

Causality *

The alien

Imagine that I am an intelligent being from a planet far, far away and a member of a space-ship crew in the science department. As such, my job is to explore the universe. We are looking for beings on other celestial bodies, especially intelligent beings. Right now we are in the orbit of a very interesting blue object. Let us call it "Terra." Obviously, beings of limited intelligence exist there. It is now my task to explore the cultural standards of their theories: myths, religion, view of life, philosophy, science and last but not least their everyday life. The last is the most difficult, by the way. To give you an idea of those difficulties I will tell you about one incident which happened to me on Terra:

The Terranians have an irresistible need to hold someone responsible for everything that happens to them, may it be good or bad. They need someone whom they can praise or blame, reward or punish. In former times they believed in higher spirits, gods and demons. Later on, they developed more systematically and tried to attribute one phenomenon to an earlier phenomenon, so-called "cause". They used regularities for it, which they assume to be valid, so-called "sentences of causality." They used them to explain a phenomenon, and if they are confronted with a phenomenon which they cannot explain, they won't feel quite good. The greatest part of their science and established legal system is based on the question: Who (or what) did it? You will therefore understand that I am very much interested in how the Terranians are able connect one phenomenon with another one. I want to find out what "cause" means.

The Black-Coats

On my search I looked for a building where they deal with the question: Who did it? The building looked rather old, with broad stairs, large halls and oversized ornamented doors. Among the Terranians who stayed there, some of them attracted my attention because they wore long and uncomfortable black coats with wide sleeves. Their partly hectic, partly bored behaviour showed a strange contrast to their formal dress.

I turned to one of the black-coats who stood in front of one of the large doors and asked him: “Excuse me, what do you understand as being a “cause”?” “An act will be causal if you cannot leave it aside without the result being dropped.”, he answered promptly. If a creature answered my questions that promptly in most cases, it would have been the result of being drilled into them,. “How do you know whether the result would be dropped if the act did not happen?” I kept on asking. “For that we have a series of natural laws and of our general experiences to accompany them!” “Well, so the act must be a necessary condition for the result, but not the only one. It is not in the perpetrator’s hands if the result really happens or not,” I answered.

“All right”, he said, “but it doesn’t depend on that decisively. It is crucial that the perpetrator would have avoided the result if he had not acted at all”.

“So you attribute the result to the perpetrator’s act, because he could have avoided it.” That seemed to be quite reasonable to me, but then I began to get second thoughts. “So you can never hold someone responsible for having killed another person”. The black-coat looked at me surprised.

“O.k.”, I explained, “as far as I know, you are all multi-cellular creatures and therefore mortal, so that means every one of you has to die one day. Therefore it is not necessary at all, that another person does anything to him.”

My interlocutor became somewhat impatient. “You are not allowed to view that in such an abstract manner! It doesn’t depend on the result in general but on the result in its concrete form as it came about. It will make a difference, however, if one gets stabbed to death today or if one dies of a heart attack tomorrow.”

“I don’t quite understand”, I protested, and what does the sentence mean “somebody is stabbed to death?”

“Quite simple”, he answered, “that means that the stab with a knife is causal for the result”. “But I just want to know what causality means!,” I replied.

“A stab with a knife will be causal if it cannot be left aside without the result being dropped.”

“Oh no, now we are back at our starting point”, I said to myself.

I thanked him – as is customary on Terra – and looked for another black-coat. But, he too answered: “An act is causal if it cannot be left aside without the result being dropped!” In order to step forward quicker in our discussion, I presented a case to him – one should always present a case to black-coats, otherwise they don’t under-

stand anything –. “Someone is suffering from a disease of which he will die in the near future, as we are able to judge by natural laws. An impatient heir gives him a dose of poison, which is known to have deadly consequences for human beings. If I ask what would have happened without the act, I have to come to the conclusion that the sick person would have died anyway. So, does it mean that the heir is not causal for the death of the person?”

“Of course he was”, replied the black-coat promptly. “Your comparing the patients’ death due to an illness instead of the poison is referred to as a substitute cause. However, you are not allowed to add a substitute cause to the series of events”.

“How should I know what a substitute cause is? I still don’t know what a cause is. What then can I add if I have to answer the question, what would have happened without the perpetrator’s act and what not?”

“You should not add anything, you should stick to the facts that really happened”, he said.

“All right, but then I can’t answer your question at all what would have happened if something had been different as it really was”, I said. Then one of the big doors opened, the black-coat said good-bye, and quickly disappeared closing the door behind him.

I returned to the spaceship and wrote my report: The Terranians believe they have a concept of “causation.” They assume that a cause for a result is every condition which is necessary for the outcome, pursuant to natural laws. But they do not use this requirement consequentially. Sometimes they regard a condition to be a cause for the result, even if it is not a necessary condition for it. If one wants to know however, what they ask for when defining a conditional relationship between cause and effect, they will answer with a nicely formulated circular statement or a blatant contradiction. Actually, the Terranians do not have any concept of causality, at all.

