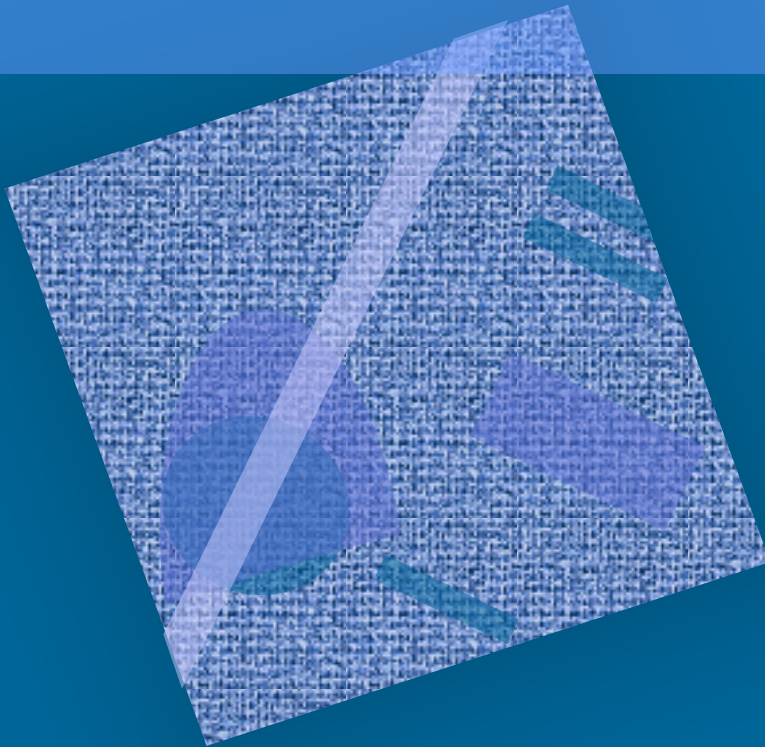


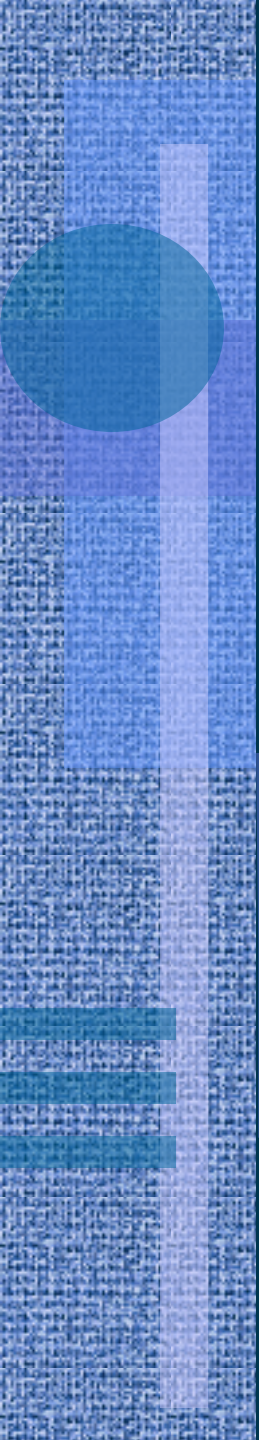
The Pellagra Story



Introduction

Scientists have common approaches to solving problems. Usually, people think of experiments as one way scientists investigate problems.

- What kinds of experiments are possible when you study human beings?
- How can you collect evidence in these situations?



Imagine that doctors are observing a new disease, and they don't know what causes it.

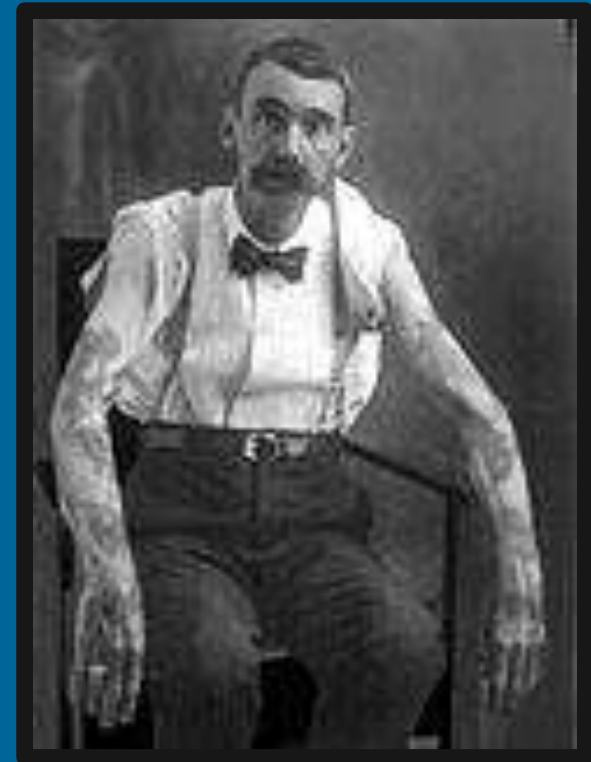
- **What are some possible causes of diseases?**
- **What kinds of things would scientists do to learn more about a disease and its cause or causes?**

