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Reality and Representations in *Rashōmon*, Gnoseology, and Quantum Mechanics

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Abstract

Kurosawa's intriguing masterpiece *Rashōmon* might appear as a manifesto of post-modern relativism, according to which we cannot know any "objective reality", but only alternative subjective "versions" of the world. This is also what some quotes by Kurosawa seem to suggest.

No doubt, the accounts of an event given from alternative conceptual, epistemic, or psychological perspectives may be very different. Yet, such stories may all correspond to the actual world, and often, by relativising them to the subjects' standpoints, we can grasp some important features of the subject-independent reality.

In fact, by this method the actual course of events in *Rashōmon* can be reconstructed in a fairly plausible and unambiguous way. Although the spectator can gather her clues only from the apparently confusing and unreliable accounts of the various characters, perhaps Kurosawa's story is less enigmatic than he himself thought.

The script also bears striking resemblances to the puzzles of quantum mechanics. Actually, if current theories are right, microphysical reality is even more elusive than historic reality, portrayed by Kurosawa through the deforming mirrors of subjective drives and motivations. But upon reflection, even in quantum mechanics there is no need to give up the idea that there exists an objective, if awkward, reality, and that we can know it at least partially and perspectively.

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1. *Rashōmon*

Rashōmon is the 1950 film which made famous in the western world its director Akira Kurosawa and its protagonist actor, Toshiro Mifune. It is based on two short stories, *Rashōmon* (1915) and *Yabu no naka* (*In a Grove*, 1922) by Ryūnosuke Akutagawa, who wrote the former at the age of 23, and later was to kill himself.

Kurosawa had promised to the motion picture company Daiei to produce a very low budget movie, completely shot in the Nara forest, with only seven actors and a single set piece, the imposing ruins of the Rashō gate. But the managers complained that the one gigantic set piece already cost a fortune. Besides, they considered the film of little interest, and were reluctant to distribute it. However, through the initiative of Giuliana Stramigioli, an Italian teacher at the University of Foreign Studies in Tokyo, the film was presented at the Venice Film Festival, winning the Golden Lion prize for the best movie. A few months later it won *ad honorem* an Academy Award as best foreign film.

This is the story: a Buddhist monk, a woodcutter and a commoner, caught in a heavy and unceasing rain, take shelter under the ruined Rashōmon gate. The monk and the woodcutter comment the upsetting events in which they have been involved a few days earlier: the woodcutter found in the forest the stabbed body of a samurai, Takehiro Kanazawa. No weapon was found around, but the bandit Tajōmaru was arrested and charged with the murder. In court the bandit confessed that, upon meeting Takehiro with his wife Masako in the forest, he had been caught by lust; so, after capturing the samurai by a trick and tying him up, he raped his wife. The lady initially tried to defend herself by her precious dagger, but she was soon seduced by him, and immediately after the rape implored him to restore her honour by fighting with her husband in order to decide to whom she was to belong thereafter. So, after loosening the husband he defeated and killed him by his sword.

Masako, on the contrary, told the jury that after the rape the bandit left. Thus she used her dagger to cut the rope which tied her husband, imploring him to kill her, for she couldn't tolerate her shame. But Takehiro looked at her with such a glacial contempt that she couldn't bear it anymore. Distraught, in a sort of trance she tried to kill herself, but she fainted and collapsed over the man, so finally driving the blade into his chest by her own weight. Upon recovering, she wandered in the woods, eventually reaching the temple, where the monk found her.

Next, the court summoned a medium, who evoked the samurai's spirit. The latter told a yet different story: after raping Masako, Tajōmaru invited

her to escape with him. The lady accepted, but first invited the bandit to kill her husband, as she couldn't belong to two men at once. But the bandit, horrified by her ferocity, set Takehiro free. The samurai, however, unable to stand such a ignominy, killed himself by his wife's dagger, although before passing away he felt someone removing the dagger from his chest. In fact, the precious dagger had not been found on the scene of the crime.

