***The Game of Logic* by Lewis Carroll**
**Chapter I, "New Lamps for Old."**

**Edition and collation by Amy R. Boyd**

## Historical Collation

N. B.: this text was converted from the HTML/CSS web version, and as such the formatting is not intended for casual reading. It also lacks images. (No changes to the diagrams occur between editions in the chapter presented herein.) Its sole purpose is to offer a stable reference for the historical collation. Lines on which no number appears (due to the eccentricities of Microsoft Word's ideas about the relationship between tables and line numbers), the lines are referred to by the nearest number above.

All variants have been recorded. Changes that were repeated have been recorded in every instance because in one instance the variants are not perfectly consistent (*not-nice* in 87 is either *unripe* or *not-ripe* in 86). In order to avoid confusion by recording some repetitions but not others, I have elected to record all of them. Line numbers with asterisks refer to notes below.

Nearly all substantives have been taken adopted from the 1887. The exceptions are noted here in a separate table for convenience, as well as in the main collation list:

**Substantive Changes not Adopted from the 1887 Edition**

| location | Boyd 2013 | Macmillan 86 | Macmillan 87 |
|---|---|---|---|
| 4.15 first* | are | are | and |
| 10.1* | of making | of making | to make |

**Complete Collation**

| location | Boyd 2013 | Macmillan 86 | Macmillan 87 |
|---|---|---|---|
| 1.2 | : | : | ; |
| 1.21 | PREFACE. | PREFACE. | PREFACE^ |
| 1.27 | twenty-two! | twenty-two! | twenty-two. |
| 2.4 thrice | new Cakes are nice | red Apples are ripe | new Cakes are nice |

| | | | |
|---|---|---|---|
| 2.7 | new Cakes are nice | red Apples are ripe | new Cakes are nice |
| 2.29 | new Cakes are nice | red Apples are ripe | new Cakes are nice |
| 2.30 | new Cakes are nice (Cakes) | red Apples are ripe (Apples) | new Cakes are nice (Cakes) |
| 2.31 | new Cakes | red Apples | new Cakes |
| 2.31 | nice (Cakes) | ripe (Apples) | nice (Cakes) |
| 2.31 | New Cakes | Red Apples | New Cakes |
| 3.1 | nice (Cakes) | ripe (Apples) | nice (Cakes) |
| 3.4 | niceness | ripeness | niceness |
| 3.4-5 | new Cakes | red Apples | new Cakes |
| 3.13 | Cakes | Apples | Cakes |
| 3.14 | new | red | new |
| 3.14 | *not*-new | *not*-red | *not*-new |
| 3.15-16 | *elderly* Cakes, *aged* Cakes, *ante-diluvian* Cakes | *yellow* Apples, *blue* Apples, *mauve-colored* Apples | *elderly* Cakes, *aged* Cakes, *ante-diluvian* Cakes |
| 3.16-17 | nice Cakes | ripe Apples | nice Cakes |
| 3.17 | not-nice | unripe | not-nice |
| 3.18 twice | new | red | new |
| 3.19 twice | nice | ripe | nice |
| 3.20 | Cakes | Apples | Cakes |
| 3.21 | Cakes | Apples | Cakes |
| 3.21 | *new* | *red* | *new* |

| | | | |
|---|---|---|---|
| 3.22 | *nice* | *ripe* | *nice* |
| 3.22 | Hence, | Hence, | Hence^ |
| 3.22 | Cakes | Apples | Cakes |
| 3.23 | new and nice | red and ripe | new and nice |
| 3.26 | Cakes | Apples | Cakes |
| 3.26 | not-new and nice | not-red and ripe | not-new and nice |
| 3.28 | Cakes | Apples | Cakes |
| 3.29 | Cake | Apple | Cake |
| 3.29 | Cakes | Apples | Cakes |
| 3.31 | Cakes | Apples | Cakes |
| 3.33 | new Cakes | red Apples | new Cakes |
| 3.34 | new | red | new |
| 3.36 | new Cakes | red Apples | new Cakes |
| 4.2 | nice | ripe | nice |
| 4.2 twice | Cakes | Apples | Cakes |
| 4.3 thrice | Cakes | Apples | Cakes |
| 4.3 twice | nice | ripe | nice |
| 4.7 | Cakes | Apples | Cakes |
| 4.9 | Cakes | Apples | Cakes |
| 4.11 | Cakes | Apples | Cakes |
| 4.15 first* | are | are | and |

| | | | |
|---|---|---|---|
| 4.15 | new are nice | red are ripe | new are nice |
| 4.17 | new are not-nice | red are unripe | new are not-nice |
| 4.19-20 | new Cakes are nice | red are ripe | new Cakes are nice |
| 4.22 | new Cakes are not-nice | red are unripe | new Cakes are not-nice |
| 4.25 | some new are nice, *and* some are not nice | some red are ripe, *and* some are unripe | some new are nice, *and* some are not nice |
| 4.27 | no new are nice, *and* none are not-nice | no red are ripe, *and* none are unripe | no new are nice, *and* none are not-nice |
| 4.28 | "no new exist," i. e. "no Cakes are new." | "no red exist *at all*." | "no new exist," i. e. "no Cakes are new." |
| 4.28 | is because | follows from the fact that | is because |
| 4.28-29 | "nice" and "not-nice" | "ripe" and "not-ripe" | "nice" and "not nice" |
| 4.29 | new Cakes | red Apples | new Cakes |
| 4.29 | i. e., | i. e., | i. e.ˆ |
| 4.30 | new Cakes | red Apples | new Cakes |
| 4.31 | you had | I were to ask you | you had |
| 4.31 | no Cakes are new | no red exist at all | no Cakes are new |
| 4.31-32 | which would be "some Cakes are new" | that is, "some red exist" | which would be "some Cakes are new" |
| 4.32 | some Cakes are *x* | some *x* exist | some Cakes are *x* |
| 5.1 | new Cakes | red Apples | new Cakes |
| 5.2 | *nice* | *ripe* | *nice* |
| 5.3 | *not-nice* | *unripe* | *not-nice* |