History of Pellagra

- Pellagra was first identified in 1735 and was often mistaken for leprosy.
- It first appeared in the United States in the 1820s and was known as the disease of the four “Ds”:
 - dermatitis,
 - diarrhea
 - dementia
 - death.

History of Pellagra

- It was a disease that affected many people in the southern part of the United States in the early 1900s.
- By 1912, 30,000 cases of pellagra were reported in South Carolina alone.



Dr. Goldberger



In 1914, Dr. Joseph Goldberger, a Hungarian immigrant who had grown up in New York City, was asked to investigate pellagra.

Questions

1. What was the first step in Dr. Goldberger's research into pellagra?
 - Explain why this step was important in developing his hypothesis.
 - During this first step in his research, what evidence did Dr. Goldberger find that suggested that pellagra was not caused by germs?

Questions

2. What was Dr. Goldberger's hypothesis about the cause of pellagra?

- What did he do to provide evidence of the relationship between pellagra and nutrition?**
- How could he have provided more convincing evidence of the relationship between pellagra and nutrition?**

Questions

3. Why didn't people believe Dr. Goldberger's conclusion about the cause of pellagra?
(There are two reasons.)

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In case video didn't work...

- http://www.teachersdomain.org/asset/odys08_vid_pellagra/
- <http://www.allthink.com/v/pellagrastory>

What was the problem of pellagra?

What did people think caused pellagra?

- 1.
- 2.
- 3.
- 4.

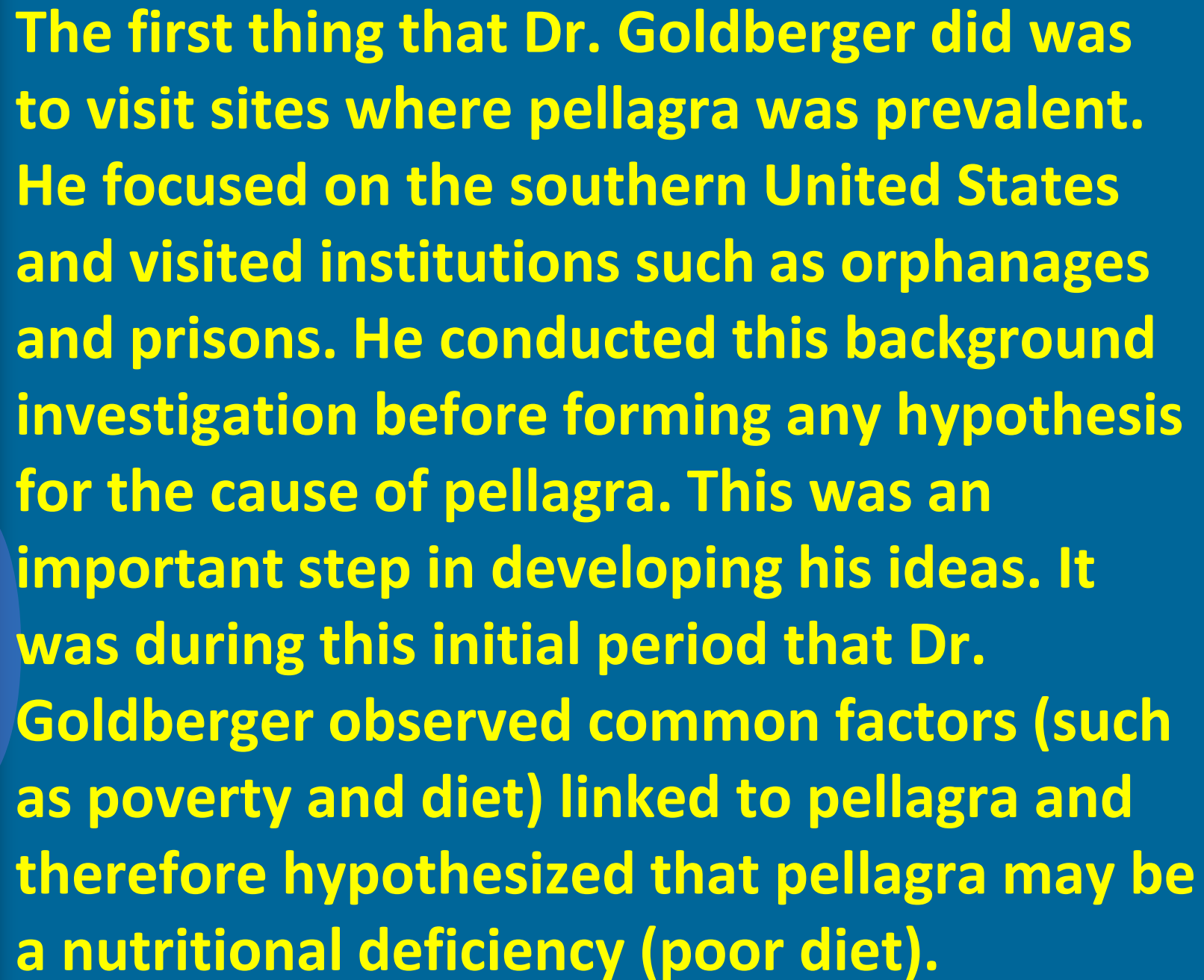
What evidence did Dr. Goldberger observe or collect about pellagra?

