A.303/10

PROBLEMS OF PHILOSOPHY

A THIRD LEVEL ARTS COURSE

'Time'

A discussion between Bernard Williams
Knightbridge Professor of Philosophy,
Cambridge
and
Dennis Sciama, Fellow of All Souls College
Oxford

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OPENING TITLES

1. PROBLEMS OF PHILOSOPHY (black b/g)

2. Question mark animation

3. TIME

4. A discussion between
Bernard Williams
Knightbridge Professor of Philosophy
Cambridge

Dennis Sciama
Fellow of All Souls College
Oxford

5. Introduced by Susan Wilson
Lecturer in Philosopy

(The discussion follows and takes part in a college library in Cambridge)
Susan Wilson, Lecturer in Philosophy, Open University chairs the discussion

A.303/10 "Time"

Susan Wilson

There are some philosophical problems which look more likely to be solved by scientists than by philosophers. When one asks questions like "Is the mind distinct from the body?" or "What is time ?" one naturally expects that the things that scientists find out will be, at least, relevant to these questions that philosophers are interested in.

However, it isn't always easy to know exactly what is the relation between the kinds of things scientists find out and the kind of things philosophers are interested in; particularly in the case of a subject like "Time" where the kinds of things that physicists do seem very remote, both from common sense and from the ordinary run of philosophy. So what we're going to do today is try and explore this. Here to discuss this question with me I have Dr. Dennis Sciama, Astro-physicist from the University of Oxford, and Professor Bernard Williams, a philosopher from the University of Cambridge.

Could you perhaps tell us first what do you think is the relation between physics and philosophy ? Do you think these two activities have anything at all in common, or do you think they're completely different.

Professor Williams :

Well I certainly think there is something in common. Granted the always important point that philosophers don't advance theories that are going to be checked by experiment - that is a very important point. But still the distinction between the two things, I think, has been very exagerrated in a lot of recent philosophy. I think particularly because some recent philosophers have made a very simple distinction between concepts

or ideas on the one hand from notions we used to think about the world - these are supposed to be the business of philosophy, and fact on the other and it's supposed to be the business of scientists to think about facts; therefore a lot of us think about the notions and a lot of the scientists find out the facts and this is mostly you know, complete division of labour.

And this really does seem to me to be quite artificial and for more than one reason the really: one is the concepts or notions we used to describe the world are actually affected by the facts that we discover. For another scientists don't just quote 'discover facts' they form new concepts for describing the world which and the greatest scientific advances have consisted of forming new concepts to describe the world - this is true of Newton, it was true of Einstein - particularly in this matter of time. And I think, in fact, some of the things that used to be done by people called philosophers are now, in fact, done by people called physicists who are thinking about the right, the best concept, of describing what they've discovered.

So that's a way, it seems to me, in which (as it were) science affects philosophy.

I think there are also ways in which philosophy affects science and that's, to some extent, our business today more directly because it seems to me the question of interpretation scientists give of their facts - I mean they discover certain things, they have to have theories and certain consequences. The question arises How consistently, with common sense and ordinary (as far as possible with common sense) and orinary logical notions can we interpret those discoveries. And I'd think I'd like to start really by asking Dennis Sciama whether he thinks that some of the results that modern aste-physics and modern relativity theories come up with, arn't too flagrantly in defiance of ordinaty notions, or ordinary logical conceptions that people have of time. And I suppose the famous clock paradox, for instance,

might be one example of this.

Professor Sciama :

Well I'd like to say at the outset that I don't set much store by common sense unless you make me change my view towards the end of this programme!

To take the example you mentioned - the clock paradox - just to recall very briefly what this is: it states that according to Einstein's relativity, and we now believe this to be completely confirmed by observation: if a man gets into a spaceship and goes far out into the Universe at high speed and then returns, he will age much less than someone who stays at home, and if one wants to put this difference in dramatic terms, one could choose the duration of his flight and his speed in such a way that the earth's age is, say, a thousand years and the man in the spaceship may be only ageing a few days.

Now modern physicists are quite used to this particular result of relativity. Common sense would, perhaps, object to the fact that the two durations of the journey are different according to whether you stay on the earth or go out in the spaceship. But that's for you to say.

Professor Williams :

I don't think anyone is going to want - nobody with any sense anyway - is going to want to defend 'common sense' in that sort of respect. That is if we just have a general expectation - roughly that if you come back in a rocket you've got to be as old as people you knew you left behind. That really is a factual expectation. for philosophy to try and dispute about that - a priori would seem to me to be a terribly dogmatic mistake. I think the question is Can we are there some issues of principle, things about the actual logical structures of time in which it's going

to be fair of philosophy to insist upon them. For instance, suppose someone were to ask while the astronaut was on his way "What was the astronaut doing at the precise moment that I was shaving this morning" - does the paradox entail that there isn't going to be an answer to that question ?