But when hearing these reports, the woodcutter comments that they are all lies, and he reveals that, contrary to what he declared to the court, he had not reached the place afterwards, but hidden among the sprays he had observed the whole scene. Thus he had seen that after the rape Tajōmaru, taken by the woman, kneeled and begged her to escape with him. But Masako refused, freed the husband and asked the two men to fight for her love. As both were afraid and reluctant, she scoffed that they were not real men. At last, they drew their swords, but in the duel both proved fearful, clumsy and inept: eventually the samurai accidentally went to the ground, and begged the bandit to spare his life. But Tajōmaru after some hesitation killed him, while Masako fled.

So "everybody lies, there is no longer any truth in the world", the desolate monk complains. And the commoner echoes: we can't be sincere even to ourselves, we inevitably want to believe in the good, and try to conceal evil.

At this point a wail is heard, an abandoned neonate wrapped in a blanket. The commoner latches onto the blanket, and when the woodcutter blames him for this theft, he retorts by charging him of stealing the dagger. In fact, he had noticed that the woodcutter startled in hearing that the dead samurai had felt someone taking the dagger from his chest; moreover, in hearing that Masako and Takehiro indicated the dagger as the fatal weapon, the woodcutter had become nervous, shouting that those were all lies. This is why the woodcutter had not confessed to the court to have been on the scene, says the commoner: in order to avoid being criminated for stealing the dagger. The woodcutter cannot deny the charge, but he takes the baby in his arms: he is very poor and has six children to feed at home, but one more won't make a great difference. This of course partly excuses his theft, and helps the monk to regain his trust in the basic goodness of human heart.

2. The relativity of objective knowledge

This was Kurosawa's comment on his work:

> Human beings are incapable of being honest to themselves. They cannot talk about themselves without embellishing the picture. This script portraits human beings

> who cannot survive without lies which flatter them be better than what they are ... You say that you can't understand this script at all, but that is because the human heart itself is impossible to understand. If you focus on the impossibility of truly understanding human psychology and read the script one more time, I think you will grasp the point of it (Kurosawa 1982).

Apparently during the shooting the cast kept bothering the director asking what was the solution and what had actually happened in the wood. To which Kurosawa consistently replied that that did not really matter to the movie, which was supposed to explore multiple realities, not to picture one unique reality.

In fact, what most strikes in this work is that the different versions of the story are not introduced as narrations, but enacted and shown to the audience as if they were actual flashbacks of objective events. This is why the movie have been read also as a manifesto of relativism; but I shall suggest that perhaps this is not the case, and perhaps we can find out, about this story, more than Kurosawa himself could see in it.

Here I am not concerned with the technical features which underlie the magic of this film: the influences of silent film, photography, lighting, camera movement, soundtrack. Nor will I touch upon the ethical aspects of the movie, which are important but sufficiently clear by themselves. I rather wish to discuss the epistemological and gnoseological problems raised by the story.

Modern philosophy, at least since Kant, has pointed out that mind is not like a mirror, and knowing is not pure mirroring. Knowledge is a relation between the subject and reality: in fact, Plato explained in the *Theaetetus* that knowing is having a true justified belief; moreover, beliefs are true when they correspond to reality, at least in the minimal sense of consistently representing equal features of reality as equal, and representing features as differing in the same way only if they actually differ in the same way. But different subjects have different ways of representing the same reality, depending on their psychology, cultural background, conceptual schemes, etc. Therefore different subjects may have different but equally true beliefs about the same reality. In other words, in a technical jargon, true beliefs (hence knowledge) are *functions* of both reality *and* the subject: their content is determined both by what the world is like and by the peculiar cognitive background of the subject.

