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steven barfield

**Dark Matter: The Controversy Surrounding
Michael Frayn's *Copenhagen***

Steven Barfield

Many theatregoers, theatre reviewers and literary critics (as well as the playwright himself) have been rather dumbfounded by the controversy that has come to surround his play, *Copenhagen*, in the United States. For example, Paul Lawrence Rose, an historian, and one of the play's most vehement and determined critics, concluded that *Copenhagen* is: 'subtle revisionism [...] destructive of the integrity of art, of science, and of history'.¹ In this essay, I will chart the growth of this controversy and offer some explanation as to why and how it occurred and will discuss the significance of this in terms of a broader, more political context. My perspective, is that of a literary critic working in the field of contemporary theatre studies, not that of an historian or scientist.

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Copenhagen is an imaginary series of discussions between three historical characters. Two of them, are among the most famous theoretical physicists of the 20th Century: Werner Heisenberg, a German and Niels Bohr, a Dane. The other character is Margrethe, Bohr's wife. The conversations in the play are revisitations, by their long dead ghosts, of a notorious meeting between Bohr and Heisenberg, which took place in Nazi-occupied Denmark in 1941. The motive behind Heisenberg's visit to Bohr and what was said, or, was not said, during their meeting remain

disputed. The subsequent difference of opinion about both of these matters has continued unabated for over 60 years. Heisenberg and Bohr were very old friends and long-standing collaborators on many ground-breaking discoveries in physics, but Heisenberg was in 1941 a leading scientist of Nazi Germany, ostensibly heading their atomic weapons research team, while the half-Jewish Bohr was a member of a subject nation. Historians and others have argued about both the meeting and why Heisenberg made the visit, but there is no doubt, that it caused a painful, decisive and permanent break in their close friendship. Michael Frayn's *Copenhagen*, is the first attempt to turn the actual meeting and the disputes about it, into a drama.

The controversy about *Copenhagen* began when it was first performed in New York (to generally positive reviews in the newspapers, and, later, winning awards), and that controversy continues to haunt the play even as the play becomes increasingly successful. It summons forth numbers of articles condemning and supporting the play, accompanied by increasing acrimony and polemic among critics and defenders. In addition, there have been several important symposia in the United States, connected to the play and the historical issues it raises.² In sharp contrast, the play when first produced in Britain was very much a surprise success, both commercially and critically. Frayn remarked later: 'I thought it unlikely that anyone would want to produce it. I can't remember ever thinking that anyone would come to see it, much less have strong views about it'.³ It was originally staged in 1998 at the Cottesloe, a small studio theatre on three levels, which is part of the Royal National Theatre.⁴ It won both the 1998 *Evening Standard* and 1998 Critics Circle Awards for 'Best New Play' and was a critical success, as reviews indicate.⁵ Michael Billington in *The Guardian* remarked: 'Some claim to have been blinded by Frayn's science. I emerged deeply moved by his simultaneous awareness of life's value and its inexplicable mystery'.⁶ After a short run, the play transferred to the West End's Duchess Theatre where it ran from 5 February 1999 to 7 April 2001. Subsequent transfers have remained remarkably consistent with the original staging of the play – Michael Blakemore directed both of the London productions, as well as the one in New York – which suggests that the very different reactions in the United States were not due to a directorial reinterpretation. While some British critics certainly realized there were issues in the play, they saw these as falling very much within

the traditional context of plays of ideas that represented science and politics, such as Bertolt Brecht's *Galileo* or Howard Brenton's *The Genius*. Duncan Wu, a literary critic, drew attention to this aspect of *Copenhagen*, in his introduction to interviews with Frayn and Michael Blakemore (the original director of the play):

[*Copenhagen*] seems perfectly to express the anxiety of the West at a moment when an increasing number of third world countries are acquiring the knowledge and means to construct the bomb. More importantly, it dramatizes the dilemma of taking responsibility for such acquisitions.⁷

In this way, most British reviewers and critics saw the play as being about contemporary issues of social responsibility in science, rather than about the representation and interpretation of historical events. If anything, the historical moment represented by the play was regarded as less important than the more specific theme of our political responsibility for nuclear weapons. (It is probably significant, here, that Britain is a country where the Campaign for Nuclear Disarmament has always been a powerful social force.) The literary critic Victoria Stewart argues that *Copenhagen* is a criticism of Heisenberg's belief 'that science could somehow seal itself away from politics'.⁸ (This thesis is largely consistent with the way that plays about science, such as Brecht's *Galileo* and Brenton's *The Genius* depict the problematic relationship between scientists and society.) *Copenhagen* therefore was thought to have staged a dialogue between science and theatre whose primary relevance is to arguments about today's world, rather than to those about Bohr's and Heisenberg's original meeting. I should confess that this is very much how I too viewed the play, as a member of the original London audiences of both the productions.

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It was Frayn himself, who first raised the question of the accuracy of the scientific and historical contexts, and their importance, in his 'Postscript' to the first Methuen edition of the play, a shortened version of which is in the original programme.⁹ I suspect, that this Postscript was designed to make a difficult play understandable, without encumbering

the dramatic action by excessive exposition: the scientific and historical material in the play is displaced into this short essay. Frayn's article cannot be construed as a response to what the British press or critics had said, because it predated reviews of the play and no one had shown any particular interest in this aspect of the drama. It is not a defence after the event, but part of the original conception of the text of the play. I remember thinking at the time how long and involved Frayn's account was (it has subsequently been extended and revised in each new revised edition of the play, growing from 19 to 54 pages). It is not simply an author's traditional note on sources, but rather an essay that discusses the science and history informing the play and, as I shall argue, could be perceived as taking sides in an ongoing historical controversy. Frayn remarks at the beginning of the Postscript:

Where a work of fiction features historical characters and historical events it's reasonable to want to know how much if it is fiction and how much of it is history. So let me make it as clear as I can in regard to this play.