Promptly after I had submitted my report, I was called to the captain, which wasn’t a good sign. It was unfortunately much worse than I had been prepared for.

The Captain

“I am giving you an official reprimand because of your lack of readiness”, the captain welcomed me and threw the report in front of my feet. “The space-travel authority

doesn't pay you to nit-pick every short-coming that the Terranians may have. Expect an iH-reprimand as well, if you don't get it right."

I was scared because an iH-reprimand – which means reprimand due to intellectual hubris – is the worst and most degrading thing which may happen to a philosophy agent in the service. Three of these reprimands and you lose your research-license because of an unqualified character. And I already had one!

"Yes, an iH-reprimand", the captain said to my puzzled expression. "In your last report you wrote that a big part of the science and the biggest part of the established laws on Terra are based on this concept of causality. And now you state that they do not have any concept at all. If you were right in your arrogant statements, then their houses and bridges would have to crumble and fall – or they would never have come to be.

And the Terranians would arbitrarily attribute all sorts of things to one another; everything would otherwise be purely accidental. But their civilization is of a considerable standard and so is their established legal system. So what about overlooking one or the other logical inconsistencies? Pull yourself together!!

"Yes Sir", I replied.

So, the captain wants to give me an iH-reprimand because I am not prepared to overlook logical mistakes. Apparently, "elementary logic" is not taught at the space-travel academy. If there is a contradiction in a text, the whole text will be pointless! The second black-coat said to me, "I should ask what would have happened (note the subjunctive!), if the perpetrator had not acted at all." I shall give statements about a process that actually never happened. But on the other hand, I shall not add anything that did not happen. That is a smooth contradiction and no intelligent creature in the whole universe can follow this instruction. For that matter, neither could an "un-intelligent being, either! It is simply nonsense in the strictest sense of the word.

And the first Terranians told me that if I wanted to determine the cause of an action for a result, I would have to look at the result in its concrete form. And it just belongs to this concrete shape that the act in question is causal for the result! But after all, I still don't know when and why an act is causal for a result. As long as nobody pre-

sents further rules, I can proclaim any phenomenon to be causal for a result by stating that it belongs to the result in its concrete form.

So, what the first black-coat told me is actually not wrong but on the other hand it doesn't help me any further.

Why then are the Terranians civilised and have established legal systems that work? I have not explained that. In so far, the captain was right. There must be reasonable sentences for determining causality which I have not worked out yet, however. What the Terranians say, those wearing the black-coats anyway, is obviously incorrect respectively absurd. But what they do is obviously not. Therefore I have to look for what they do and I have to figure out the applied sentences. Then I am going to write down those sentences and the title of my report will be: "Causality-concept of the Terranians". The captain cannot expect me to find out more than that.

What I need is a Terranian whose job it is to determine causes in individual cases. I will watch him while determining those causes and I will make sure that it is not too simple of a case, because one doesn't need to carefully apply the methods in simple cases. Perhaps sometimes a wrong explanation can be accepted, because the result is so obviously right.

A white-coat

When I asked for such a Terranian they referred me to the medical examiner Dr. Quincy. His uniform, a simple waist length white coat, is not as commanding as the costume of the black-coats. But my impression is that the white-coats are more respected by the Terranians than the black-coats. One always believes them as long as they don't argue among each other. Dr. Quincy welcomed me very warmly and let me watch him while he worked – I told him I worked for a TV-station.

"I have a quite interesting case at the moment", he explained, "a patient died of cardiac arrest after undergoing a bypass-operation. I assume that the bypass was not sutured neatly and burst. In this case the heart-bag, which is a skin that surrounds the heart without bonding with it, becomes filled with blood and exerts so much pressure on the heart that it quickly becomes exhausted and gives out."

"I understand, as a doctor, you know certain processes which lead to a patient's death pursuant to general natural laws. You have just given a necessary condition – pursuant to natural laws – for the patient's death, and this condition includes mal-

practice of the doctor in attendance. So you will hold the doctor in attendance responsible for the patient's death."

"I see that you are no criminalist and haven't read many criminal stories either, have you?" Dr. Quincy replied in a somewhat condescending manner. He continued, "An explanation may be conclusive to the highest extent, but it doesn't necessarily have to be correct in the end. I don't put someone into prison just because of bare speculations, and surely not a colleague of mine!"

"So how will you proceed?", I asked. "Quite simple", he said. "I will examine whether the bypass was sutured poorly and so burst as a result thereof, or not. Would you like to watch a post-mortem examination?"

"Better not", I replied, I'd rather wait outside." While waiting outside, I had a little time to contemplate about the things the doctor had said to me. Obviously the key was – not to place the emphasis on a "necessary" condition, but rather a "sufficient" one. A sufficient condition allows one to conclude the result from the condition, but not vice-versa. If the Terranians really insisted on a necessary condition as a cause, they would be able to deduce the condition from the result. Thus they only needed to know the result in order to determine who is responsible for it. If they only demand sufficient conditions, however, they can only point to the result from that condition. But the realization of the result is the starting point of all consideration. So, their only chance is to look for sufficient conditions, which lead to the result. It is therefore, to a certain degree, a mere matter of luck whether they find them or not.

