CHAPTER VI
THESE STRANGE HUNTERS AND FISHERMEN

"In your last book," said Alice, "you had a lot of interesting puzzles about certain people who always lie, and others who always tell the truth. They make various statements, and the problem is to find out which ones are the liars and which ones are the truthtellers. Do you know any more puzzles like that?"

"No!" said Tony. "I want some more detective puzzles. I want to know who stole it and who owns it!"

Well, at this point, about half the children clamored for more detective puzzles and half clamored for puzzles about people who either always lie or always tell the truth.

"I'll tell you what," I said. "I'll give you some very interesting puzzles that combine both features you want."

And so, I told the following story:

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"There is a strange tropical island on which hunting and fishing are the only two occupations. Every islander is either a hunter or a fisherman, but never both. The curious thing is that the hunters always lie—they never tell the truth—and the fishermen always tell the truth—they never lie."

"Just a minute," interrupted Alice. "Is this realistic? Is there any evidence that hunters lie any more than fishermen?"

"Of course not," I replied. "This is only a *story*, and I am not saying that in general hunters lie more often than fishermen, but only that on this particular island, it so happened that the hunters always lied and the fishermen always told the truth. Now, I shall tell you some interesting things that happened on this island."

• 1 •

Who Stole the Monkey? One day a monkey was stolen from the zoo. An islander was tried and was asked, "Did you steal the monkey?" He replied, "The monkey was stolen by a hunter."

Now remember: hunters always lie and fishermen always tell the truth.

Was this islander innocent or guilty?

• 2 •

What Next? Then it was definitely found out that the thief must be one of two brothers. [Just because they were brothers doesn't mean that they necessarily have the same occupation; it could be that one is a hunter and the other a fishermen]. Well, the two brothers made the following statements in court:

First Brother: Either I am a hunter, or the monkey was stolen by a fisherman.

Second Brother: I didn't steal the monkey!

Who stole the monkey?

• 3 •

Who Stole the Elephant? One day an elephant (of all things!) was stolen on this island. The two suspects are Aaron and Ba-

rab. It was not known at the beginning of the trial whether either one was actually guilty. Well, they made the following statements in court:

Aaron: I did not steal the elephant.

Barab: One of the two of us is a hunter and the other is a fisherman.

Can it be determined who stole the elephant?

•4•

Who Owns the Elephant? Well, the elephant was recovered, and it belonged to one of three islanders. They made the following claims:

First Islander: The elephant is mine.
Second Islander: The elephant is mine.
Third Islander: At least two of us are hunters.

•5•

Who Stole the Panther? On the same island, three men—Alu, Bomba, and Kuhla—made the following statements about a stolen panther:

Alu: Either Bomba is innocent or he is a fisherman.
Bomba: Either I am innocent or Alu is a hunter.
Kuhla: The guilty one is not a fisherman.

Who stole the panther?

•6•

An Intriguing Mystery Finding the owner of the panther proved to be a particularly interesting problem.

"A panther is a rather odd thing to *own!*" said Alice.

"These were odd islanders," I responded. "Anyway, it was known that the panther belonged to one of three men—A, B,

or C—though it was not known whether the owner was a hunter or a fisherman. The three made the following statements in court:

A: The panther belongs to C.

B: The panther does not belong to me.

C: At least two of us are hunters.

From this, the judge could not decide who owned the panther. Fortunately, Inspector Craig of Scotland Yard happened to be vacationing on this island at the time and was sitting in court, since he was interested in the case. He asked the judge, 'Your Honor, may I interrogate one of the three?'

'Surely,' the judge replied.

Well, Inspector Craig asked for C, 'Come on, now, which of you three really owns the panther?' C answered, and Craig then knew who owned the panther."

Who owns the panther?

• 7 •

Did John Steal the Giraffe? On the same island of hunters and fishermen, a giraffe was stolen one day. One of the islanders, John, was accused of stealing it. He and his brother Dick made the following statements in court:

John: I am innocent.