The central event is a real one. Heisenberg did go to Copenhagen in 1941, and there was a meeting with Bohr, in the teeth of all the difficulties encountered by my characters. He probably went to dinner at the Bohrs' house, and the two men probably went for a walk to escape from any possible microphones, though there is some dispute about even these simple matters. The question of what they actually said to each other has been even more disputed, and where there's ambiguity in the play about what happened, it's because there is in the recollection of the participants. Much more sustained speculation still has been devoted to the question of what Heisenberg was hoping to achieve by the meeting. All the alternative and co-existing explications offered in the play, except perhaps the final one, have been aired at various times, in one form or another.¹⁰

It is worth asking why Frayn, as a playwright, is so concerned to establish the validity of the historical context for his play. If, as he claims here, there are relatively few facts in this case, why not leave it at that? Why is it not enough, to list the range of historical sources that he has used to create his work? I can think of no other recent British play based on historical events, where an author has been so concerned to clarify what is fiction and what is history in their drama, even to the extent of discussing and summarising the various historical accounts which have informed his play. In fact, Frayn's remarks, suggest it is at least feasible

to try to distinguish between those parts of *Copenhagen* that are some kind of *direct* historical reportage, as opposed to the elements that embody the fictional strategy of creating an imaginary work which uses real people. This is important, because it leads me to a central part of my argument: it is Frayn's long Postscript to *Copenhagen* that suggested to American historians, that the play should be measured in historical terms, not the actual play itself. In discussing the problems of the historical record and the disputes between professional historians in this Postscript, Frayn has suggested the play is some kind of historical account.

The physicist and historian of science Gerald Holton remarks: '[T] here is of course the danger that the intermingling of playwright, actors, physics and history of science, might in some minds strengthen the all-too-common failing to confuse the play, a work of fiction, with a documentary.'¹¹ This may also explain Paul Lawrence Rose's rather acid remark that Frayn, 'affects to be an entertainer rather than a historian (although in his printed Postscript, he likes to play the historian)'.¹² While it certainly doesn't help Rose's argument to imply that literature is merely entertainment when compared to history, nonetheless he is responding to an authorial Postscript that encourages a reading of *Copenhagen* as some form of statement about historical events, even if that statement is that these historical events cannot be known objectively. In addition, Frayn does much more to invite such rejoinders from historians. Frayn suggests, for example, there is some fundamental contiguity between what he terms the 'storyteller' and 'historian'.

The great challenge facing the story teller and the historian alike is to get inside people's heads, to stand where they stood and see the world as they saw it, to make some informed estimate of their motives and intentions – and this is precisely where recorded and recordable history cannot reach.¹³

Now, while this parallel between historian and imaginative writer is meaningful in various ways, not least because both employ narrative, in another sense it is problematic. The 'storyteller' (or in Frayn's case the dramatist), is not primarily concerned with historical objectivity, or debates over primary and secondary sources, as modern historians *are*. Historians such as Paul Lawrence Rose would be unlikely to regard their work as requiring imagination, to 'get inside people's heads', because there is an area beyond the range of 'recordable history'. I suspect that

Rose would be unwilling to accept the implication of Frayn's argument that the storyteller takes over the role of the historian when orthodox history is no longer possible. In addition, the question is crucial of whether there are indeed *facts* in the case of the real Heisenberg's visit to Bohr. There is no agreement among historians of an absence of facts about this final private meeting between Bohr and Heisenberg, despite Frayn's suggestion at the beginning of his Postscript (above). Instead, many historians, for instance Rose and Holton, would argue that there *are* clear facts upon which an objective analysis of Heisenberg's behaviour and intentions can be made. Rose's reaction in this respect is telling: he takes Frayn to be ignoring historical facts because he [Frayn] wishes to, not because. to Rose's mind, there are none available. Rose asks: 'What influences have led Frayn to shun the fairly straightforward historical and moral facts of the Heisenberg story in favor of his own peculiar interpretation?'¹⁴

Most problematic of all, is that Frayn's Postscript appears to maintain an inconsistent stance. He criticises some historians' depictions of Heisenberg, while endorsing others', but simultaneously suggests this is not borne out in the play itself. For example, Frayn implies that an earlier article by Paul Lawrence Rose (in 1984) suffers from bias against Heisenberg (which may explain why *Copenhagen* drew such a furious response from Rose). Frayn suggests that Rose's article assumes a lack of sympathy with Heisenberg that is manifest throughout, though Frayn does not either engage with its line of argument or use of evidence directly. He argues that Rose's paper, 'takes a remarkably high moral tone. [...] he talked about Heisenberg's "guff", his "self-serving, self-deluding claims" and his "elementary moral stupidity"'.¹⁵ This is clearly a criticism of sorts, by Frayn, of Rose's argument, which itself is representative of the dominant perspective among historians: that Heisenberg gave a deliberately erroneous view of his meeting with Bohr. Heisenberg, according to this argument, consciously did this after World War II, to suggest he was an unwilling participant in Hitler's atomic weapons project.