| | | | |
|---|---|---|---|
| 5.15 | new Cakes are nice | red are ripe | new Cakes are nice |
| 5.17 | new Cakes are nice | red Apples are ripe | new Cakes are nice |
| 5.18 | new Cakes are nice | red Apples are ripe | new Cakes are nice |
| 5.18 | new Cakes are not-nice | red Apples are unripe | new Cakes are not-nice |
| 5.20 | new Cakes are not-nice | red Apples are unripe | new Cakes are not-nice |
| 5.21 | Cake | Apple | Cake |
| 5.21 | nice | ripe | nice |
| 5.23 | Cake | Apple | Cake |
| 5.26 twice | Cakes | Apples | Cakes |
| 5.29 | *nice* | *ripe* | *nice* |
| 5.29-30 | *not-nice* | *unripe* | *not-nice* |
| 5.30 | Cakes | Apples | Cakes |
| 5.36 | a single Thing | one single thing | a single Thing |
| 5.36 | is called | is sometimes called | is called |
| 5.36 | *'Individual'* | *"Individual"* | *'Individual'* |
| 6.2 | *nice* Cakes | *ripe* Apples | *nice* Cakes |
| 6.3 | Cakes | Apples | Cakes |
| 6.3 | nice | ripe | nice |
| 6.7-8 | nice Cakes are new | ripe Apples are red | nice Cakes are new |
| 6.10 | new Cakes are nice | red Apples are ripe | new Cakes are nice |
| 6.10 | *nice* Cakes are *new* | *ripe* Apples are *red* | *nice* Cakes are *new* |

| | | | |
|---|---|---|---|
| 6.13 | new Cakes | red Apples | new Cakes |
| 6.14 | new Cakes are nice | red Apples are ripe | new Cakes are nice |
| 6.15 | nice Cakes | ripe Apples | nice Cakes |
| 6.16 | nice Cakes are new | ripe Apples are red | nice Cakes are new |
| 6.21 thrice | nice are not-new | ripe are not-red | nice are not-new |
| 6.21 thrice | nice are new | ripe are red | nice are new |
| 6.21 | new are nice | red are ripe | new are nice |
| 6.21 | not-new | not-red | not-new |
| 6.21 | Cakes are nice | ripe exist | Cakes are nice |
| 6.22-7.5* | | | |
| 7.8 | Cakes | Apples | Cakes |
| 7.10 | Cakes | Apples | Cakes |
| 7.11 | Cakes | Apples | Cakes |
| 7.15 | Cakes | Apples | Cakes |
| 7.16 | new, not-nice | red, unripe | new, not-nice |
| 7.17 | Cakes | Apples | Cakes |
| 7.17 | new, not-nice | red, unripe | new, not-nice |
| 7.18 | Cakes | Apples | Cakes |
| 7.23 | new Cakes | red Apples | new Cakes |
| 7.23-4 | new Cakes | red Apples | new Cakes |
| 7.25 | Cakes | Apples | Cakes |

| | | | |
|---|---|---|---|
| 7.35 | Cakes | Apples | Cakes |
| 8.2 | Cakes | Apples | Cakes |
| 8.29 | Two more remarks about Propositions need to be made. | One more remark about Propositions should be made. | Two more remarks about Propositions need to be made. |
| 8.30-4 | One is that, in every Proposition beginning with "some" or "all", the *actual existence* of the 'Subject' is asserted. If, for instance, I say "all misers are selfish," I mean that misers *actually exist*. If I wished to avoid making this assertion, and merely to state the *law* that miserliness necessarily involves selfishness, I should say "no misers are unselfish" which does not assert that any misers exist at all, but merely that, if any *did* exist, they *would* be selfish. | *omit* | One is that, in every Proposition beginning with "some" or "all", the *actual existence* of the 'Subject' is asserted. If, for instance, I say "all misers are selfish," I mean that misers *actually exist*. If I wished to avoid making this assertion, and merely to state the *law* that miserliness necessarily involves selfishness, I should say "no misers are unselfish" which does not assert that any misers exist at all, but merely that, if any *did* exist, they *would* be selfish. |
| 9.1 | The other is that, when a Proposition begins | When they begin | The other is that, when a Proposition begins |
| 9.1 | contains | contain | contains |
| 9.4 | some Things are *abcdef* | some *abcdef* exist | some Things are *abcdef* |
| 9.6-7 | reckless," each being equivalent to "No men are wise old rash reckless gamblers." | reckless." | reckless," each being equivalent to "No men are wise old rash reckless gamblers." |
| 9.16 | *Conclusion*', | *Conclusion*', | *Conclusion*'ˆ |
| 9.21 | '*the Middle Term*' | "*the Middle Term*" | '*the Middle Term*' |

| | | | |
|---|---|---|---|
| 9.24 | ‘*the Middle Terms*’ | "*the Middle Terms*" | ‘*the Middle Terms*’ |
| 9.29 | new Cakes | red Apples | new Cakes |
| 9.29 | nice Cakes | ripe Apples | nice Cakes |
| 9.30 | counters | Counters | counters |
| 9.30 | Cakes | Apples | Cakes |
| 9.31 | newness | redness | newness |
| 9.31 | niceness | ripeness | niceness |
| 10.1* | of making | of making | to make |
| 10.4 | counters | Counters | counters |
| 10.5 | counters | Counters | counters |
| 10.6 | nice Cakes are unwholesome (Cakes) | ripe Apples are unwholesome (Apples) | nice Cakes are unwholesome (Cakes) |
| 10.6 | *y*-Cakes are *m′*-(Cakes) | *y*-Apples are *m′*-(Apples) | *y*-Cakes are *m′*-(Cakes) |
| 10.7 | Cakes | Apples | Cakes |
| 10.10 | new Cakes | red Apples | new Cakes |
| 10.10 | Cakes | Apples | Cakes |
| 10.11 thrice | Cakes | Apples | Cakes |
| 10.13 | compartments | Compartments | compartments |
| 10.13 | counter | Counter | counter |
| 10.15 | counter | Counter | counter |
| 10.16 | counters | Counters | counters |
| 10.20 | counter | Counter | counter |

