

The Asylum of Doctor Tarr and Professor Fether

Adapted from: *The Lady or the Tiger?* by Raymond Smullyan
(With apologies to Edgar Allan Poe)

Inspector Craig of Scotland Yard was called to investigate an insane asylum where it was suspected that something was wrong. The asylum was run by two doctors named Doctor Tarr and Professor Fether. There were other doctors on the staff as well. The only inhabitants were patients and doctors – the doctors constituted the entire staff.

Each inhabitant of the asylum, patient or doctor, was either sane or insane. Moreover, the sane ones were *totally* sane and a hundred percent accurate in all their beliefs; all true propositions they knew to be true and all false propositions they knew to be false. The insane ones were totally inaccurate in their beliefs; all true propositions they believed to be false and all false propositions they believed to be true. It is to be assumed also that all the inhabitants were always honest – whatever they said, they really believed.

While Craig was waiting to interview Doctor Tarr and Professor Fether, he spoke separately to two inhabitants whose last names were Jones and Smith.

“Tell me,” Craig asked Jones, “what do you know about Mr. Smith?”

“You should call him *Doctor* Smith,” replied Jones. “He is a doctor on our staff.”

Some time later, Craig met Smith and asked, “What do you know about Jones? Is he sane or insane?”

“He is insane,” replied Smith.

The inspector mulled over the situation for a while, and then had private interviews with Doctor Tarr and Professor Fether. Here is the interview with Doctor Tarr:

Craig: Tell me, Doctor Tarr, are all the doctors in this asylum sane?

Tarr: Of course they are!

Craig: What about the patients? Are they all insane?

Tarr: At least one of them is.

The second answer struck Craig as a surprisingly modest claim! Why was Doctor Tarr being so cautious?

Craig then had his interview with Professor Fether, which went as follows:

Craig: Surely it is true that all the patients in this asylum are insane, isn't it?

Fether: Of course it is true! What kind of asylum do you think we are running?

Craig: What about the doctors? Are they all sane?

Fether: At least one of them is.

Craig: What about Doctor Tarr? Is he sane?

Fether: Of course he is! How dare you ask me such a question?

At this point, Craig realized the full horror of the situation! What was it?

After you have solved the problem and proved your answer, consider the following two variations.

1. Was the last question really necessary? That is, could Craig have deduced the same conclusion without knowing that Fether thinks that Tarr is sane?

2. When Craig asked Fether, "What about the doctors? Are they all sane?", suppose Fether had just replied, "At least Doctor Tarr is sane." Would the conclusion have been the same?

On the one hand, if Doctor Tarr is sane, it certainly implies that at least one doctor is sane. On the other hand, the negation of the statement "Doctor Tarr is sane" is much weaker than the negation of the sentence "At least one doctor is sane." Resolve this dilemma.