Frayn goes on in the subsequent revised version of the Postscript in 2002, to make similar objections to Rose's book, *Heisenberg and the Nazi Atomic Bomb Project*. Frayn wryly observes that this might have been 'handwritten in green ink', so strong is the 'contempt for Heisenberg'.¹⁶ Although Frayn does not criticise Rose's arguments, this

suggests that he considers Rose's work to be flawed by its attitude to Heisenberg. In contrast, the dissenting historical thesis is that of Thomas Powers' *HEISENBERG'S WAR*. Powers tries to rehabilitate exactly the analysis of Heisenberg's behaviour that historians such as Rose have dismissed as a post-war fabrication by Heisenberg himself. Powers goes further and suggests that Heisenberg may have deliberately sabotaged the German atomic bomb project, by withholding key information. (Thomas Powers is a journalist by profession, rather than an academic historian.) Frayn makes his own preference clear, referring to Powers' book as, 'remarkable ... generous in its understanding'.¹⁷

This makes Frayn's later remark appear disingenuous, when he states: 'The play is not an attempt to adjudicate between these differing views of Heisenberg's personality, or these differing accounts of his activities'.¹⁸ Frayn's Postscript, therefore, endorses Power's argument as being better, in some sense, than that of many historians (one can only read 'generous in its understanding' as referring to Power's attitude to Heisenberg), which suggests that Power's book is the main source for *Copenhagen*. Yet, Frayn simultaneously asserts that the play itself, is *not* favouring Power's standpoint on Heisenberg over that of a historian such as Rose. It is not surprising, that for many historians this is at best confusing!

I think what Frayn is implying here (this is discussed in more detail below), is that in order to create the complex and ambiguous character of the fictional Heisenberg in *Copenhagen*, he needed an account such as that of Powers. A play based on Rose's account of Heisenberg, for example, while it may be closer to the historical facts of the matter, would have a central character who an audience could have no sympathy with whatsoever, and would make it impossible to develop *Copenhagen's* dramatic themes. Furthermore, the play itself does offer sharply contrasting views of such matters through the characters themselves, rather than by means of a framework of authorial meaning (as, say, a history book would use). Plays can do this, while essays can't. The character of Margrethe (as Frayn also tells us in the Post-Postscript of the revised play) is sceptical throughout *Copenhagen* of Heisenberg's claims, and her attitude is closest to that of historians such as Rose and Holton.¹⁹ She undermines exactly the kind of arguments on behalf of

Heisenberg that someone like Thomas Powers makes. The fictitious 'Heisenberg' that Frayn creates, lies closer to Power's account, because that book is much more favourable to the way that the real Heisenberg presented himself and his actions, in his own comments. *Copenhagen's* Heisenberg couldn't represent himself in the same way that Rose's interpretation of Heisenberg does, as people are seldom so hostile to themselves.

To sum up then, it is likely that *Copenhagen's* critics such as Paul Rose and Gerald Holton saw the play as direct intervention in an existing historical dispute (about Heisenberg's meeting with Bohr and what the former said subsequently about that meeting) *because* of Frayn's Postscript, and then read the play as framed by that same Postscript. For historians such as Rose, Holton and others, Powers' HEISENBERG'S WAR is not simply a wrong interpretation of history, but is misleading and dangerous, because it ends up defending Heisenberg by accepting Heisenberg's own revisionary, self-exculpatory account of his meeting with Bohr. By implication, therefore, acceptance of this argument would mean tolerating a presentation of Heisenberg's wartime activities in a much more favourable light than they deserve. Frayn's Postscript would thus appear to suggest that *Copenhagen* does have some kind of historical validity (albeit in a way that is hazy and not about objectivity) and prefers one particular position and source (that of Powers' book) to those views of the majority of historians.

In addition, Frayn argues there is a strong relationship between drama and history, which would imply that *Copenhagen* as drama is a kind of history (though exactly what kind is obscure). In turn, it is reasonable for historians such as Rose to regard Frayn's 'Postscript' (*and hence the play*) as criticising their own arguments, in terms they would consider misinformed, and reliant on a single and very contested source (Powers' HEISENBERG'S WAR). For Rose and Holton, even a refusal to adjudicate between differing views of Heisenberg would itself be taking a stance closer to Powers' view than their own. As Rose argues: 'For the central facts of the visit are really not in doubt, even if some people like Frayn refuse to face them'.²⁰

Further evidence that Frayn sees *Copenhagen* as some form of history that needs to be accurate is provided by later revisions to the text and the production of a 'Post-Postscript', which considers questions of historical validity even further, while defending *Copenhagen* against the

charges levelled by several historians. Frayn writes that:

With hindsight, I think I accept some of these criticisms. I should perhaps have had Heisenberg justify Germany's war aims on the Eastern front directly, instead of having Bohr refer to his arguments in one angry but passing aside. I should perhaps have found some way to make the parallel with all the other trips that were found offensive, and about whose purpose there was none of the mystery which had seemed to attach to the one in Copenhagen.²¹

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However, I do think we have to separate the actual play from the author's Postscript, because they are very different kinds of texts. Specific genres of written language require dissimilar methods of reading and create meaning in particular ways. Historical drama may rely on history, but audiences do not receive it in the same way as history. Are Shakespeare's *Henry V* and *Macbeth* without value, because they bear little or no resemblance to historical fact? Do they therefore have nothing relevant to tell us about the relationships between society, individuals and politics? I think the answers here are both 'no': Frayn's *Copenhagen* requires examination in the same terms as other dramas based on historical events. Whatever the issues raised by Frayn's Postscript (and I do have some sympathy for the historians who have responded to Frayn over this matter), it really isn't the same genre of text as a play and should not be read as a framing device that would turn *Copenhagen* into some form of direct historical commentary. Frayn has unintentionally made this potential confusion worse because of the Postscript and his argument that distinguishing between dramatic fact and fiction is not only possible, but also a useful and appropriate thing to do. This invokes criticism by historians.