| | | | |
|---|---|---|---|
| 10.22 | counter | Counter | counter |
| 10.23 | Cake | Apple | Cake |
| 10.24 | counter | Counter | counter |
| 10.30-31 | new Cakes are not-nice (Cakes) | red Apples are unripe (Apples) | new Cakes are not-nice (Cakes) |
| 10.31 | not-nice Cakes are new (Cakes) | unripe Apples are red (Apples) | not-nice Cakes are new (Cakes) |
| 10.32 | looks neatest | is neatest, I think | looks neatest |
| 10.34 | new Cakes | red Apples | new Cakes |
| 10.34 | nice Cakes | ripe Apples | nice Cakes |
| 10.34 | new Cakes are not-nice | red Apples are unripe | new Cakes are not-nice |
| 11.11 | Cakes | Apples | Cakes |
| 11.13 | ‘Middle Terms’ | ‘Middle’ Terms | ‘Middle Terms’ |
| 13.3 | *no x can* | they *cannot* | *no x can* |
| 13.4 | *can possibly* | can *possibly* | *can possibly* |
| 13.5 | *x can* be *y* | *x can be y* | *x can* be *y* |
| 13.7 | are ever | can be | are ever |
| 13.18 | *x* | *x*-Things | *x* |
| 13.18 | *y* | *y*-(Things) | *y* |
| 13.19 | *x* | *x*-Things | *x* |
| 13.19 | *y* | *y*-(Things) | *y* |
| 13.20 | *x* | *x*-Things | *x* |

| | | | |
|---|---|---|---|
| 13.20 | *y* | *y*-(Things) | *y* |
| 13.21 | *y′* | *y′*-(Things) | *y′* |
| 13.21 second | the Attributes | *omit* | the Attributes |

**Notes**

4.15 The use of “and” in 87, despite having some precedent in mathematical logic, appears to be a mistake rather than an intentional change, based on the parallel uses of “are” in the surrounding text.

6.22-7.5* These paragraphs are before the chart rather than after in 87.

10.1 My decision to retain the 86 reading is based simply on the fact that this kind of isolated nit-picky change is not the kind that Carroll is in the habit of making, and the 87 reading is not better (indeed, it seems rather less grammatical). It seems likely to have been introduced, instead, mistakenly.

## To my Child-Friend.

I charm in vain : for never again,
All keenly as my glance I bend,
Will Memory, goddess coy,
Embody for my joy
Departed days, nor let me gaze
On thee, my Fairy Friend !

Yet could thy face, in mystic grace,
A moment smile on me, 'twould send
Far-darting rays of light
From Heaven athwart the night,
By which to read in very deed
Thy spirit, sweetest Friend !

So may the stream of Life's long dream
Flow gently onward to its end,
With many a floweret gay,
Adown its willowy way :
May no sigh vex, no care perplex,
My loving little Friend !

## PREFACE.

"There foam'd rebellious Logic, gagg'd and bound."

THIS Game requires nine Counters—four of one colour and five of another: say four red and five grey.

Besides the nine Counters, it also requires one Player, *at least*. I am not aware of any Game that can be played with *less* than this number: while there are several that require *more:* take Cricket, for instance, which requires twenty-two. How much easier it is, when you want to play a Game, to find *one* Player than twenty-two! At the same time, though one Player is enough, a good deal more amusement may be got by two working at it together, and correcting each other's mistakes.

A second advantage, possessed by this Game, is that, besides being an endless source of amusement (the number of arguments, that may be worked by it, being infinite), it will give the Players a little instruction as well. But is there any great harm in *that*, so long as you get plenty of amusement?

# CHAPTER I.

## NEW LAMPS FOR OLD.

"Light come, light go."

### § 1. *Propositions.*

"Some new Cakes are Nice."

"No new Cakes are nice."

"All new Cakes are nice."

There are three '*Propositions'* for you——the only three kinds we are going to use in this Game: and the first thing to be done is to learn how to express them on the Board.

Let us begin with "Some new Cakes are nice." But, before doing so, a remark has to be made——one that is rather important, and by no means easy to understand all in a moment: so please to read this *very* carefully.

The world contains many *Things* (such as "Buns", "Babies ", "Beetles", "Battledores", &c.); and these Things possess many *Attributes* (such as "baked", "beautiful", "black", "broken", &c.: in fact, whatever can be "attributed to", that is "said to belong to", any Thing, is an Attribute). Whenever we wish to mention a Thing, we use a *Substantive*: when we wish to mention an Attribute, we use an *Adjective*. People have asked the question "Can a Thing exist without any Attributes belonging to it?" It is a very puzzling question, and I'm not going to try to answer it: let us turn up our noses, and treat it with contemptuous silence, as if it really wasn't worth noticing. But, if they put it the other way, and ask "Can an Attribute exist without any Thing for it to belong to?", we may say at once "No: no more than a Baby could go a railway-journey with no one to take care of it!" You never saw "beautiful" floating about in the air, or littered about on the floor, without any Thing to *be* beautiful, now did you?

And now what am I driving at, in all this long rigmarole? It is this. You may put "is" or "are" between the names of two *Things* (for example, "some Pigs are fat Animals"), or between the names of two *Attributes* (for example, "pink is light-red"), and in each case it will make good sense. But, if you put "is" or "are" between the name of a *Thing* and the name of an *Attribute* (for example, "some Pigs are pink"), you do *not* make good sense (for how can a Thing *be* an Attribute?) unless you have an understanding with the person to whom you are speaking. And the simplest understanding would, I think, be this——that the Substantive shall be supposed to be repeated at the end of the sentence, so that the sentence, if written out in full, would be "some Pigs are pink (Pigs)". And now the word "are" makes quite good sense.

Thus, in order to make good sense of the Proposition "some new Cakes are nice", we must suppose it to be written out in full, in the form "some new Cakes are nice (Cakes)". Now this contains two '*Terms*'—— "new Cakes" being one of them, and "nice (Cakes)" the other. "New Cakes," being the

one we are talking about, is called the '*Subject*' of the Proposition, and "nice (Cakes)" the '*Predicate*'. Also this Proposition is said to be a '*Particular*' one, since it does not speak of the *whole* of its Subject, but only of a *part* of it. The other two kinds are said to be '*Universal*', because they speak of the *whole* of their Subjects——the one denying niceness, and the other asserting it, of the *whole* class of "new Cakes". Lastly, if you would like to have a definition of the word '*Proposition*' itself, you may take this:—"a sentence stating that some, or none, or all, of the Things belonging to a certain class, called its 'Subject', are also Things belonging to a certain other class, called its 'Predicate' ".

You will find these seven words——*Proposition*, *Attribute*, *Term*, *Subject*, *Predicate*,*Particular*, *Universal*——charmingly useful, if any friend should happen to ask if you have ever studied Logic. Mind you bring all seven words into your answer, and your friend will go away deeply impressed—— 'a sadder and a wiser man'.