Professor Sciama :

It does - Yes. In fact, according to Einstein's relativity which we all accept now, one has lost the concept of absolute simultaneity - by that I mean if you take two points which are separated in space and take an event occurring at each point, and then ask "Are they simultaneous or not - these events?" the answer is It depends on the observer who is trying to decide this question; two observers moving relative to one another will answer that question in effect differently - that is if the one observer, the events are simultaneous; for an observer moving relative to him they will not be simultaneous. There is no absolute sense in which these two events are simply simultaneous as they would have been thought to be by Newton. So that concept has also gone in relativity. But presumably you would say that philosophers can accept that situation.

Professor Williams :

Well I think there again - Yes. And I think what this illustrates is the very, very interesting point about how one goes on eroding parts of the common sense conception of time, or the everyday, uninformed conception of time until one get to a point at which as it were, the philosopher starts 'digging his heels in' on logical or conceptual grounds. Of course what worries philosophers in particular is whether he's just digging his heels in, not because we've got to some absolute point of principle because he's now got to something which is, as it were, even just harder to swallow than what we've had already.

we've had already.

So we've got two sorts of things which, at least I'm prepared to swallow, and I'd be jolly silly if I wasn't, if I wasn't prepared to : namely one about the expectation that roughly everybody is going to look equally old, wherever they've been - putting it very crudely, is to be waived so also the idea of absolute simultaneity. I wonder if we get nearer something that people feel uneasily as a reall question of principle when we get to the notion of time going in one direction. What would be a contemporary, physical view about the notion of time going in one direction ?

Professor Sciama :

Well if you mean by that the question of the irreversibility of time, I think a modern physicist, or even a physicist in 1900 would have said that although probably human beings work in the way they do depend on time being irreversible in our own locality, it is not intrinsic and inherrent to the concept of time that there be thisirreversibility because a physicist can well contemplate, and often does for various purposes. Let us take a simple example : a box which contains radiation and atoms and which is reached what we call thermo-dynamic equilibrium - that is processes are occurring just as often in one direction as in the otherdirection and is a complete overall balance. Now time is still a peramator that physicists would use in the description of that system, but there would be no irreversible phenomona. For every process that went one way in time, there'd be a balancing process somewhere else in the box going the other way in time and there'd be as many of one as the other. There'd be no way of telling which way time was going by looking at the box at one instant and then what we would call a much later instant. You couldn't by just studying the behaviour in that box at these two instances, tell which was the earlier

which was the later. There would be a concept called "Time" would still be needed in order to describe the behaviour of the system but it would not be a concept that would lead to there being an arrow attached to

Professor Williams :

Now I don't understand why you call the concept that you're describing system "Time". I mean if time applies to the system, does it not mean that some things are after other things.

Professor Sciama :

Well you don't need to say which was earlier and which was later in every intrinsic sense, in terms of the behaviour in the box. You needn't call it "Time" you can use any word you like. The important point for the physicist is what the mathematical aspects of this peramator are.

Professor Williams :

But you can use any word you like, obviously because, for instance various nations use any word they have. The question is not the words you use but whether it is time. One of the things that a philosopher surely can rightly ask here is : To what extent does a peramator have to be related to either our experience of the passage of time, or certain essential structural possibilities of time, as might be included in the uniqueness of its direction - MIGHT be included in order to call Time the peramator in question Sorry

Susan Wilson :

Can I sort of just ask you another question which may perhaps clear this up and that is, you say we do need a fourth peramator - what's your motivation for saying we need a fourth peramator at all ?

Professor Sciama :

Well the motivation is that we cannot adequately characterise the system without using it because if at a different time there were also a collision at that place, we would need a peramator, or if we there were two nearby points and we wanted to ask relative to a particular observer whether his collisions occurred at the same time or not, we need a peramator to specify that because a system is physically different if the collisions at nearby points occur at the same time or at different times for that observer.

But what I think where Bernard begs a question I feel is he says We have to decide that whatever word we use, whether it really is time, as though they were given a notion of time before we started which was identifiable and then we would ask of any particular case whether the use of the word 'Time' in that case corresponded really to time. And this is what I desire.