However, many theatregoers may never read the text of the play, let alone the author's written Postscript. For an audience, the performance of the text is what matters and where meaning is located. Whereas an authorial Postscript can have the same univocal intention that an objective historical account may possess, for drama to be successful it must allow multiple and conflicting interpretations to be drawn out by directors, actors and audiences that exceed any singular authorial intention. No single character has to possess an ultimately

objective and omniscient view of the whole play. Richness and three-dimensionality in dramatic characterisation result in motivation that is as complex and unconscious as in actual human behaviour. Nor is *Copenhagen* a straightforwardly realist play, insofar as it does not try to directly recreate the real-world meeting that took place in 1941 Denmark, between three actual people: Bohr, his wife Margrethe and Heisenberg. Instead, the play stages an imaginary conversation between ghosts in some Dantean limbo, who are condemned continually to 'redraft' their report of their meeting, to see if they can finally understand and agree on what happened and what it meant. The three characters, Bohr, Margrethe, Heisenberg, have hindsight about the events they are trying to understand. Historians do not write about what ghosts might think or say, and this dramatic device distances us from the idea that the play is an attempted recreation of actual, historical events.

For Frayn's critics, the problem is that drama cannot be read in the same way as a text can be read, with a single, intended meaning. Jonathan Logan, a physicist and historian of science, in a review of *Copenhagen* in *American Scientist* reads one of Heisenberg's final speeches as if it were an essay.

BOHR: Heisenberg, I have to say – if people are to be measured strictly in terms of observable quantities ...

HEISENBERG: Then should need a strange new quantum ethics. There'd be a place in heaven for me. And another one for the SS man I met on my way home from Haigerloch. That was the end of my war.²²

Logan reads this speech as though the exhausted Heisenberg is being completely sincere at this point in the play. Logan believes it should be taken at face value, and that this in turn represents what the playwright wishes the audience to think. Logan argues: 'So fast and so far does Frayn take us, this somehow is not meant to shock. Losing sight of the moral horizon can make you feel giddy – or sick.'²³

Frayn's rejoinder on this point is perfectly reasonable:

Even harder to credit was the reaction in some quarters to the "strange new quantum ethics" proposed by the fictitious Heisenberg. I suppose I should have erected a flashing 'IRONY' sign in front of it.²⁴

Logan's criticism is therefore problematic, because he does not recognise the critical strategies necessary for reading the words of a

character in a play, but assumes the whole piece should be read, as if it possessed the coherency of a thesis. Nor is Logan much concerned with context: these characters are clearly not in Heaven, and it is hard to imagine even the most forgiving God making a special place in the after-life for the SS! The speech is Heisenberg's attempt at a somewhat anxious and wan joke, combined with the even more desperate hope that he might just be remembered more favourably by history than his actions would permit. However, he is intelligent enough to know that this will never happen, as he remarks several times throughout the play. A few lines earlier than the speech Logan quotes, Heisenberg remarks to Bohr that: 'You were a good man, from first to last, and no one could ever say otherwise. Whereas I ...'²⁵ Even if Logan had not seen the performance (he seems to have written a review of the *text* of the play), he rather mistakes the tone of this speech. Audiences are composed of many individuals, but it would seem surprising that so many reviewers had failed to see the ending of the play as the authorial sanctioned apology for Heisenberg that Logan perceives it to be.

Plays represent a multiplicity of different and competing voices and characters have their own individualised viewpoints of themselves and the dramatic action. It is misleading for the North American critics of the play to read individual characters as if they endorsed some supposed authorial view. These critics seem convinced, on reading the Postscript, that Frayn intends Heisenberg to be a kind of heroic protagonist; and so, they read the play as biased towards him. That much of what Heisenberg says is undercut by his historical behaviour as exemplified in the play simply doesn't occur to them. It is not easy to see the character of Heisenberg as heroic, when after all; he is a willing member of the Nazi party. He doesn't fly into exile, nor does he actively oppose the Nazi regime. He himself remarks in a speech: 'I've never claimed to be a hero'.²⁶ Heisenberg accepts on many occasions that his actions are flawed, whatever his intentions. Even when he does not, Margarethe is always there to continually undercut his position and his interpretations of his behaviour.

MARGARETHE: No! When he first came in 1924 he was a humble assistant lecturer from a humiliated nation, grateful to have a job. Now here you are, back in triumph – the leading scientist in a nation that's conquered most of Europe. You've come to show us how well you've done in life.²⁷

However, beneath many of the criticisms of *Copenhagen* there is a buried assumption, with a more subtle argument: Anything that raises the possibility of Bohr's culpability (however minor and marginal) in the production of the atom bomb and its eventual use as weapon must be dismissed at all costs. Therefore, I would argue, the attacks on what is taken to be the (positive) misrepresentation of Heisenberg in the play are often *causally* linked to defences against the possibility of an accompanying (negative) misrepresentation of Bohr in *Copenhagen*. As Paul Lawrence Rose states:

It is simply monstrous to draw or imply a moral symmetry between Bohr and his disciple. Niels Bohr was a man of the most intense moral awareness, whose integrity has been universally recognized.²⁸