Now please to look at the smaller Diagram on the Board, and suppose it to be a cupboard, intended for all the Cakes in the world (it would have to be a good large one, of course). And let us suppose all the new ones to be put into the upper half (marked '*x*'), and all the rest (that is, the *not*-new ones) into the lower half (marked '*x*′'). Thus the lower half would contain *elderly* Cakes, *aged* Cakes, *ante-diluvian* Cakes——if there are any: I haven't seen many myself——and so on. Let us also suppose all the nice Cakes to be put into the left-hand half (marked '*y*'), and all the rest (that is, the not-nice ones) into the right-hand half (marked '*y*′'). At present, then, we must understand *x* to mean "new", *x*′ "not-new", *y* "nice, and *y*′ "not-nice."

And now what kind of Cakes would you expect to find in compartment No. 5?

It is part of the upper half, you see; so that, if it has any Cakes in it, they must be *new*: and it is part of the left-hand half; so that they must be *nice*. Hence, if there are any Cakes in this compartment, they must have the double '*Attribute*' "new and nice": or, if we use letters, they must be "*xy*."

Observe that the letters *x, y* are written on two of the edges of this compartment. This you will find a very convenient rule for knowing what Attributes belong to the Things in any compartment. Take No. 7, for instance. If there are any Cakes there, they must be "*x*′*y*", that is, they must be "not-new and nice."

Now let us make another agreement——that a red counter in a compartment shall mean that it is '*occupied*', that is, that there are *some* Cakes in it. (The word 'some,' in Logic, means 'one or more': so that a single Cake in a compartment would be quite enough reason for saying "there are *some* Cakes here"). Also let us agree that a grey counter in a compartment shall mean that it is 'empty', that is, that there are *no* Cakes in it. In the following Diagrams, I shall put '1' (meaning 'one or more') where you are to put a *red* counter, and '0' (meaning 'none') where you are to put a *grey* one.

As the Subject of our Proposition is to be "new Cakes", we are only concerned, at present, with the *upper* half of the cupboard, where all the Cakes have the attribute *x*, that is, "new."

Now, fixing our attention on this upper half, suppose we found it marked like this,

that is, with a red counter in No. 5. What would this tell us, with regard to the class of "new Cakes"?

Would it not tell us that there are *some* of them in the *xy*-compartment? That is, that some of them

(besides having the Attribute *x*, which belongs to both compartments) have the Attribute *y* (that is, "nice"). This we might express by saying "some *x*-Cakes are *y*-(Cakes)", or, putting words instead of letters, "Some new Cakes are nice (Cakes)", or, in a shorter form, "Some new Cakes are nice".

At last we have found out how to represent the first Proposition of this Section. If you have not *clearly* understood all I have said, go no further, but read it over and over again, till you *do* understand it. After that is once mastered, you will find all the rest quite easy.

It will save a little trouble, in doing the other Propositions, if we agree to leave out the word "Cakes" altogether. I find it convenient to call the whole class of Things, for which the cupboard is intended, the '*Universe.'* Thus we might have begun this business by saying "Let us take a Universe of Cakes." (Sounds nice, doesn't it?)

Of course any other Things would have done just as well as Cakes. We might make Propositions about "a Universe of Lizards", or even "a Universe of Hornets". (Wouldn't *that* be a charming Universe to live in?)

So far, then, we have learned that

means "some *x* are *y*," i. e. "some new are nice."

I think you will see, without further explanation, that

means "some *x* are *y′*," i. e. "some new are not-nice. "

Now let us put a *grey* counter into No. 5, and ask ourselves the meaning of

This tells us that the *xy*-compartment is *empty*, which we may express by "no *x* are *y*", or, "no new Cakes are nice". This is the second of the three Propositions at the head of this Section.

In the same way,

would mean "no *x* are *y′*," or, "no new Cakes are not-nice."

What would you make of this, I wonder?

I hope you will not have much trouble in making out that this represents a *double* Proposition: namely, "some *x* are *y*, *and* some are *y′*, i. e. "some new are nice, *and* some are not-nice."

The following is a little harder, perhaps:—

This means "no *x* are *y*, *and* none are *y′*," i. e. "no new are nice, *and* none are not-nice": which leads to the rather curious result that "no new exist," i. e. "no Cakes are new." This is because "nice" and "not-nice" make what we call an '*exhaustive*' division of the class "new Cakes": i. e., between them, they *exhaust* the whole class, so that all the new Cakes, that exist, must be found in one or the other of them.

And now suppose you had to represent, with counters, the contradictory to "no Cakes are new", which would be "some Cakes are new", or, putting letters for words, "some Cakes are *x*", how would you do it?

This will puzzle you a little, I expect. Evidently you must put a red counter *somewhere* in the *x*-half of

the cupboard, since you know there are *some* new Cakes. But you must not put it into the *left-hand* compartment, since you do not know them to be *nice*: nor may you put it into the *right-hand* one, since you do not know them to be *not-nice*.

What, then, are you to do? I think the best way out of the difficulty is to place the red counter *on the division-line* between the *xy*-compartment and the *xy'*-compartment. This I shall represent (as *I* always put '1' where *you* are to put a red counter) by the diagram

Our ingenious American cousins have invented a phrase to express the position of a man who wants to join one or the other of two parties—— such as their two parties 'Democrats' and 'Republicans'—— but ca'n't make up his mind *which*. Such a man is said to be "sitting on the fence." Now that is exactly the position of the red counter you have just placed on the division-line. He likes the look of No. 5, and he likes the look of No. 6, and he doesn't know *which* to jump down into. So there he sits astride, silly fellow, dangling his legs, one on each side of the fence!

Now I am going to give you a much harder one to make out. What does this mean?

This is clearly a *double* Proposition. It tells us, not only that "some *x* are *y*," but also that "no *x* are *not y*." Hence the result is "all *x* are *y*," i. e. "all new Cakes are nice", which is the last of the three Propositions at the head of this Section.

We see, then, that the Universal Proposition "All new Cakes are nice " consists of *two* Propositions taken together, namely, "Some new Cakes are nice," and "No new Cakes are not-nice."

In the same way

would mean "all *x* are *y"*", that is, "All new Cakes are not-nice."

Now what would you make of such a Proposition as "The Cake you have given me is nice"? Is it Particular, or Universal?

"Particular, of course," you readily reply. "One single Cake is hardly worth calling 'some,' even."