What did Dr. Goldberger conclude about the cause of pellagra?

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Questions

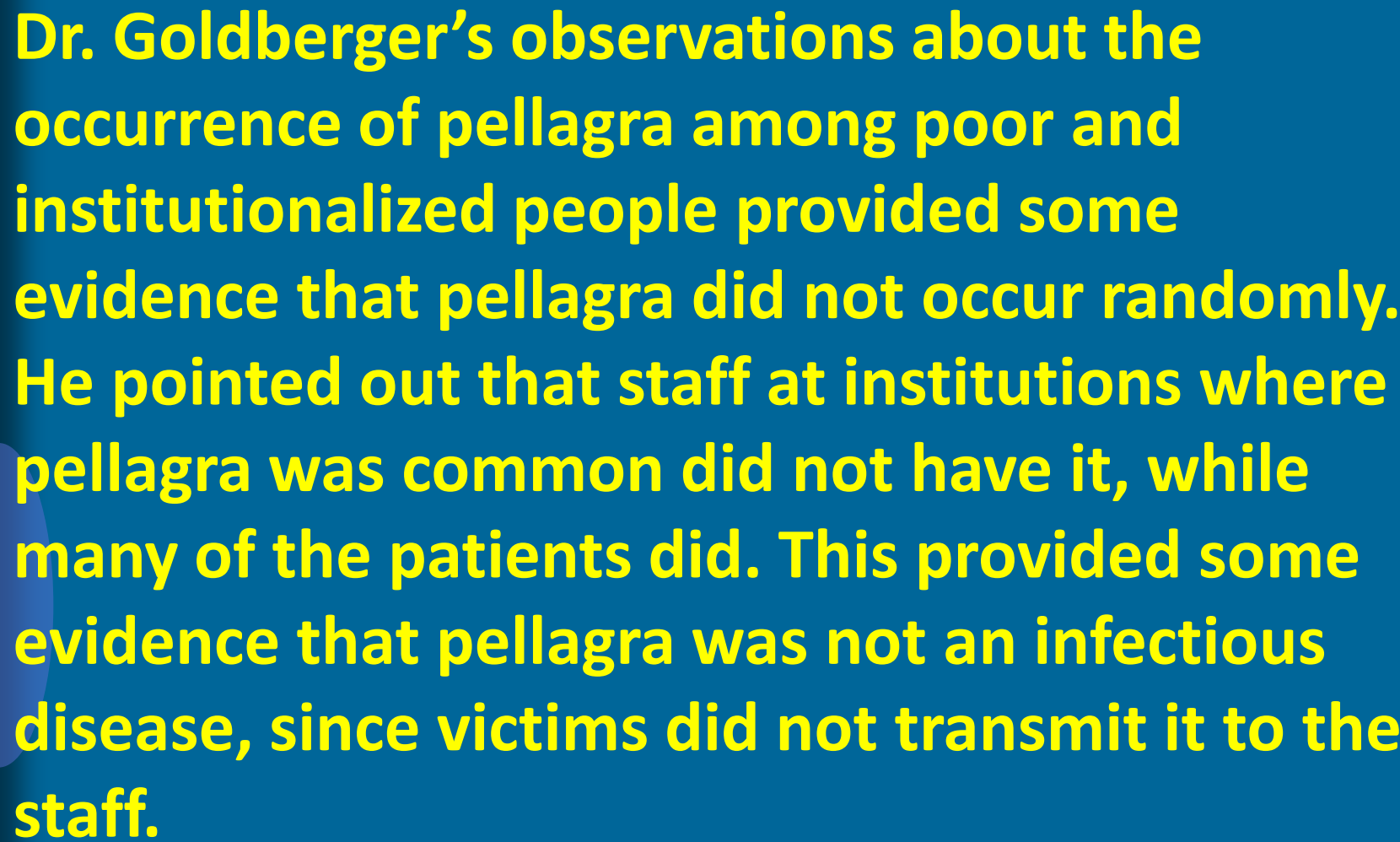
1. What was the first step in Dr. Goldberger's research into pellagra?
 - Explain why this step was important in developing his hypothesis.