In addition, these criticisms regarding the way Bohr is presented in *Copenhagen* are associated with an anxiety that Frayn's play implies some type of criticism of Allied work on / use of the atom bomb. Logan makes this critical stance clear in his review:

By the play's elegiac conclusion, the audience has been led ... to accept a thoroughly manipulated version of Heisenberg ... [who] had 'never managed to contribute to the death of one single solitary person.' Bohr, by contrast, is charged with complicity in the human disaster of Hiroshima and Nagasaki.²⁹

By wrenching this line out of its dramatic context, Logan elides the fact that this quotation comes from a speech given by a rueful Bohr, in response to Heisenberg, who has just stated: 'You were a good man, from first to last, and no one could ever say otherwise.'³⁰ However, Bohr in this scene, is both trying to comfort the distraught Heisenberg, who they both know will go down in history as a willing servant of an evil regime – as is inevitable – and also speaking as a man of conscience and responsibility should do when faced with the horror of nuclear weapons and the trauma they have inflicted on civilisation.

It is important to remember that the conversations in the play occur in an imaginary space beyond any specific historical moment, which allows them to have contemporary relevance. The characters are

not interested only in the history of the atom bomb in World War II, but also the subsequent threat nuclear weapons pose to humanity.

Nevertheless, what is striking about Logan's argument is his description of the fate of Hiroshima and Nagasaki as a 'human disaster'. This phrase is problematic, because it suggests that the *premeditated use of weapons of mass destruction* against a civilian population (whether justified or not) is much like the *unintended accident of the meltdown* of Chernobyl. These things are both certainly 'disasters', with regard to their consequences, but bombs are intended to have that effect. They are not just disasters *for* human being, they are disasters *meant* by human beings. For Logan to define the bombings of Hiroshima and Nagasaki in this way is to remove them from the realm of political, scientific and military decision-making, and thus offer a form of defence against criticisms of those who actually made such decisions. Logan's argument therefore shies away from the necessity of thinking through science's ethical responsibility towards humankind.

That inability stands as the polar opposite to the discussion and speeches of Heisenberg, Bohr and Margrethe in *Copenhagen*. These three ghosts are obliged to revisit their past, because the creation of nuclear weapons has consequences that still matter to us today. If one of Margrethe's roles in the play is, as we have seen, to challenge Heisenberg's perspective, another is to remind the audience continually that physicists helped create the atomic bombs that killed people – and might still do so.

MARGARETHE: [W]hat it came down to in the end, all that shining springtime in the 1920s, that's what it produced – a more efficient machine for killing people.³¹

From a European point of view, one sees a kind of American 'exceptionalism' at work here in such criticisms as those by Rose, Logan and Holton. The Manhattan Project is remembered as a heroic narrative and eschatology centring on (and culminating) in American military and scientific success, with little accompanying public debate about nuclear weapons – or the actual bombing of Hiroshima and Nagasaki. This narrative is part of a surprisingly resolute faith in science and technology as the paradigmatic solution to the world's problems. Thus, lying behind the arguments of many of *Copenhagen's* critics, is an extreme reluctance to accept any comment that might appear to criticise scientists and the

accepted history of the atom bomb project. This assumption includes repressing any linkage of that heroic narrative to the actual use of nuclear weapons on Hiroshima and Nagasaki and, equally, keenly desires to avoid connecting the historical moment of *Copenhagen* to current concerns.

Paul Lawrence Rose fears that the play misrepresents Heisenberg to the detriment of Bohr. He argues, as we have seen above, that the play is a 'vicious denigration' of Bohr 'the good man', as a transference of Heisenberg's real guilt onto Bohr. The fictitious Heisenberg projects his very real guilt at having tried to develop an atom bomb for Hitler onto Bohr, by emphasising Bohr's involvement in the (successful) work at Los Alamos, as opposed to the failure of Heisenberg's own attempt to build an atom bomb. By this, Heisenberg makes his failure obscure his less-than-laudable original intentions. According to Rose, Bohr 'only [joined the Atom Bomb project] after his serious ethical misgivings about such a weapon had been overcome by consideration of the immediate evil presented by Nazism.'³²

Perhaps aware that most audiences (and the theatre reviewers) would miss this subtle play of transferred guilt, and, instead, feel that the character of Bohr is presented in the play as both moral and virtuous, Rose decides to raise the stakes. The Bohr of *Copenhagen*, he claims, (he offers no textual evidence from the play to support this assertion) is a 'self-absorbed prig, indifferent to the births and welfare of his own children.'³³ As he believes the play favours Heisenberg to the detriment of Bohr, then inevitably this means it *must* offer characterisations that would support such views.

But does Rose's interpretation of Bohr's character in *Copenhagen* make any sense in terms of the play? In *Copenhagen*, Bohr is continually haunted by the loss of his son Christian in a boating accident. Bohr (and Margrethe, his wife) suffer repetitive anguish because of this trauma, and it is deeply mysterious to this reader, as to how a member of the audience could fail to be moved by their evident suffering, and by the accompanying eerie sound of the gulls' forlorn calls in the performance.

BOHR: And once again I see those same few moments that I see every day.

HEISENBERG: Those short moments on the boat, when the tiller slams over in the heavy sea, and Christian is falling

BOHR: If I hadn't let him take the helm ...

HEISENBERG: Those long moments in the water.

BOHR: Those endless moments in the water.³⁴

Are this really the words of a 'self absorbed prig, indifferent to the births and welfare of his own children', as Rose interprets the character of Bohr to be?