Dr. Quincy returned from performing the examination: "I was wrong, I have to admit."

"So the bypass was o.k.?" I asked him. "Not at all, it was sutured miserably and the patient would have died on it in some weeks; he had no chance. But, the bypass had not torn, another coronary vessel had burst and filled the heart-bag with blood. This was the real cause for his death; the malpractice would only be a substitute cause."

At this moment, a super-nova occurred in my mind: That is how the Terranians eliminate substitute causes. A cause is a sufficient condition for the result pursuant to natural laws. But not all the facts which connect the result with this condition have really happened. And the distinctive feature of a substitute cause is that the explanation of the result which it provides is not – or more precisely – not completely true. So the second black-coat was correct when he advised me not to add something that had not really happened, however, he should not have demanded from me to answer

the question of whether the result would have happened anyway after cancelling the act which we examined to be causal.

But I was still not completely satisfied. “Dr. Quincy, as far as I understand, the deciding element is about “sufficient” and not “necessary” conditions. But now you claim that the cause of a result is every true and, pursuant to natural laws, sufficient condition for its arising. Then you are never able to call the act of a human being as being the cause of a result. Such an act in itself is never enough to explain the result.”

“That is not necessary at all”, Dr. Quincy replied. “It is adequate that the result occurs as a component of this sufficient condition. In this case we call it a cause or, if you like, a contributing cause of the result.”

“But it is still unclear which kind of relationship must really exist between the cause and result”, I continued and now it was my turn to explain something to Dr. Quincy. “If you give me a sufficient condition for a result, I will be able to add any number of facts to this sufficient condition and will get a sufficient condition again. So, how do you make sure that one doesn’t add any facts like e.g. a certain human behaviour to each causal explanation in order to hold him responsible for the result?”

“But this is quite simple again,” Dr. Quincy answered somewhat impatient. “Imagine my assistant would have performed the post-mortem examination and would have written into his report that the patient had died of cardiac arrest, because one of the coronary vessels had burst. Moreover, there was also a badly sutured bypass. However, I would tell him he might as well leave the badly sutured bypass aside when explaining the cause of death, because it is not a necessary component for the explanation of the patient’s death.” Another super-nova occurred in my mind again. That is how it works with leaving something aside! The Terranians demand neither a necessary nor a sufficient condition for a cause. A cause for them is, on the contrary, each necessary component of a sufficient condition for the result, pursuant to natural laws. If a fact is a necessary component of such a sufficient condition, then they will reconsider it by eliminating this fact from the series of events or, how they express it in their own words, leave it aside. After that, they examine if the condition remains sufficient for the explanation of the result. Therefore, the point is not leaving facts aside and stating afterwards what would have happened without them. It is leaving aside a certain event from a causal explanation which was already asserted in order to examine whether the explanation is still conclusive without this event.

So why didn't the black-coats tell me that from the beginning? They would have spared me a lot of trouble. Simple! Because they themselves don't know it! The causal explanations they normally deal with are so obvious and trivial that they don't make the effort to think them out completely and to formulate them. So, what should one say to a case like the following: A shoots the healthy B down, B dies?

Because the black-coats are supposed to explain everything they rule on, however trivial it may be, they merely present the last step of the causal explanation. Here, they demonstrate that the act, which in their view is causal and is necessary for the explanation of the result (not the result!). And then consider the part to explain the whole and therefore believe that they need to demand a "necessary condition for the result." This error will certainly create a lot of fictitious problems, for them.

The final report

Back onboard the space-ship I wrote my new report:

"If the Terranians attribute a phenomenon to other phenomenons as causes they will proceed on the assumption that there exist general rules, so-called natural laws, which provide that after a certain constellation of phenomenons another certain constellation has to follow. Whether they are convinced that this has to be applied to all processes – that means that each process is completely predetermined by those natural laws - may remain undecided in the present context. It may be sufficient to say that they assume this for the largest part of everyday-occurrences and their technology. These natural laws normally have the logical form of a sufficient condition, which means that if a certain cumulation of conditions is given, a certain effect will be caused necessarily.

If the Terranians want to attribute an effect to its cause, they begin to search for such phenomenons which happened before the effect had arisen and for natural laws which necessarily lead to this effect as a consequence. If they find such a complex of phenomenons which actually occurred and whose regular consequence arose, they will pretend to have explained the effect by causality. One single cause is a component of such a causal explanation, a necessary one in fact. That means that without this component the prerequisites of the natural laws would not completely be met. But precisely the consequence should be explained with the help of this component. So it could have severe consequences for the Terranians if they accepted a fact for

their causal explanation that is not a necessary one. Therefore the Terranians examine the necessity of a single component of a causal explanation by, after having advanced this explanation, cancelling or as they say, leaving aside this component. If the result can still be derived from the remaining facts pursuant to natural laws, this component will not be a necessary one and will be regarded as a non-cause. It will only constitute a cause if the explanation becomes false, that means that the result is not deducible any longer as once this fact has been eliminated.

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