No, my dear impulsive Reader, it is 'Universal'. Remember that, few as they are (and I grant you they couldn't well be fewer), they are (or rather 'it is') *all* that you have given me! Thus, if (leaving 'red' out of the question) I divide my Universe of Cakes into two classes——the Cakes you have given me (to which I assign the upper half of the cupboard), and those you *haven't* given me (which are to go below)——I find the lower half fairly full, and the upper one as nearly as possible empty. And then, when I am told to put an upright division into each half, keeping the *nice* Cakes to the left, and the *not-nice* ones to the right, I begin by carefully collecting *all* the Cakes you have given me (saying to myself, from time to time, "Generous creature! How shall I ever repay such kindness?"), and piling them up in the left-hand compartment. *And it doesn't take long to do it!*

Here is another Universal Proposition for you. "Barzillai Beckalegg is an honest man." That means "*All* the Barzillai Beckaleggs, that I am now considering, are honest men." (You think I invented that name, now don't you? But I didn't. It's on a carrier's cart, somewhere down in Cornwall.)

This kind of Universal Proposition (where the Subject is a single Thing) is called an '*Individual*'

Proposition.

Now let us take "*nice* Cakes" as the Subject of our Proposition: that is, let us fix our thoughts on the *left-hand* half of the cupboard, where all the Cakes have the attribute *y*, that is, "nice."

Suppose we find it marked like this:—

What would that tell us?

I hope that it is not necessary, after explaining the *horizontal* oblong so fully, to spend much time over the *upright* one. I hope you will see, for yourself, that this means "some *y* are *x*", that is, "Some nice Cakes are new."

"But," you will say, "we have had this case before. You put a red counter into No. 5, and you told us it meant 'some new Cakes are nice'; and *now* you tell us that it means 'some *nice* Cakes are *new*'! Can it mean *both*?"

The question is a very thoughtful one, and does you *great* credit, dear Reader! It *does* mean both. If you choose to take *x* (that is, "new Cakes") as your Subject, and to regard No. 5 as part of the *horizontal* oblong, you may read it "some *x* are *y*", that is "some new Cakes are nice": but, if you choose to take *y* (that is, "nice Cakes") as your Subject, and to regard No. 5 as part of an *upright* oblong, *then* you may read it "some *y* are *x* ", that is, "some nice Cakes are new". They are merely two different ways of expressing the very same truth.

Without more words, I will simply set down the other ways in which this upright oblong might be marked, adding the meaning in each case. By comparing them with the various cases of the horizontal oblong, you will, I hope, be able to understand them clearly.

| Symbols. | Meanings. |
|---|---|
| | Some *y* are *x′*; i. e. Some nice are not-new. |
| | No *y* are *x*; i. e. No nice are new. [Observe that this is merely another way of expressing "No new are nice."] |
| | No *y* are *x′*; i. e. No nice are not-new. |
| | Some *y* are *x*, and some are *x′*; i. e. Some nice are new, and some are not-new. |
| | No *y* are *x*, and none are *x′*; i. e. No *y* exist; i. e. No Cakes are nice. |
| | All *y* are *x*; i. e. All nice are new. |
| | All *y* are *x′*; i. e. All nice are not-new. |

You will find it a good plan to examine yourself on this table, by covering up first one column and then

the other, and ‘dodging about’, as the children say.

Also you will do well to write out for yourself two other tables——one for the *lower* half of the cupboard, and the other for its *right-hand* half.

And now I think we have said all we need to say about the smaller Diagram, and may go on to the larger one.

This may be taken to be a cupboard divided in the same way as the last, but *also* divided into two portions, for the Attribute *m*. Let us give to *m* the meaning “wholesome”: and let us suppose that all *wholesome* Cakes are places *inside* the central Square, and all the *unwholesome* ones *outside* it, that is, in one or other of the four queer-shaped *outer* compartments.

We see that, just as, in the smaller Diagram, the Cakes in each compartment had *two* Attributes, so, here, the Cakes in each compartment have *three* Attributes: and, just as the letters, representing the *two* Attributes, were written on the *edges* of the compartment, so, here, they are written at the *corners*. (Observe that *m′* is supposed to be written at each of the four outer corners.) So that we can tell in a moment, by looking at a compartment, what three Attributes belong to the Things in it. For instance, take No. 12. Here we find *x*, *y′*, *m*, at the corners: so we know that the Cakes in it, if there are any, have the triple Attribute, ‘*xy′m*’, that is “new, not-nice, and wholesome.” Again, take No. 16. Here we find, at the corners, *x′*, *y′*, *m′*: so the Cakes in it are “not-new, not-nice, and unwholesome.” (Remarkably untempting Cakes!)

It would take far too long to go through all the Propositions, containing *x* and *y*, *x* and *m*, and *y* and *m*, which can be represented on this diagram (there are ninety-six altogether, so I am sure you will excuse me!) and I must content myself with doing two or three, as specimens. You will do well to work out a lot more for yourself.

Taking the upper half by itself, so that our Subject is “new Cakes”, how are we to represent “no new Cakes are wholesome”?

This is, writing letters for words, “no *x* are *m*.” Now this tells us that none of the Cakes, belonging to the upper half of the cupboard, are to be found *inside* the central Square: that is, the two compartments, No. 11 and No. 12 are *empty*. And this, of course, is represented by

And now how are we to represent the contradictory Proposition “*some x* are *m*”? This is a difficulty I have already considered. I think the best way is to place a red counter *on the division-line* between No. 11 and No. 12, and to understand this to mean that *one* of the two compartments is ‘occupied,’ but that we do not at present know *which*. This I shall represent thus:—

Now let us express “all *x* are *m*.”

This consists, we know, of *two* Propositions, “Some *x* are *m*,”
and “No *x* are *m′*.”

Let us express the negative part first. This tells us that none of the Cakes, belonging to the upper half of the cupboard, are to be found *outside* the central Square: that is, the two compartments, No. 9 and No.

10, are *empty*. This, of course, is represented by

But we have yet to represent "Some *x* are *m*." This tells us that there are *some* Cakes in the oblong consisting of No. 11 and No. 12: so we place our red counter, as in the previous example, on the division-line between No. 11 and No. 12, and the result is

Now let us try one or two interpretations.

What are we to make of this, with regard to *x* and *y*?