Dick: My brother and I have the same occupation (hunter or fisherman).

Did John steal the giraffe?

• 8 •

Then Who Did Steal It? Well, *somebody* stole the giraffe. Who was it? After the island police investigated the situation, the thief was narrowed down to one of three islanders—A, B,

or C. It was known that only one of the three participated in the robbery. The three made the following statements:

A: B stole the giraffe.
B: The giraffe was stolen by a fisherman.
C: All three of us have the same occupation (hunter or fisherman).

Who stole the giraffe?

• 9 •

Who Stole the Fish? One day a hunter stole a fish from a fisherman. The three suspects were A, B, and C. The hunter who stole the fish was one of them, and the other two were both fishermen:

The judge first asked A, "Did you steal the fish?" A refused to answer. Then B was asked, "Did you steal the fish?" B also refused to answer. Then C was asked, "Did you steal the fish?" C replied, "Either B or I stole the fish."

Who stole the fish?

• 10 •

Who Owns the Fish? The fisherman who owned the fish appeared in court with two others who happened to be both hunters. Call the three men D, E, and F.

D claimed that E owns the fish, and E and F made no comments.

Who owns the fish?

• 11 •

Who Stole the Seal? One day a fisherman stole a seal from another fisherman. The thief was actually one of three suspects:

A, B, or C. It was not known what the others were (hunters or fishermen). They made the following statements:
A: At least one of us is a hunter.
B: I am a fisherman.
C: That is true.
Who stole the seal?

• 12 •

Who Owns the Seal? Three men—A, B, and C—appeared in court. The fisherman who owned the seal was one of them. Only two of them made statements.
A: At least one of us is a hunter.
B: C owns the seal.
Who owns the seal?

• 13 •

The Society of Crafty Hunters A certain subgroup of the hunters have formed a society called "The Society of Crafty Hunters." To be admitted to the society, you must appear before their tribunal and convince them that you are a hunter and that you are crafty. But you are allowed to make only one statement. Assuming you are one of the islanders and are, in fact, a crafty hunter, what statement would gain you entrance into their society?

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At this point, one of the children objected to the solution given at the end of the chapter for reasons I explain at the end of the solution. So I gave them the following problem to clarify an important logical point.

• 14 •

Some Theoretical Questions
(a) Is it possible for any inhabitant of this island to say, "I am a hunter"?
(b) Is it possible for an inhabitant to say, "I am a hunter and two plus two equals five"?
(c) Is it possible for an inhabitant to make the following two statements separately: (1) I am a hunter; (2) Two plus two equals five?
(d) Can any inhabitant say, "I am a hunter and two plus two equals four?"

• 15 •

The Society of Wise Fisherman To enter the Society of Wise Fishermen, you must make a single statement that will simultaneously accomplish three things:
(1) It must convince them that you are a fisherman.
(2) It must convince them that you have caught at least one hundred fish.
(3) It must enable them to deduce your first name.
What single statement will do this?

• 16 •

How Many Were Married? I once met two islanders, A and B, and I was interested in knowing of each whether he was married or single. Well, A said that B is not an unmarried fisherman, and B said that A is not a married hunter. As I later found out, at least one of them was a hunter.
How many of them were married?

• 17 •

An Interesting Personal Adventure I was once sent over to the island of hunters and fishermen to do some counter-espionage. [If you don't know the word *espionage*, either ask someone or look it up in a dictionary.] In particular, the government knew that there was a certain man on the island named McSnoy, and it was vital to find out whether McSnoy was a hunter or a fisherman.

Well, shortly after I arrived, I found McSnoy (whom I recognized from a photograph) having lunch with another islander whose name was *McEldridge*. Now, I didn't care in the least whether McEldridge was a hunter or a fisherman; I was interested only in McSnoy. I asked McEldridge, "Are both of you hunters?" McEldridge answered *yes* or *no*. I thought for a while but could not determine what McSnoy was. Then I asked McSnoy, "Did he answer truthfully?" McSnoy answered *yes* or *no*, and I was then able to make an accurate report to the government concerning McSnoy's occupation.