The first thing that Dr. Goldberger did was to visit sites where pellagra was prevalent. He focused on the southern United States and visited institutions such as orphanages and prisons. He conducted this background investigation before forming any hypothesis for the cause of pellagra. This was an important step in developing his ideas. It was during this initial period that Dr. Goldberger observed common factors (such as poverty and diet) linked to pellagra and therefore hypothesized that pellagra may be a nutritional deficiency (poor diet).

Questions

1. What was the first step in Dr. Goldberger's research into pellagra?
 - Explain why this step was important in developing his hypothesis.
 - **During this first step in his research, what evidence did Dr. Goldberger find that suggested that pellagra was not caused by germs?**



Dr. Goldberger's observations about the occurrence of pellagra among poor and institutionalized people provided some evidence that pellagra did not occur randomly. He pointed out that staff at institutions where pellagra was common did not have it, while many of the patients did. This provided some evidence that pellagra was not an infectious disease, since victims did not transmit it to the staff.

Questions

2. What was Dr. Goldberger's hypothesis about the cause of pellagra?

- What did he do to provide evidence of the relationship between pellagra and nutrition?**
- How could he have provided more convincing evidence of the relationship between pellagra and nutrition?**

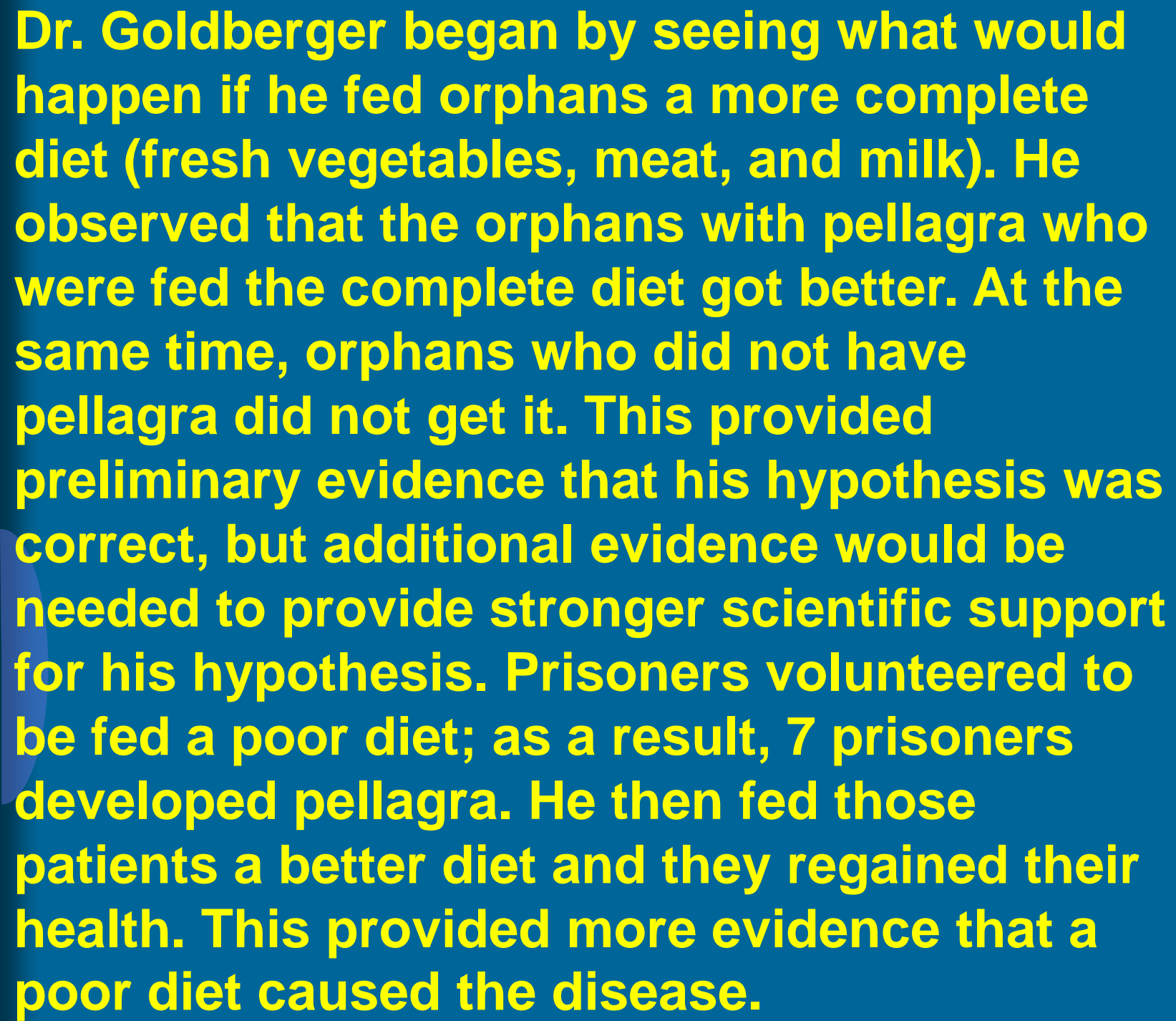
Questions

2. What was Dr. Goldberger's hypothesis about the cause of pellagra?

Dr. Goldberger hypothesized that pellagra was caused by a nutritional deficiency.

Questions

2. What was Dr. Goldberger's hypothesis about the cause of pellagra?
 - **What did he do to provide evidence of the relationship between pellagra and nutrition?**
 - How could he have provided more convincing evidence of the relationship between pellagra and nutrition?