From this one could draw some hasty but wrong conclusions:

> (1) Relativism: reality is for each subject (person, or culture, group, etc.) as the subject represents it, and there is no one way in which reality is *in itself*. Thus, truth is what appears as such to a subject, although the same

account may be true for certain subjects and false for others, and there is no objective truth.

(2) Nihilism: reality and truth do not exist; there are only beliefs, descriptions or representations.

(3) Solipsism: reality and truth do not exist; there are only *my* beliefs, descriptions or representations.

(4) Idealism: reality does not exist *in itself*, but only as a representation, i.e. in as much as it is thought by a universal *Spirit*; truth is the correspondence of our particular beliefs with reality, understood as the content of the Spirit's thought.

There is no need to say that these conclusions contrast with commonsense; but I wish to point out that in spite of the appearance they are not supported by this movie; and since *Rashōmon* has some interesting parallels in gnoseology and Quantum Mechanics, they are not supported by these disciplines either.

In fact, although different subjects may have different ways of representing reality, their representations correspond to the same reality (hence, they are objectively true) if each subject consistently represents (in his/her/its idiosyncratic way) equal features as equal, and represents various couples of features as differing in the same way W_1 only if all of them actually differ some way W_2 (although W_1 and W_2 may be different). For instance, one might chose different notations to represent musical notes: but no matter which system of signs one chose, a melody will be correctly represented on the staff if one always represents the same note by the same sign, and different notes N1 and N2 by different signs S1 and S2—although, of course, the difference between N1 and N2 (i.e., an acoustic difference) is not the same as that between S1 and S2 (which is a graphic difference). No doubt, quite often among different representations one will be true and the others false. But different representations can also be equally true of the same reality if all of them correspond to it, although in different ways; i.e., if they describe the same thing by different languages or representation systems. This is exactly what happens with geographical maps: the spherical surface of the Earth can be projected onto a plane map by different projection systems (those of Mercator, Eckert, Gauss-Boaga, Goode, Hammer, Mollweide, or Peters). Maps drawn by these different systems may be equally correct and compatible among themselves, although they are clearly different and they do not picture exactly the same aspects of the Earth—for instance, some are

designed to represent lengths, but not the angles; some the angles but not the surfaces; etc. (Alai 1994, pp. 138-142., § 3.6.).

Nelson Goodman and others objected that no map represents the Earth *as it is in itself*, precisely because each one represents it through a projection (Goodman 1978). For instance, all maps are two-dimensional, while the Earth itself is three-dimensional; of course we can represent it by a globe, but even it will differ from reality in some different ways, and so will any other form of representation; hence, we don't know reality, but just our representations of it.

But this presupposes a gross misunderstanding, because any representation (whether a picture, a description, or a belief) represents something other from itself: therefore it cannot be *identical* to what it represents. Representing *is* describing something by means of something different! This is possible because although the properties of representations may differ from those of the represented object, they are *functions* of them, i.e., vary consistently with them. For instance, the marks on the music staff are graphic entities and have nothing in common with the notes, which are acoustic entities: but they represent them very precisely, since they vary in a strictly corresponding way. The same of course is true of words in language, thoughts in the mind, and any other system of representation (Alai 1994, ch. II).

The measure of a stick is given by different numbers if one uses meters, yards, cubits, or any other unit, but each of these numbers correctly represents the objective length of the stick. If I take a number by itself, it says nothing about reality; but if I am told in which unit it is expressed, I learn an objective feature of the world (ibi., pp. 138-142).

3. Finding out about reality: difficult, not impossible

In Kurosawa's movie the subjective factors which influence the account given by each character are the various reasons they have to lie or to tell the truth, and the emotive and epistemic conditions which may allow them to have a correct perception or a deceptive one: "All men deceive or are deceived" says the cynic and pessimistic commoner, often commenting as an impartial umpire. Yet, he himself eventually shows that by discovering that a witness has motives to lie, from his or her lies we can find our way to the truth.