Is McSnoy a hunter or a fisherman?

• 18 •

Who Owns the Hunting Dog? On the hunter-fisherman island, a hunting dog was lost. It was recovered, and, of course, it belonged to a hunter. The owner was one of two men, A and B, and the other man was a fisherman.

The two men appeared in court. The judge asked A, "If B were asked whether he owns the dog, what would he say?"

A replied, "B would claim to own the dog."

Which one owns the dog?

• 19 •

Who Stole the Platypus? One day a hunter stole a platypus from the zoo. Three defendants—A, B, and C—were tried. It

was not certain that the thief was among them, but it was certain that if any of the three was a hunter, then one of them was the thief. The three made the following statements in court:

A: At least one of us is a fisherman.

B: At least one of us is a hunter.

C: I am not a hunter.

Is the thief necessarily present? If so, can it be determined which one he is?

• 20 •

Who Stole the Aardvark? It was not known whether the thief who stole the aardvark was a hunter or a fisherman. The only suspect was a man named Momba. He was asked in court: "Was the aardvark stolen by a fisherman?" Momba answered the question, and the judge then knew whether he was innocent or guilty.

Which was he?

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And now, we come to my favorite case of all that happened on this island:

One day, a whale was stolen. Now, please don't ask me *how*, because I haven't the faintest idea! Anyway, a whale *was* stolen, and the problem, of course, is to find out who stole it.

• 21 •

The First Trial (A Case of Identity) It was suspected, but not known, that the thief was one of a pair of identical twins—the only such pair on the island. Now, the twins are not necessarily of the same occupation; it is quite possible that one could be a hunter and the other a fisherman, but then again, they might both be hunters or both fishermen. Anyway, the day of the trial

came, and the judge asked them, "Did either of you steal the whale?" He got the following answer:

First Twin: Maybe one of us stole the whale, or then again, maybe neither of us stole the whale.

Second Twin: No fisherman on this island ever steals whales!

Well, this evidence was quite insufficient to convict or acquit either one. The two brothers were returned to their cells.

The next day, the trial resumed, and the twins were brought back to court. The judge suddenly realized that he could not tell them apart; hence, he had no idea which twin had made which statement the day before. He asked one of them—call him A—, "Are you the one who claimed yesterday that no fisherman on this island ever steals whales?" A answered, and the judge then knew whether he was guilty or innocent.

Is A guilty or innocent? Is his brother guilty or innocent?

• 22 •

The Second Trial The next two suspects were Momba and an islander named *Karl*. It is possible that neither of them stole the whale, or that just one of them stole the whale, or that they both stole it together.

Well, eight witnesses testified at this trial. We will call them A, B, C, D, E, F, G, and H. Each of them was either a hunter or a fisherman. They gave the following testimony:

A: Karl is a fisherman.

B: Momba is a hunter.

C: A is a hunter.

D: B is a hunter.

E: C and D are both fishermen.

F: Either Karl is a fisherman, or Momba is a hunter.

G: E and F have the same occupation.

H: My occupation is the same as G's, and at least one of the defendants is innocent.

Out of this logical tangle, the guilt or innocence of each of the two defendants can be determined.

What is the solution?

SOLUTIONS

1. Suppose the speaker is a fisherman. Then his statement is true, which means that the monkey was stolen by a hunter; so the speaker is innocent in this case. On the other hand, suppose the speaker is a hunter. Then his statement is false, which means that the monkey was stolen by a fisherman; so, in this case, the speaker is also innocent. So, in either case, the speaker is innocent.

2. The first brother *claims* that at least one of these alternatives holds: (a) he is a hunter; (b) the monkey was stolen by a fisherman. If he is a hunter, then alternative (a) does hold, which means that his statement is true that at least one of the alternatives holds. This would mean that a hunter made a true statement, which is not possible. Therefore, the first brother can't be a hunter; he must be a fisherman. Now that we know he is a fisherman, then we see that his statement is true, which means that either he is a hunter or else the monkey was stolen by a fisherman. But he is not a hunter; therefore, the monkey was stolen by a fisherman.

