

### Challenge Problem 3

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Question: "which came first, the chicken or the egg?"

- Definitions Of Chickens and Eggs

According to the Dictionary Merriam-Webster and my own opinion,

1. Chicken: a bird that is raised by people for its eggs and meat

\*A chicken is the animal which can produce eggs

2. Egg: a hard-shelled oval thing which **usually a chicken produces** and **most** baby chickens are born from **(Not other kinds of eggs! If you mean the snake eggs, this question is meaningless!)**

\*An egg is something where a chicken can be born

3. In this question, we regard the chicken and the egg as **two general terms**, not as some specific or individual objects. If you regard the chicken in this question as the chicken on your aunt's farm and the eggs as something you ate on this morning, then there will be no relationship between these two things and **this question is going to be meaningless!**

- The Core of This Problem

If we want to find out the answer, we should focus on the following statements, and judge whether they are True or False.

1. The chicken is only born in the egg.

Or

M is the chicken **if and only if** M is born in the eggs.

**\*Attention:** The definition only states that a chicken **can** emerge from an egg, but it does not mean that all the chickens must be came from eggs.

2. The egg can only be produced by the chicken.

Or

M is an egg **if and only if** M comes from a chicken.

**\*Attention:** The definition only states that a chicken is the animal which can produce eggs, but it does not mean that all the eggs must be produced by chickens.

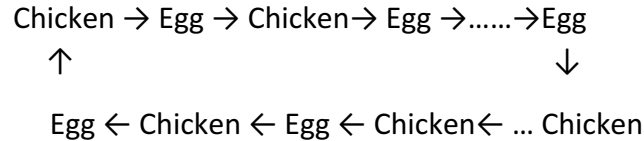
- Possible Outcomes

We can call the first statement P and the second statement Q.

1. P is True, Q is True:

Then, the chicken is only born in the egg and the egg can only be produced by the chicken.

We can use a graph to show this logic:



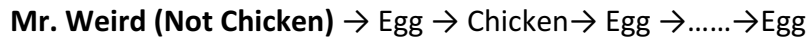
This logic graph is going to be an infinite circle.

In this way, I will regard the chicken and the egg as a same object but in different stages of life. They are logically same, so you cannot tell which came first.

2. P is True, Q is False:

Then, the chicken is only born in the egg but eggs may not come from the chicken in the old time.

We can use a graph to show this logic:

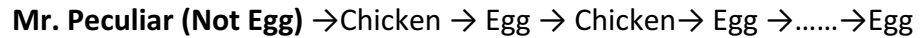


In this way, the egg came first.

3. P is False, Q is True:

Then, eggs can only be produced by the chickens but chicken can be born in other animals in the old time.

We can use a graph to show this logic:

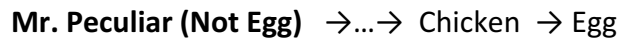
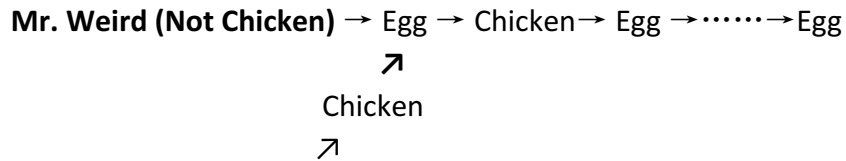


In this way, the chicken came first.

4. P is False, Q is False:

Eggs may not come from the chicken; at the same time, chickens may be produced by other peculiar animals in the ancient time.

We can use a graph to show this logic:



Chicken



**Mr. Peculiar (Not Egg)**

In this way, the graph will be a large map with a lots of possible connections. We cannot tell which one came first.

- My Opinion and Biological Evidence

In my personal opinion, I believe that P is False and Q is True, which means that eggs can only be produced by the chickens and the chickens are possible to come from something other than eggs. *Therefore, I think that chickens came earlier than eggs.* Here is the biological evidence:

**Eggs must come from chickens**

Biological scientists found that the formation of egg shells depends on proteins found only in a chicken's ovaries. The protein is called ovocledidin-17, or OC-17, and it is the element that speeds up the development of the shell. Therefore, eggs could only be laid by chickens.

**Chickens may come from Dinosaurs Eggs**

According to *popular science*, dinosaurs were laying eggs before there were any birds, and the ancestors of chickens were chicken-like birds which laid eggs. According to the Darwin's theory of evolution, the chicken may come from an egg produced by from ancient chicken-like animals. In this view, the chicken we are familiar with these days came earlier than the egg.

- Conclusion

The chicken came first.