So, either we just repeat, with the monk and the woodcutter, that "all this is unintelligible", or we try to make up all the *models* of the event (i.e., all the ways in which it might have happened) which are compatible with these four

stories *once they are read in the light of the reasons which could have driven each character (witness and/or agent) to deceive or to be deceived*. When so doing we may then find out that one of the following three is the case:

> (1) more than one course of events is possible (i.e., compatible with all the four stories and all we know about the likelihood that the tellers lied or were self-deceived). In this case we cannot know what actually happened. This however is not to say that all of these courses of events are equally real. Even less would this mean that all the four accounts are equally true: in fact, we know that none of them is completely true, although there are some truths (not the same, though) in each one.
>
> (2) There is just one course of events compatible with our information: in this case we can correctly suppose that this is what really happened, and that each of the four stories is partially correct to the extent that it agrees with it. Notice, however, that this is just a more or less justified supposition, for both the four stories and our information about the agents are partial, and mistakes are always possible, especially when we must interpret what they say through subtle psychological analyses.
>
> (3) There is no course of events which is compatible with all we can reasonably gather from the different accounts and from our reconstruction of their possible lies or mistakes. In this case we must conclude that even if there exists an objective reality (i.e., one way in which things actually happened) we cannot recognize it because we have gone wrong at some point in our interpretation of the stories, either in accepting this or that statement as true, or in taking it as a lie or an involuntary mistake.

One could take the opposite stand, claiming that since no reconstruction can be made which is compatible with all the data, there was no objective course of events, and the facts exist only within the account given by each witness; hence, in effect, there are four different and equally real courses of events. But holding such a radical conclusion just in for the sake of avoiding to concede that we made some mistake in interpreting the stories is an unacceptable toll: for on the contrary, we know that such mistakes are easily made.

For instance, some elements are attested by all the different accounts, findings and independent reports, hence there is no reason to doubt of their objectivity: everything indicates that the couple encountered Tajōmaru; that the latter captured Takehiro, then raped Masako, then seized the samurai's

horse and sword; that Takehiro was set free by cutting the rope which tied him, but eventually was killed; that the dagger has disappeared.

Besides, the bandit, the lady and the samurai, all accuse themselves of killing Takehiro, but notice, only Masako risks a capital sentence for this. In fact, Tajōmaru, as a bandit, will be sentenced anyhow, and Takehiro is dead (and besides, in the hypothesis he would have been a suicide, so he couldn't be charged with homicide). Therefore, either Masako is actually guilty, or she has *very* strong reasons to lie, or both. In fact, if she had killed her husband as she declares (under a shock, after trying to kill herself, distraught by her husband's contempt) these should have been considered as extenuating circumstances. So, perhaps, she is telling this version in order to conceal a much worse crime, the deliberate murder of her own husband.

Also the remaining two characters have strong motives to present their own version of the event. This is seen from their own accounts and from what is told by the woodcutter. We know that when the woodcutter claims to have been an eyewitness he says the truth, for this admission is against his own interests, and when he said the opposite to jury he lied (in order to avoid a charge of theft). Moreover, this is confirmed by the clues noticed by the commoner, and the woodcutter has no need to lie on the behavior of the other three characters. So his testimony is particularly useful.

Now, from his account Tajōmaru and Takehiro emerge as petty characters: Tajōmaru is a week man, for after the rape he fell in love and kneeled to beg the woman (this is partly confirmed by the samurai, who therefore is truthful on this particular). But Masako refused, freed the husband and spurred the two men to fight for her love (as partly confirmed by Tajōmaru). However Takehiro proved coward and mean, refusing to fight to avenge his wife, and despising her for her rape (this is confirmed by Masako, who therefore says the truth on this subject). Moreover, during the duel both men proved to be fearful and inept: eventually the bandit won through a stroke of luck, and the samurai even begged him to spare his life.