Now we know that the first brother is a fisherman, and also that the monkey was stolen by a fisherman. From this information it would be premature to conclude that the first brother must have been the one who stole the monkey; we must reason further.

If the second brother is a hunter, then he didn't steal the monkey, because the monkey was stolen by a fisherman. On the other hand, if the second brother is a fisherman, then his statement is true, which means he, again, couldn't have stolen the monkey. Therefore, it must have been the first brother who stole the monkey.

3. From Barab's statement, we can prove in the following manner that Aaron must be a hunter:

Suppose Barab is a fisherman. Then his statement is true, which means that one of them is a hunter and one a fisherman. Since Barab is a fisherman, then it must be Aaron who is the hunter.

This proves that Aaron is a hunter, provided that Barab is a fisherman. But suppose Barab is a hunter. Well, in that case, his statement is false, which means that Barab and Aaron are not of different occupations (as Barab claims) but must really be of the same occupation. Then, since Barab is a hunter and Aaron is of the same occupation, then Aaron must also be a hunter.

This proves that regardless of whether Barab is a hunter or a fisherman, Aaron must be a hunter. [Incidentally, it is not possible to determine whether Barab is a hunter or a fisherman.] Since Aaron is a hunter, his statement is false, and, therefore, Aaron stole the monkey.

4. The first and second islanders can't both be fishermen, since their statements can't both be true. Therefore, at least one of the first two must be a hunter. Now, if the third islander were a hunter, then it would be true that at least two of them are hunters (namely, he and one of the first two), and we would have a hunter making a true statement. Therefore, the third islander must be a fisherman. This means that his statement

is true, so there are at least two hunters present. Since the third islander is not a hunter, then the first two are both hunters. Therefore, both their statements are false, so the third islander must be the owner of the elephant.

5. We first show that Kuhla must be innocent. Well, Kuhla is either a fisherman or a hunter. Suppose he is a fisherman; then his statement that the guilty one is not a fisherman must be true; so Kuhla, since he is a fisherman, can't be guilty. So, if Kuhla is a fisherman, then he is innocent. Now, suppose Kuhla is a hunter; then his statement is false, which means that the thief is a fisherman; so Kuhla, since he is a hunter, can't be the thief. So, in this case, Kuhla is again innocent. Therefore, regardless of whether Kuhla is a fisherman or a hunter, he is innocent. So the guilty one is either Alu or Bomba.

We next prove that Alu is a fisherman—we show that if Alu is a hunter, we get a contradiction. Well, suppose Alu is a hunter; then Bomba must be a fisherman (because he claims that one of the two alternatives holds: (a) Bomba is innocent; (b) Alu is a hunter. Well, alternative (b) does hold; so it is true that at least one of the alternatives (a) or (b) holds). Since Bomba is a fisherman, then it is certainly true that *either* he is innocent *or* he is a fisherman. But then, how could Alu, a hunter, make this true statement? This proves that Alu can't be a hunter; so he is a fisherman.

Since Alu is a fisherman, his statement is true; so Bomba is either innocent or he is a fisherman. So if Bomba is not a fisherman, he is innocent. What if Bomba is a fisherman? In that case his statement is true, which means that either he is innocent or Alu is a hunter. But Alu is not a hunter (we proved that); so Bomba must be innocent. Therefore, Bomba is innocent, regardless of whether he is a fisherman or a hunter.

We now know that Kuhla and Bomba are both innocent; therefore, Alu must be the guilty one.

6.   On the basis of the three statements made before Inspector Craig interrogated C, we will show that if C is a hunter, then he owns the panther, and if C is a fisherman, then B owns the panther.

Suppose C is a hunter; then his statement is false; hence there are not at least two hunters; so A and B must both be fishermen. Since A is a fisherman, then his statement is true; so the panther belongs to C. This proves that if C is a hunter, the panther belongs to C.