Rose also argues that the play suggests that the Allies and the Nazis are morally equivalent (again, he offers no textual evidence from the play to support this idea). As Rose argues:

Everyone, then, is seen to be guilty, and so everyone is blameless. There is no difference between the Gestapo and British intelligence. The British bombing of Dresden and Berlin is as bad as Hitler's Blitz on British and Polish civilians. Churchill and Roosevelt are amoral power-wielders, just like Hitler (another Heisenberg glibness), and so on.³⁵

This is an attempt on Rose's part to widen the parameters of the debate, regarding his assertion of the presumed similarities between Bohr and Heisenberg implied in *Copenhagen*, into a much larger historical arena. In fact, the play doesn't really suggest such an equivalence: it is the Nazis, who are attempting to round up Danish Jewry and transport them to concentration camps, Hitler who is described (by Bohr) as a 'homicidal maniac'. The persecution of the Jews, which features so prominently in the play, was the action of a vicious, racist regime, which committed appalling acts of genocide without even a pretence of military justification. I think it very unlikely, that a British or European audience could ever be convinced of any general moral equivalence between the Nazis and the Allies. Perhaps an American audience could be, but somehow I doubt this.

What Rose must therefore be repressing in his argument, is that the only possible moral parallel between the Allies and the Nazis established in *Copenhagen* turns on the scientific development (as it turns out, unsuccessfully, in the case of the German project) of atomic weapons. This in turn leads to the responsibility for their production and use, by those who possess them. As Margrethe says bitterly, speaking as much of our present, as of the past: 'And this wonderful machine may yet kill every man, woman and child in the world.'³⁶ Margrethe, (whom neither Rose or Logan pay much attention to) represents the voice of those who are less concerned about the original justifications of the development and use of atomic weapons in World War II, than about the consequences. This voice does *not* suggest the Allies are morally equivalent to the Nazi regime, but neither does it let them off the moral

hook of responsibility for developing atomic weapons nor their first use of them. One problem with the accounts by *Copenhagen's* critics, such as those of Rose and Logan, is that they, perhaps unconsciously, elide Margrethe's voice and, therefore, elide what it represents.

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Perhaps most disturbing in Rose's argument is his suggestion that the play contains an implicit anti-Semitism, or at least an uncritical reflection of such (although he doesn't seem able to bring himself to say this directly). This is evinced, to his mind, by both the play's misrepresentation of the half-Jewish Bohr, as already discussed, but also by what Rose regards as a crucial moment in the play's structure of transferring culpability from Heisenberg (who was engaged in military research, however unsuccessfully, for what we would all agree was an evil regime) to others. For Rose, Heisenberg's guilt is therefore transferred to Bohr and in exactly the same way, Rose suggests, that guilt for atomic weapons is located at the door of Jewish scientists.

The Allies in general, and the Jews too; after all, as Frayn's play points out – in a moment that stuns a New York audience – the true inventors of the bomb, Otto Frisch and Rudolf Peierls, were Jews.³⁷

Frayn's recent reply to this is worth quoting in full.

Other criticisms I found extremely difficult to make sense of – some even to credit. Professor Rose, who detected the subtle revisionism of the play, found a particularly sinister significance in one detail – the fictitious Heisenberg's remarking upon the neatness of the historical irony whereby the crucial calculation (of the critical mass), which persuaded the Allies of the possibility of building a nuclear weapon, was made by a German and an Austrian, driven into exile in Britain because they were Jewish. Professor Rose saw this as an attempt to blame "the Jews" for the bomb's invention.³⁸

Rose has recently renewed some elements of his charge, while modifying others.

Finally, there is the question of implicit anti-Semitism – not of Mr. Frayn, of course, but of Heisenberg and others. At page 83 of his US edition, Mr. Frayn has Heisenberg state that the crucial calculation for a bomb was done by Frisch and Peierls in England, instead of "for us" in

Germany. Then:

MARGARETHE: Because they were Jews.

HEISENBERG: There's something almost mathematically elegant about that.

Whatever his faults as a historian, Mr. Frayn is too experienced a playwright to be unaware of the impact this implication has on audiences, whether Jewish or not.³⁹

I think there are several points to make here. First, this is quite an intriguing use of rhetoric by Rose, even if not very substantial as evidence. Why exactly are New York audiences stunned? We only have the words of Rose to testify to this. Exactly how does one decide an audience is stunned, or, for that matter, what stunned them? Is Rose suggesting American audiences are less well-informed than others, and thus had no idea that the Nazi persecution of the Jews had forced Jewish physicists, like so many other groups, to flee from Germany? The Nazis' obsessive racial policies often worked to their own detriment, as for example in the Ukraine, and elsewhere, where the German army were welcomed as liberators but quickly turned their possible Slavic allies into enemies.

More worrying however, is the relentlessness of Rose's attempt to turn history into a question of individuals, whether Jewish or not. It was clearly, the United States' decisive advantage in military-industrial terms and political will that made the Manhattan Project work. Some scientists were Jewish, others were not: but they were a determining factor, insofar as they helped convince the Allies to make the huge commitment of resources to realise the atomic bomb and provided the theory. They are not the end, or the only important part of the story.

Let us return to the play for a moment. What happens in the scene quoted above is, in fact, Heisenberg's sudden realization that Nazi anti-Semitism contributed to Germany's downfall, and that he had been quite blind to this before. Margrethe is forcing him to recognise it. The sudden symmetry he discovers is his recognition of something he had been largely unaware of. This mathematical elegance is equivalent to poetic justice. Such statements are consistent with the characterisation of Heisenberg throughout *Copenhagen* as a flawed, sometimes thoughtless, often stubbornly naïve individual. However, this should not distract us

from the point that both scientists as individuals and science as whole, bear moral responsibility for what they, and it, help others to achieve. Rose's argument, because of its particular focus, effectively obscures the more general issues of both scientific and social responsibility for atomic weapons and successive generations of weapons of mass destruction.