This tells us, with regard to the *xy′*-Square, that it is wholly 'empty', since *both* compartments are so marked. With regard to the *xy*-Square, it tells us that it is 'occupied'. True, it is only *one* compartment of it that is so marked; but that is quite enough, whether the other be 'occupied' or 'empty', to settle the fact that there is *something* in the Square.

If, then, we transfer our marks to the smaller Diagram, so as to get rid of the *m*-subdivisions, we have a right to mark it

which means, you know, "all *x* are *y*."

The result would have been exactly the same, if the given oblong had been marked thus:—

Once more: how shall we interpret this, with regard to *x* and *y*?

This tells us, as to the *xy*-Square, that *one* of its compartments is 'empty'. But this information is quite useless, as there is no mark in the *other* compartment. If the other compartment happened to be 'empty' too, the Square would be 'empty': and, if it happened to be 'occupied', the Square would be 'occupied'. So, as we do not know *which* is the case, we can say nothing about *this* Square.

The other Square, the *xy′*-Square, we know (as in the previous example) to be 'occupied'.

If, then, we transfer our marks to the smaller Diagram, we get merely this:—which means, you know, "some *x* are *y′*."

These principles may be applied to all the other oblongs. For instance, to represent "all *y′* are *m″*" we should mark the *right-hand upright oblong* (the one that has the attribute *y′*) thus:—

and, if we were told to interpret the lower half of the cupboard, marked as follows, with regard to *x* and *y*,

we should transfer it to the smaller Diagram thus,

and read it "all *x′* are *y*."

Two more remarks about Propositions need to be made.

One is that, in every Proposition beginning with "some" or "all", the *actual existence* of the 'Subject' is asserted. If, for instance, I say "all misers are selfish," I mean that misers *actually exist*. If I wished to avoid making this assertion, and merely to state the *law* that miserliness necessarily involves selfishness, I should say "no misers are unselfish" which does not assert that any misers exist at all, but merely that, if any *did* exist, they *would* be selfish.

The other is that, when a Proposition begins with "some" or "no", and contains more than two Attributes, these Attributes may be re-arranged, and shifted from one Term to the other, *ad libitum*. For example, "some *abc* are *def*" may be re-arranged as "some *bf* are *acde*," each being equivalent to "some Things are *abcdef*". Again "No wise old men are rash and reckless gamblers" may be re-arranged as "No rash old gamblers are wise and reckless," each being equivalent to "No men are wise old rash reckless gamblers."

## § 2. *Syllogisms*.

Now suppose we divide our Universe of Things in three ways, with regard to three different Attributes. Out of these three Attributes, we may make up three different couples (for instance, if they were *a*, *b*, *c*, we might make up the three couples *ab*, *ac*, *bc*). Also suppose we have two Propositions given us, containing two of these three couples, and that from them we can prove a third Proposition containing the third couple. (For example, if we divide our Universe for *m*, *x*, and *y*; and if we have the two Propositions given us, "no *m* are $x''$" and "all $m'$ are *y*", containing the two couples *mx* and *my*, it might be possible to prove from them a third Proposition, containing *x* and *y*.)

In such a case we call the given Propositions '*the Premisses*', the third one '*the Conclusion*', and the whole set '*a Syllogism*'.

Evidently, *one* of the Attributes must occur in both Premisses; or else one must occur in *one* Premiss, and its *contradictory* in the other.

In the first case (when, for example, the Premisses are "some *m* are *x*" and no *m* are $y''$") the Term, which occurs twice, is called '*the Middle Term*', because it serves as a sort of link between the other two Terms.

In the second case (when, for example, the Premisses are "no *m* are $x''$" and "all $m'$ are *y*") the two Terms, which contain these contradictory Attributes, may be called '*the Middle Terms*'.

Thus, in the first case, the class of "*m*-Things" is the Middle Term; and, in the second case, the two classes of "*m*-Things" and "$m'$-Things " are the Middle Terms.

The Attribute, which occurs in the Middle Term or Terms, disappears in the Conclusion, and it is said to be "eliminated", which literally means "turned out of doors".

Now let us try to draw a Conclusion from the two Premisses—

"Some new Cakes are unwholesome; }
No nice Cakes are unwholesome."

In order to express them with counters, we need to divide Cakes in *three* different ways, with regard to newness, to niceness, and to wholesomeness. For this we must use the larger Diagram, making *x* mean "new", *y* "nice", and *m* "wholesome". (Everything *inside* the central Square is supposed to have the attribute *m*, and everything *outside* it the attribute $m'$, i. e. "not-*m*".)

You had better adopt the rule of making *m* mean the Attribute which occurs in the *Middle* Term or Terms. (I have chosen *m* as the symbol, because 'middle' begins with 'm'.)

Now, in representing the two Premisses, I prefer to begin with the *negative* one (the one beginning with "no"), because *grey* counters can always be placed with *certainty*, and will then help to fix the position of the red counters, which are sometimes a little uncertain where they will be most welcome.

Let us express, then "no nice Cakes are unwholesome (Cakes) ", i. e. "no *y*-Cakes are *m′*-(Cakes)". This tells us that none of the Cakes belonging to the *y*-half of the cupboard are in its *m′* compartments (i. e. the ones *outside* the central Square). Hence the two compartments, No. 9 and No. 15, are both '*empty*' ; and we must place a grey counter in *each* of them, thus:—

We have now to express the other Premiss, namely, "some new Cakes are unwholesome (Cakes)", i. e. "some *x*-Cakes are *m′*-(Cakes)". This tells us that some of the Cakes in the *x*-half of the cupboard are in its *m′*-compartments. Hence *one* of the two compartments, No. 9 and No. 10, is 'occupied' : and, as we are not told in *which* of these two compartments to place the red counter, the usual rule would be to lay it on the division-line between them: but, in this case, the other Premiss has settled the matter for us, by declaring No. 9 to be *empty*. Hence the red counter has no choice, and *must* go into No. 10, thus:—

And now what counters will this information enable us to place in the *smaller* Diagram, so as to get some Proposition involving *x* and *y* only, leaving out *m*? Let us take its four compartments, one by one.

First, No. 5. All we know about *this* is that its *outer* portion is empty: but we know nothing about its *inner* portion. Thus the Square *may* be empty, or it *may* have something in it. Who can tell? So we dare not place *any* counter in this Square.

Secondly, what of No. 6? Here we are a little better off. We know that there is *something* in it, for there is a red counter in its outer portion. It is true we do not know whether its inner portion is empty or occupied: but what does *that* matter? One solitary Cake, in one corner of the Square, is quite sufficient excuse for saying "*this Square is occupied*", and for marking it with a red counter.