Suppose C is a fisherman. Then his statement that at least two of them are hunters must be true; hence A and B must both be hunters. Since B is a hunter, his statement is false, which means that B owns the panther. This proves that if C is a fisherman, then B owns the panther.

This is as much as we can deduce from just the three statements made prior to Craig's question to C. Now, Craig asked C who owns the panther, and C either said that he did or that B did or that A did—we are not told which—but we are told that after C answered, Craig did know who owned the panther. Now, C is either a fisherman or a hunter. If C is a fisherman, then B must own the panther (as we have seen); hence C, since he is truthful, would name B as the owner. So, if C is a fisherman, he named B.

Suppose C is a hunter; then, as we have seen, C owns the panther; hence C, since he is untruthful, would never admit owning the panther; hence, he would have named B or C. So if C is a hunter, he named either B or C. So, in either case (fisherman or hunter), C must have named either A or B. If C named B, then it could be either that C is a fisherman and B owns the panther, or that C is a hunter and C owns the panther, but there would be no possible way to know which. Therefore, if C named B, Craig would have had no way of knowing who really owned the panther. However, we are given that Craig *did* know; therefore, it must be that C named A, and Craig

then knew that C owns the panther. Therefore, C owns the panther.

7. If Dick is a fisherman, then his statement is true; hence the two brothers are of the same occupation, which means that John is also a fisherman. If Dick is a hunter, his statement is false, which means that John is of a different occupation from Dick, which means that John is a fisherman. In either case, John is a fisherman. Therefore, John's statement is true; so John is innocent.

8. Suppose C is a fisherman. Then all three are fishermen (as he said); hence A is a fisherman, and B stole the giraffe. So if C is a fisherman, then B stole the giraffe.

Now, suppose C is a hunter. Then his statement is false, which means that they don't all have the same occupation; hence, at least one of A or B must be a fisherman. If A is a fisherman, then again B stole the giraffe.

Suppose A is a hunter. Then B is the only fisherman, and his statement is true; so a fisherman stole the giraffe, and since he is the only fisherman, then again B stole the giraffe. So, in all possible cases, B stole the giraffe.

9. Suppose C is a hunter. Then C stole the fish (since C is the only hunter). Then his statement that either B or he stole it is true, and we have the impossible situation of a hunter making a true statement. Therefore, C must be a fisherman. Hence, his statement is true; so either he or B stole the fish. Since C is a fisherman, he didn't steal it. So B stole the fish.

10. If D is a fisherman, then his statement is true that E owns the fish, but this would mean that E is a hunter and owns the fish, which is not possible. Therefore, D must be a hunter. This means that his statement is false; hence, E doesn't really own the fish. Also, D doesn't own it (because D is a hunter); hence, it is F who owns the fish.

11.   If A were a hunter, then it would be true that at least one of them is a hunter; so a hunter (A) would be making a true statement, which is not possible. Therefore, A must be a fisherman. Since A is a fisherman, then his statement that at least one of them is a hunter must be true. Therefore, either B or C is a hunter. But since C agrees with B, and at least one of them is a hunter, then both of them must be hunters. Therefore, A is the only fisherman; so A stole the seal.

12.   Again, A must be a hunter (for the same reason as in the last problem), and at least one of B or C must be a fisherman. If B is a fisherman, then his statement is true, which means that C owns the seal. If B is a hunter, then he and A are both hunters; hence C is the only fisherman; so C owns the seal. So, in either case (whether B is a fisherman or a hunter), C owns the seal.

13.   One statement that would gain you entrance into the society is" "I am a hunter, but not a crafty one." A fisherman could never make that statement, so the tribunal would know that you are a hunter. They would also know that if you were not a crafty hunter, your statement would be true, and that a hunter can't make true statements. Therefore, they will know that you must be a crafty hunter.