It is precisely in order to conceal these weaknesses that each of them depicts himself as strong and manful: Tajōmaru boasts to be a lady-killer, holding that Masako was taken by him and practically acquiesced to his assault (this is partly confirmed by the woodcutter, and implicitly and unwillingly by the husband himself); besides, he depicts himself as a valorous swordsman, defeating a valiant samurai after 23 attacks. Takehiro cut a poor figure both as a fighter and as a man, for he was defeated by Tajōmaru and rejected in disdain by Masako when he refused to fight for her. But he claims to have performed *seppuku*, the most brave and honorable action for a defeated samurai, killing himself by Masako's dagger. In this way he also

implicitly denies to have despised his wife to the point of motivating her to kill him.

Thus masculine pride causes both Tajōmaru and Takehiro to consciously or unconsciously distort reality. The monk objects: "Why would a dead lie?" But the cynic commoner replies: "Because we'd always like to conceal evil and believe in good". In fact, Takehiro is not necessarily lying, maybe his perception of facts was blurred by the extreme distress of that dramatic moment and obnubilated by the approaching death.

This allows to reach a reasonable conclusion on the culprit: since Takehiro was weak and fearful, as we know from both Masako and the woodcutter, his claim to have killed himself is implausible. On the other hand we saw that the best explanation of Masako's self accusation is that she actually killed her husband, although probably not exactly as she said. This is contradicted by the woodcutter's statement that Takehiro was killed by Tajōmaru's sword. But while his account is largely reliable, we know that he has a strong motivate to lie on this particular point: in order to avoid being suspected of stealing the dagger, he is interested in backing Tajōmaru's version that the dagger had no role in the homicide, and had been lost in the hectic and chaotic moments following Masako's initial defense and the rape.

It follows that the duel, which represents the most spectacular section of the movie, and which is staged twice, once as an heroic fight and the other as a tragicomic sequence, probably never happened: it was just the figment of a petty thief and the boast of a fanfaron. So, as we often learn in science, much of what we see is an outer appearance, while the actual events do not fall under our senses, and must be laboriously reconstructed by reasoning.

It seems clear that Masako spurred Tajōmaru to duel with her husband and take her away with him, for she didn't bear anymore with her routinely marriage ("this hard daily farce" as she says); but at that point probably Tajōmaru preferred to flee, scared both by the risk to lose his life in the duel, and by that unexpectedly passional and strong-willed woman. Perhaps the rape itself had taken an unexpected turn, when the lady took the initiative, leaving the bandit abashed and shaken in his virile confidence.

On the other hand, Masako's claim to have killed her husband almost in a trance, after pleading in vain to be killed by him, is implausible, and may be at most part of the truth. The hand that jabbed her dagger into Takehiro's chest was probably driven also by other impulses: (1) the agony for his contempt; (2) the anger for his pettiness and cowardice; (3) the wrath for having been rejected as a wife, and considered as a bitch; (4) the incapability to bear that someone witnessed that she had willingly yielded to Tajōmaru, or

even asked to take her with him, and yet, perhaps, had been rejected by him (even by him, a bandit!).

If this is (at least in part) how things actually went, it is clear why she tells an almost completely false story (except for the killing itself): in order to provide for herself all the possible morally and legally extenuating circumstances. But perhaps she lies also for two more subtle reasons: (1) the (conscious or unconscious) restraint to show what she is in effect: a strong, passional and determinate woman, dominating with respect to two weak and inept men; and (2) the need, in spite of all, to convince us (or herself) that she epitomizes the traditional character of Japanese women (weak, subdued, incapable of autonomous decisions), a character which she enacts perfectly by her attitude and in her story.

Therefore, the case with this plot is quite possibly the second of the three abovementioned ones: there is one and (with some approximation) only one possible course of events compatible with all the information we can gather from the different accounts and the best explanations of the characters' behavior; so, we can assume with some justification (although not with complete certainty) that this is what actually happened, and that each of the four stories is partially true as far as it agrees with this reconstruction.