As to No. 7, we are in the same condition as with No. 5——we find it *partly* 'empty', but we do not know whether the other part is empty or occupied: so we dare not mark this Square.

And as to No. 8, we have simply no information *at all*.

The result is

Our 'Conclusion', then, must be got out of the rather meagre piece of information that there is a red counter in the *xy′*-Square. Hence our Conclusion is "some *x* are *y′*", i. e. "some new Cakes are not-nice (Cakes)": or, if you prefer to take *y′* as your Subject, "some not-nice Cakes are new (Cakes)"; but the other looks neatest.

We will now write out the whole Syllogism, putting the symbol ? for "therefore ", and omitting "Cakes", for the sake of brevity, at the end of each Proposition.

"Some new Cakes are unwholesome; }

No nice Cakes are unwholesome.

∴ Some new Cakes are not-nice."

And you have now worked out, successfully, your first '*Syllogism*'. Permit me to congratulate you, and to express the hope that it is but the beginning of a long and glorious series of similar victories!

We will work out one other Syllogism——a rather harder one than the last——and then, I think, you may be safely left to play the Game by yourself, or (better) with any friend whom you can find, that is able and willing to take a share in the sport.

Let us see what we can make of the two Premisses—

"All Dragons are uncanny; }
All Scotchmen are canny."

Remember, I don't guarantee the Premisses to be *facts*. In the first place, I never even saw a Dragon: and, in the second place, it isn't of the slightest consequence to us, as *Logicians*, whether our Premisses are true or false: all *we* have to do is to make out whether they *lead logically to the Conclusion*, so that, if *they* were true, *it* would be true also.

You see, we must give up the "Cakes" now, or our cupboards will be of no use to us. We must take, as our 'Universe', some class of things which will include 'Dragons and Scotchmen: shall we say 'Animals'? And, as "canny" is evidently the Attribute belonging to the 'Middle Terms', we will let *m* stand for "canny", *x* for "Dragons", and *y* for "Scotchmen". So that our two Premisses are, in full,

"All Dragon-Animals are uncanny (Animals); }
All Scotchman-Animals are canny
(Animals)."

And these may be expressed, using letters for words, thus:—

"All *x* are *m′*; }
All *y* are *m*."

The first Premiss consists, as you already know, of two parts:— "Some *x* are *m′*," and "No *x* are *m*."

And the second also consists of two parts:— "Some *y* are *m*," and "No *y* are *m′*."

Let us take the negative portions first.

We have, then, to mark, on the larger Diagram, first, "no *x* are *m*", and secondly, "no *y*are *m″*". I think you will see, without further explanation, that the two results, separately, are

and that these two, when combined, give us

We have now to mark the two positive portions, "some *x* are *m″*" and "some *y* are *m*".

The only two compartments, available for Things which are *xm′*, are No. 9 and No. 10. Of these, No. 9 is already marked as ‘empty’ ; so our red counter *must* go into No. 10.

Similarly, the only two, available for *ym*, are No. 11 and No. 13. Of these, No. 11 is already marked as ‘empty’ ; so our red counter *must* go into No. 13.

The final result is

And now how much of this information can usefully be transferred to the smaller Diagram?

Let us take its four compartments, one by one.

As to No. 5? This, we see, is wholly ‘empty’. (So mark it with a grey counter.)

As to No. 6? This, we see, is ‘occupied’. (So mark it with a red counter.)

As to No. 7? Ditto, ditto.

As to No. 8? No information.

The smaller Diagram is now pretty liberally marked:—

And now what Conclusion can we read off from this? Well, it is impossible to pack such abundant information into *one* Proposition: we shall have to indulge in *two*, this time.

First, by taking *x* as Subject, we get “all *x* are *y″*”, that is, “All Dragons are not-Scotchmen”: secondly, by taking *y* as Subject, we get “all *y* are *x″*”, that is, “All Scotchmen are not-Dragons”.

Let us now write out, all together, our two Premisses and our brace of Conclusions.

“All Dragons are uncanny; }
All Scotchmen are canny.

∴ { All Dragons are not-Scotchmen;
All Scotchmen are not-Dragons.”

Let me mention, in conclusion, that you may perhaps meet with logical treatises in which it is not assumed that any Thing *exists* at all, but “some *x* are *y*” is understood to mean “the Attributes *x*, *y* are *compatible*, so that a Thing can have both at once”, and “no *x* are *y*” to mean “the Attributes *x*, *y* are *incompatible*, so that nothing can have both at once”.

In such treatises, Propositions have quite different meanings from what they have in our ‘Game of Logic’, and it will be well to understand exactly what the difference is.

First take “some *x* are *y*”. Here *we* understand “are” to mean “are, as an actual *fact*”——which of course implies that some *x*-Things *exist*. But *they* (the writers of these other treatises) only understand “are” to mean“*can* be”, which does not at all imply that any *exist*. So they mean *less* than we do: our meaning includes theirs (for of course “some *x are y*” includes “some *x can be y*”), but theirs does *not* include ours. For example, “some Welsh hippopotami are heavy” would be *true*, according to these writers (since the Attributes “Welsh ” and “heavy” are quite *compatible* in a hippopotamus), but it

would be *false* in our Game (since there are no Welsh hippopotami to *be* heavy).

Secondly, take "no *x* are *y*". Here *we* only understand "are" to mean "are, as an actual *fact*"——which does not at all imply that no *x can* be *y*. But *they* understand the Proposition to mean, not only that none *are y*, but that none *can possibly* be *y*. So they mean *more* than we do: their meaning includes ours (for of course "no *x can* be *y*" includes "no *x are y*"), but ours does *not* include theirs. For example, "no Police-|men are eight feet high" would be *true* in our Game (since, as an actual fact, no such splendid specimens are ever found), but it would be *false*, according to these writers (since the Attributes "belonging to the Police Force" and "eight feet high" are quite *compatible:* there is nothing to *prevent* a Policeman from growing to that height, if sufficiently rubbed with Rowland's Macassar Oil——which is said to make *hair* grow, when rubbed on hair, and so of course will make a *Policeman* grow, when rubbed on a Policeman).