   Incidentally, some readers may object to this solution on the grounds that no inhabitant of this island can say that he is a hunter. Although it is true that no inhabitant can say that, the objection is not valid for reasons we discuss below.

14.   (a) Certainly not! A fisherman would never lie and say that he is a hunter, and a hunter would never truthfully admit to being a hunter. So, no inhabitant of the island can say that he is a hunter.

   (b) This is a very different story! No fisherman could say that, but a hunter could. Since it is false that two plus two

equals five, then it is false that the speaker is a hunter *and* that two plus two equals five; hence, a hunter could make that false statement.

It is important to realize that if a sentence consists of two clauses connected by the word *and*, if so much as one of the clauses is false, then the whole sentence is to be regarded as false. For example, if I know French but not German, then I would be lying if I said, "I know both French and German," or, if I said, "I know French and I know German."

(c) This is a horse of a different color! No, it is *not* possible for an inhabitant of this island to make these two statements separately, because no one can say (1) alone.

This, in comparison with (b), elucidates a very interesting point in connection with the logic of lying: If a truthful person makes two statements separately, it is the same thing as if he makes one single statement asserting that both are true. But it is an entirely different matter when a liar asserts two statements separately, and when he, in one sentence, asserts that both are true. In the first case, both statements must be false, while in the second case, all that follows is that at least one is false. For example, suppose a liar makes two separate statements: (1) John is guilty; (2) Jim is guilty. Then, in fact, both John and Jim must be innocent. On the other hand, suppose a liar makes the one single statement: John is guilty and Jim is guilty. The liar is in effect saying that both are guilty, and since he is lying, they are not both guilty. But this does not mean that they both have to be innocent; it only means that at least one has to be innocent.

(d) No.

15. Let's say that your first name is John. Then a single statement that will gain your entrance into the Society of Wise Fishermen is this: "Either I am a hunter, or I, whose name is John, have caught at least a hundred fish."

Your statement asserts that at least one of the following two facts holds: (1) you are a hunter; (2) your name is John, and you have caught at least one hundred fish. If you were a hunter, fact (1) would hold, which would make your statement true, but hunters can't make true statements. Therefore (the Society would reason), you must be a fisherman. Then what you say is really the case, which means that either (1) or (2) holds. But (1) can't hold; therefore (2) holds; so your name is John, and you have caught at least one hundred fish.

16. If B is a hunter, then his statement is false, which means that A is a married hunter and, hence, a hunter. If B is not a hunter, then A must again be a hunter, because at least one of them is a hunter. Therefore, A is a hunter. Since A is a hunter, his statement is false; therefore, B is an unmarried fisherman. Since B is a fisherman, his statement is true; so A is not a married hunter. But A is a hunter; therefore, A is unmarried. So, neither one is married.

17. This is quite a different type of problem from any we have yet considered; it appears at first as if you are not given enough information to solve it, but actually you are.

I did not tell you what either McEldridge or McSnoy answered, but it is possible for you to figure out both. Suppose McEldridge had answered, "Yes." Then I would have known what McSnoy was because a fisherman could not claim that he and McSnoy are both hunters; hence McEldridge would have to be a hunter. Therefore, McEldridge's answer was a lie, which means that they are not both hunters; so McSnoy must be a fisherman. So, if McEldridge had answered, "Yes," then I would have known that McSnoy was a fisherman. But, as I told you, I didn't know what McSnoy was; therefore, McEldridge wouldn't have answered, "Yes"; he must have answered, "No." This means that there are three possibilities:

(1) McEldridge is a fisherman and McSnoy a hunter.
(2) McEldridge is a fisherman and McSnoy a fisherman.
(3) Both are hunters.
[The possibility that McEldridge is a hunter and McSnoy a fisherman is out, because in this case McEldridge would have lied and said, "Yes."]