4. *Rashōmon* and Quantum Mechanics

The paradoxes of Quantum Mechanics (QM) have often been cited to support relativism. In fact, there are various interesting analogies between *Rashōmon* and quantum physics.

(1) In the film the woodcutter, which initially is supposed to be a neutral observer, eventually turns out to have been a part of the event, and to have a subjectively distorted perspective on it. Equally, many scholars stress that in QM (unlike in classical physics) the observer necessarily interferes with the observed reality (see Bohr 1928; Bohr 1958, 83-93; Tarozzi 1992, pp. 32-35); this has led many to claim that any distinction between the subject and the object is arbitrary (Von Neumann 1932, ch. VI, §1), to the point that only in the subjective perception reality takes on a definite form (Wigner 1967).

(2) In the movie we don't see the events by our eyes, but only through the account given by the agents. Similarly, in QM we get access to the properties of objects only through measuring instruments or experimental apparatuses, so that what we learn is not "how the reality is", but only

> "how reality appears when explored through this or that apparatus" (Bohr 1935).
>
> (3) In the movie we certainly know the antecedents (the couple travelling through the forest, the encounter with the bandit, the rape) and the final situation (the dead samurai, Masako found by the monk at the temple, Tajōmaru imprisoned), but the evolution from the former to the latter eludes us and seems to be a subjective question. Analogously, in QM the initial and the final location of a moving particle can be determined, but the intermediate trajectory seems to be wholly indeterminate: there are many "real" trajectories, or none at all (Wheeler 1984).

But there seems to be a fundamental difference: confronting what each character in the film says with what the others say and with their subjective motivations, we can try to reconstruct a plausible model of the real events. The same happens in *classical* mechanics: by keeping into account the specific contribution given by the experimental apparatus to the output representation, we can work our way to the objective nature of the physical system. For instance, if I measure the temperature of a cup of hot water by dipping a thermometer, the water will be cooled down by the thermometer. But if we know the temperature, mass and specific heat of the thermometer, beside the mass and specific heat of water, from the temperature measured by the thermometer we can compute the temperature the water had "in itself" before being measured.

But things don't work this way in QM: apparently, before being measured the state of the system is undetermined, it gets determined precisely by the measuring operations. Besides, the measure given by the instrument each time is purely casual, even if we can predict rather precisely the distribution of values over a long series of repetitions on systems prepared in the same way. It is as if the water had no precise temperature before being measured, and the values read by the thermometer each time were completely random, but we knew that in the long run 50% of the measurements will mark between 36° and 40°, while 15% will mark between 30° and 36°, and another 15% between 40° and 46°, etc. Or it is as if in *Rashōmon* before the characters tell anything the killing of Takehiro had not really happened, or not in a determinate way, and it took place in one way or the other depending on which story one hears.

All this is so strange to seem incredible, but it is confirmed by theorems and experiments. In the famous "EPR" thought experiment (Einstein, Podolski and Rosen 1935) we imagine to produce couples of twin particles (photons, for instance) which then travel a long distance in opposite

directions. QM tells that some of their properties, like polarization, are not determined before measurement. For instance, we can test each of the two photons for polarization at different angles (say, 0°, 30° and 60°), but in general the results are random, both for each particle and for the couple. So, if we learn that a photon is polarized at 0°, and then we ask whether it is polarized at 30°, we can get indifferently either answer; analogously, if after discovering that photon #1 is (or is not) polarized at 0°, we ask whether photon #2 is polarized, say , at 30°, or 60°, the answer is again random. Yet, there are some precise constraints: (I) the probability of a positive vs. negative result in any of these test is 1/2: so in a long series of tests at different angles, each photon will yield a positive result exactly 1/2 of the times; (II) whenever tested for polarization in the same direction, photon #1 and photon #2 always give the same result: when #1 is polarized at 0°, #2 also is, and vice versa; when #1 in *not* polarized at 0°, also #2 is *not*, and vice versa; and the same goes for 30° and 60°. However, (III) whenever the two photons are tested for polarizations which differ by 30° (e.g., respectively at 0° and 30°, or at 30° and 60°) they yield the same outcome 3/4 of the times, and (IV) when they are tested for polarizations which differ by 60° (e.g., respectively at 0° and 60°, or at 30° and 90°) they agree 1/4 of the times.