Thirdly, take "all *x* are *y*", which consists of the two partial Propositions "some *x* are *y*" and "no *x* are *y*′". Here, of course, the treatises mean *less* than we do in the *first* part, and *more* than we do in the *second*. But the two operations don't balance each other——any more than you can console a man, for having knocked down one of his chimneys, by giving him an extra door-step.

If you meet with Syllogisms of this kind, you may work them, quite easily, by the system I have given you: you have only to make 'are' mean 'are *capable* of being', and all will go smoothly. For "some *x* are *y*" will become "some *x* are capable of being *y*", that is, "the Attributes *x*, *y* are *compatible*". And "no *x* are *y*" will become "no *x* are capable of being *y*", that is, "the Attributes *x*, *y* are *incompatible*". And, of course, "all *x* are *y*" will become "some *x* are capable of being *y*, and none are capable of being *y*′", that is, "the Attributes *x*, *y* are *compatible*, and the Attributes *x*, *y*′ are *incompatible*." In using the Diagrams for this system, you must understand a red counter to mean "there may *possibly* be something in this compartment," and a grey one to mean "there cannot *possibly* be anything in this compartment."

## § 3. *Fallacies.*

And so you think, do you, that the chief use of Logic, in real life, is to deduce Conclusions from workable Premisses, and to satisfy yourself that the Conclusions, deduced by other people, are correct? I only wish it were! Society would be much less liable to panics and other delusions, and *political* life, especially, would be a totally different thing, if even a majority of the arguments, that are scattered broadcast over the world, were correct! But it is all the other way, I fear. For *one* workable Pair of Premisses (I mean a Pair that lead to a logical Conclusion) that you meet with in reading your newspaper or magazine, you will probably find *five* that lead to no Conclusion at all: and, even when the Premisses *are* workable, for *one* instance, where the writer draws a correct Conclusion, there are probably *ten* where he draws an incorrect one.

In the first case, you may say "the *Premisses* are fallacious": in the second, "the *Conclusion* is fallacious."

The chief use you will find, in such Logical skill as this Game may teach you, will be detecting '*Fallacies*' of these two kinds.

The first kind of Fallacy——'Fallacious Premisses'——you will detect when, after marking them on the larger Diagram, you try to transfer the marks to the smaller. You will take its four compartments, one by one, and ask for each in turn, "What mark can I place *here*?"; and in *every* one the answer will be "No information!", showing that there is *no Conclusion at all*. For instance,

"All soldiers are brave; }
Some Englishmen are brave.

∴ Some Englishmen are soldiers."

looks uncommonly *like* a Syllogism, and might easily take in a less experienced Logician. But *you* are not to be caught by such a trick! You would simply set out the Premisses, and would then calmly remark "Fallacious *Premisses*!": you wouldn't condescend to ask what *Conclusion* the writer professed to draw——knowing that, *whatever* it is, it *must* be wrong. You would be just as safe as that wise mother was, who said "Mary, just go up to the nursery, and see what Baby's doing, *and tell him not to do it*!"

The other kind of Fallacy——'Fallacious Conclusion'——you will not detect till you have marked *both* Diagrams, and have read off the correct Conclusion, and have compared it with the Conclusion which the writer has drawn.

But mind, you mustn't say "*Fallacious* Conclusion," simply because it is not *identical* with the correct one: it may be a *part* of the correct Conclusion, and so be quite correct, quite correct, *as far as it goes*. In this case you would merely remark, with a pitying smile, "*Defective* Conclusion!" Suppose, for example, you were to meet with this Syllogism:—

"All unselfish people are generous; }
No misers are generous.

∴ No misers are unselfish."

the Premisses of which might be thus expressed in letters:—

"All $x'$ are $m$; }
No $y$ are $m$."

Here the correct Conclusion would be "All $x'$ are $y''$" (that is, "All unselfish people are not misers"), while the Conclusion drawn by the writer, is "No $y$ are $x'$," (which is the same as "No $x'$ are $y$," and so is *part* of "All $x'$ are $y'$.") Here you would simply say "*Defective* Conclusion!" The same thing would happen, if you were in a confectioner's shop, and if a little boy were to come in, put down twopence, and march off triumphantly with a single penny-|bun. You would shake your head mournfully, and would remark "Defective Conclusion! Poor little chap!" And perhaps you would ask the young lady

behind the counter whether she would let *you* eat the bun, which the little boy had paid for and left behind him: and perhaps *she* would reply "Sha'n't!"

But if, in the above example, the writer had drawn the Conclusion "All misers are selfish" (that is, "All *y* are *x*"), this would be going *beyond* his legitimate rights (since it would assert the *existence* of *y*, which is not contained in the Premisses), and you would very properly say "Fallacious Conclusion!"

Now, when you read other treatises on Logic, you will meet with various kinds of (so-called) 'Fallacies', which are by no means *always* so. For example, if you were to put before one of these Logicians the Pair of Premisses

"No honest men cheat; }
No dishonest men are trustworthy."

and were to ask him what Conclusion followed, he would probably say "None at all! Your Premisses offend against *two* distinct Rules, and are as fallacious as they can well be!" Then suppose you were bold enough to say "The Conclusion is 'No men who cheat are trust-|worthy'," I fear your Logical friend would turn away hastily——perhaps angry, perhaps only scornful: in any case, the result would be unpleasant. *I advise you not to try the experiment!*

"But why is this?" you will say. "Do you mean to tell us that all these Logicians are wrong?" Far from it, dear Reader! From *their* point of view, they are perfectly right. But they do not include, in their system, anything like *all* the possible forms of Syllogisms.

They have a sort of nervous dread of Attributes beginning with a negative particle. For example, such Propositions as "All not-*x* are *y*," "No *x* are not-*y*," are quite outside their system. And thus, having (from sheer nervousness) excluded a quantity of very useful forms, they have made rules which, though quite applicable to the few forms which they allow of, are no use at all when you consider all possible forms.

Let us not quarrel with them, dear Reader! There is room enough in the world for both of us. Let us quietly take our broader system: and, if they choose to shut their eyes to all these useful forms, and to say "They are not Syllogisms at all!" we can but stand aside, and let them Rush upon their Fate! There is scarcely anything of yours, upon which it is so dangerous to Rush, as your Fate. You may Rush upon your Potato-beds, or your Strawberry-beds, without doing much harm: you may even Rush upon your Balcony (unless it is a new house, built by contract, and with no clerk of the works) and may survive the foolhardy enterprise: but if you once Rush upon your *Fate*—why, you must take the consequences!