This is not to say however, that Rose does not have a valid historical point when he claims that the twin reasons pushing the Allied atomic bomb project were a desire to win the war against Germany and a fear that there was an equivalent Nazi attempt at development of such weapons.⁴⁰ But, it doesn't remove the more general questions the play poses, about scientific responsibility to society, and the consequences of such actions. If we focus, as Rose does, on the reason for the production of atomic weapons to the exclusion of their consequences, then we fail to see the outcome: tens of thousands of civilians deaths and countless casualties, in Hiroshima and Nagasaki, and a lasting shadow cast over civilisation.

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Though not in the way he intends, Paul Lawrence Rose may be right to attack *Copenhagen* for being 'destructive of the integrity of art, of science, and of history'. If, that is to say, by the 'integrity' of science he means that the play refuses to seal science off conveniently from society and its responsibility towards human beings, indeed, from the urgency of thinking of science as an ethical or political activity. Frayn's play succeeds as drama, in part, because it challenges such a view of science as a hermetically-closed endeavour. *Copenhagen* returns science from the ordered discourse of scientists and their historians to the anxieties and concerns of ordinary people.

Copenhagen is also a critique of the integrity of a 'history', as it suggests a history that is no more than a desire to accurately record what happened in the past is a historicism that fails to engage with the vicissitudes of the present. We might instead prefer to see *Copenhagen* as opening up a dialogue between the dead and the living, and between the historical, the present and the future. As Walter Benjamin wrote in 'The Theses on History': 'For every image of the past that is not recognized by

the present as one of its own concerns threatens to disappear irretrievably'.⁴¹

Art often needs to be destructive of the supposed integrity of academic disciplines, in the pursuit of a wider remit: an obligation to question accepted ideas and assumptions. Nor is Heisenberg's final speech, which ends upon the line, 'the final core of uncertainty at the heart of things', in the last analysis 'banal', as Rose asserts.⁴² Uncertainty is also about possibility: in this case, that which links the future to the past, for good and ill. It serves to remind us that what joins our preservation with others' annihilation is now contingency. We all now share that same fate created by the development of the atomic bomb, which is that our preservation is fraught with the possibility of our annihilation. This is why Heisenberg imagines history might have happened *differently*, if he had done his calculations correctly: London, or Paris, or Copenhagen, might have suffered the destruction of Hiroshima or Nagasaki. The point is to make an audience feel and question this possibility, while remembering that life's intrinsic importance and essential strangeness, are part of what makes it worth preserving. Margrethe is significantly, both a woman and a non-scientist, her voice is therefore closer to that of ordinary people caught up in such events. She doesn't accept many of Heisenberg's attempted explanations of his behaviour, but nor does she buy into the myth of a pure science without any consequences for humanity. She sums up towards the end of the play, what the atomic bomb meant in more human terms.

MARGARETHE: And when all our eyes are closed, when even the ghosts have gone, what will be left of our beloved world? Our ruined and dishonoured and beloved world?⁴³

This deliberately echoes a similar elegiac comment made by Heisenberg about Germany a few lines earlier: 'My ruined and dishonoured and beloved homeland'. Heisenberg puts into words how much Nazism has cost Germany, in terms of a ruin that is as much ethical as economic, it is dishonoured by what has been done in its name. Margrethe, however, rephrases this to include the whole world, emphasising the ruinous price paid by everyone in ethical, political and human terms, for the development and use of the atomic bomb.

see also:

Katherine McNamara, "The Colossus," Archipelago, Vol. 6, No. 1
(scroll down to "What Did Heisenberg Say? What Did Bohr hear? How Science Enters the Imagination.")

John Casey, "On the Farm Hall Transcripts," Letters to the Editor, Archipelago Vol. 6, No. 2

Katherine McNamara, "A Year in Washington, A Visitation of Ghosts," Archipelago, Vol. 6, No. 3
(scroll down to "Missiles over Alaska")

Epigraph, "Endnotes," Archipelago, Vol. 4, No. 1

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introduced, interviewed and edited (Basingstoke: Macmillan, 2000) 209 – 230.

_____, 'Michael Blakemore' *ibid.*, 232 –250.

Notes

1 Paul Lawrence Rose, 'Copenhagen Plays Well, at History's Expense.' in *The Chronicle of Higher Education*, 46(35), Section 2, May 5th 2000, B4–B6. This is [available \(online\) to subscribers](#), accessed 1st January 2004.

2 I would like to thank Prof. Brian Schwartz (City University of New York), Prof. Harry Lustig (City College of New York) and Dr. Arthur Molella (Director, Lemelson Center for the History of Invention and Innovation) for inviting me to attend as a panellist at the Symposium, *The Copenhagen Interpretation: Science and History on the Stage*, held at The Smithsonian Institution on March 2nd 2002. I'd also like to thank Will Eastman for his hospitality. I learned a great deal from both the speakers and the expert quality of the discussion, which, indeed, prompted this article.

The program is [here](#). A video of the Smithsonian event is available [here](#).

3 Michael Frayn, 'Friends and Mortal Enemies' in *The Guardian*, Saturday Review, Saturday March 23rd 2002, 1 and 3 , accessed 23rd May 2002.