Professor Williams :

No but our situation just is this surely : that it's absolutely characteristic philosophical situation it seems to me which is that if you start with the entire set of opinions about time which, as it were, an ordinary man in the street has, then clearly some of these are just confused and false and can be discounted, as can be seen in the course of scientific investigation. If you say that there's absolutely nothing to be taken over from this into the concept of time, we can call anything we like time, then this is obviously an absurd situation because we just now, as it were, have a verbal misunderstanding. It might turn out, for instance, that what we've now labelled with the word 'time' was just a certain dimension of space. I mean, for instance, the following really does seem to be a plausible suggestion: that if two 'things' (and that's all I'm going to call them)for the moment) but light for instance,

collisions of particles, are to be individuated, separated from one another by the use of a peramator called Time, then it's got to be by saying that one of them was before the other.

Susan Wilson :

Well I think you've got something special about this havn't you

Professor Sciama :

Well there's something else to say about the question of before and after indeed but well it doesn't really relate to this particular point that we're discussing but I'd like to mention it if it doesn't confuse the question too much. This is a question which even physicists are worried whether they've gone too far! But I would like at least for the purposes of this discussion to take a position of defending what I'm now about to say, to try and make a case that we can strip our ordinary notion of time, of rather more elements that one would normally suspect was possible, and still have enough left to have a usable concept in physics in all that is needed perhaps.

What I have in mind is a situation which arises in certain solutions of the equations Einstein uses in general relativity, which is different from the special relativity we've talked about in connection with the Clock paradox - the generality of it concerns gravitational phenomena in particular and a magician called discovered that one could have a curious universe conforming to Einstein's theory but in a state of rotation which had the remarkable property he discovered that there were closed time-like lines in this universe. What that means in more ordinary language is you could get in a spaceship and travel out like the fresh-faced astronaut, except you wouldn't come back to the starting point simply younger than the people who stayed at home, but you could, if you chose your journey correctly, you could actually travel round in a line that was closed in time as well as space - and by that I mean you would

travel first into your past, and then end up at the moment you began - not only at the space point you began, but at the same time that you began.

Susan Wilson :

So that instead of time spreading out in a line, just spreading out like that, it goes in a circle.

Professor Sciama :

That's right - Yes.

Susan Wilson :

So you could come back to the point where you started from in time.

Professor Sciama :

In time - that's right. Now many physicists feel that this is unacceptable on common sense grounds, or even on consistency grounds because they worry about the problems that if you can travel into your past, could you then not do things which were incompatible with the present situation.

Professor Williams :

It not causal inaccessible is it - the time when you are, as it were 'in your own past'. Are the places where you, as I'm playing this game for the moment first had your past causally accessible from where you then are ?

Susan Wilson :

Yes I think we'd better close up a bit. What have we lost by saying that things go round in a circle ?

Professor Sciama :

Well we've lost the idea that the before/after relations goes on in the ordinary way that we normally think. In other words, according

to this view two events are such that one is before the other and after the other according to which way round you go along this circle.

Susan Wilson :

And this is the serious let you think

Professor Williams :

Well I'd like it's the serious lot, I'd say that as it's so far been presented to us that it's demonstrably self-contradictory and Dennis will have to tell me why it isn't. It's self-contradictory for the following reasons: to say that I get back to the same time is the claim, if it means what it purports to mean at the time one's gone the circle which is that the events, which consisted of my starting is the same event as the event that consisted of my arriving.

Now I figure in that event - and it's ONE event, ONE happening, that's the point about it being the same time O.K. Now the first time I'm at that event or I havn't been in a spaceship, the second time I'm at it I have been in a spaceship, so there is one event which consists of me both having been and not having been in a spaceship, and that is the contradiction.

It requires me to have contrary properties at the same time and to have contrary properties at the same time is a definition of what it is to be a contradiction.

Professor Sciama :

Well that's true but another point is there may be a physical objection to this phenomena rather than a logical one. It could be that in a universe that had that property, it wouldn't be possible for human beings to exist with their memories and sensation of free will

Professor Williams :

Professor Williams :

How do you answer logical objections

Professor Sciama :

I want to just say there's a possible physical objection that the actual universe couldn't be one of those, perhaps.

Professor Williams :

We have a stronger objection than that: no Universe could be like that at all

Professor Sciama :

This is the part I don't quite see because you could certainly exhibit such a solution, it doesn't have people in because people is too complicated to put in a solution of Einstein's equation

Professor Williams :

The point is well we can generalise about people: the point is that the solution we're making as dogmatic a claim as might be made in the opposite direction, O.K. for the sake of the argument but the philosophical argument will go like this: No solution which formerly had this loop-like property could be interpreted as the property of time, as being an exemplification of time, and the argument is quite simply the following: that if the notion of a contradiction is the notion of something having contrary properties at the same time. Now if there is ONE time O.K. which fugures both at the start and the end of this loop, there must be contrary things that are true of it and things in it, namely the propery that they havn't yet been on the loop, and the property that they have been on the loop, and these two properties are contrary to one another and nothing can have it at the same time. But if the loop was a loop, then anything that went round the loop and came 'back' to the same instant would have to satisfy that condition, therefore it's logically impossible. //

Susan Wilson :

Can I ask you two questions about that : the first one is Do you accept the law of non-contradiction ?

