principle is well illustrated in this little lecture on chemistry: no rules or formulas being given you are expected to draw all information you can from the lessons which are not given!