4 For a useful history of this small studio theatre, see Mulryne, Ronnie, Margaret Shewring *et al.*, (eds.), *THE COTTESLOE AT THE NATIONAL: INFINITE RICHES IN A LITTLE ROOM* (Stratford-upon-Avon, UK : Mulryne & Shewring/ Royal National Theatre 1999).

5 A selection of excerpts from reviews of the two London productions may be found at two sites: The Royal National Theatre 1998 production in the Cottesloe, at [The Royal National Theatre Web Archive](#) , accessed 10th January 2004; *and* The Royal National Theatre 1999–2001 production at the Duchess Theatre, [Albemarle of London, London West End Theatre Guide](#), accessed 23rd May 2002.

6 Michael Billington, 'Copenhagen', *The Guardian*, Wednesday, February 10th , 1999 , accessed 23rd May 2002.

7 Duncan Wu, 'Michael Frayn, *Copenhagen* (1998)', in Duncan Wu, *MAKING PLAYS: INTERVIEWS WITH CONTEMPORARY BRITISH DRAMATISTS AND DIRECTORS* (Basingstoke: Macmillan, 2000) p. 213.

8 Victoria Stewart, 'A Theatre of Uncertainties: Science and History in Michael Frayn's *Copenhagen*,' *New Theatre Quarterly*, XV:4 (NTQ 60), November 1999, 301–307. (Cambridge and New York: Cambridge University Press) p. 304.

9 Frayn, 'Postscript', in *Copenhagen*. There are now at least three versions of this document, accompanying the editions of the play that have been produced. The original 1998 edition of the play had an initial version, Frayn, Michael, 'Postscript', in *Copenhagen* (London: Methuen 1998) pp. 97-116. This was then presented in a somewhat revised version, Frayn, Michael, 'Postscript' [revised] in *Copenhagen* (London: Methuen 2000) [This is the same version in the American edition, New York: Anchor Books 2000.]

The current version, however now includes not only a newly revised 'Postscript', but also a 'Post-Postscript'! Frayn, Michael, 'Postscript and Post-Postscript', in *Copenhagen* (London: Methuen 2003) pp. 95–149. It has grown from the original 19 to 54 pages.

Faced with the problem of which version to refer to in this article, I have settled on the only one currently available to readers, which is the 2003 version, unless the point which one of Frayn's critics makes, is substantially affected by changes that Frayn made subsequent to the version on which they were commenting.

10 Frayn, 'Postscript', in *Copenhagen* (2003), pp. 95-6.

11 Gerald Holton, 'Werner Heisenberg and Albert Einstein,' paper at *Creating Copenhagen, A Symposium Exploring Scientific, Historical and Theatrical Perspectives Surrounding the Events of the Acclaimed Play*, Graduate Center of the City University of New York on 27 March 2000 , accessed 23rd May 2002.

12 [Rose](#), *op. cit.*, accessed 1st January 2004.

13 Frayn, 'Postscript', in *Copenhagen* (2003) pp. 97.

14 [Rose](#), *op. cit.*, accessed 1st January 2004

15 Frayn, Michael, 'Postscript', in *Copenhagen* (2003), p. 107.

16 Frayn, Michael, 'Postscript', *ibid.*, pp. 107–8.

17 Frayn, Michael, 'Postscript', *ibid.*, p. 111.

18 Frayn, Michael, 'Postscript', *ibid.*, p. 112.

19 Frayn, Michael, 'Post-Postscript', *ibid.*, pp. 137–8.

20 [Rose](#), *op. cit.* , accessed 1st January 2004.

21 Frayn, 'Post Postscript', in *Copenhagen* (2003), p. 133.

22 Frayn, *Copenhagen*, p. 92.

23 Jonathan Logan, 'A Strange New Quantum Ethics' *American Scientist*, July–August 2000 , accessed 1st June 2003.

24 Frayn, '[Friends and Mortal Enemies](#)' *op. cit.*, accessed 23rd May 2002,

25 Frayn, *Copenhagen*, p. 91.

26 Frayn, *ibid.*, p. 75.

27 Frayn, *ibid.*, p. 74.

28 [Rose](#), *op. cit.*, accessed 1st January 2004.

29 [Logan](#), *op. cit.* , accessed 1st June 2003.

30 Frayn, *Copenhagen*, p. 91.

31 Frayn, *ibid.*, p. 79.

32 [Rose](#), *op. cit.* , accessed 1st January 2004.

33 [Rose](#), *ibid.* , accessed 1st January 2004.

34 Frayn, *Copenhagen*, pp 29–30.

35 [Rose](#), *op. cit.* , accessed 1st January 2004.

36 Frayn, *Copenhagen*, p. 79.

37 [Rose](#), *op. cit.*, accessed 1st January 2004.

38 Frayn, 'Friends and Mortal Enemies', *op. cit.* , accessed 23rd May 2002.

39 Rose, Paul Lawrence and Thomas Powers (reply), 'Copenhagen Cont'd,' in *The New York Review of Books*, May 9, 2002, , accessed 23rd May 2002.

40 See, for example, Richard Rhodes, THE MAKING OF THE ATOMIC BOMB (New York: Simon & Schuster 1998).

41 Walter Benjamin, 'Theses on the Philosophy of History', in ILLUMINATIONS (ed. and trans) Harry Zorn. (London: Pimlico 1999), pp. 245–256.

42 [Rose](#), *op. cit.* , accessed 1st January 2004.

43 Frayn, *Copenhagen*, p. 94.

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