Dr. Goldberger began by seeing what would happen if he fed orphans a more complete diet (fresh vegetables, meat, and milk). He observed that the orphans with pellagra who were fed the complete diet got better. At the same time, orphans who did not have pellagra did not get it. This provided preliminary evidence that his hypothesis was correct, but additional evidence would be needed to provide stronger scientific support for his hypothesis. Prisoners volunteered to be fed a poor diet; as a result, 7 prisoners developed pellagra. He then fed those patients a better diet and they regained their health. This provided more evidence that a poor diet caused the disease.

Questions

2. What was Dr. Goldberger's hypothesis about the cause of pellagra?
 - What did he do to provide evidence of the relationship between pellagra and nutrition?
 - **How could he have provided more convincing evidence of the relationship between pellagra and nutrition?**

- increasing the sample size of the experiment
- extending the length of the experiment (until all the prisoners developed pellagra)
- testing other theories about the cause of pellagra and finding out exactly what kinds of food prevented pellagra

Questions

3. Why didn't people believe Dr. Goldberger's conclusion about the cause of pellagra?
(There are two reasons.)

People didn't believe Dr. Goldberger for both scientific and societal reasons:

1. Scientists were impressed at the time with the successes of the germ theory of disease *so they expected a* microbial cause for pellagra. They felt that a non-microbial cause would have been discovered already.
2. Others disbelieved the dietary cause of pellagra because they felt Dr. Goldberger was attacking the Southern way of life.

Final Thoughts...

- To investigate his hypothesis, Dr. Goldberger had prisoners volunteer to be fed a poor diet; as a result, seven out of 11 prisoners developed pellagra.
- What do you think about Dr. Goldberger's decision to experiment on people? Support your answer with evidence and identify the trade-offs of your decision.