Next, I asked McSnoy whether McEldridge had told the truth. In other words, whether McEldridge is a fisherman. If the first case holds (McEldridge a fisherman and McSnoy a hunter), McSnoy would answer, "No." If the second case holds, he would answer, "Yes," and if the third case holds, he would answer, "Yes." So, if McSnoy had answered, "Yes," then either the second or third case could hold, which means McSnoy could be either a fisherman or a hunter, and I couldn't have known which. But I told you that McSnoy's answer *did* enable me to know which; therefore, McSnoy must have answered, "No," and I knew that McSnoy must be a hunter (and also, incidentally, that McEldridge was a fisherman).

18. If B is a fisherman, then he doesn't own the dog; hence, he wouldn't lie and claim he did. If B is a hunter, then he does, in fact, own the dog, but he wouldn't be truthful and claim that he did. So it is not possible that B would claim to own the dog. Therefore, A lied; so A is the hunter and owns the dog.

19. If B were a hunter, he could never have made the true statement that at least one of them is a hunter. Therefore, B must be a fisherman. This means that there is at least one fisherman present (namely B); so A's statement is true; so A is also a fisherman. Also, since B is a fisherman, his statement that at least one of them is a hunter must be true. Therefore, C must be a hunter, and he is the only hunter. Since a hunter is present, the thief is present, and since the thief is a hunter, he must be C.

20.   If Momba had answered, "Yes," then the judge would have had no way of knowing whether Momba was innocent or guilty (because it could be that Momba is a fisherman and the aardvark was stolen either by him or by another fisherman, and it could also be that he is a hunter, and the aardvark was stolen either by him or by another hunter). But the judge did know; therefore, Momba must have answered, "No." This means that Momba must be innocent—for the same reasons given in the solution to the first problem of this chapter (namely, that if Momba is a fisherman, then his statement is true; so a hunter stole the aardvark, and if Momba is a hunter, then his statement is false; so a fisherman stole the aardvark).

[Incidentally, it wasn't until years later that the true thief who stole the aardvark was found. It turned out to be a hunter by the name of *McSnickle*, but the trial was a dull one; so I won't bother you with it].

21.   The statement made by the first twin on the first day was trivially true; hence, the first twin must be a fisherman.

Now, we consider the second day. We are not told whether A answered *yes* or *no* to the question of whether he was the second twin of yesterday, but we are told that the judge knew whether he was innocent or guilty after the answer. Now, the only way the judge could have known is by getting the answer "Yes." [Had A answered, "No," he could have been either the first twin telling the truth or the second twin lying, and the judge would have known no more than he knew before.] So A claimed to be the second twin of yesterday. Now, if he were the first twin, he could not have lied and claimed to be the second twin (because we already know that the first twin is a fisherman); so A really was the second twin and was telling the truth. Therefore, the second twin of yesterday is a fisherman. Therefore, his statement of yesterday was true; so no

fisherman on this island ever steals whales. Since both brothers were fisherman, both were innocent.

22. I will first prove that E and F cannot possibly have the same occupations, and hence that G must be a hunter.

Suppose E is a fisherman; then C and D are both fishermen, and A and B are both hunters. Then Karl is a hunter and Momba is a fisherman. Then F's statement is false, since neither Karl is a fisherman, nor is Momba a hunter. This proves that if E is a fisherman, then F is a hunter.

Now suppose E is a hunter; then C and D are not both fishermen. Then A and B are not both hunters; so at least one of their statements is true. This means that either Karl is a fisherman or Momba is a hunter—just as I said! This makes F a fisherman. So if E is a hunter, F is a fisherman.

I have just proved that if E is a fisherman, then F is a hunter, and if E is a hunter, then F is a fisherman; so E and F cannot have the same occupation. This conclusively proves that G is a hunter.

Now that we know that G is a hunter, we consider H's statement. A fisherman could never claim any statement that says, among other things, that his occupation is that of G (who is a hunter); so H must be a hunter. Then the first clause of his statement is true (he is of the same occupation as G), and since his total statement is false, then it must be the second clause that is false. In other words, it is false that at least one of the defendants is innocent. So both defendants are guilty (which, incidentally, is not surprising, since it is not easy for one person, unaided, to steal a whale).