Professor ~~Williams~~ SCIAMA :

I do

Susan Wilson :

You do naturally right

Professor ~~Williams~~ SCIAMA :

Maybe a future generation went, but I do.

Susan Wilson :

Right, now we've got you to accept the law of non-contradiction now how do you get out of the fact that according to the loop theory you would have to violate it all the time

Professor Sciama :

Simpy because I think Bernard's language is a language that's appropriate to the ordinary concept of the way the time axis works but would not be appropriate with a closed loop. What would be the situation here is that if you took a short stretch of the loop, then the concept of before and after would be completely well defined over that short stretch, but it's just globally the topologists would simply say that this concept is not a global one, it's only a local one. The before/after concept breaks down globally but it is a concept that works alright for short stretches.

Professor Williams :

But does anything keep going round this loop ? Does it go round this loop more than once ?

Professor Sciama :

No

Professor Williams :

It goes round it once

Professor Sciama :

I don't think that's a language that's appropriate because if you said it went round several times, that would be implying a distinction between being at one particular event on more than one occasion which is - supposing there was some concept of time over and above the intrinsic concept of time if this solution is right in the equation. And that would not be true so you simply have that loop given and there's no question that you go round that loop 35 times; the loop is simply given.

Professor Williams :

No I take that point

Susan Wilson :

Are you saying there isn't a language available to talk about the loop thing, or is it that we're using your one. There is a language available we're just using the wrong one

Professor Sciama :

You're using the wrong one

Susan Wilson :

I think the question you want to ask is ; you've stripped away so much from the concept of time that we're neither of us sure what we've got left.

Professor Sciama :

Well I can answer that - certainly the physicist regards it as his task to abstract from appearances, to obtain the fundamental structure of time and it may be that from his point of view there isn't much left of what we normally think of time, what is left is

that the space time manifold must be described geometrically in a way that makes it clear that time is different from space - that's what Einstein did in his general theory of relativity. Why we choose to call the extra dimension which is geometrically different 'time' is because I suppose it has sufficiently recognisable properties compared with our ordinary notion of time, and that it seems useful to keep the same word - if only because let's say physically speaking because over a short stretch of that time-like loop, the before/after relation does hold.

For instance in the Girder Universe it would actually take something like ten thousand million years to go all the way round, so in a given lifetime for instance the before/after concept would work perfectly reasonably - so there doesn't seem much point in just choosing a different word for the more general concept.

Professor Williams :

Well I think the point is that I think we might manage to agree, as it were about this, is it isn't we're certainly not dealingvery often in philosophical problems, we're not really dealing here with just the question of a word - it was just a question of whether we chose to call it 'time' or not, it wouldn't matter. The point is there are certain features of our experience which we call and regard as the temperal features which seems to be structurally related to that experience - experience of before and after; above all the experience of the passage of time in certain directions. And I suppose we could agree that the philosophical problems here are going to locate themselves in relations between that ordinary experience, in the structural features of that ordinary experience, and the physicist's models that you've been talking about. In particular in our ordinary thought we certainly regard before and after as transitive; that it's forming one series and that if one thing is before another, another is before that, then that first thing must be before the last one we

mentioned. But that's not going to be true, for instance, on the closed time-like loops and therefore I think where philosophical investigation is going to be needed here isabout the relation between these topological and geometrical properties and our ordinary experience at the time. And I think unless something can be said about that, there will remain a doubt, a darkness, over the question of whether these purely topological relations are to be regarded as time.

Susan Wilson :

So I think what we've seen here is that it's impossible to completely separate out philosophical problems from imperial, or scientific, ones. And that the idea that these two activities are quite separate from the each other is quite wrong.

Dennis Sciama, Bernard Williams - thank you very much.

END TITLES

1. taking part were
   Susan Wilson
   Dennis Sciama
   Bernard Willisma

2. Lighting cameraman
   Phil Law

   Sound Recordist
   Bill Meedkums

   Film Editor
   Richard Macqueen

3. Production
   Richard Callanan

4. A Production for The Open University
   BBC-tv