Constraint (II) (i.e., giving the same result when tested for polarization in the same direction) might seem matter of course, for it is natural to think that since the two photons are produced together as twins, they are equal from the beginning in having or not having certain properties: for instance, in being both polarized at 0° but not a 30°; or at 60° but not at 0° and 30° etc. But this contrasts with the fact that the result of each single test is random. Moreover, John Bell (1964) showed by a relatively simple computation that if the results were pre-determined by the properties shared by the two photons since their common origin, in a long series of measurements whereby we test each of the two photons for different polarizations (not necessarily the same for which we test the other) would respect certain inequalities, while QM predicts the opposite. Thus QM denies that such properties are objectively determined independently of our observations. This can be clearly and perspicuously illustrated as follows.[1]

If polarization tests revealed pre-existing properties, in 5/9 of the cases the two photons would *agree* (i.e., either both or neither would display polarization in a given direction), in 4/9 of the cases they would disagree. For instance, let's suppose that two photons had objectively defined

[1] I am following here Ghirardi (1997, pp. 205-213) and Fano & Macchia (2016, § 2), which in turn are based on Mermin (1981), Squires (1993) and Maudlin (1994).

properties before measurement, for instance that they were both polarized at 0°, but not at 30° or 60°; then the possible results of measuring them for the three types of polarization would be the following:

0°, 0°	0°, 30°	0°, 60°	30°, 0°	30°, 30°	30°, 60°	60°, 0°	60°, 30°	60°, 60°
yes, yes	yes, no	yes, no	no, yes	no, no	no, no	no, yes	no, no	no, no
agree	disagree	disagree	disagree	agree	agree	disagree	agree	agree

Table 4.1 What we would observe in EPR cases if reality were objective and local.

So, in five out of nine cases they would agree. The same would obviously hold for any other possible distribution of the objective properties.

On the contrary, QM predicts that there will be exactly the same proportion of agreement and disagreement: in precisely half of the cases the measured property will be either displayed or not displayed by both photons, and in half of the cases it will be displayed by one but not by the other. Moreover, experiments made by Aspect's group (Aspect, Dalibard, Rogers 1982) and others confirmed exactly the predictions of QM. This seems to show that, contrary to our assumption, these properties are not objectively present since the beginning, but the measurement on one photon determines which property it has, and the other photon instantaneously conforms with it, so giving always the same answer whenever tested for the same property as the other.

Furthermore, a well known theorem by Kochen and Specker says that if we ascribe a property to the system before measurement, when testing photon #1 for polarization at 0° we get different results depending on whether in earlier measurements we had tested photon #2 for polarization at 30° or for polarization at 60°. This is to say that a property of photon #1 is influenced by the observation of different properties of photon #2 (Kochen, Specker 1967).

How puzzling is this behavior of quantum objects and properties can be appreciated by figuring what would happen in the setting of *Rashōmon* if its characters and events behaved in a similar way.

