Problem of the Week
Solution Eight

For three-valued logic, the agreed upon truth table for conditionals is this:

$\rightarrow$	T	N	F
T	T	N	F
N	T	T	N
F	T	T	T

You come to a fork in the road, and want to know which path will take you to the city. Chewbacca is standing nearby so you ask him which path to take. He replies, "If I am a knight then you should take the left fork. But if I am knave then you should take the right fork." Which path should you take?

SOLUTION: You should take the left fork.

Notice that an if-then statement is true whenever the first part of the statement is false. If Chebacca were a knave, then the first part of his first conditional statement (the one that begins with, "If I am a knight...") would be false. That would imply that the entire statement is true. Since this would entail a knave making a true statement, we have reached a contradiction.

If Chewbacca is a neutral, then the statements, "I am a knight" and "I am a knave" both have truth value N. A conditional statement whose first part is neutral is only neutral when the second part is false. But one of the statements, "You should take the left fork," and "You should take the right fork," must be true. This means it is impossible for both conditional statements to have the truth value N. This entails that a neutral person has made a statement with a classical truth value, which is a contradiction.

We conclude that Chewbacca is a knight. That means the first part of his first conditional statement must be true. We conclude that the second part must be true as well, which implies that you should take the left fork. (His second conditional statement, beginning, "If I am a knave...," has a false first part and is therefore automatically true.)