To this end, suppose we take two characters—say, the two surviving protagonists, Masako (Mk) and Tajōmaru (Tj)—and ask each of them for many times over the 9 ordered couples of questions in which we can combine three different questions, e.g.: 1. Did Takehiro kill himself? (TK?) 2. Was he killed by the sword? (KS?) 3. Did the woodcutter steal the dagger? (WS?), as shown by Table 4.2 (a toy example where the 9 couples of questions are asked only twice):

Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk
TK ?	TK ?	TK ?	KS ?	TK ?	WS ?	KS ?	TK ?	KS ?	KS ?	KS ?	WS ?	WS ?	TK ?	WS ?	KS ?	WS ?	WS ?
yes	yes	yes	no	yes	yes	no	yes	no	no	no	yes	no	yes	yes	yes	no	no
agree		disagree		agree		disagree		agree		disagree		disagree		agree		agree	
Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk	Tj	Mk
TK ?	TK ?	TK ?	KS ?	TK ?	WS ?	KS ?	TK ?	KS ?	KS ?	KS ?	WS ?	WS ?	TK ?	WS ?	KS ?	WS ?	WS ?
no	no	yes	no	yes	no	no	no	no	no	yes	yes	yes	no	no	yes	yes	yes
agree		disagree		disagree		agree		agree		agree		disagree		disagree		agree	

Table 4.2 What we would observe if the *Rashōmon* world were ruled by QM laws.

Here Masako and Tajōmaru resemble two twin photons in that they both were originally part of the same event and were sensorially impressed by it. Besides, since the two photons cannot lie, suppose we analyze the *Rashōmon* story (more or less as done above) and by taking into account all the objective clues and the motivations the characters have to deceive or to be self-deceived, we distinguish the true answers from the false ones, and keep only the former while discarding the latter. Further, suppose Masako and Tajōmaru cannot in any way communicate, either in advance, to agree on which version they should give, or after one has answered, to let the other know what answer he or she gave. Assuming this, if *Rashōmon* were like QM we would find that:

(a) both Tajōmaru and Masako answer each question randomly, and each of them does not in general give the same answer to the same question. Yet, each of them in the long run gives an equal number of affirmative and negative answers. Nonetheless,

(b) although they cannot communicate (just like the photons cannot influence each other), whenever Tajōmaru and Masako are asked the same question (as in the 1st, 5th and 9th column), they agree; instead when asked different questions, they have well defined probabilities of answering in the same way (e.g., 1/4 for TK-KS, or 1/2 for WS-KS, etc.). Moreover,

(c) *which answer* is given to a question by Tajōmaru depends on which question was asked to Masako, and which answer she gave, and vice versa—even though each of them ignores both the question asked to the other one and the answer he or she gave. As a result, in the whole they agree exactly the same number of times as they disagree, not 5/9 of the times, as it would happen if their answers were consistent and reflected an objective reality. Therefore

(d) since by hypothesis their answers are true, yet they are mutually inconsistent, there is no coherent course of events which is compatible with all the possible data, no objective way in which things have actually happened, independently of our inquiries. In fact, the event which makes each answer either true or false becomes real at the time the answer is given, and it depends on which other question was asked.

Thus, QM instantiates the third of the abovementioned possible outcomes of our inquiries about reality: there is no way in which reality might have been in itself, independently of our inquiry, which is possible in the light of all our data: things seems to happen in an *impossible* way. Moreover, when we examine contrasting versions to find out about a homicide or any social event, and we can't find any reconstruction of the event compatible with all we know, we may still imagine that this is because we went wrong in reconstructing the witnesses' beliefs and motivations. But this is not possible in QM, for here we are faced with experimental data whose interpretation is straightforward.

Even so, however, these surprising findings about QM don't legitimate relativism, nihilism, solipsism, or idealism: they don't show that there is no objective reality, but simply that polarization, spin, and other such properties do not exist before we measure them (like the temperature of water); rather, they are produced, we don't know how, at the time of their measurement. Perhaps they are like skills, which are revealed only by exercise, not as though they pre-existed, but because they are produced at the very time and by the very action which reveals them. Moreover, the reality of quantum properties is more deeply intertwined than that of ordinary properties, so that objects apparently separate influence each other as if by magic or telepathic connections. Perhaps quantum properties are rather like relations: for instance, just like John cannot become Jill's husband without her becoming John's wife, and without Jill's father instantaneously becoming John's father-in-law, no matter how distant he is.

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